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Digital farmer registry and tailored extension and advisory services in Ethiopia: A process evaluation

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Introduction

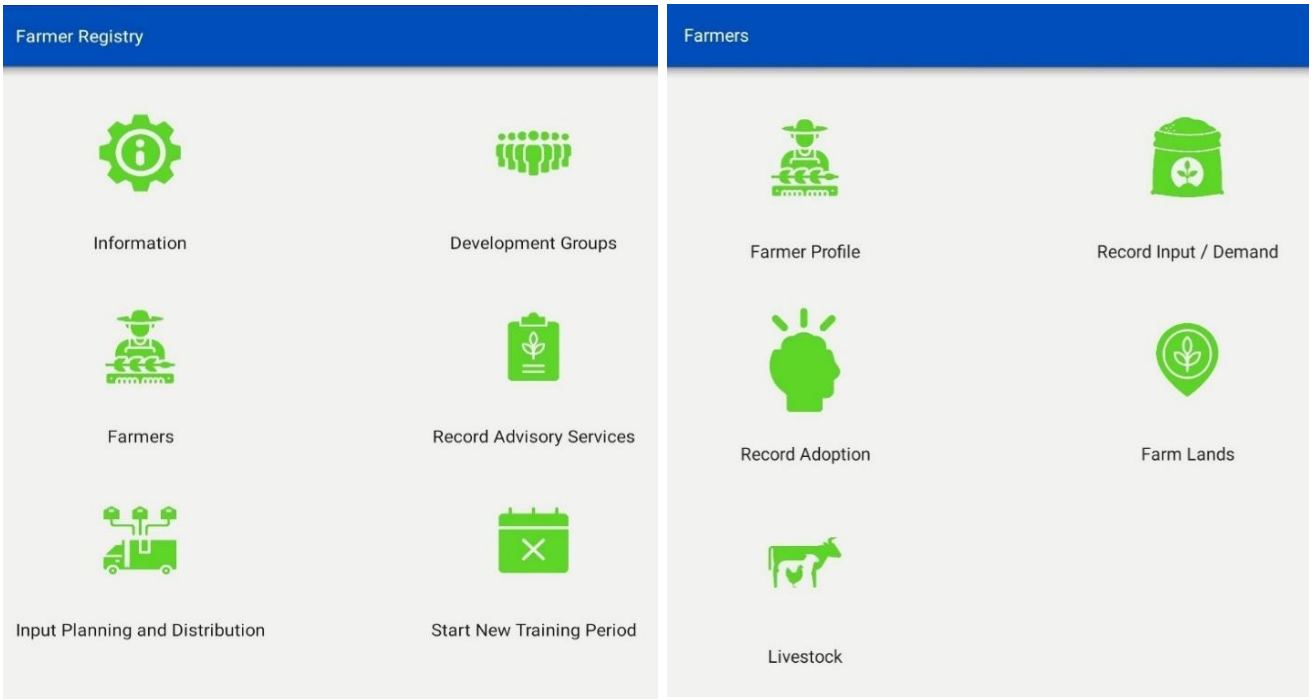
Ethiopia hosts one of the largest extension systems in Africa, with approximately 43 development agents (DAs) per 10,000 farmers, more than 15,000 farmers training centers (FTCs) that serve as a focal point for agricultural development activities at the local level, and 25 Agricultural Technical Vocational Education and Training (ATVET) institutes that prepare and update extension staff in both general and specialized fields of expertise (Berhane et al. 2018; ATA 2014; Davis et al. 2010). DAs reportedly reach more than 75% of farm households in the country (CSA 2017), and every kebele hosts an average of three DAs, each with his or her own specialization.

However, there are concerns about the quality of extension and advisory services DAs provide mainly because DAs are overburdened and under-resourced. DAs actively engage in activities that do not typically fall under the mandate of agricultural extension services, including the collection of taxes, loan repayments and mobilization of labor for public works. A related concern is the simple "technology-push" approach to agricultural intensification followed by most DAs since they do not have the time to closely know the farmers and provide a more "tailored and knowledge-driven" advisory that puts farmers' priorities and technical capabilities at the center of DA's effort (Berhane et al. 2018; Bachewe et al. 2017).

The farmer registry pilot project

The digital farmer registry, being piloted by Digital Green and the Ministry of Agriculture (MoA), aims to address some of the concerns related with the existing extension approach through facilitating provision of demand-driven extension and advisory service. The core activities during the piloting stage include developing a user-friendly application and web portal, mobilizing and training government functionaries to use the application (mainly DAs), and providing backstopping support. While MoA provided the logistics required for implementing the registry, Digital Green catered to the training and technical support throughout the implementation process.

Figure 1: Farmer registry application (left) and farmers module (right)



Note: Information: register DA and DA leader information. Development groups: register development groups and members. Farmers: register farmers and their associated livestock, plot and input demand as well as view farmers list. Record advisory services: record advisory services provided. Input planning and distribution: Records input planning and distribution. Start new training period: reset the farmer training data for a new year or production season. Farmer profile: register farmers profile including farm household characteristics and farming type. Record input/demand: records inputs. Record adoption: records adoption of technologies and practices. Farm lands: record information about farm plots/parcels. Livestock: records livestock information.

Source: Digital Green.

The pilot project introduced a digital registry tool mainly used by DAs to create and maintain an up-to-date farmer profile including participation in extension meetings, training and adoption of recommended technologies and practices, among others (Figure 1). The registry has a mobile application with a wide range of functionalities used by DAs at the kebele level and a web portal for automated programmatic reporting and user (DA) monitoring and supervision at the local, regional, and federal levels. In addition to facilitating data generation and sharing, the application is expected to significantly reduce the effort DAs spent on data collection and report writing, which accounts up to 20% of their time (Berhane et al. 2018). Moreover, equipping DAs with such types of digital solutions is expected to enhance their motivation and enable them to be more effective, increasing the impact and visibility of their work.

The pilot was implemented in four woredas across three regions (i.e., Amhara, Oromia and SNNPR) in May 2022. Five kebeles from each woreda, and three DAs from each kebele were selected to take part in the pilot. At the time of the survey, about 60 DAs in 21 kebeles and selected subject matter specialists from each pilot woredas and zones were trained on how to use the application.

Data and Methods

Drawing on qualitative and quantitative data collected from DAs (60), farmers (174), and information users (16) both from pilot and adjacent non-pilot kebeles, we assessed the pilot implementation process, and the effect of the digital farmer registry application on DAs' ability to provide tailored and knowledge-driven extension and advisory services. Data were collected from the four pilot woredas four

to five months after the implementation of the pilot project. Despite a short duration between the implementation and the process evaluation to discern full impact, we draw important lessons related to the implementation process as well as indicative results on the potential of the farmer registry in enabling tailored and knowledge driven extension services provision.

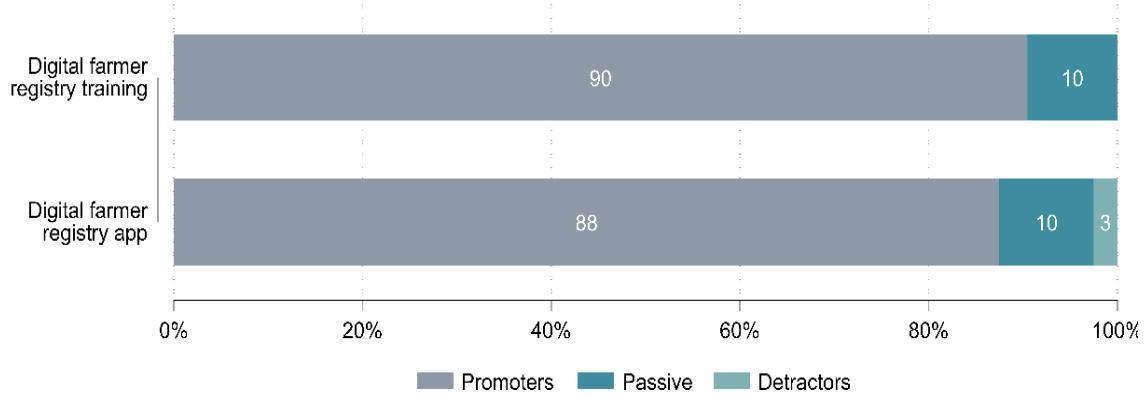
Key results

The main results/highlights from the process evaluation include the following:

- DAs' ability to use the digital farmer registry application.

The capacity building training provided by the project is instrumental not only in enabling DAs to use the application but also in improving their digital and communication skills. Most of the DAs from the pilot implementation were using the application independently by the time of the assessment. Moreover, half of the DAs stated that they have trained fellow DAs on the use of the application. DAs were also questioned about the degree to which they recommend the capacity building training to other fellow DAs on a 10-point scale, which we grouped into three promoter scores: promoters (9-10), passive (7-8), and detractors (6 and below). As shown in Figure 2, most DAs highly recommended the training with a Net Promoter Score (NPS) of 90%. While DAs overall appreciated the content of the training, some of the DAs indicated the time during which the training was provided (i.e., peak season) and poor internet connectivity limited their ability to fully exploit the training potential. They suggested that future capacity building training (in digital solutions) should consider the seasonality of DA work schedules along with internet connection availability.

Figure 2: Promoter score of DAs on digital farmer registry training and application



- The application's relevance to DAs work.

Both DAs and woreda level functionaries show strong interest in the application. DAs specifically indicated the modules in the application facilitate the collection of relevant information that closely align with their day-to-day activities, which they can use to customize their extension and advisory services. Report users at the woreda level, on the other hand, highlight the value of generating accurate and timely information for data driven decision making. Like that of the application training, the vast majority of DAs highly recommended the application to other DAs with NPS of 88% (Figure 2).

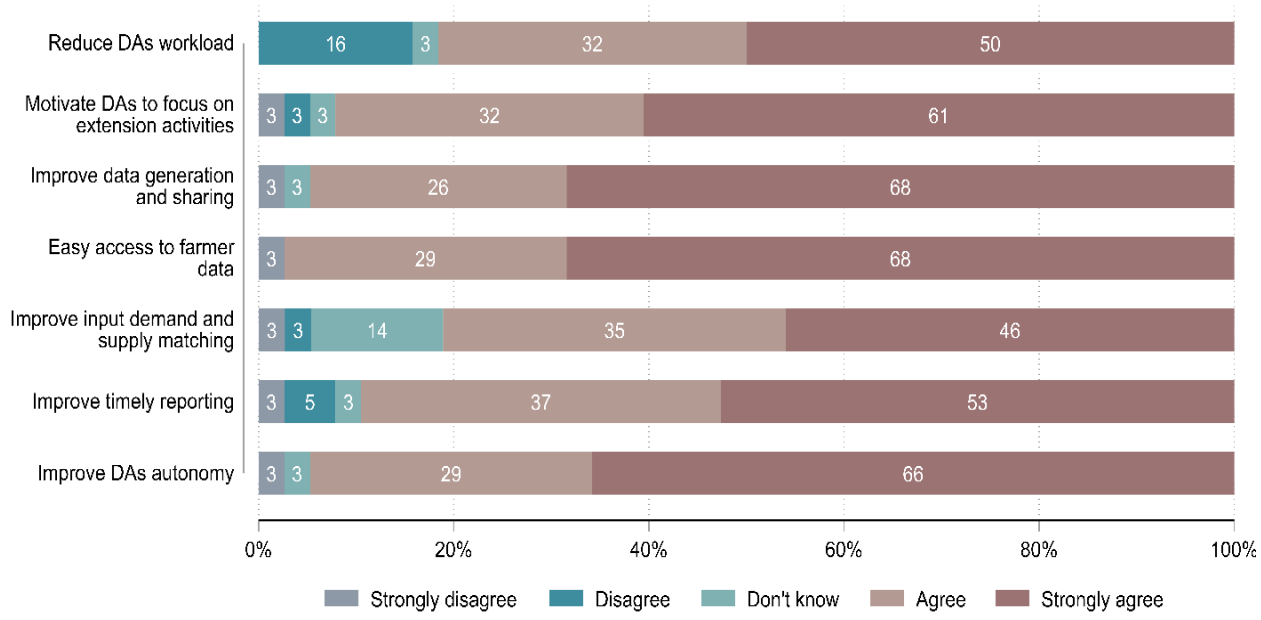
- User-friendliness of the application.

Almost all DAs who partook in the pilot were using the farmer registry application and registered more than 13,800 farm households in the four pilot woredas (21 kebeles) during the first 3-4 months, although following different approaches – i.e., most DAs digitize the existing paper-based records and contact the farmers when the existing paper-based information is incomplete, while some DAs record all the information in the registry directly from farmers. Irrespective of the registration approach, most DAs reported comfort using the application (almost on a daily basis) independently with no need for additional support. Moreover, about half of the DAs indicated that they have supported/trained a fellow DA on the use of the application. However, DAs raised concern on the capacity of the devices they received (e.g., the tablet processing speed) and internet connectivity in remote kebeles.

- DAs' perception of the potential benefits/impacts of the application.

Since it is too early to assess the impact of the farmer registry application on DAs' workload, motivation, and ability to provide tailored extension services, etc., we asked DAs about their perception of the potential benefits of the application. As shown in Figure 3, most DAs respond in the affirmative that the digital farmer registry has the potential to reduce their workload (82%), help them focus on extension activities (93%), improves data generating and sharing (94%), help them to easily access to farmer's data (97%), improve timely reporting (90%) and enable them to be more autonomous (95%). DAs also indicated that the registration process gives them a snapshot of the farmers they serve and cater to their demands better. We observed incipit tendencies to provide customized extension services by DAs that register farmers afresh using the farmer registry application, suggesting that registering farmers directly via the application might lead to DAs better knowing their clients and providing customized extension services to them.

Figure 3: DAs perception on the potential benefits/impacts of the digital farmer registry application



- The quality of data recorded in the digital farmer registry application.

While most DAs uphold the opinion that the data recorded in the farmer registry is accurate and reliable, the results based on the data validation exercise indicated some discrepancies between the application data and self-reports by farmers. These discrepancies may be partly attributed to the approach most DAs followed in the registration process (i.e., relying on digitization of existing written records that are not up to date). As more and more of the data is directly recorded and updated directly onto the application, we can reasonably expect the data quality to continuously improve. Some of the discrepancies could also be attributed to farmers' misperception about the Farmer Registry's objecting, resulting in potential misreporting. That said, the results from the comparative analysis between pilot and non-pilot kebeles reflect indicative results of possible improvements in data accuracy of digital farmer registry.

- Key challenges DAs faced during the pilot implementation.

DAs reported numerous challenges that limit the effective implementation of the pilot. The main challenges include limited institutional support from the bureau of agriculture, farmers misperception about the objective of the registration, poor mobile and internet connectivity in remote locations, shortage of tablets and device malfunction, and limited backstopping support. Another important concern indicated by DAs is the time intensive farmer registration process, and the limited possibility to engage or leverage farmer group leaders like in the case of paper-based data collection.

Conclusions

Ethiopia’s extension system is the largest in Africa in terms of the work force and resources deployed, with DAs reaching approximately 75 percent of farmers in the country. Yet, there remain concerns about the quality of extension services DAs provide mainly due to mismatch between DAs workload and resources. Because of the time constraint and lack of systematic data generation and sharing mechanism, DAs do not usually know their farmers enough to provide customized extension and advisory services. To address some of these concerns, Digital Green, in collaboration with the MoA, introduced and piloted digital farmer registry, an application with wide range of functions including a mobile app which enables DAs to create and maintain farmer profile and extension data along with a web portal capable of backend analytic and user monitoring. Drawing on qualitative and quantitative data from DAs, farmers, and information users from pilot and adjacent non-pilot kebeles, we assess the pilot with a focus on the implementation process (e.g., the rollout of the pilot), reliability of the data collected through the farmer registry application, and its initial effect on DAs ability to provide customized extension and advisory services.

Our results indicate a strong buy-in for the application among DAs and information users, with DAs reportedly gaining an array of benefits both from the technical training and the rollout. Most DAs started registering farmers data using the app at the time of the assessment and found most of the functionalities to be user-friendly. Initial assessment also indicates that the application helps DAs know their farmers better as compared to the traditional approach. On the other hand, although the various functions of the web portal including report generation, user monitoring and backend analytics were expected to be tested at the pilot stage, woreda information users did not use the web portal at the time of the survey due lack of adequate technical and logistic support.

Initial quality assessment of the registered farmer information paints a mixed picture. Such data quality issues may arise due to the registration approach followed by DAs and farmers' perception about registration, among others. DAs did not follow a uniform approach. A sizable share of DAs partly digitizing the existing paper-based records about farmers meant that any inaccuracies in the paper-based data were carried over to the digital registry. This problem can potentially be mitigated by putting in place a standard registration approach, preferably recording all data directly from farmers. Relatedly, farmers were generally skeptical that the registration may have implications on tax payment and land redistribution and may have opted to give inaccurate information. Therefore, collection of data from farmers should be preceded by provision of adequate information to farmers on how the data will be used. Designing mechanisms to adequately inform and persuade farmers would smoothen the scale-up process and improve the quality of information collected from farmers.

DAs also faced several other challenges in the registration process including inadequate institutional and limited backstopping support. It is important to address these challenges through provision of adequate training, availing the necessary equipment, creating awareness about the registration, and institutionalizing the use of the farmer registry application at all levels. It is also important to rigorously assess the impact of the farmer registry on provision of tailored extension and advisory services before scaling up.

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