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HARNESSING AGRICULTURE DATA FOR ACCESS TO FINANCE

A Feasibility Study for the Establishment of an Aggregated Agritech Database in Uganda

CONTENTS

ACRONYMS

API	Application Programming Interface
BoU	Bank of Uganda
DPP	Data Protection and Privacy
EPRC	Economic Policy Research Centre
FITSPA	Financial Technologies Service Providers Association
FSP	Financial Service Providers
GES	Growth Enhancement Support Scheme
NeGP-A	National e-Governance Plan in Agriculture
NIRA	National Identification and Registration Authority
PMFBY	Pradhan Mantri Fasal Bima Yojana
Sida	Swedish International Development Cooperation Agency
UBA	Uganda Bankers' Association
UBOS	Uganda Bureau of Statistics
UNCDF	United Nations Capital Development Fund

ACKNOWLEDGEMENT

This publication presents the results of a study conducted to assess the viability of creating an integrated AgriTech database in Uganda. The objective of this initiative is to centralize the fragmented farmer data currently stored in separate databases maintained by individual AgriTech and related FinTech firms across the country. The study was commissioned by the United Nations Capital Development Fund (UNCDF), in partnership with the Financial Technologies Service Providers Association (FITSPA) and the Uganda Bankers' Association (UBA).

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EXECUTIVE SUMMARY

Digitization of agriculture value chains has been going on in Uganda for the last seven years or so. High among the promises of the digitization has been the potential for data-driven financing for farmers and other value chain actors. With support from development partners, a number of tech companies have invested in collecting farm and farmer data, built farmer profiles and AgriTech platforms that offer various services to farmers.

Driven mainly by individual private sector providers, with little policy guidance and direction from macro level actors, these AgriTech platforms have taken a "walled garden approach" which, over time is proving difficult to scale without strategic consolidation. These walled gardens prevent key integrations, partnerships for growth and undermine the sustainability of such digital solutions given high upfront costs and limited value offering to farmers.

The business models are stymied by the high costs of registering customers, building robust platforms, and providing the digital and financial literacy needed along the value chain to make these systems work. The walled garden approach means that each of these costs are incurred by every platform provider, and synergies are limited, reducing the efficiency of the ecosystem. Additionally, given the limited number of ecosystem actors within these closed digital solutions, they provide limited value for the smallholder farmer due to fewer interactions (breadth of services being limited) and fewer exchanges (limited number of actors).

In Uganda, efforts towards partnership in this space continue to be hindered by a lack of trust in the quality of the data. While data is increasingly a key resource for service and business model innovation - "the new gold in the digital economy" - the lack of a harmonized / standardized approach to data collection, validation, distribution / sharing – is stifling data driven innovation.

It is increasingly imperative that the AgriTech ecosystem considers moving towards a harmonized partnership approach that breaks down some of these "walled gardens" especially around data.

This, however, must be done carefully to ensure that entities that have invested in this data are compensated for its collection and continued management, while customers are given access to more services of higher quality and lower cost. Even more important, that the many farmers whose data is collected get to experience tangible benefits from their data.

Consequently, UNCDF commissioned this study in collaboration with key ecosystem partners, namely the Uganda Bankers' Association (UBA) and the Financial Technology Service Providers Association (FITSPA). The study's purpose was to evaluate the desirability, feasibility, and viability of an aggregated database model for agricultural data, with the primary objective of enabling data-driven financing for farmers and actors in the agricultural value chain. This initiative contributes to the ongoing pursuit of innovative financing models for the agriculture sector, which has been grappling with insufficient levels of financing in Uganda.

KEY FINDINGS

From a market perspective, the findings underscore the significant need for an aggregated database – both on the supply and demand side. Financial Service Providers (FSPs) seek alternative data sources to tap into a potentially lucrative market segment. Concurrently, AgriTechs and FinTechs are actively collecting this data and are willing to share it for a fee. The study has also delineated the benefits and potential challenges associated with accessing and sharing data on the database.

In terms of technical feasibility, the study has identified several challenges, primarily related to the lack of quality data and standardization. Furthermore, it has been noted that numerous AgriTechs and FinTechs utilize different technologies and systems. However, the use of Application Programming Interface (APIs) to access the database could potentially alleviate these differences. Additionally, the study has highlighted the differing levels of technical proficiency among FSPs in managing the data output. While some FSPs have the capability to process the data collected, many others do not possess this capability.

From an operational perspective, the custodianship and management of the database will be paramount to its success. The operational feasibility analysis has highlighted various custodian scenarios based on key informant interviews conducted. It is evident from the four scenarios presented that there is a crucial need to protect and consider the interests of both FSPs and AgriTech/FinTechs. Additionally, it's apparent that industry associations, while being potential custodians of the database, lack requisite technical expertise, underscoring the necessity of involving a commercial entity to address this challenge. This approach also anticipates the involvement of regulators for oversight.

Operationalizing the database requires allocating financial resources for both the initial investment and ongoing operation of the platform. Moreover, there may be additional costs associated with adapting existing IT and data systems to comply with required data standards. These adjustments may encompass both technical infrastructure and human resources involved in data collection and management. Moreover, effective management of

the database will necessitate ensuring data standardization, maintaining data quality, and employing sound methodology. Therefore, data quality standards will serve as a fundamental value proposition for the proposed database model. The collected data should align with the database's objectives, and there should be consideration given to potentially implementing minimal data quality standards to facilitate broader participation in the short to medium term. Nonetheless, enhancing data quality should remain a priority over time.

Ensuring compliance with Uganda's existing data privacy law will be crucial for both data suppliers and data users. This can be accomplished by implementing robust procedures between the database and the data suppliers, as well as within the database itself. It's essential to assess the nature and sensitivity of the data, the sources, and the levels of aggregation right from the outset of the database implementation process.

The financial feasibility analysis of the proposed aggregated database emphasizes the incentives for AgriTech and FinTech firms, primarily focusing on the financial rewards for accessing their data.

It also examines potential payment structures for FSPs to access the data. Additionally, the analysis explores various business models and recommends a potentially sustainable subscription model with tiered access for different FSPs.

However, due to the absence of actual financial figures at this stage, it is challenging to determine the true cost of setting up the database. Conducting a realistic cost/benefit analysis is also difficult, which makes it challenging to understand the profitability or lack thereof for the database.

In conclusion, the study findings suggest a moderate level of feasibility across the four perspectives analyzed. However, the success of the database will depend not only on the willingness of potential participants to share their collected data but also on the level of participation of the AgriTechs and FinTechs in the initial phases of the database's implementation.

BACKGROUND

UNCDF, FITSPA, and UBA commissioned a feasibility study to explore the establishment of an integrated Agri-Tech database in Uganda. This database aims to consolidate disparate farmer data currently dispersed across siloed databases maintained by various Agri-Tech and related FinTech entities in the country.

The envisioned database would serve as a centralized platform, facilitating seamless access for FSPs to pertinent data crucial for the effective delivery of tailored products to smallholder farmers.

The feasibility study examines a spectrum of institutional, technical, and financial considerations. It provides recommendations and strategic pathways to pragmatically pursue the proposed initiative. This report presents the outcomes of this study.

Agriculture accounts for a significant portion of Uganda's economy, contributing 24.1 per cent to the gross domestic product and approximately 30 percent to the value of exports. Notably, agricultural exports represent 20 percent of the nation's total foreign exchange earnings (UBOS, 2022)[1].

[1]*Uganda Bureau of Statistics (UBOS). 2022. Statistical Abstract 2022. Uganda Bureau of Statistics.*

Furthermore, the sector accounts for a substantial 72 percent of the country's total employment (EPRC, 2021)[2].

Despite its economic significance, access to finance remains a formidable challenge, particularly for smallholder farmers, constituting 85 percent of the agricultural workforce. A mere 12.3 percent of the country's overall credit is allocated to the agricultural sector (BoU, 2021)[3].

This underscores a significant opportunity to address the financing needs of smallholder farmers, who are predominantly excluded from formal borrowing channels. While 77 percent of Ugandans engage in borrowing, only 31 percent access formal financial institutions. Historically, financial service providers have shown limited interest in catering to the smallholder segment due to low transaction values and insufficient collateral, rendering them high-risk clientele.

However, the availability of alternative nuanced data presents a transformative prospect for FSPs, offering insights into this underserved segment and fostering an environment conducive to providing tailored products and services. Consequently, the aggregation of such data plays a pivotal role in bolstering the capacity to extend agricultural financing on a large scale.

The proliferation of AgriTech and FinTech enterprises in Uganda has substantially reduced service costs, enabling the provision of services in smaller increments to a broader demographic of rural smallholder farmers. Leveraging big data tools holds promise in enhancing credit targeting precision, thereby broadening access to uncollateralized credit. Moreover, advancements in remote sensing technology facilitate improved assessment of climate risks, albeit progress in this domain has been relatively gradual compared to credit evaluation.

Nevertheless, the absence of a coordinated effort among organizations collecting smallholder data poses a challenge, impeding FSPs' ability to assess the quality and accessibility of available data. The objective of UNCDF, FITSPA and UBA is to have all this data collated in one comprehensive aggregated database, which provides a single point of entry to smallholder data that can enable FSPs to make decisions on the provision of relevant financial products.

[2]*Economic Policy Research Centre (EPRC). 2021. Agriculture in Uganda: Employment Statistics and Financial Inclusion. Economic Policy Research Centre.*

[3]*Bank of Uganda (BoU). 2021. Annual Report. Bank of Uganda.*

OBJECTIVES & METHODOLOGY OF STUDY

The feasibility study addresses the following objectives:

- To understand the desirability of the database from a user perspective.
- To establish the technical options available to achieve the database as a gateway to farmer data.
- To provide an understanding of the operational dimensions of sustainably running such a database.
- To gain an understanding of the potential barriers to establishing the database and how these may be overcome. These include institutional and financial aspects.
- Develop scenarios for set up and use of the aggregated database in a pragmatic way.

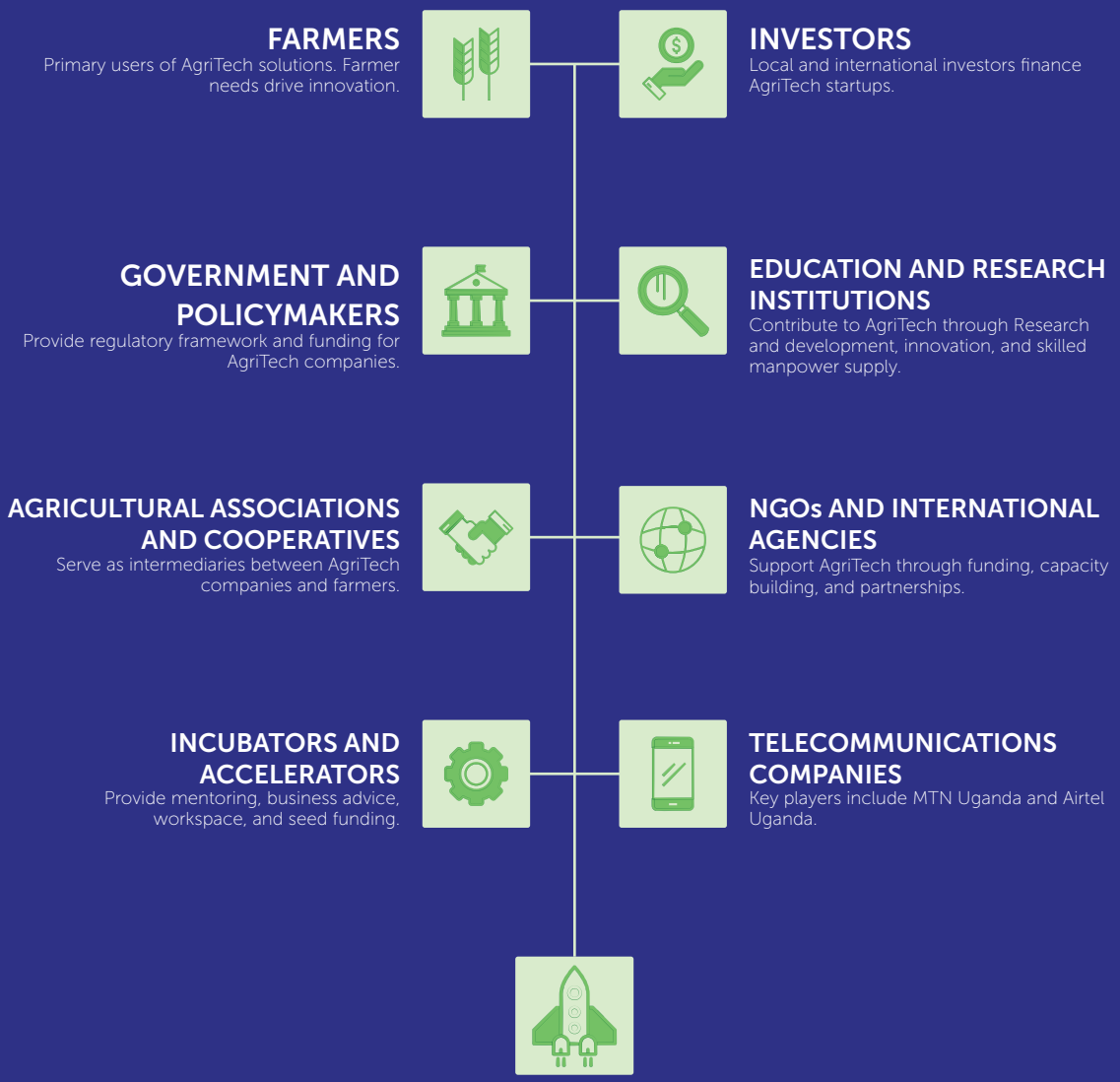
To achieve these objectives, the study delves into four dimensions:

1. Market Feasibility/Desirability: This dimension involves deeply understanding the demand for the proposed solution among key stakeholders. It includes assessing stakeholder perspectives on the prerequisites for their engagement with the platform.
2. Technical Feasibility: This dimension assesses the technical and organizational feasibility of implementing the proposed solution. It involves soliciting feedback from stakeholders on the technical aspects of the project.
3. Financial Feasibility/Viability: Here, the study critically evaluates the financial requirements for the database to function as a sustainable business model. It entails proposing potential structures, designs, and business models suitable for the Ugandan context.
4. Operational Feasibility: This dimension focuses on identifying the operational and corporate governance structures necessary for the sustainable management of the database. It includes considerations of legal and regulatory requirements.

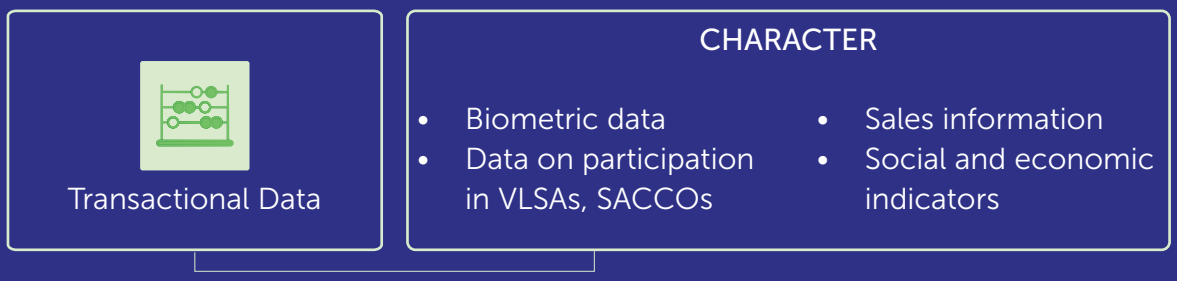
The feasibility study employed a combination of desk research and stakeholder consultations to identify available data and global best practices. Key informant interviews were conducted with stakeholders to explore the potential of an aggregated database in the Ugandan market, identify barriers and risks, and synthesize secondary sources to understand their strategic implications.

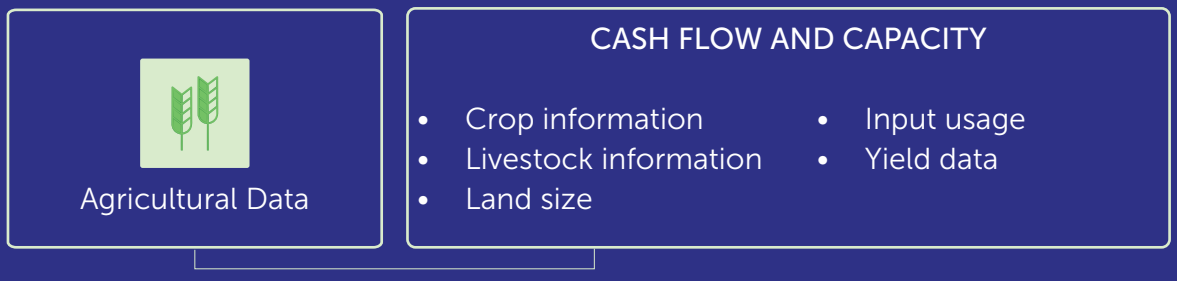
AGRITECH ECOSYSTEM IN UGANDA

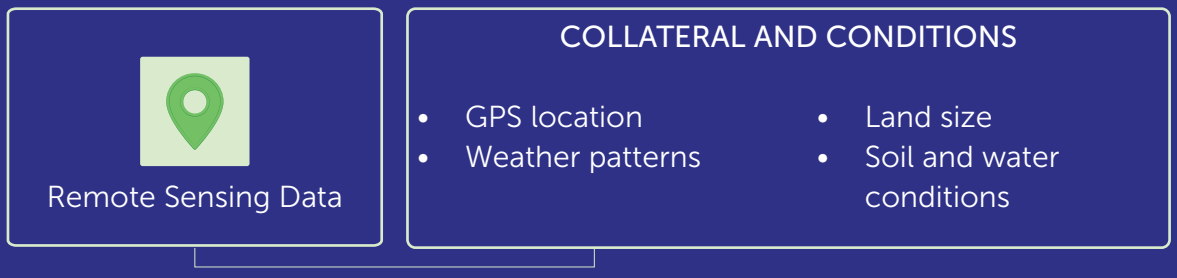
The AgriTech ecosystem in Uganda comprises various interconnected entities and factors that contribute to the advancement of technology in agriculture. Here's an overview:



DATA COLLECTED BY AGRI-TECHS AND FINTECHS







GLOBAL SCAN OF AGGREGATED DATABASES

The feasibility study drew from case studies from India and Nigeria to showcase how both governments and the private sector have successfully consolidated and overseen aggregated databases for smallholder farmers. These case studies serve as benchmarks, offering valuable insights that could inform the design and execution of a comparable database structure in Uganda. Emphasizing the significance of rigorous data management and inclusivity, these models highlight the pivotal role such databases play in fostering sustainable growth within the agricultural sector.

CASE STUDY: INDIA

In India, the assessment scrutinized two notable aggregated databases: i) the National e-Governance Plan in Agriculture (NeGP-A) and ii) the Pradhan Mantri Fasal Bima Yojana (PMFBY), a government-sponsored crop insurance scheme.

From the India case studies, we gather insights into the sophisticated data structures leveraging cutting-edge technologies such as remote sensing drones and mobile technologies. These advancements enable real-time monitoring and expedited updates of data. Moreover, a centralized database system utilized for collecting,

processing, and disseminating smallholder farmer information could significantly benefit Uganda, enhancing planning, decision-making, and resource allocation.

The India case study also underscores the pivotal role of digitized land records in streamlining data collection, facilitating seamless linkages between farmers, their landholdings, and crops. Uganda could explore public-private partnerships to access government-collected data through institutions like the National Identification and Registration Authority (NIRA), thereby enhancing the authenticity of the agritech database.

In the Indian context, data custodianship rests with the government, which oversees the process and invests resources in building the capacity of both government officials and smallholder farmers. Drawing from this model, the Ugandan government could spearhead similar training programs and awareness campaigns, facilitating smoother data collection and enhancing the quality of data collected by agritechs and fintechs.

The PMFBY case in India is distinguished by its inclusive coverage, aiming to encompass all farmers regardless of landholding size. Furthermore, there is a strong emphasis on farmer education and data accessibility, mirroring the NeGP-A approach, which utilizes ICT tools to make agricultural information readily accessible to farmers irrespective of their location.

Uganda could leverage similar technologies, such as portals, mobile apps, and SMS services, to disseminate vital agricultural information to its farming communities.

CASE STUDY: NIGERIA

In Nigeria, the assessment examined the Nigerian Growth Enhancement Support (GES) Scheme, implemented by the Federal Ministry of Agriculture and Rural Development. The GES leverages advanced digital technologies in its data systems, notably establishing a digital platform for farmer registration and integrating identity verification with subsidy distribution. This integration optimizes operations and minimizes fraudulent activities through secure data encryption and validation protocols. Uganda could benefit from similar data structuring techniques, potentially leveraging cloud-based technologies to enhance the efficiency, transparency, and security of its agritech database.

The GES system employs a systematic data collection process, mandating comprehensive farmer registration to capture diverse data points ranging from demographic information to farming practices. Designed for scalability and adaptability, the database serves as a valuable resource for planning, policymaking, and future interventions.

Furthermore, the GES Scheme integrates financial technology, particularly mobile money, into its data custodianship strategy. This ensures secure data

custodianship, as financial transactions are traceable and auditable, while also promoting financial inclusion by bringing many farmers into the formal banking sector. Uganda could emulate these practices, possibly incorporating advanced encryption and cybersecurity measures to ensure secure, responsible, and inclusive data custodianship.

Expanding the extent of its database, the GES Scheme strategically engages in public-private partnerships and targeted subsidies. Collaborating with private sector partners diversifies data sources and ensures a consistent supply of quality inputs. The e-voucher system facilitates more targeted subsidies, allowing the database to capture a wider range of farmer profiles and needs. Uganda could explore similar strategies, potentially employing big data analytics and AI-driven predictive modeling to extend the reach and impact of its agricultural databases.

Drawing insights from both the Indian and Nigerian models, it is essential to recognize the necessity of a multi-faceted approach involving diverse stakeholders, each playing crucial roles to ensure cohesive execution of the database.

MARKET FEASIBILITY (DESIRABILITY)

The feasibility study assessed the desirability of the aggregated AgriTech database from both the demand and supply sides of primary stakeholders, including FSPs, AgriTech, and FinTech companies, who would utilize this database. Insights gleaned from Key Informant Interviews informed this evaluation.

For each highlighted stakeholder group, we identified potential key benefits of utilizing the aggregated AgriTech database, as well as potential challenges. Key themes that emerged from this analysis included data quality, technological adequacy, and pricing and cost considerations associated with accessing data.

	BENEFITS	CHALLENGES
Financial Service providers (Demand Side)	**Identifying customer segments:** FSPs noted the database facilitates access to marginalized markets. **Understanding customer behavior:** Data yields holistic insights into specific needs accurately. **Reduced data collection cost:** Aggregated database minimizes data collection expenses. **Improved Processes:** Data aggregation streamlines lending processes, including risk profiling and credit appraisal. **Designing new products:** Data informs product design, pricing, and targeted marketing campaigns.	**Data quality:** FSPs acknowledged the challenge of accessing high-quality data, critical for credit and risk profiling. **Pricing:** FSPs noted the affordability challenge in accessing data. **Technology and human capacity:** Adopting alternative data necessitates FSPs to enhance technical skills for data manipulation.

	BENEFITS	CHALLENGES
Agri-techs and FinTechs (Supply Side)	**Increasing Revenue sources:** Agritechs and FinTechs are willing to share data if compensated. **Reducing duplication of efforts:** Data centralization minimizes redundant collection efforts, currently common among agritechs. **Access to information:** Agri-Techs and FinTechs anticipate broader information access via the aggregated database, facilitating access to a wider array of financial services. **Access to financial services for smallholder farmers:** Sharing data incentivizes AgriTechs and FinTechs to broaden access to financial services for smallholder farmers	**Cost of data collection:** The cost of acquisition of smallholder farmer data is high due to factors like extensive agent network reliance and costs associated with farmer awareness on data protection. **Quality of data:** Utilization of non-tech savvy village agents impacts data quality; poor internet connectivity hampers real-time data updates. **Integration of Technology:** Sharing their data will mean that AgriTechs and FinTechs will need to integrate their systems with the database agritech system. **Security:** Concerns arise over potential data misuse if the database lacks robust security measures against hacking.

TECHNICAL FEASIBILITY

The study examines the technical functionality of the database, including key assumptions, potential structure, minimum quality standards, IT requirements, and database architecture overview. It also evaluates the necessary technical knowledge and capacity.

Key Assumptions for the Aggregated Database:

a. **Representative:** Capable of gathering and transmitting relevant data across various agriculture value chains to stakeholders.

b. **Reliable:** Ensures data provided meets minimum quality standards.

c. **Secure:** Protected against IT attacks and threats.

d. **Scalable:** Can accommodate growth in users and data without experiencing scalability issues.

e. **Based on Mutual Exchange:** Partners must have developed information systems and agree to share data through the platform.

The database must adhere to Uganda's Data Protection legal framework, particularly regarding privacy. Understanding stakeholder demand, access, and usage is crucial in designing the database's technical specifications.

The relevant functions outlined in the figure below are as follows:

1. **Data uploading:** AgriTechs and FinTechs, acting as suppliers, would upload data to the database. This process can be done through APIs or a Web Portal with restricted and protected access.

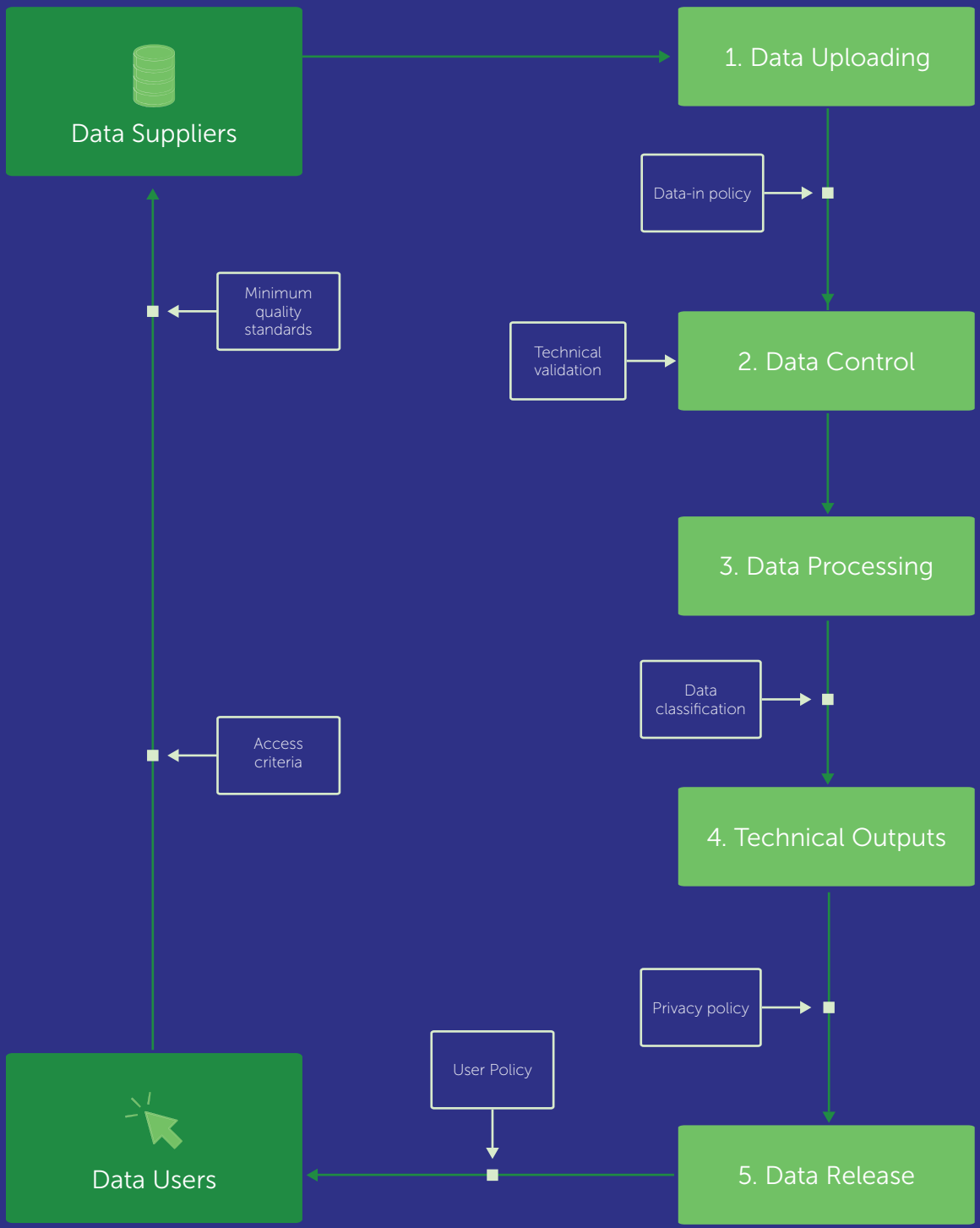
2. **Data control:** The management team of the database would handle data control, including technical validation of the uploaded data.

3. **Data processing:** The management team of the database or a third-party provider, such as a Credit Reference Bureau, would analyze, order, classify, and organize the data for publication.

4. **Technical outputs:** The technical outputs consist of the data products of the platform, such as credit scores and farmer profiles.

Data release: Data release would adhere to the commercial and privacy policies of the platform and comply with all privacy and competition legislation. The platform's outputs would be released through an API or platform Web Portal. FSPs can access the platform's Web Portal by complying with the platform user policies and access criteria.

PROPOSED STRUCTURE OF THE AGRITECH DATABASE



OPERATIONAL FEASIBILITY

The operational feasibility study assesses how the database will be implemented and effectively governed over time. This includes examining various scenarios for the organizational structure and ensuring compliance with relevant policy, regulatory, and legal requirements. The goal is to determine whether there are adequate resources, skills, and competencies to successfully manage the database. Key concerns that emerged include establishing partnerships for custodianship and assessing the technical capabilities of relevant stakeholders.

MANAGEMENT OF THE DATABASE

The effectiveness of a database within the agriculture value chain depends on its management and governance. The custodian must possess the requisite tools and expertise to handle sensitive data securely.

During discussions, organizations such as AgriTechs and FinTechs expressed a preference for FITSPA as their custodian, whereas FSPs leaned towards

Table: Scenarios for Database Management

SCENARIO	REPRESENT INTERESTS OF AGRITECHS AND FINTECHS	REPRESENT THE INTERESTS OF FINANCIAL SERVICE PROVIDERS	TECHNICAL COMPETENCY AND EXPERIENCE
FITSPA as custodian	✓	✗	✗
UBA as custodian	✗	✓	✗
Partnership between FTSPA and UBA as custodian	✓	✓	✗
Commercial entity as custodian	✗	✗	✓

UBA. Nonetheless, all stakeholders emphasized the importance of a custodian with the necessary technical proficiency.

Some proposed that private commercial entities possessing the required expertise could effectively manage the database. Additionally, regulatory oversight is essential due to the sensitivity of the data involved. However, involving government agencies presents challenges due to issues like lack of agility and bureaucratic hurdles. During Key Informant Interviews, four scenarios for running the database were deliberated upon.

The four different scenarios for selecting a custodian for the database are outlined below:

FITSPA as custodian: AgriTech and FinTech companies advocate for FITSPA as a suitable custodian due to its robust organizational capacity, effective representation of interests, and commitment to data protection.

However, challenges in technical capacity may necessitate partnerships with competent commercial entities, development partners, or donors like UNCDF. Involving a government entity such as NITA or the Ministry of Agriculture could address these technical gaps. Stakeholder inclusion could be facilitated through a steering committee.

UBA as custodian: FSPs express confidence in UBA's ability to serve as the custodian, citing its strong technical skills and regulatory understanding. They acknowledge the need for government oversight but highlight challenges like bureaucracy and lack of agility.

Similar to the approach suggested by AgriTechs and FinTechs, they propose a steering committee for stakeholder inclusion and believe UBA can leverage the technical skills and regulatory landscape of market players.

Partnership between UBA and FITSPA: Another proposed scenario involves joint custodianship between UBA and FITSPA, representing the interests of primary stakeholders. However, technical capacity issues within both associations may require the involvement of a commercial entity and government representation, despite potential delays and bureaucratic hurdles.

Commercial Entity as Custodian: AgriTechs and FinTechs suggest entrusting a reputable commercial entity with strong technical capabilities, such as Raxio or Gnugrid, as the custodian for the database. However, concerns arise regarding potential conflicts of interest with profit-driven commercial entities compromising stakeholder interests.

In managing the database, a central body would be necessary to oversee organization and management. The administration board would serve as the leading body, possessing decision-making authority and legal responsibility. Its primary role would involve defining institutional objectives

for the database and ensuring their implementation.

REQUIREMENTS FOR THE DATABASE:

(i) Data Protection and Privacy (DPP) Act of Uganda, 2019: Compliance with the DPP Act is crucial for database implementation. While AgriTechs and FinTechs are aware of the DPP Act and adhere to mandatory requirements for data collection, more efforts are needed to educate smallholder farmers about their rights as data subjects. Fulfilling conditions such as informed consent from subjects, signed agreements with data suppliers, authorized personnel for data treatment, implementing access control systems, and secure data storage are essential for legal compliance.

(ii) Licenses: Under Uganda's National Payment Systems regime, three categories of licenses are applicable, including payment systems operator license, payment service provider license, and issuer of payment instrument license. The aggregated database would fall under the payment system operator license, which covers e-fund transfer systems, clearing systems, settlement systems, and third-party systems like aggregators, integrators, or payment gateways. Compliance with these licensing requirements is essential for operating the database within the regulatory framework.

FINANCIAL FEASIBILITY

The financial feasibility section examines potential incentives for data suppliers, including smallholder farmers, AgriTechs, and FinTechs, as well as explores potential payment structures for Financial Service Providers (FSPs) as the demand side of the data. Additionally, it presents various financial models aimed at ensuring the sustainability of the database.

Table: Incentives for the data suppliers

STAKEHOLDER	PROPOSED INCENTIVES
Smallholder Farmers (Primary data owners)	Aggregated data can improve the farmers' access to: • Quality inputs at discounted prices • Affordable and suitable financing • Markets
AgriTechs and FinTechs (Data collectors)	Compensation to the AgriTechs and FinTechs as data collectors would have to be consisted as an incentive. These can be in the form of: • One-time standardized fee • Customized fees based on individual profiles provided • API hits for payments • Revenue share on the interest earned off accessing data that has been monetized.

The financial feasibility section examines potential incentives for data suppliers, including smallholder farmers, AgriTechs, and FinTechs, as well as explores potential payment structures for Financial Service Providers (FSPs) as the demand side of the data. Additionally, it presents various financial models aimed at ensuring the sustainability of the database.

PAYMENT STRUCTURE FOR FINANCIAL SERVICE PROVIDERS

Given the diverse sizes and financial capabilities of the FSPs, several payment options could be considered for accessing the proposed database:

- Once-off payment: FSPs could opt for a one-time payment model to access the database. This payment would grant them access to basic functionalities and basic descriptive statistics.

- Payment per profile in a value chain: Alternatively, FSPs could choose to pay per farmer profile within a specific value chain.

- Payment per credit score: FSPs may also opt to pay for each credit score they access from the database.

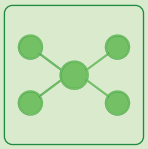
POTENTIAL FINANCIAL MODELS FOR THE DATABASE

Ensuring the sustainable operation of a database entails managing costs such as software, hardware, human resources, and operational expenses. Partnering with donors could serve as a viable funding method for the startup phase and pilot implementation. This is particularly crucial as database management and onboarding of AgriTechs and FinTechs necessitate initial capital investment before transitioning to a sustainable revenue model. Various financial models are available for consideration, with their suitability summarized on the following page.

POTENTIAL FINANCIAL MODELS FOR THE DATABASE

FREEMIUM MODEL | *RATED: NOT SUITABLE*
By providing basic access to the database at no cost, FSPs can assess its value before committing to an investment. Additionval features such as more detailed data, analytical tools, or specialized services could be made available for a fee. The freemium model would not be a sustainable standalone model - unless there is funding to compensate the AgriTechs and FinTechs.

TRANSACTION FEE MODEL | *RATED: NOT SUITABLE*
The database serve as marketplace facilitating transactions (like selling crops, renting equipment, or connecting with buyers), charging a small fee for each successful transaction could be a viable option. This way the database will be the sustainability engine while farmers opt-in to share their information with third-party providers. This model does not fit the objectives of why the aggregated database is being established.



AFFILIATE MARKETING MODEL | *RATED: NOT SUITABLE*
The database could partner with agricultural suppliers or service providers and earn a commission for every sale made through referral links on the platform. Closely similar to the advertising revenue, the difference is that this model is commission-based. This model does not fit the objectives of why the aggregated database is being established.

SPONSORSHIP MODEL | *RATED: NOT SUITABLE*
Businesses or organizations who have an interest in supporting the agricultural sector could sponsor access to the database by incentivizing the farmers, or fund specific features or services within the platform. This model does not fit the objectives of why the aggregated database is being established.

ADVERTISING MODEL | *RATED: NOT SUITABLE*
The database platform could display ads from businesses or organizations that want to reach farmers. These could include suppliers of farming equipment and materials, agricultural service providers, or even financial institutions offering agricultural loans. This model does not fit the objectives of why the aggregated database is being established.

TIERED PRICING MODEL | *RATED: SUITABLE*
Different levels of access or services could be provided at different price points. For example, a basic level might provide general market trends, a mid-tier could provide more specific data points and access to analysis tools, and a high-tier could provide personalized reports and forecasting on farmer production capacity. The tiered pricing model works because it provides different levels of access for the different FSP needs as well as sizes.

DATA MONETIZATION/SUBSCRIPTION MODEL | *RATED: SUITABLE*
This would need to be approached carefully, respecting all data privacy laws and regulations. Anonymized aggregated data from the platform could potentially be of interest to research institutions, policymakers, or agribusiness corporations. This model is sustainable because it generates revenue by charging customers a recurring fee that is processed at regular intervals.

RECOMMENDATIONS

1. AgriTechs and FinTechs should prioritize data quality by ensuring accuracy, reliability, and regular updates. Establishing necessary data standards is essential. Evaluating the consistency of methodologies used by these entities is crucial to ensure data reliability. Effective management of the database is vital for standardization, providing guidelines for AgriTechs and FinTechs to follow. Fortunately, much of the required data is already being collected by these entities.

2. The database's management structure should consider the interests of both FSPs and AgriTechs/FinTechs, including representation from a commercial entity for technical expertise and a government entity. Consideration should be given to employing a third-party processor to ensure standardized outputs accessible to all FSPs.

3. To address FSPs' concerns regarding pricing, implementing a tiered system of database access to accommodate FSPs of varying sizes is recommended.

4. It is crucial for both data suppliers and users to adhere to legal regulations, particularly the Data Protection and Privacy Act of Uganda, 2019. The database must obtain the required licensing to operate within legal boundaries.

Impact Capital
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ABOUT UNCDF

The UN Capital Development Fund assists developing countries in the development of their economies by supplementing existing sources of capital assistance by means of grants, loans and guarantees, first and foremost for the least developed among the developing countries.

As a Flagship Catalytic Blended Financing platform of the UN, UNCDF utilizes its unique capability to crowd-in finance for the scaling of development impact where the needs are greatest—a capability rooted in UNCDF's unique investment mandate—to support the achievement of the 2030 Agenda for Sustainable Development and the realization of the Doha Programme of Action for the least developed countries, 2022–2031.

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