A generic template for farmer profiling

Authors: Stephane Boyera (<u>stephane@sbc4d.com</u>), Aman Grewal (<u>aman@sbc4d.com</u>) - SBC4D Date: 18 November 2020

Introduction

To increase their production and increase their income, small-holder farmers need various types of services such as extension services, financial services, or trade services. The design, deployment and delivery of these services in their physical or ICT format require the mash-up of data at the farm-level with data from the global context and available through e.g. open datasets released by national, regional, or international organizations. In the same way, Farmer Organizations (FO) needs to know well their constituencies in order to offer them valuable services, and to conduct appropriate advocacy activities. Finally, policy makers at regional, national, and continental level needs also detailed information about agriculture activities, challenges, and output in order to take informed decisions that support effectively small-holder farmers. To address these needs, there is a growing interest, research studies and pilot experiences across Africa that investigate approaches to build farmer profile platform and database whose aim is to aggregate a series of farm-level and farmers data. While various FO, agribusinesses, cooperatives, and governments have engaged in setting up such platforms, there is no real common approach between all these initiatives, in particular in the set of information collected. This lack of homogeneity could become in a near future a potential challenge for the aggregation and mash-up of information between various initiatives, leading to a missed opportunity for getting a larger view based on trends documented at local level. Obviously, each country, each crop, each value chain has its own requirements in terms of required data. However, the review of existing initiatives shows that there is a common set of information that is always appearing in farmer profiles. The aim of this paper is to make a first step toward the standardization of a profile template and identify this set of information that all initiatives should implement to leverage interoperability between farmer profile platforms.

The document is structured in four main sections: (1) Farmer profiling concept; (2) farmer profile Content; (3) Generic Profile Template; (4) references of related studies and initiatives.

Farmer Profiling Concept

A farmer profiling platform is an enabler for farmer-centric information services and for policymakers. The diagram below shows how a farmer profiling platform fits in a larger context.



There are four main areas in which information systems can support farmers activities:

- 1. **Extension services**: All the services from pre- to post-harvest to assist farmers to extract the greatest value from his or her assets, and to combat any pest or disease that may endanger the harvest.
- 2. **Financial services**: A range of financial services are essential to support agriculture activities including traditional banking services, micro finance, and subsidy schemes.
- 3. **Market services**: This area includes all services that ease access to market and support farmers in getting the best prices for their produce.
- 4. FO/Cooperative/Agribusiness services: FO, Cooperatives and farmers group are both potential stakeholders and users of such platforms. In many countries many such organizations are not able to manage efficiently their membership, understand where the members are and what they do. This absence of such information limits their ability to not only provide services to their members, but also manage efficiently their organization, and execute their advocacy role.

While these four areas are broad, the information needed by farmers is specific and personal to them, depending on where they are, what they produce, what kind of certification they have etc. All such information service providers in these areas stand to benefit from access to farmer profile information to provide tailored and targeted information to farmers.

Finally, it is important to note that a farmer profiling platform is an enabler for both public services (e.g. market price information to farmers, extension services) and private services (e.g. financial loans). Apart from information services, policymakers are also potential consumers of data stored in profile information. The profiling platform can provide raw content to compute key policy indicators (e.g. land planted, size of land under irrigation, etc.). In the same way, the profiling platform can be used to forecast the impact of subsidy schemes or other policy interventions.

However, while all these applications can potentially be enabled by a profiling platform, the success of such platform, and its ability to deliver expected results, depends on several elements, including

the implementation context; the content of the profiles; the quality, timeliness and completeness of data stored; and the usability, reliability and effectiveness of the platform from a technical point of view.

From a technical perspective, a farmer profiling platform has different elements that are summarized in the diagram below.



Roughly, the system is structured around 4 core elements:

- 1. The central repository where all profiles are stored
- 2. A module to collect data in the field from farmers. This module is usually instantiated with different functionalities and different technologies (USSD, IVR, SMS, smartphone app)
- 3. A module to manage the overall platform, give credentials, check data, etc.
- 4. A web interface and an API that enables third party that want to build services and exploit profiles to access and retrieve data

In terms of implementation, there are 3 core elements to address:

- The data collection and update model: The success of a farmer profiling platform is largely due to its ability to capture regularly and host updated reliable information. One of the most important design elements is therefore related to the data collection and update model. In this component, core questions to answer are
 - Who is going to collect farmer-level data? Who is going to update the data?
 - How and how often?
 - What are incentives for farmers to provide accurate data and for collector to conduct an exhaustive data collection process
 - o What are the operational and investment costs for data collection and update?

- **The platform business model**: The success of a farmer profiling platform relies largely and its sustainability model. Main elements of the business models include:
 - The investment cost
 - The operational cost for both the platform, the global staff, the data collectors, and the data collection
 - The potential customers for the farmer profiling platform, the products they are interested in, and the price they are ready to pay for the products
 - o The cost of designing and maintaining targeted products
- **The profile content**: Finally, the success of a farmer profiling platform relies in its ability to support the development of services and analytics that is required by the different audience. This is mainly driven by the information stored in each individual profile.

This document focuses only on the third component that is developed in the next section.

Farmer Profile Content

A farmer profiling platform is not a goal by itself but is an enabler that supports and eases the delivery of targeted information and other services to farmers. A profiling platform can support those services depending on the information stored in each profile. The main categories of data at the farm-level are presented below.

• **Personal Information**: This component contains the profile and list the information about the farmer's identity (name, id number, birthday, gender, language spoken, income level, education level/literacy level, number of people in the household ...). Note that some information like the literacy level or the languages is usually critical to design accessible ICT services.

It is important to note that a critical element is the identification of the farmer. A farmer profiling platform stores a large set of profiles and it is therefore important to know how to retrieve the specific record attached to a farmer. Some countries implement a national scheme for personal identification (e.g. ID cards in European countries or the Aadhaar system in India). Such schemes can easily be used as the index in the database of profiles. However, in a number of countries, there is no reliable ID number or other unique identifier to identify a specific farmer. In such a case, it is critical to understand the element of information that could uniquely identify a person. In some countries, first and last names are unreliable identifiers, so too are farm addresses. The use of biometrics such as fingerprints is relatively difficult to put in place and presents several challenges, outside the cost dimension. It usually requires a series of elements such as name, address related to a specific point of interest (school, health center...), phone number, etc. that are useful to identify the person. Note that picture is a potentially useful element to verify the profile information, but it is useless as a search criterion.

- Communication information: Communication information covers all information to interact with the farmer either directly or through broadcast media. It includes information such as phone number(s), phone type (smartphone, basic phone, etc.), phone literacy (ability to use different technologies on phone such as SMS or app), email, social networks used, or radio/TV listened (and at which time). This data is particularly useful to understand the most efficient way to deliver services and information to the farmer
- Location: location information is critical to locate the farmer. It usually includes Information such as administrative address (split by administrative divisions such as region, district ...) and GPS coordinates.

- **Financial instruments**: Information about financial instruments available at the farmer level is critical for financial services (e.g. credit, insurance, or subsidies payments). It includes information about bank accounts including mobile money accounts
- **Credit information:** Credit information is critical to support access to credit. It includes information such as credit record, farm business plan (to identify cash needs and timing of repayment during a complete crop cycle), SACCOs/ROSCAs membership, active credit information
- Insurance information: insurance information is also an important set of information for different purposes such as credit but also to identify covered and uncovered risks. Information includes field(s) covered, risk(s) covered, cost, company, amount repaid in case of the risk(s) materialize.
- **Farm details:** Information about the farm as an enterprise is critical to identify specific needs and interventions to support the activities. Key information includes registration number (if the farm is a formal registered business), labor force available on the farm, equipment (for planting, harvesting, post-harvesting) or the (list of) extension agent associated with the farm/farmer. In some cases, when the farm is a formal business, it is characterized by its financial data (turnover, benefit, etc.). In the case of small-holder farmers, the farm financial data is usually the same as the farmer financial data. In some cases, it may be appropriate to separate the two.
- Qualification and certification data: Qualification and certification apply to either the farm or the farmer, sometimes down to some specific fields. Most certification requires first training. However, some training does not lead to any certification. This information is critical for many purposes. First, most certifications have regulations on various activities from planting to applying treatment to harvesting. Extension services must adapt to these constraints. Then, certifications provide added-value to the end-product, and this is critical for the marketing activities. Finally, knowing the certifications a farmer has enables him to access other certifications more easily. This, for example is the objective of a service like Standard Maps¹ that lets a farmer know, based on their current certifications and the ones they want to reach, the set of modules they have to follow. The information required for qualification and certification includes training/certification name/label, training/certification date or training/certification institution.
- Field information: In many cases, a farmer manages more than one field in different places, or even if it has one piece of land, the space is split in sections with different crops. Core field information includes location², size (the size may be available on the land title, evaluated by the farmer or automatically computed if a field map is provided), elevation (important for some crops), soil, land title and crop history. Field information also include crop information (crop, variety, type of seeds). The crop information is highly dependent on the type of commodity grown trees (coffee, cocoa, coconut, ...) or tea are quite different compared to seasonal crops. The crop information must therefore be adapted.
- **Production information:** The production information is usually linked to a field. This information is usually useful for extension service and to prepare trade or post-harvest activities. It usually includes planting information (date, spacing, intercropping information, equipment, amount of seeds used), activities information (treatment applied, fertilizer, extension service interventions, pest & disease attacks & treatments, activities such as weeding, water usage, yield, loss, rainfall, ...). Here again the production information is related to the specificities of the crop.

¹ <u>http://www.standardsmap.org/</u>

² Location may have different formats: administrative location, the GPS coordinates of one point in the field or a map (geofencing) of the field. The later offers more opportunities for specific services (forecast of production, evaluation of inputs required etc.) and is obviously more complex and more costly to acquire

- **Business information:** Business information is a critical element for marketing and selling of the yields or transformed products. This information describes linkages between the farmer and other key stakeholders in the value chain for conducting his/her businesses. It includes information such as cooperatives/production cluster membership, markets the farmers is linked to, agribusinesses linkages, total amount of products sold (per trade channel such as cooperative, at market at farm gate) and prices sold.
- Legal information: Part of the information stored in a farmer profile are personal data (name, phone number...) and in countries that have adopted a personal data protection legislation, the collect, storage and sharing of such information is heavily regulated, and requires the implementation of specific processes. The exact set of requirements varies from one country to another. However, there are commonalities across all legislations, in particular the need to capture explicit content from the farmer to collect, store and share those information, and the need to let a farmer know the purpose and the list of organizations with who the information will be shared. These information have to be stored in the individual profile.

Note that these categories are categories of generic information. You also have other categories that depends on the type of activities (crop information, livestock information ...) that are not listed here.

Information attributes

Apart from the information itself, the value of a profile relies also on a series of attribute attached to the information. In particular, the following attributes are critical:

• **Collection Method**: There are many different ways to collect information summarized in the diagram below:



Source: USAID report on Digital Farmer Profiles: Reimagining Smallholder Agriculture

Not all collection methods provide the same level of accuracy. For example, self-declaration is always subject to caution. A farmer may not know well the size of his/her field or may want to voluntarily overestimate or underestimate it depending on his/her perception of the goal of the data collection. If he/she feels e.g. that this may serve the tax authority, he would underestimate it. If he/she feels that this may help him/her access credit, he/she would overestimate it. It is therefore important to document how the date is captured to allow users of profile information evaluate the quality of the information.

- Validation Process: depending on the collection method, a validation process may be required to increase confidence in the information stored. When such a validation process is required, it is useful to track the validation process, and the last time it was executed.
- **Dynamic/Static**: Some information change regularly, for example for a seasonal crop, the crop being produced in a given field. On the contrary, some information does no change often such as number trees for a tree plantation, or household composition. It is important to identify

fields that need to be regularly updated (and how often) versus field that could be updated only every year or every 3 or 5 years through e.g. an agriculture census.

- **Date of update**: Knowing when the information was updated together with the knowing whether the information is static, or dynamic is important to define the confidence in the value stored in the profile for a given field.
- **History**: Some information such as e.g. yields are more valuable if historical values are kept and made available. On the contrary, some other information does not need historical value (e.g. phone number).
- **Personal information:** some information is classified as personal data and are protected by personal data protection legislations. It is critical to identify such data and ensure that any data sharing either anonymize these fields or adapt the data sharing agreements with profiles people.
- Sensitive information: Some information such as disabilities or health-related information are sensitive data that should be collected, managed, and shared very carefully. It is important to identify those to adapt processes.

A profile is therefore a set of information grouped by modules, plus a set of attributes about the information. The table below shows which module are useful depending on the planned used of the profiles.

Category	Type of services exploiting the information
Personal Information	All – Personal information appears in all profiling platform
Communication	All types of services that require direct interaction with the producer
Information	
Location	All – Location information appears in all profiling platform
Financial instruments	Services that involves financial transactions: subsidy, trade, access to
	credit
Credit information	Access to credit, subsidy scheme
Insurance information	Access to credit
Farm details	Production services
Qualification and	Production services, trade services, access to credit, subsidy scheme
certification data	
Field information	Production services, financial services
Production information	Trade services, financial services
Business information	Trade services, financial services
Legal information	Mandatory in countries where a personal data protection legislation
	exists

The next section presents a potential generic template for common profile information across geographies, actors, and value chains.

Generic Profile template

In order to design a generic profile template and identify specific fields in categories presented in the previous section, it is important to define the process for electing a specific category and/or field into the template. From our perspective, a category or a specific field should be included into the generic template if:

- It is useful for specific services
- It is common across all crops, agriculture activities and value chains

It is important to note that, in the context of this paper, we defined the concept of a generic profile template as a tool for aggregation and interoperability. This is therefore mainly in a context of anonymized data, and fields that could be classified as personal data should not be in the generic template, given its definition. However, the objective of a generic profile template is larger than only aggregation purpose and is potentially useful for any organization engaging in a farmer profiling journey. Moreover, the use of a common template could lead to the automation of anonymization techniques. We therefore decided to keep fields that contains personal information.

In the remainder of this section, for each category, we propose a list of fields and the associated attributes. This list comes from the compilation of a series of initiatives across the world. See the References section for details.

Field	Data Type	Dynamic/ Static	Need for validation ³	History ⁴	Sensitivity/ Personal information ⁵	Rationale/comment	use
Name	String	Static	0	0	0/1	In some culture, it is important to capture the father name as well in order to identify uniquely a person	Part of the person identification
First name	String	Static	0	0	0/1		Part of the person identification
Marital status	Enum	Static	0	0	0/0		Useful for safety net/ subsidy/ access to credit
ID Number	String	Static	0	0	0/1	In many countries, this information is useless as a big part of farmers have no ID or do not know their ID	
Gender	M/F	Static	0	0	0/0		Essential for gender disaggregated investigation
Date of birth	Date	Static	0	0	0/0	Date of birth is preferred to age or age group mainly because it does not change over time, and because age groups are not normalized and varies from country to country and from organization to organization. However, it is often difficult to capture this information,	Age group classification, evaluation of youth employment in agriculture, youth/aged producer specific subsidy

Personal Information

 ³ Whether the information need to be verified/validated (value 1) or not (value 0)
 ⁴ For the history attribute, 0 means that tracking the history of the value is not needed, 1 that it is needed.
 ⁵ Whether the information is classified as personal information in the context of personal data protection

						and birthyear might be the most accurate information	
Income Group	Enum ⁶	Static	0	0	1/0	Many people are reluctant to provide their level of income. Using income range provides better results. The list of range should be standardized to ease comparison and mash-up between systems	subsidy scheme targeting specific income group, safety net eligibility
Main income source	String	Static	0	0	0/0		Subsidy scheme, safety net
Other income sources	Array	Static	0	0	0/0		Subsidy scheme, safety net
Education Level	Enum ⁷	Static	0	0	1/0	Useful to adapt information delivery channel	
Household size	Integer	Static	0	0	0/0		Eligibility to safety net, potential workforce on farm
Agriculture activity start year	Date	Static	0	0	0/0		Extension service
Disabilities	Array	Static	0	0	1/0		Safety net, subsidy scheme
Health information	Array	Static	0	0	1/1		Access to credit
Health insurance	Boolean	Static	0	0	1/0		Safety net, subsidy scheme, access to credit

⁶ The type enum stands for a selection among specific options. In the case of income, a list of income group segment ⁷ For education level, it is particularly interesting to know whether people can read/write

|--|

Field	Data Type	Dynamic/ Static	Need for validation	History	Sensitivity/ Personal	Rationale/ comment	Use
					information		
Phone	Array	Dynamic	0	0	0/1	People usually have more than one phone number (multi-sim multi-operator phenomena) and tend to regularly change their phone number. It is therefore worth updating the information quite often	Communication service
Phone type	Enum ⁸	Static	0	0	0/0		Type of information service
Email	String	Static	0	0	0/1	Email is still not widely used, but this is relevant for e.g. group leaders	Potential information delivery channel
Social Network	Array	Static	0	0	0/1	As smartphones are becoming more popular people starts to use extensively social networks, and SN becomes a viable communication channel	Potential information delivery channel
Data plan	Boolean	Static	0	0	0/0	People might have a smartphone but no data plan. Knowing that someone has a	Potential information delivery channel

⁸ Basic phone, feature phone, smartphone

						data plan is an important information	
Languages	Array	Static	0	0	0/0	This is an essential information for communication. People quite often speak more than one language/local dialect	Potential information delivery language
Preferred communication channel	Enum ⁹	Static	0	0	0/0		best information delivery channel
Preferred Radio/TV Channel	Array	Static	0	0	0/0	The list of preferred channels is important for broadcast approach	best information delivery broadcast channel
Listening/Watching time	Array	Static	0	0	0/0	The time when the person is listening/watching radio/TV is essential for communication	Potential information delivery time on broadcast channels
Mobile Phone Literacy	Enum ¹⁰	Static	0	0	0/0	Important to identify accessible channels (e.g. ussd, sms)	accessible information delivery channel

Location

Field	Data Type	Dynamic/	Need for	History	Sensitivity/	Rationale/ comment	Use
		Static	validation		Personal		
					information		

⁹ Mainly Social Network, smartphone app, voice call, SMS, Radio, TV
¹⁰ It is important to identify people who use only the call function versus those who use messaging (SMS, USSD services) and those using applications on smartphones

Country	String	Static	0	0	0/0		Useful for aggregation across
							countries
Administrative	Array	Static	0/111	0	0/0	depending on the country, this	Location-
location						is composed of 2 to 4 pieces of	based
						information from region to	services
						district to county to commune.	(insurance,
						The lists are usually	weather)
						normalized by the	
						administration and uniquely	
						qualify a place that covers a	
						few villages.	
Village	String	Static	0	0	0/0		Location-
							based
							services
							(insurance,
							weather)
Neighborhood	String	Static	0/111	0	0/0	The neighborhood location	Location-
location						usually provides details on	based
						how to reach the farm in	services
						places where there is no valid	(insurance,
						address scheme. This may be	weather)
						related to a roundabout, a	
						school, or a health center	
GPS	GPS	static	0/110	0	0/1		Accurate
coordinates of	Coordinates						Location-
the farm							based
							services
							(insurance,
	1		1		1		weather)

¹¹ The location usually does not need to be verified if a data collector visits a farmer. However, when the information is provided remotely via e.g. a phone call, this usually needs verification.

F	inancia	l instruments	

Field	Data	Dynamic/	Need for	History	Sensitivity/ Personal	Rationale/ comment	Use
	Туре	Static	validation		information		
Bank	Array	Static	0	0	1/1	Information to be	The ownership of
Accounts						tracked include	a bank account is
						The financial	a useful
						institution	information for
						• The type of	services like
						account (normal	subsidy scheme,
						account, mobile	or access to
						money account)	credit.

Credit information

Field	Data Type	Dynamic/ Static	Need for validation	History	Sensitivity/ Personal	Rationale/comment	Use
Credit Records	Array ¹²	Dynamic/ Static ¹³	0	014	1/1		Essential information for credit scoring
Credit Events	Array	Static	115	0 ¹²	1/1	It is important to measure how often a producer had issues related to credit reimbursement. This can be	Essential information for credit scoring

¹² Each credit is defined by the credit provider, the amount provided, the purpose of the credit and the period of reimbursement

¹³ Usually producers take credit for each crop cycle, this may lead to multiple credits per year.

¹⁴ The principle of this field is to keep track of all credits that a producer had (or all credit events) with the corresponding period and amount. The field is expanding over time and as such it is not necessary to keep track of older values as a new value includes all history

¹⁵ Producers do not usually disclose credit events they have faced. This may need a validation by the credit provider

						linked to specific season challenges.	
Farm Business plan	Object	Static	0	0	0/0	The farm business plan is an essential element to identify and provide a rationale for a credit request, and for reimbursement calendar	Essential information for credit repayment timeline and rational for credit amount
SACCOs/ROSCAs membership	Array	Static	0	0	0/0	SACCOs and ROSCAs are both a potential means for delivering credit and a place hosting credit records for a given farmer	Useful information for access to credit (in particular credit delivery and credit scoring)

Insurance information

Field	Data Type	Dynamic/ Static	Need for validation	History	Sensitivity/ Personal information	Rationale/ comment	Use
Insurance ¹⁶	Array	Dynamic ¹⁷	1	0 ¹⁸	1/0	 Each element contains: The Field(s) covered Risk(s) covered (germination, flood, drought) Insurance company Cost 	Credit scoring, subsidy scheme, safety net

¹⁶ Note that insurance relates to fields and therefore if the insurance information category is used, it requires the field category as well

¹⁷ Insurances are usually subscribed for each season, this is therefore at best yearly, but could be up to 4 times in a year for seasonal crops

¹⁸ The field is expanding over time and as such it is not necessary to keep track of older values as a new value includes all history

	 Amount repaid if one of the risks covered happens Amount effectively repaid for this insurance
--	---

Farm details

Field	Data	Dynamic/	Need for	History	Sensitivity/ Personal	Rationale/comment	Use
Farm Registration Number	String	Static	0	0	0/0	In some countries, and for registered enterprise, the farm has a registration number	Farm identification
Manpower on farm	Array	Static	0	0	0/0	Knowing the number of permanent workers is a useful information for e.g. extension advices or for access to credit. Information to track includes the qualification of the staff and its job on the farm	Extension service, subsidy scheme
Warehouse Information	Array	Static	0	0	0/0	Whether the producer has access to and use one or more warehouse and its characteristics that may impact production/transformation (e.g. cold storage)	Access to credit (repayment), trade services, post-harvest extension service
Equipment	Array	Static	0	0	0/0	Whether there is equipment available on the farm (or shared with others). This includes Post-harvesting and processing materials, planting	Extension services

						material, harvesting	
						material	
Storage	Array	Static	0	0	0/0	It is important to track	trade
						whether the farm has storage	services,
						capacities and what are their	post-harvest
						characteristics. This is useful	extension
						information for trading and	service
						for financial services	
Livestock	Array	Dynamic	1	1	0/0		Knowing
							type and
							number of
							livestock is
							important
							for extension
							services and
							for access to
							credit

Qualification and certification data

Field	Data Type	Dynamic/ Static	Need for validation	History	Sensitivity/ Personal information	Rationale/comment	Use
Certifications	Array	Static	0	1	0/0	It is important for extension and for trading to know which certification and qualification a producer has. Information to be tracked include: • Training/Certification Name/Label • Training/Certification date • Training/Certification institution • Certification period	Extension services, trade services

Field	Data Type	Dynamic/ Static	Need for validation	History	Sensitivity/ Personal information	Rationale/comment	Use
Field Location	String/ Array	Static	1	0	0/0	This can be either an administrative location or a GPS point within the field.	Extension service, certification, insurance, credit scoring
Field size	Number	Static	119	0	0/0		Extension service, certification, insurance, credit scoring
Field geo- fencing	Array	Static	0	0	0/0	The knowledge of the accurate field position is an important element for part of the extension service or for insurance. However, a detailed geo-located map of the field enabled advanced services such as production forecast, or input amount evaluation and automatic calculation of the size of the field. Obviously, the capture of the map is a longer and more expensive process. It is therefore important to identify whether the field location is enough or if the field geo- fencing is preferable for targeted use of profile information	Extension service, certification, insurance, credit scoring
Soil	String	Static	0	1	0/0	It is essential to capture soil quality	Extension service,

Field information

¹⁹ The evaluation of field size is difficult without applying an appropriate technique or using a GPS device

							certification, insurance, credit scoring
Field Ownership	Enum ²⁰	static	0	0	0/0	Knowing whether a field is owned or rented has often an impact on services like access to credit	Access to credit
Land title	Image	Static	0	0	0/0	When available, the capture and manage of land title is an important asset for e.g. subsidy schemes.	Access to credit
Areas under cultivation	Array	Dynamic/s tatic ²¹	122	123	0/0	Information includes the list of areas under cultivation and their size	Extension service, certification, insurance, credit scoring Trade services
Type of watering/ irrigation sources	Array	Static	0	0	0/0		Extension services, insurance, credit

Production information

Field	Data Type	Dynamic/	Need for	History	Sensitivity/	Rationale/comment	Use
		Static	validation		Personal		
					information		

²⁰ Whether the producer owns or rents the field

²¹ The requirements in terms of information update depends on the crop. For seasonal crop, the information needs to be updated 2 to 4 times a year. For a tree plantation, this can be updated every year or less.

²² The measurement of the areas under cultivations is usually required

²³ For seasonal crops, it is useful to track the history of cultivation to select appropriate crops based on soil state

Planting information	Array	Dynamic	0/1 ²⁴	125	0/0	 Information tracked for each area under production includes: Date of planting Spacing Intercropping information Equipment used Amount of seeds Type & variety of seeds 	Extension services, trade services insurance, credit, certification
Production activities	Array	Dynamic	0/121	1	0/0	Information tracked include pest & disease treatments, inputs & fertilizer, activities such as e.g. weeding etc. It may also include when relevant elements such as e.g. water usage	Extension services, trade services insurance, credit, certification
Harvest and Post-harvest activities	Array	Dynamic	0/121	1	0/0	Information tracked include harvest techniques, post-harvest treatment, post-harvest processing	Extension services, trade services insurance, credit, certification
Weather information	Array	Dynamic	0/1 ²¹	1	0/0	It is important to keep track of main weather information such as rainfall, temperature, and hygrometry to relates to yields and to monitor climate change	Extension services
Yields	Array	Dynamic	0/121	126	0/0	 Information tracked includes: Forecasted volume (per grade if relevant) Real Volume (per grade if relevant) Volume sold (if relevant when part of the production if for family consumption or for 	Extension services, trade services insurance, credit

²⁴ It depends the information is provided by the extension agent (or any trusted source) or comes from a self-declaration

²⁵ It is interesting to keep history of the information to measure potential evolution of farmer's practices and impact on yields

²⁶ The field should contain one entry per active area under cultivation or a production (livestock, dairy, etc.). It is important to keep track of yields over time

Business information

Field	Data Type	Dynamic/ Static	Need for validation	History	Sensitivity/ Personal information	Rationale/comment	Use
Cooperatives/ production cluster/ Innovation Platform (IP) membership	Array	Static	0	0	0/0	Tracking Cooperatives and FOs membership is important to organize services such as group buying or group selling	Trade services
Markets	Array	Static	0	0	0/0	The markets that the producers are linked to is useful for trade services	Trade services
Agribusinesses Linkages	Array	Static	0	0	1/0	Whether the producer works with specific agribusinesses (e.g. contract farming)	Trade services
Processor linkages	Array	Static	0	0	1/0	Whether the producer works with specific transformers/ processors	Trade services, post- harvest extension services
Transport Linkages	Array	Static	0	0	1/0	Whether the producer works with transport services	Trade services

Legal information

Field	Data Type	Dynamic/Static	Need for	History	Sensitivity/	Rationale/comment	Use
			validation		Personal		
					information		

Explicit	Boolean	NA ²⁷	0	0	0/0	This needs to be updated each time the	Compliance to personal
agreement for						use or sharing conditions change. It is	data protection legislations
personal data						therefore important to capture last	
capture						update date	
Authorized	Array	NA ¹¹	0	0	0/0	List of sharing agreements that the	Compliance to personal
sharing						farmer has authorized	data protection legislations
agreement							

²⁷ The information does not change at the farm-level and the update is at the initiative of the farmer profiles platform manager when he/she wants to change the data sharing agreement, or when he/she needs to comply to local legislations.

References

The content of this document comes from the compilation of a series of research studies plus a series of prototype implementations or feasibility studies that the authors contributed to. These references are listed below.

Research Studies

Addison, C., Figuères, C., Oweyesiga, H., Muwonge, D., Nsimidala, E., Sezibera, A., Boyera, S., Besemer, H., Pesce, V., Birba, A., Muyiramye, D., CTA Working Paper, June 2020, Data-driven opportunities for farmer organizations <u>https://cgspace.cgiar.org/handle/10568/108356</u>

Boyera, S., Addison, C. and Msengezi, C. 2017. Farmer profiling: making data work for smallholder farmers. *CTA Working Paper 17/09,* CTA, Wageningen, Netherlands. <u>https://cgspace.cgiar.org/handle/10568/89763</u>

Boyera, S., Oweyesiga, H., Addison, C. and Rambaldi, G, CTA Working Paper, May 2020, Farmer registration and profiling: A proposed work package, <u>https://cgspace.cgiar.org/handle/10568/108306</u>

Gray, B., Babcock, L., Tobias, L., McCord, M., Herrera, A., Osei, C. and Cadavid, R. 2018. Digital Farmer Profiles: Reimagining Smallholder Agriculture, USAID, Washington DC, USA. <u>https://www.usaid.gov/sites/default/files/documents/15396/Data_Driven_Agriculture_Farmer_Prof</u> <u>ile.pdf</u>

Case studies

- Boyera, S. Strike2 Summit, Amsterdam, February 2020, Farmer profiling : lessons from 7 initiatives, presentation, Stephane Boyera <u>https://pub.sbc4d.com/2020/Strike2S_sbc4d.pptx</u>
- FEPAB in Burkina Faso <u>https://www.slideshare.net/brusselsbriefings/fepab-agritic-project-west-africa</u>
- Igara Tea Factory in Uganda <u>https://vimeo.com/263101646</u> <u>https://www.cta.int/pt/article/profiling-tea-farmers-in-uganda-sid06fc60f4a-abe5-4783-ac15-7cc51b3e6c4f</u>
- Nucafé in Uganda <u>https://ictupdate.cta.int/en/article/value-addition-through-digitalisation-for-ugandan-coffee-farmers-sid063cfbfb5-a904-4078-a296-4b563772f53c</u>
- Fiji Crop Livestock Council in Fiji <u>https://cgspace.cgiar.org/bitstream/handle/10568/98979/Exp_Cap7_Daunivalu.pdf?sequen</u> <u>ce=1&isAllowed=y</u>

Misc.

Boyera S., Co-author, FAO online course, September 2019, Farm Data Management, Sharing and Services for Agriculture Development, <u>https://aims.gitbook.io/farm-data-mooc/</u>