THE REPUBLIC OF UGANDA

THE WORLD BANK

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

AGRICULTURE CLUSTER DEVELOPMENT PROJECT (ACDP)

THE DISRUPTIVE AGRICULTURAL TECHNOLOGY INNOVATION CHALLENGE

PROOF OF CONCEPT & TOR REPORT

FEBRUARY 2020

1. Background

The Government of Uganda (GOU), through the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) received funding from the World Bank towards the cost of the Agriculture Cluster Development Project (ACDP). The project objective is to raise on-farm production, productivity, and marketable volumes of **Beans, Rice, Maize, Cassava** and **Coffee**, in 12 geographical clusters, making up 55 districts. ACDP is uniquely designed to leverage digital and disruptive Agricultural Technologies, delivering agricultural services to farmers including; input subsidies, extension, market information, and others through innovations such as e-vouchers, e-wallet, e-extension, e-diary, e-statistics, and Management Information Systems (MIS).

The project has met various challenges in the implementation such as: delays in the development of the applications and system failures which has affected farmer group registration, farmer enrolments, farmer access to project information and agricultural extension, project implementation and monitoring, and data analytics. These challenges have slowed the progress of the project towards the realisation of the development objective. It is envisioned that interventions such as **Disruptive Agricultural Technological (DAT)**[1] Innovation Challenge, could help MAAIF and project team to identify technological applications to turn around the project performance, through automation of key business processes along the value chain, as well as improving service delivery to the intended project beneficiaries.

Accordingly, MAAIF in partnership with the World Bank organised a **DAT Innovation challenge**, in which agri-tech firms with proven agricultural digital solutions were invited to express interest in showcasing their innovative solutions, that could mitigate implementation challenges of the ACDP.

The objective of the Innovation Challenge was to explore opportunities offered by Disruptive Agricultural Technologies (DATs) to address the ACDP implementation challenges.

Implementational challenges were categorised into four major categories, namely; (1) Advisory and Information for agricultural productivity, (2) Market Linkages, (3) Financial Inclusion, and (4) Data Analytics. Each of the categories was further subdivided into the specific challenge areas, to obtain functional specific solutions. **(See Annex 1)**.

An invitation to express interest was run in the print media, and other platforms on October 07, 2019, and over Eighty-Eight applications were received, out of which 22 met the selection criteria as defined. The Twenty-Two successful applicants were mentored by the ministry technical staff through a one-day bootcamp, to give them a chance to understand the requirement at hand, and to modify their application to meet the solutions requirements. These were subjected to another vetting process through which 15 candidates were identified to pitch their solutions. Only one solution was required per challenge area, and by the end of the pitch day, all four winners had been identified. Two solutions were also identified for

[1] *"Disruptive Agricultural Technologies (DATs) are digital and non-digital innovations that enable smallholder farmers to **leapfrog** their current constraints and improve their yields, incomes, nutritional status, and climate resilience. These technologies range from mobile apps, to digital identities for farmers, to solar applications for agriculture, to portable agriculture devices, to bio-fortified foods."*

uptake because they presented a unique approach to solving some of the major challenges of the project. These included Jabba Engineering Limited, and Converge Systems Limited that offered a mobile soil analysis solution and a detailed farmer profiling solution respectively. The six candidates were invited to a proof of concept workshop, as the final stage of engagement before the solutions uptake.

2. Objective of the Proof of Concept Workshop

The objective of the proof of concept workshop was twofold. (1) For the Innovators of the winning solutions to present their systems and or solutions in totality, and for (2) The user departments to evaluate the solutions and identify areas for enhancement.

The identified gaps would later be developed to constitute a Term of Reference (TOR) for customisation of the various product to fit to purpose.

3. Innovative Solutions

The Innovators were each required to make a complete presentation of their solutions, with emphasis on the challenge profile developed. A presenter ought to meet the various requirements as highlighted in the challenge profile, or any gap identified would be registered as an area for enhancement.

3.1 M-Omulimisa

The team emerged the winners of the Challenge Area 1, relating to Information and Advisory for Agricultural Productivity. The requirement under this category, was a multitude of functionality, with the core being delivery of extension and advisory services. The solution was required to support farmer profiling, delivery of agricultural equipment such as tractor hire services, provision of pest and disease alert mechanisms as well as provision of soil productivity information and satellite imagery and remote sensing. The system presents the current functionality;

- System enables farmers to ask agriculture-related questions in the farmers' local languages and get responses from extension agents free of charge using any kind of phone
- Extension agents use the mobile app to respond to farmer questions on the go
- System provides for pests and disease identification through a smartphone application. A farmer is able to take pictures of a disease or pest and push for diagnosis of the same through extension workers
- Self-registration of farmers through the mobile app as well as SMS[2]
- Reporting of disease and pest outbreak and visualization of the reports via a digital map to track location of reports
- Delivering targeted extension messages based on language, enterprise, area etc. via bulk SMS

[2] This functionality needs to be modified to relay the farmer data into the farmer database by Converge Systems Limited. All aspects such as receiving communications, enrolment, registration for a service should be hinged onto the larger farmer database

- Delivering of alerts on disease and pests out breaks, weather etc. with visual, video and text via the mobile app to farmers, extension agents etc.
- Visualization of profiled farmers via a digital map
- App notifications for new questions, alerts, disease, outbreaks etc.
- Tracking of the activity of extension agents by their supervisors on number of farmer queries answered, farmers/group registered etc. at different levels
- Input demand aggregation and output forecasting[3]

M-Omulimisa Areas for enhancement

- Provide for automated real time alert of pests and diseases to farmers within our database. Farmers in our database should be able to get alerts in a way of bulk notifications
- Provide an interactive platform that is enabled with video and audio, to support self-help to users
- Provide platform for linkage with the other solutions such as the farmer database that will hold farmer profiles. The linkages should extend to other partners and organs within the sector
- Embedded a functionality for farm input hire and acquisition. This is a major functionality under the market system, the requirement here therefore is for the specific data that can be pulled from that platform
- Provide a clear workflow for the early warning. How an incident gets reported through the system, and actioned on. Equally, embed user levels and roles, and enforce access rights
- Provide for automated responses for FAQs. Define a catalogue of FAQs, develop a model for quick captures of these FAQs and automation for the responses
- Define extension workers profiles and map them out. Tag these through the e-diary, to monitor their activities and service requests
- Provide for a standardised model for data uploads through the enforced user levels
- Provide, especially the video and audio in the major directs within the country
- The platform should support offline data uploads where it is required
- Create escalations of queries through the various levels. This relates to cases when the query is not in the category of FAQ, and the starting level of response is unable to attend to it
- Provide expertise and professional support on collecting, collating and organizing agricultural data, information and knowledge for the agricultural e-extension information system
- Develop relevant data and information collection tools to support digitization and content generation. Data collection tools is a function under the data analytics section, define the required models and have the tools developed by the data experts
- Provide capacity building services to information and knowledge owners on e-content development and packaging

[3] This functionality should be moved to the market system

- Support development of e-content platforms, such as Mobile Application, SMS-based Query Service (Short Code) & Social Media Accounts for dissemination of specialized and general information to farmers.
- Support development of information and knowledge management strategies to support access to information on agricultural technologies, models and markets and foster linkages to other agricultural institutions.
- Enabling farmers to submit audio and video files via the app
- Providing a library of information on major enterprises on the app
- Integrating weather and price information on the app
- Develop an information dissemination model and functionality to and from the farmers
- Provide for soil productivity information. Work out a practical model for relaying data obtained from Jabba Engineering[4]

3.2 Jabba Engineering Limited

The firm emerged as the first runners up under Challenge Area 1, that relates to Information and Advisory for Agricultural Productivity. The firm offers a mobile soil testing kit and soil analysis services. Albeit Jabba presented a solution that only solved one challenge, it is a key requirement to support the realisation of the project development objective. The solution will also be integrated with the applications such as the profiling tool, and the extension and advisory services application. The uptake and collaboration model for the solution is as defined below;

Jabba Engineering Uptake model

- Generate all garden profiles for the farmers enrolled onto the system
- 20% of the enrolled farmers should be subsidised at 100% by the project, the 80% should obtain the service as an input through the e-voucher system
- Provide three testing kits per cluster to train the extension workers on soil test skills, quality monitoring and fertiliser application
- Train the project district focal persons and the agro input dealers on soil sampling and testing, test reports and fertilisation interpretation
- Generate 120 fertilisation plans for each of the ACDP commodities, and standardised advisory services on fertiliser application
- Create a database for MAAIF to monitor soil testing activities and nutrient distribution statistics. This database would be integrated with the Agriculture Extension and Advisory Information System
- Equip soil test laboratories in the project clusters
- Periodic monitoring and reporting of progress made on implementation of the soil testing activities within the contracting period

3.3 Akello Banker

[4] Firm participated in the challenge, but did not emerge as a winner. However, they offered a unique and practical solution to a core requirement under the challenge areas. The solution was recommended for uptake and a model is defined under recommendations of this document

Akello Banker emerged as the winner under Challenge Area 2; Market Linkages. The challenge area looked at obtaining solutions that would facilitate the establishment of input and output market linkages, bulking of demand of for imported of adopted fertiliser and agrochemical supply through PPPs, and as well strengthen the agro-input dealer distribution network and quality control systems. The firm presented a solution that offered the below functionality;

- Profiling of farmers[5]
- Profiling of service providers e.g. Agro-input dealers[6], extension workers[7], animal traction providers, irrigation service providers etc.
- Registration and profiling of all government Tractors/Tractor Service Providers[8]
- Profiling and administration of farmer groups[9]
- Administration of input dealer/businesses
- Dashboards with analytics for Governments
- Marketplace Extension to buyers of produce
- Electronic agronomy (E-Agronomy)[10]
- Allow farmers to identify available agricultural services within their Areas[11]
- Allow agricultural service providers to offer their services to the farmers
- Allow farmers to hire and pay for equipment and agricultural services by cash or on Credit[12]
- Mobile banking, Mobile money integration and SMS alerts integration
- Allows farmers to order and pay for services.
- Links farmers to the Markets – Aggregators[13]
- Enables integration with other sector solutions including financial services.
- Guarantee payments until the service is provided
- Allow the verification of users and the providers
- Provide a feedback service for both farmers and service providers to allow for the development of a trusted community
- Allowing for matching search requests with actual services available

Akello Banker Areas for enhancement

- Include a public dashboard to support buyer-seller transactions
- System should show average prices for the input and output

[5] Function of the Farmer Database by Converge Systems. This will be dropped from the current development by AkelloBanker
[6] A detailed workflow on Input dealer profiling needs to be defined. The workflow should allow for personal enrolments and allow for the appointed authority to approve the application on fulfilment of the requirements
[7] This should be pulled from the farmer database by converge systems
[8] Data for this functionality should be pulled from the Management System for Mechanisation Equipment, under the department of Agricultural Infrastructure Management and Water for Agricultural Productivity
[9] Function of the farmer database
[10] Function of the Agriculture Extension and Advisory Information System, by M-Omulimisa
[11] Make possible through a mobile application
[12] Develop a model for M-Cash to develop an integration requirement. Combine all functionality that requires transfer of funds and develop a model for M-Cash to develop the integration requirements
[13] Provide a public dashboard where the buyers and sellers can interface but not to transact through it. The interaction should prompt the person to enrol as either a dealer, an off taker, a farmer or a distributor. The connection should be made with the relevant databases

- Maintain a database of certified input dealers
- Keep transaction logs, to enhance security
- Add an interface for buyer/seller locator
- System audit trail for errors and illegal behaviour
- Provide for flexibility to integrate with other systems developed
- Provide for functionality for USSD, Mobile and desktop application
- Provide for linkage with the farmer database
- Provide an optimised mobile application
- The function of farmer profiling should be moved to the farmer database by converge systems. Akello Banker thus needs to define the specific farmer fields required to enhance their model

3.4 Converge Systems Limited

Converge Systems participated under Challenge Area 4; that relates to Data Analytics, and did not emerge as the best under this category. The firm however presented a solution with a functionality that cuts across all other platforms. The firm presented a comprehensive farmer profiling solution that can be used as a central repository for farmer data, extension service provider data, as well as input dealers. This solution is cross cutting in nature, in that all other applications need to pull the specific data fields from it, into their own tools without necessarily creating the same functionality requirements.

The tool will be adopted as a standalone data management application to support profiling of all the sector players. Data from it will be made available through a request to the ministry as the custodian of this data. The tool currently presents the following capabilities;

- The system provides a concrete database for all farmer groups across the country
- Maps out enterprises to all administrative regions up to Parish level in Uganda i.e Region, Sub region, District, Sub county and Parish
- Provides an API for external app linkages to existing and future applications
- Maps out farmer groups by GPS location, HH of the farmers across the country
- Provides a Farmer Group self-enrollment through an android app used by extension officers
- Maps farmer groups to services received through the various interventions over time
- Ensures data access rights are respected by giving access to limited data to different users
- Builds a farmer group profile over time using data from external systems linked to Farmers Guide
- Gives reports on farmer groups across all administrative locations in Uganda i.e about 2,000 locations
- Uses interactive maps to simplify and aggregate data on farmer groups across the country
- Connects farmer groups to all activities under the agricultural value chain

Areas for enhancement

- Define and modify the various attributes of a farmer and develop a comprehensive database on individual farmers to include the interventions the farmer has been a part of, land sizes, soil structures, group membership numbers, enterprise, acreage, gender,

- Tag farmers to the existing farmer organizations
- Map out enterprises to farmers, to groups, and to regions
- Facilitate for Integration with other functional platforms for service delivery. Present a concrete model for pushing data to the other applications
- Provide for group validation mechanisms for enrolment – through escalations
- Map out farmer groups by GPS location, HH of the farmers
- Map farmers to services received through the various sector interventions
- Provide for update user rights to the DLGs
- Categorization of the groups to various attributes such as enterprise, acreage, location etc. (introduce filters)
- Provide for the ability to modify of farmer group data at the relevant user level
    - How do we ensure we have an updated list of the groups and that of the farmers
- Make a linkage to farmer activities on other platforms to create an analysis of it
- Categorization of the large-scale farmers who don't belong to the groups
- Enforce data protection functionality to limit unauthorised access to farmer data
- Create a database for the extension workers, and provide model for pushing data to the other platforms that might require a value or two

3.5 Data Care Uganda Limited

Data Care Uganda Limited participated under Challenge Area 4; that related to data analytics. The firm did not have a specific solution to present but the NFASS, which they were contracted to build for the Ministry, through the Statistics division. The firm however demonstrated capacity to manipulate the base structures they have in their possession to deliver a new functionality. The NFASS was also observed to have most of the functional requirements under this category, and they included;

- The solution has an API to allow collection of data using the 3rd party data collection applications
- System is able to mine data from other applications
- The system is customizable to any requirement from the user
- User able to create their own analysis formulas
- Able to create own data collection tools
- System can pick point data to allow plotting within the system using the national polygon data
- System allows for manipulation of data to give user specific reporting requirements
- System has a workflow model that portrays a data journey through which the responsible officers authenticate the various levels along the journey

Areas for enhancement

- Provide for customisation of data collection tools to the specific data needs
- Support Electronic planning and reporting at the district and national level
- Facilitate for centralized data management
- The solution should have the ability to make analysis based on specified variables

- The system should support aggregation of routine monitoring data
- Present a dash board of key performance indicators. Automate measuring of progress made against the set targets
- Link Results frameworks with the key indicators
- Smooth flow of data from the data generators through the systems and cleaned for the necessary uploads. Define the data journey at the various levels
- Systems should be interrogated to produce the required reports at any given time
- System querying to produce specified data variables
- Support for integration with other sector platforms
- Provide for data filters to allow user get custom data requirements

3.6 M-Cash Uganda Limited

M-Cash emerged as the winner under Challenge Area 3; Financial Inclusion. From their demonstration, the firm presented a high level of understanding of the requirement under this category, and offered a simplistic solution that mitigated the various challenges experienced in implementation of especially the e-Voucher. The solution presents the key functionalities below;

- The system is able to pull and push from and to the e-wallet
- The system is supported by an agent network distribution, which makes funds transfers more available
- The system supports Farmer profiling[14]
- Facilitates Access to input markets
- All-inclusive payment solution that includes the various modes of payment
- Mobile application that can improve enrolment, with minimal human interventions
- System data captures are automated to a large extent
- Has a database of agro input dealers
- Shows balances on the wallet through USSD, Mobile applications, Interswitch enabled ATMs
- System provides for credit services but available clients that meet the risk profiles

Areas for enhancement

- Provide for a quicker and shorter enrolment process
- Farmer contribution should be supported through various channel for crediting to include over the counter
- Redemption of inputs needs to be seamless, and the input dealer needs to be credited instantly upon redemption
- The system uptime needs to be at 99% uptime
- Provide for a strategy to access inputs within the farmer proximity
- Provide for mechanisms to set prices in relation to the prevailing market rates
- Reporting system considering all the required parameter such as gender, youth etc.
- Allow for offline enrolments and other capabilities
- Aggregation of orders for collection by one single person on behalf of the other beneficiaries

[14] This functionality needs to be strengthened through the stakeholder database by Converge Systems Limited

- Provide for verification of data with NIRA systems even though they are not entirely clean
- Enhancement of security to include biometrics where appropriately needed
- Provide filters to support reporting

4.0 Solutions Uptake Model

The under which the identified solutions shall be adapted will be detailed in the RFP document to send out to the various innovators. However, for purposes of this report, the uptake model, along with the general functionality requirement of the identified solutions is as detailed below;

4.1 M-Omulimisa - The tool should be obtained and enhanced as the Agriculture Extension and Advisory System for the sector. The firm needs to collaborate with Jabba Engineering and develop a functionality that will capture soil productivity information. All other aspects of real-time alert for pests and diseases should be incorporated.

The function of farmer profiling will be shifted to converge systems limited. The firm thus has to establish the variables required for the system to function well so that a data pushing model is obtained from Converge Systems Limited.

4.2 Jabba Engineering Limited – The firm's soil test solution should be adopted as a complete package. The project should offer 100% subsidy on testing for 20% of the total target beneficiaries. This should be used as an incentive to increase the enrolment levels. 80% of the beneficiaries should obtain the service as an input through the e-voucher system. The project should further secure a minimum of 3 soil testing kits for each of the clusters making up the 54 districts, to support knowledge uptake and transfers at the local governments.

Jabba Engineering should work out a data management model for inclusion into the farmer database, as well as the extension and advisory platform by Converge Systems and M-Omulimisa respectively. The model should be able to relay graphs on the soil structures and should be easily represented in form of a map

4.3 AkelloBanker – To access the application, one has to create user credentials to enable them login. The system is thus used by only the authorised users, who are enrolled onto the platform. The system, on uptake should be modified to allow for the public, generally the buyers and sellers of agricultural produce and inputs to interact freely through the platform without the need to login. At the point of effecting a transaction, a user profile should be obtained and stored into the stakeholder database

4.4 Converge Systems Limited - The firm presents a comprehensive farmer profile database. The solution should be adopted as a standalone application for managing sector player profiles. These include the farmers, input dealers, extension workers, agro-service providers etc. The tool should be used a central repository for all this data and should be built with the capabilities to push the required variables to the other applications requiring them. Similarly, it should allow for the data update through the third-party applications, such as enrolling as an input dealer through a market system. Such data should be pushed automatically onto the sector storage.

Converge Systems Limited scope should be widened further to support the implementation of two other applications; **(1) e-diary, and (2) e-GRM**. The functional requirements for these tools were developed the Ministry and project technical staff and a functional prototype for each of them developed in house. Despite these being useful tools, they have not been developed to completion and remain in a working model form. Since these tools rely heavily on the data generated through the profiling tool, it is paramount for the scope of Converge Systems Limited to be widened to include the implementation of these solutions.

4.5 Data Care Uganda Limited – The firm indicated to have a base structure/platform upon which customization and remodelling is done to deliver a customer requirement. The firm should be taken on to provide deliver a monitoring and evaluation tool. The tool should allow for data pulling from the other applications to provide for analysis of data, and should equally provide a central repository for all data that requires manipulations to provide statistics.

4.6 M-Cash Uganda Limited – The firm presents a solution that nearly solves all the challenges experienced with the current implementation of the e-voucher system. The system should be adopted and implemented as a parallel one to the current system. M-Cash Uganda Limited should be given an opportunity to implement their version of the system in some of the project clusters. This move will increase enrolment levels since the workload will have been reduced from the management agency.

Annex 1.

The Disruptive Agricultural Technology (DAT) Innovation Challenge Areas

Challenge Areas (broad)	Challenge sub-theme (Requirement)	PCU Rep	MAAIF Rep	(1) **Current business process:** Brief description of your current business process requirement (how you deliberate on your mandate). (2) **Problem:** Define the challenges you experience in execution of the above mandate, for which you need a solution developed. (3) **Requirement:** Define the kind of automation you require, to improve service delivery
Advisory and Information for Agricultural Productivity Challenge Subject Matter Specialist / Challenge Jury – **Beatrice B. Byaruga – Director Agriculture Extension Services**	Profiling farmers and increasing registration and enrolment	William Etek	Amos Mpungu	**Current business process:** A farmer registration tool with an Application has been developed where MAAIF and Local Government extension staff have to follow the farmers and collect the information which is then up loaded on the server.
				Problem: It is expensive to register the farmer.
				Requirement: A Simple user-friendly application that can be used by the farmers on their own is required.
	Delivering of agricultural extension and advisory services	Francis Nuwagira & ZAEC – Ekulu & Mwebaze	Connie Acayo	**Current business process:** • Direct physical interaction of extension workers with farmers. Delivery of extension information and knowledge is mainly using manual teaching and learning aids. • Service delivery is supply led, and not demand driven by farmers
				Problem: • Limited access to technology, knowledge and information to the farmers • Limited demand for agricultural extension services • High costs of extension service delivery • No standardized content and streamlined delivery approaches
				Requirement: A customized and interactive e-extension (audio and digital) system adaptable major languages (English, Luganda, Runyakitara, Lusoga, Luo, Lumasaba, Ateso, Lugbara and others) and commonly used ICT tools, (not only limited to smartphones)
	Delivering digitally enabled agricultural equipment hire services, such as tractor hire	Eng. Denis Tumusiime	Eng. Madrine Naziwa	**Current business process:** Manual identification of isolated service providers for mechanisation equipment hire; input based rates negotiations.
				Problem: • Limited appreciation of potential benefits of technology (mechanical) adoption. • **Difficulty in matching demand with supply market;** Farmers cannot know where the nearest Equipment to his farm is and cannot determine when the equipment hire service will be availed by the service provider; Service provision is at the convenience of the service provider. Equipment hire service provision should be at the convenience of the farmer instead of the service provider in order to allow the farmer plan for the season well.

Challenge Areas (broad)	Challenge sub-theme (Requirement)	PCU Rep	MAAIF Rep	(1) **Current business process:** Brief description of your current business process requirement (how you deliberate on your mandate). (2) **Problem:** Define the challenges you experience in execution of the above mandate, for which you need a solution developed. (3) **Requirement:** Define the kind of automation you require, to improve service delivery
				• **lack of standard output-based rates**; It is also easy to cheat the famers because the time spent on the beneficiaries' farmers can only be determined by the operator. • Approval of the quality and quantity of services provided to the farmer is done manually by District Local Government officials.
				Requirement: Platform that facilitates matching of demand with supply market at standard output rates; Convenient mode of delivery of appropriate message to the public on the benefits and options of technology adoption.
	Real-time alert of pest and diseases, and early warning	Milly Mbuliro & Nuwagira	David Kutunga & Hakuza Annunciata	**Current business process:** Routine surveillance and reporting for pest and disease- manual data collection
				Problem: • No monitoring mechanisms for pests and diseases, no reporting mechanisms for pests and disease outbreaks • No early warning alert system to farmers, no response mechanism
				Requirement: • Geo-tagged (referenced) data collection tools for extension workers for real-time data collection • Data repository for pests and diseases, that can routinely be updated • Advisory information on pests and diseases to farmers
	Solutions offering soil productivity information, satellite imagery as well as remote sensing	Pr. Francis Ogwang & Milly	Kabango Fred	**Current business process:** • Farmers rely on nutrient deficiency symptoms on plants to diagnose soil nutrients problem and plant health vigour as an indicator for soil health. • Farmers also use cultural methods e.g. yield, soil colour and texture, land and cropping history to characterise soil productivity. Soils are manually sampled for laboratory analysis by technical persons, which process is lengthy to inform timeliness in decision making. Most farmers grow cultural/historical crops on the same pieces of land, continuously and haphazardly.
				Problem: • No site-specific information on soil fertility to guide field extension workers and farmers on inputs use by type and quantity. • Farmers don't carry out suitability matching of enterprise to land/soil type, thus increasing production and productivity cost. • There is lack of soils information against which apps developers can base upon to build systems that address site specific soil fertility concerns.
				Requirement:

Challenge Areas (broad)	Challenge sub-theme (Requirement)	PCU Rep	MAAIF Rep	(1) **Current business process:** Brief description of your current business process requirement (how you deliberate on your mandate). (2) **Problem:** Define the challenges you experience in execution of the above mandate, for which you need a solution developed. (3) **Requirement:** Define the kind of automation you require, to improve service delivery
				Increase access to on-site soil fertility information with attendant input type and quantity using phone apps or phone SMSs. e-soil information system/platform (parish level) on soil fertility status with keen attention to right input recommendation by type and quantity to inform farm planning for profitable farming.
Market linkages Challenge Subject Matter Specialist / Challenge Jury – **Ogwang Yafesi**	Establishing input and output market linkages	Fred Muhanguzi	Kizito Odong & Erongu Moses	**Current business process:** Physical delivery of information to the users (relies on middlemen as village agents to offtake farmers produce)
				Problem: • There are no formal input and output linkages • Farmers rely on middlemen • Expensive mechanism • Untimely • Limited in scope and time
				Requirement: An interactive platform to link input -output market players
	Bulking of demand for import of adapted fertilizer and agrochemical supply through PPPs	Nuwagira, & Etek	Alex Otut, Erongu & Isaac W	**Current business process;** Agro-dealers are currently importing inputs without any indicative consumption figure of the various inputs.
				Problem: Poor estimation of input stocking levels since there are no models that can help predict and estimate demand for inputs
				Requirement: an interactive platform for farmers, agro-input dealers and other stakeholders for input availability and potential demand
	Strengthening of the agro-input dealers' distribution network and quality control systems	Fred Muhanguzi	Isaac & Moses Erongu	**Current business process:** Movement from shop to shop to enforce quality parameters including carrying taste samples to countries that have the tools
				Problem • Hard to identify and locate the dealers with needed capacity • Hard to identify the fake input • Expensive to access suppliers • Limited personnel and instruments to build an effective quality control system
				Requirement: Efficient distribution and quality detection system
				Current business process:

Challenge Areas (broad)	Challenge sub-theme (Requirement)	PCU Rep	MAAIF Rep	(1) **Current business process:** Brief description of your current business process requirement (how you deliberate on your mandate). (2) **Problem:** Define the challenges you experience in execution of the above mandate, for which you need a solution developed. (3) **Requirement:** Define the kind of automation you require, to improve service delivery
Financial Inclusion Challenge Subject Matter Expert **– Beine Peter Ahimbisibwe**	Input credit, e-wallet and insurance among others	William Etek, Vicky Auma	Amos Mpungu	E-voucher; Farmers make commitment contribution and top-up payments through the agent banking and Mobile Money platform to their e-voucher account, they make order and during redemption the Agro-input dealer's initiates payment request and farmers account is debited, and the government contribution is debited and total credited on Agro-input dealers e-voucher account. We make manual payments to dealers. **Problem:** The system is not stable to fulfil the automated payment process **Requirement:** Stability and efficiency in effecting the above process.
Data Challenge Subject Matter Specialist - Ndiku Richard	Statistics	Allan Guma, and Milly	Amos Mpungu & Sunday G.	**Current business process:** • Data is collected by various Departments of MAAIF, MAAIF Agencies and District Local Governments. This data remains a product of the organisation that collected it, and will make own analysis of it to inform decision making **Problem:** • Data collection is still paper based, and is not geo-referenced • Limited sharing of information between institutions hence affecting planning, reporting, monitoring and evaluation for increased crop production, processing, value addition and marketing • The sector lacks a central repository for statistical data **Requirement:** Application (s) and database system in which individual users (institutions) will provide data and information following agreed on indicators. The information will then be further processed centrally and feed-back given. The application (s) and system should therefore be able to carry out the following among others; • Individual data entry and sharing, • Individual data, analysis and reporting, • Centralized data analysis: The system should be able to receive data and information, process and analyse data and produce reports, • Forward Data sharing: The system should be able to enhance sharing of data from individual users, • Backward data sharing: The system should be able to share data and information backwards from the centralized system to the individual users, • Ability to use various file formats Ms. Word, MS Excel, Stata, Shape files, photos (e.g. tiff, jpeg), etc.

Challenge Areas (broad)	Challenge sub-theme (Requirement)	PCU Rep	MAAIF Rep	(1) **Current business process:** Brief description of your current business process requirement (how you deliberate on your mandate). (2) **Problem:** Define the challenges you experience in execution of the above mandate, for which you need a solution developed. (3) **Requirement:** Define the kind of automation you require, to improve service delivery
	Monitoring and Evaluation	Amelia	Felix Okurut	**Current business process:** • Data is collected in different formats by different users • Planning and reporting for the project done manually at national and district level • Standardized routine monitoring tools developed with potentially large data sets to be collected • Numerous reporting requirements for different stakeholders
				Problem: • Lack of a functional management information system that allows electronic planning and reporting for the project at both the national and district level • Lack of a centralized database for all project and MAAIF data • Tedious process of reporting to different stakeholders
				Requirement: • A functional management information system that allows planning and reporting for the project at both the national and district level, taking care of the different GoU and WB formats • Centralized database that captures and aggregates all project and MAAIF routine monitoring data and for all other e-platforms • System that would centralise reporting such as simplified e-reporting formats by subcomponent • Dashboards for key performance indicators