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# Farmer registration and profiling: A proposed work package

Stephan Boyera, Hamlus Oweyesiga, Chris Addison and Giacomo Rambaldi

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The Technical Centre for Agricultural and Rural Cooperation (CTA) is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). CTA operates under the framework of the Cotonou Agreement and is funded by the EU. For more information on CTA, visit www.cta.int.

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Please address comments on this Working Paper to Chris Addison (addison@cta.int).

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# Preface

This Working Paper is part of a series of publications produced during the Data4Ag project supported by the Technical Centre for Agricultural and Rural Cooperation (CTA), working together with the Pan African Farmers Organisation (PAFO) and AgriCord, the global alliance of agri-agencies, mandated by farmers' organisations.

The Data4Ag project had four components: 1) Field studies, working directly with farmers' organisations in the digitisation of their membership records and farmer profiles; 2) Research examining the existing literature and findings from similar work, in particular farmers' data rights; 3) Capacity building, in particular training those working with farmers' organisations on data driven solutions; and 4) Policy formulation, for example working with the Global Open Data for Agriculture and Nutrition initiative (GODAN) on policy to support the local data ecosystem.

The work with field partners originated from proposals developed during the continental Briefing co-organised by PAFO and CTA in July 2014 in Nairobi and November 2015 in Durban. The purpose of the present Working Paper is to provide information about a possible farmers' registration process as gathered from activities undertaken under the Data4Ag project.

# Description

The proposed work package describes the processes, tools (software, hardware), resources (human, financial) and competencies required for an organisation (cooperatives, agribusinesses, farmer organisations, etc.) to conduct a farmer profiling exercise.

This document builds primarily on the lessons learned from two projects in Uganda funded by CTA and executed by two organisations in Uganda: the Igara Grower Tea Factory Ltd (IGTF)[1], a tea agrobusiness; and the National Union of Coffee Agribusinesses and Farm Enterprises (NUCAFE)[2], an umbrella national coffee farmers' organisation.

The work package focuses on the farmer profiling/registration process, which is only one element of the CTA Data4Ag project. It is linked in particular to the business development work package and the drone work package, when a particular project includes such a module.

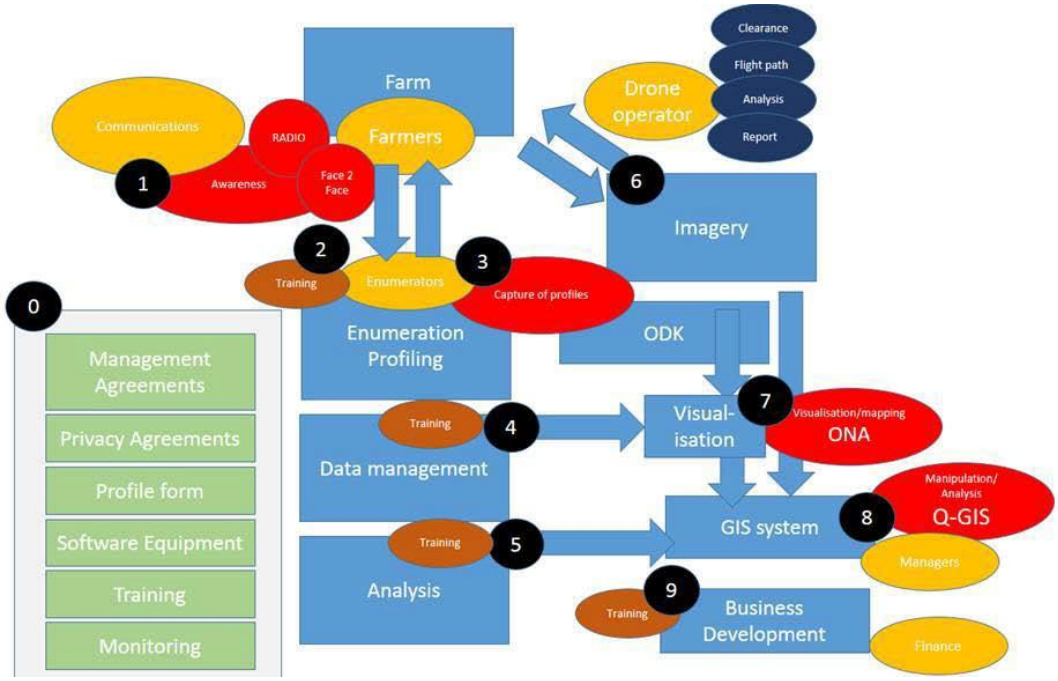
[1] http://www.ugatea.com/igara-tea-factory
[2] http://www.nucafe.org/

# Techniques, processes and procedures

*Any techniques, tools, standards, processes or procedures to be used in the creation of the specialist products*

### Overall technical architecture

After an initial planning phase (0)[3], the process starts by sensitising farmers (1), using both radio programmes and face-to-face meetings. Next comes the identification and training of enumerators (2)[4], considering that not all of them may be able or willing to continue. Enumerators interview farmers (3), informing them of the process and of their rights. This is followed by data management training with Ona software (4) and GIS training (5), after which drones are used to make images of all farms (6). The team needs to manage the Ona system (7) for the duration of acquisition and goes on to analyse the GIS data (8) to develop new services and improve business. A last step considers the development of specific business skills (capacity building), especially covering the use of financial software (9).




The architecture proposed above is only one example of a possible architecture. There are different types of software platforms that could be considered. ODK (Open Data Kit) and Ona are a good option for a census-type approach, and Ona offers a series of functionalities to closely monitor the data collection. On the long term, the subscription fees of Ona may be an obstacle to long-term sustainability. There is an emerging free and open source option developed by the *Collectif stratégie alimentaire* (CSA[5]) called PUMA2 (*Programme unifié de monitoring agricole* V2) published on Framagit[6]. While this package has, at the time of writing this Working

[3] As part of the initial planning phase, local regulations, particularly on personal data protection, should be investigated.

[4] Training of enumerators should include personal data protection best practices, or country-specific personal data protection regulation.

[5] http://www.csa-be.org/

[6] https://framagit.org/jorge/puma2

Paper, some limitations (no offline mode, internationalised but only available in French for now), it is a promising solution for the community, and could, in future, serve as a reference package enriched over time by contributors.

**Equipment**

The exact list of equipment required for the project depends on the current equipment in place, as well as the context analysis. The procurement list in the case of IGTF was:

- One laptop for storage/server and two laptops for data analysis
- Ten GPS tablets
    - 7-inch portrait mode size
    - Some tablets or phones should be secured in case of hardware failure or other unavailability issues (lost, stolen, etc.)
- Power banks for tablets
    - 10000 mAH
- One memory card of 32GB for each tablet
- Airtime for each enumerator to call support. NB: There was no data plan nor SIM put in the tablet as the synchronisation framework was based on enumerators coming back to the factory and using the WiFi network. This should be considered depending on the synchronisation framework adopted
- GPS if GP tasks are separated from enumeration
    - Oregon 750 Garmin
- Three external drives for external backup (2TO) – for drone images
- Waterproof bag for tablets
- Clothing for enumerators (raincoat, t-shirt, etc.)
- Stabilised mobile generator to charge power banks in remote places during collection (usually attached to a vehicle)
- Tablet software
    - Information security: software on the phone to protect data collected in case of loss of equipment (software Surefox Pro). The software has two roles:
        - preventing the use of the tablet for other purposes by the enumerators
        - preventing the use of the tablet by non-enumerators
- PC software
    - Ona platform: unlimited licence plan for at least a year

**Human resources**

The exact list of staff to be involved depends on the specific local conditions and project scope. In the case of the IGTF project, the following staff were involved.

*Organisation*

Executive project manager who has the authority:

- to engage the organisation in an MoU and to hire staff
- to manage, validate and sign financial and activity reports
- to engage financial resources of the organisation
- to all departments of the organisation (from the IT department to field officers)
- time allocation: 95% FTE

Technical project manager with the following characteristics:

- IT specialist who can manage all technical aspects of the project
- Knowledge and experience to interact with all departments of the organisation, in particular field officers
- Knowledge and experience to interact with the organisation's partners, for instance technical partners
- Knowledge to do data analysis
- Time allocation: 95% FTE

*Staff*

- Agronomist

- Enumerators (the number of enumerators is based on the expected length of the collection phase)
    - Profile requirements:
        - Project focus (youth, gender balance)
        - ICT literacy and familiarity with gadgets
        - Knowledge of the geographical area
        - Knowledge of the community local language
        - English speaking and writing skills (certificate level)

      Note that enumerators might also be staff from outside or staff working for a technical partner.
    - An enumerator can map four to five farmers per day if he or she focuses only on form filling or on farm (garden) GPS mapping. The number may be slightly lower, depending on specific conditions such as crop, number and size of fields, geographical location (travel time), or weather conditions.
    - If GPS mapping is part of the profiling exercise, it is recommended that the mapping is conducted at the same time as the form filling.
    - The final number of enumerators trained should be higher than the calculated number to manage dropouts, unavailability, sickness or underperformance. An increase of 50% more enumerators is recommended.

- Field extension personnel

- Data analysts
    - Time allocation: 75% FTE

- If the project includes a drone module (see the drone work package)
    - Remote sensing specialist to manage and provide expertise on lens for drones to generate the relevant pictures for detecting specific

crop/commodity conditions, etc.
    - Drone pilot

*Technical partner*[7]

A number of technical staff: in the case of the IGTF, three staff from the technical partner were assigned to the project for training and support.

- Time allocation (on average): 50% FTE

**Capacity building**

*Organisation*

- Personal data protection best practices or local regulations if these exist

- Business development: providing a rational and a focus for the profiling exercise. This includes the identification of services that will be built on profile data, and their requirements in terms of data points or other elements such as a validation process. See business development work package

- Technical training
    - GIS
    - GPS
    - ODK/Ona
    - Data analysis
    - If there is a drone module: see the drone work package capacity building section

- Awareness training
    - Field agents to know which information is collected and for what purpose

*Enumerators*

- Personal data protection best practices or local regulations if these exist

- ODK form filling: 4 days with hands-on exercises with notes (slides)

**Budget**

The following elements should appear in the project budget.

*Human resources*

- Organisation's staff resources
- Technical partner's staff resources

*Equipment*

- Organisation
- Technical partner

[7] The choice of technical partner should take in consideration personal data protection regulations. For example, some regulations prevent the transfer of personal data to a foreign country, impacting the ability for a foreign technical partner to access and use the data.

*Travel*

- Organisation's travel and daily allowance
    - Profile
    - Meeting with farmers
    - Meeting with local government authorities (LGA)
- Enumerator's travel and daily allowance
- Technical partner's travel and daily allowance

*Profile costs*

- Collection costs (the amount given per profile to enumerators)
- Data costs (depending on the synchronization framework)
- Farmer's dossier
- Drone costs if relevant (see the drone work package)

*Activities costs*

- Radio spot budget
- Farmer meeting costs
- Training logistics costs
- Advisory group logistic costs

*Miscellaneous costs*

- Printing budget for printing large maps and farmer profiles to return to farmers
- Airtime for enumerators

**Tasks**

*Project management*

- Identify existing regulations: regulations that impact data collection such as personal data protection regulations should be reviewed, and constraints identified. If there isn't any regulation in the country, it is recommended to implement personal data protection international best practices

- Authority involvement
    - Involve the LGA at the very beginning before going to the field to get approval and raise awareness

- Setting up the project advisory group
    - Farmers' representatives to evaluate benefits of the product
        - Profile
        - Services on top of the profile
    - Organisation representative to check whether the project supports business development as planned
    - Donors to evaluate the outputs and outcomes of the project
    - LGA and national governments to channel project results and influence future policies or replications to a larger set of agribusinesses

- Defining the M&E plan

- Activities
- Impact (output and outcomes) – to be based on the Data4ag M&E plan

*Evaluation of the organisational infrastructure and capacities*

- ICT equipment
  - Server
  - Network
  - Power supply/backup
  - Data security and backup

- Internet connectivity
  - Bandwidth (speed)
  - Cost (unlimited or size-based)
  - Reliability
  - Stability

- IT capacities
  - Available resources
  - Level of the resources: using internet, smartphone apps

- Farmers' environment
  - Number of farmers to map and their location
  - Connectivity around the location to define the synchronization framework

At the end of this process, the following elements will be established:

- Overall architecture for the ICT platform and for the profile synchronization
- Procurement plan for equipment
- Capacity building plan for staff

*Profile content*

- Definition of the objectives of the profiling exercise **(**linked to the business development work package)
  - For what will the profile be used?

- Definition of the profile fields
  - Use of a profile template
    - See Farmer profiling: Making data work for smallholder farmers
    - See IGTF profile example
  - Adaptation of the template
    - Business model and objectives
    - Project needs
    - Datasets already managed by the organisation
    - Select only useful data (i.e. the complete but smallest profile is the best one) to avoid largely empty forms
    - Consider other parties' potential interests (governments, donors)
  - Validate the template with field extension officers to be sure all information required to support their activities is captured
  - Finalise the content
    - Identify information that farmers may not want to disclose to make

it optional
        - Identify elements that may be duplicated in the same profile (e.g. a farmer may have multiple fields)
        - Add specific fields that may be required to comply to local personal data protection regulations. E.g. explicit consent to data collection, provision of information related to opt-out mechanism or use of information
    - Implement forms in ODK and upload these in tablets

At the end of this process, the profile content is designed, the Ona platform set up, and the tablets loaded with forms.

**Profile collection and management**

***Pre-collection phase***

*Farmer-level*

- Awareness-raising activities
    - Radio spots
    - Talk shows with LGA
    - Advertisements that describe the activities and underline the opportunities/benefits of the profiling
    - Advertisements on activity scheduling to be placed at collection points

- Farmers' meetings
    - Process presentation
        - Why is the profiling happening (benefit for farmers)?
        - Who will do the profiling? Introducing the way to identify enumerators
        - Where will it happen?
        - When will it happen?
        - Process description
    - Data privacy and protection guidelines presentation
        - Signing an agreement between each farmer and the organisation might be too long but appropriate in some countries
        - Organisation should consider including the membership agreement signed when joining the organisation/cooperative/etc. with a link to the code of conduct
        - In the same way, the profile capture should be part of the membership agreement

*Enumerator level*

- Identification of enumerators
- Agreement signing with enumerators
- Training of enumerators

*Organisation level*

- Scheduling
    - Split the geographical zone in different geographical subareas based on administrative level (the right administrative level depends on the country as well as the internal geographical split in place within the organisation). This defines the series of areas that the team of enumerators will cover in

the timeline
    - Split the subareas in centres
        - Attach centres to one enumerator
        - Define the timing of centres for each enumerator based on the number of farmers in the centre

***Collection phase***

- Phase the work based on the organisation's constraints due to seasonal activity (optional, depends on the specific crops/timing)

- Check the profile quality on a weekly basis
    - Upload
    - Extract and do data analysis
    - Send the same people back to redo the profiling

- Build and provide a physical output of the profile (farmer dossier) to the farmer

***Data analysis***

- Exploitation of profile data for the business cases identified

# Development interfaces

*Interfaces that must be maintained while developing the products. These may be people providing information or those who need to receive information*

- **Technical project coordinator – enumerators**: the technical project coordinator checks the profiles collected weekly and sends enumerators back in case of quality issues

- **Enumerators – field manager**: the field manager drives the enumerators' activity in the field
    - Field agents introduce enumerators to farmers

- **Technical project coordinator – project advisory group**: the advisory group will follow the development and output of the project

- **Technical coordinator – technical partner**: the technical project manager drives the relationship with the technical partner and organises schedules (training) and support requests

# Operations and maintenance interfaces

*Identification of any specialist products with which the product(s) in the work package will have to interface during their operational life. These may be other products to be produced by the project, existing products, or those to be produced by other projects (for example, if the project is part of a programme)*

Update of profiles, based on:

- A query from a farmer via the field extension officer who called the technical project coordinator who mobilised the enumerator
    - New fields, split the field, etc.
    - Heritage/death
    - Selling of fields

- Organisational needs
    - Data analysis shows that some information is missing
    - Detection of issues
        - Theoretical yields versus real yields
        - Double profiling
        - Double claiming (same garden belonging to different farmers)

## Configuration management requirements

*A statement of any arrangements that must be made by the producer for: version control of the products in the work package; obtaining copies of other products or their product descriptions; submission of the product to configuration management; any storage or security requirements; and who, if anyone, needs to be advised of changes in the status of the work package*

# Joint agreements

*Details of the agreements on effort, cost, start and end dates, and key milestones for the work package*

**Agreement between the organisation and farmers: organisation's data privacy and protection guidelines, and code of conducts**

- Drafted based on the country's legal framework

- Based on data use and sharing with third parties
    - The organisation should record and document all data sharing arrangements with third parties and mention them in the data privacy and protection guidelines
    - The code of conduct describes processes to add new data sharing agreements and get them validated by farmers

- On the long term
    - The guidelines and the organisation's code of conduct should be integrated in the membership agreement
    - The profiling is part of the membership agreement process

  Example: IGTF data privacy and protection guidelines

**MoU with technical partner**

- The MoU should include a data section that prevents the technical partner to use and record data collected on behalf of the organisation

The choice of the technical partner is based on a series of criteria:

- The location of HQ: the firm should operate in the country
- Experience and knowledge of tools (Ona/ODK/mobile)
- Staff knowledge and experience
- Available budget

Tasks that are usually for the technical partners:

- Setting up platform and tablet
- Training enumerators
- Delivering technical training to the organisation
- Technical support of organisation staff

NB: Maintenance of equipment is usually not part of the support tasks

**Enumerator contract**

- Process of synchronization (minimum periodicity)

- Data section that prevents enumerators to record or exploit the data they collect on behalf of the organisation

- Section on the material provided
    - List of material provided
    - Authorised usage
    - Reimbursement in case of lost/damage/theft

- Financial incentives
    - Price per profile
        - €2 to €3/profile seems to be an acceptable level
    - Payment modality
        - The IGTF adopted a weekly payment based on profile quality
    - Other financial elements
        - Airtime to access support
        - Daily allowance
        - Transportation

- Non-financial element
    - Clothing (raincoat, t-shirt for visual recognition)

## Tolerances

*Details of the tolerances for the work package (the tolerances will be regarding time and cost but may also include scope and risk)*

## Constraints

*Any constraints (apart from the tolerances) on the work, people to be involved, timings, charges, rules to be followed (for example, security and safety, etc.)*

- Daily backup of data
- Weekly profile data quality check during the collection phase
- Equip enumerators so that they can be easily recognised to build trust with farmers:
    - Visual for enumerators to build trust:
        - T-shirt with a specific design
        - Each enumerator may have a specific ID describing the activity

    (This should be adapted to country-specific contexts as, for example, sometimes being too official might be counterproductive)

# Reporting arrangements

*The expected frequency and content of checkpoint reports*

- Profile data collected on a weekly basis must be checked on a weekly basis and enumerators paid accordingly

- Security and audit of servers and tablets
    - Cyber security
    - Disaster and recovery procedures
    - Physical security plan

# Problem handling and escalation

*This refers to the procedure for raising issues and risks*

- Data security and protection
    - Cyber security
    - Physical protection
    - Backup
        - Onsite
        - Offsite
    - Environmental risks
        - Power
        - Weather (temperature, humidity, etc.)

- Profile quality check
    - Profiles are checked weekly
    - The same enumerators go back to the farmers in case of problems

- Profile incoherency
    - Data analysis of the profiles showing incoherency
        - Duplicated profiles
        - Duplicated gardens
    - Enumerators or field agents to back to fix errors
    - Output of farmers are too far from the theoretical output: field agents should go back to check

**Common lessons**

While each project is different in terms of objectives, scale, type of organisation or geography, there are a series of common lessons that emerge from almost all Data4Ag projects. These lessons are presented below.

**Lesson 1 – Profiling is beneficial to farmers' organisations**

For all organisations, the profiling project was beneficial and instrumental to unlock new opportunities in the form of new projects funded by other stakeholders/donors. The study identified the following two specific elements:

1. The development of a profiling project demonstrates the capacities of the farmers' organisation (FO), usually acquired as part of the project, to organise large-scale data collection and use ICT tools to collect field data. This situation creates opportunities for FOs, and many of them were involved in similar tasks after the profiling project and were able to establish new partnerships with governmental agencies/ministries and/or international organisations.

2. The profiling data is valuable and can be used for other purposes. The profile content is useful for other types of intervention than the one originally targeted as part of the CTA project. Some of the FOs were then involved in subsequent initiatives thanks to the data they gathered in the profiling project. However, this aspect has to be mitigated with Lesson 2 related to sustainability, and Lesson 7 related to business intelligence service.

**Lesson 2 – Sustainability comes from financial impact of the profiling task**

Despite the positive outcome mentioned above, less than half of the organisations (three out of seven) studied were not able to continue the project after project funding ended. While they still use the information, the value decreases quickly over time as information becomes outdated. The four other organisations have really internalised the profiling task and have changed the way they work. A more detailed analysis shows that there are common characteristics between projects that led to organisational changes, and there are also common characteristics between projects that got stalled after the end of the project.

- Large-scale data collection is a costly task. The cost per profile slightly varies from project to project but is usually over US$5 per profile. While it might be possible to get external funding to do a first collection, a recurrent update conducted like a census cannot be sustainable. It is far easier and cheaper to collect information on request across the year and via existing communication channels between the FO and its members, compared to organising a census-like process.

- The main condition for such behavioural change to appear is the usefulness of the profiling task. When farmers can directly link the provision of their data to the access of valuable services for them, they naturally become proactive. This requires two things:

    - A critical mass of people having been profiled and having access to useful services: they in return serve as shining examples and a driver for others, through word of mouth.

    - The services provide direct measurable personal benefit to the farmer. Based on these seven projects, such services include at least:

        - Access to cheaper input at the right time
        - Access to credit
        - Access to new markets or new business linkages.

- As a result of the above, one of the main lessons is that profiling should be considered as a tool to implement value-added services for farmers. Those services have to be used as the drivers to design the profiling task and not the other way around where profiling is designed without considering future services.

- The sustainability of the project is obviously also highly dependent on the operational cost. Sustainable projects are those with extremely limited operational costs, in particular on the following budget line:

    - Software: there is no software with a monthly/yearly subscription (i.e. software using a SaaS model).

    - Human resources: there is no staff dedicated to profiling. Data is collected by field staff or staff already in contact with farmers. ICT staff are staff that are not dedicated to profiling but common staff in the organisation.

**Lesson 3 – Personal data protection legislations have a major impact on profiling and should be considered at the early phases of a profiling project**

Farmer profiling includes capturing personal data. In that regard, such tasks have to comply to legislations on personal data protection when they exist. FOs who have been collecting member information since decades are not necessarily aware of such legislations or did not realise that they had to comply with it. CTA awareness raising on that matter, as well as dissemination of information on new legislations (e.g. in Uganda) were essential for that matter. Some organisations did proactively implement some best practices related to personal data protection and some had to apply corrective measures after data collection.

**Lesson 4 – The domain lacks a free and open source reference technical platform for farmer profiling**

Almost all the organisations are facing major challenges with the technical platform they use. They used different platforms and experienced different challenges that can be sorted in the following three categories:

- Financial challenges: a lot of platforms use a SaaS model that requires a monthly subscription. These costs are usually high, and all organisations who opted for this solution for the project implementation stopped their subscription at the end of the project. It is important to note that a SaaS model is not necessarily a bad option. On the contrary, for project implementation it offers an extremely attractive time/cost/effort/functionality ratio. In the same way, for census-like activities, pay-for packages provide dashboards and analytics that are critical for monitoring and the final data quality. However, such an option severely impacts the long-term sustainability.

- Technical challenges: many platforms lack features that make them hard to use in the field. Challenges include:

    - The need to have access to a stable internet connection during data collection
    - The lack of different access levels for decentralised organisations with regional/district level organisations.

- Legal challenges: the use of online services poses a series of challenges related to personal data protection that usually requires that personal data do not cross borders and/or are not stored outside the country. This element is developed in more detail in Lesson 3 below.

Another element that appeared in a couple of projects is the fact that profile data are useful for higher-level services, like access to credit or market linkages. Those services have their own online platform, but it is usually hard to create linkages between the profile platform and those service platforms leading to duplication of data and desynchronization. Similar desynchronization also appears when data is replicated at different places and updated from these places.

At this point in time, there isn't any open source software solution that meets all requirements. There are pay-for fully integrated solutions[8] or companies like

[8] See e.g. https://www.sourcetrace.com/

Jokalante[9], a Senegalese start-up, that have an integrated service platform but none of these solutions are dedicated to profiling only. There are free modules like ODK[10] for data collection, but these need to be integrated in a larger solution.

There are also international initiatives like Blue Number[11], originally developed by the United Nations together with GS1, which was then transformed in an independent entity that is currently developing a global concept of profiling for traceability but a reliable complete set of tools is not available yet. The only open source and free farmer profiling package is the one developed by *Collectif Stratégies Alimentaires* (CSA[12]) called PUMA2 (*Programme Unifié de Monitoring Agricole* V2) published on Framagit[13]. Given the challenges and opportunities, there is great opportunity for a free and open source platform to develop and meet all requirements. This, together with the documentation of projects like this study and the development of a how-to guide like the recent MooC by FAO and CTA[14] will likely ease and therefore support the development of profiling by FOs.

**Lesson 5 – Profile content should be designed through a multi-stakeholder process**

As presented in some of the points above, the setup of a profiling project and the corresponding profile data collection is a long and expensive project. The only way to really make this task sustainable is to create services around the profile data. Each type of services requires specific data points. Few organisations realised that the profile information did not have the data points they needed for specific services. Moreover, as presented in Lesson 2 above, the sustainability model usually requires a first investment to capture a critical mass of profiles. It is therefore important to ensure that this investment will cover as many players and use cases as possible to increase the sustainability.

The profile content should therefore be carefully designed ahead of the implementation and the data collection. This design should implement a multi-stakeholder approach to ensure that the profile would fit more actors and therefore would lead to more services and finally support a long-term sustainability.

**Lesson 6 – Profile data update is problematic**

While the organisation of data collection in the form of a census is relatively easy, the update of the profile information is more problematic. The information lifetime is usually short and for seasonal commodities part of the profile information needs to be updated a couple of times per year. There are two main challenges:

1. Financial challenge: as presented in Lesson 2 above, it is not financially sustainable to run regular census-type campaigns.

2. Technical challenge: related to Lesson 4 above, there is not yet, among the software solutions used in the reviewed project, a software solution that would

[9] http://jokalante.com/

[10] https://opendatakit.org/

[11] https://www.bluenumber.com/

[12] http://www.csa-be.org/

[13] https://framagit.org/jorge/puma2

[14] http://aims.fao.org/activity/blog/call-applications-online-course-farm-data-management-sharing-and-services-agriculture

allow a field agent to access, review and update a profile in the field without internet connection.

**Lesson 7 – The potential of business intelligence services on top of profile data is still to be demonstrated**

Almost all reviewed projects plan to increase the sustainability of the profiling task through the setup of a business intelligence service developed on top of the profile data. However, none of the projects has successfully set up such a service, and there is also no example in the literature of such services being successfully developed.

It is understandable that such services look very promising if one sees the profit of companies like Facebook whose business model is based on this principle. However, there are specific constraints or requirements to set up such a service.

At this point in time, this is still a largely unexplored area. There are clear opportunities, but the development of a business intelligence service is not a quick win or a low-hanging fruit. Specific investigations have to be conducted, products identified, and business models established and validated in the field. The best results will come from the integration of such an analysis at the early phases of the project.

For a more detailed discussion of these findings, please refer to the CTA Discussion Paper, to be published later in 2020.

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