East African farmers to benefit from using mobile phones to record yields

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Smallholder dairy farmers participating in dairy hubs supported by East Africa Dairy Development (EADD) in Kenya and Uganda are set to benefit from an innovative and interactive mobile-based system allowing them to effectively record farm events and gain access to productivity-enhancing information and services. The EADD project (phase II) is implementing a mobile-based system, *Ng'ombe* Planner, to gather monthly data from a set of farmers, necessary for the project's monitoring exercise in Kenya and Uganda. In Kenya, EADD implemented the survey in conjunction with Kenya Dairy Farmers Federation (KDFF).

Designed and developed to incorporate all the parameters which need to be collected during the monitoring period (2015 to 2018 when EADD II project ends), Ng'ombe Planner is a customized farmer-centric mobile-based data collection tool which enables farmers to record their farm events on their mobile phones. In Uganda, the tool was translated into Nyankole and Lusoga languages, the predominant languages in EADD II sites in Uganda.

Covering about 475 dairy farmers in 19 project sites (4 EADD and 3 KDFF sites in Kenya, and 12 EADD sites in Uganda), the system design goes beyond traditional forms of data collection where farmers are simply respondents who provide data. The tool's strength lies in its capability of moving from mere information extraction to having a conversation with farmers. Farmers record specific data on productivity, feeding and on-farm cow incidences. The recorded data is then analysed and used to produce relevant information that is shared with the farmers through the same means, their mobile phones. The farmers can use the feedback to improve their husbandry practices. Some feedback, for example records of disease incidences and signs of oestrus, are instantaneously shared with extension officers who can then offer prompt assistance to the farmers, if needed.

To implement the system, selected farmers and their animals were registered on the platform and then trained on how to record their farm activities on their phones using the Ng'ombe Planner. The farmers were shown how to access the system, record farm occurrences and also other specific records like feeding, watering, and milk production and sales. Since the system is designed to work with any mobile telephone handset and mobile service provider, it enables the farmers to take charge of their own production recording, ensuring timely and effective data collection, integrity, and dissemination of relevant feedback to farmers and project management decision makers. As the data is stored in a processing server hence no risk of data loss in cases a farmer loses his or her phone—the farmer can resume recording once s/he replaces her phone.

The tool's strength lies in its capability of moving from mere extraction of information from farmers to having a conversation with farmers. It is a two way conversation with the farmers where the farmers record specific data and in turn, get almost instantaneous relevant feedback that they can use to improve their husbandry practices.

The farmers do not require specialized phones, any ordinary phone that farmers have can be used.

Extension officers are fully engaged in the system to support the farmers by providing informed individualized attention to the farmers on a needs basis.

Extension officers being equipped to provide personalized advisory support to the farmers

The system notifies the relevant officers the moment a farmer records an adverse farm event. For instance, once an incidence of disease is reported, extension officers can access the system to disseminate important information, such as disease epidemics or vaccination campaigns. While farmers are assured of utmost confidentiality in handling their personal data and their informed consent is sort before being enlisted in the system, the system's menu can be set to allow extension officers, one per site, to access specific production records which would form a basis of personalized advisory services. In essence, the system provides a simple and direct platform enabling extension officers to support farmers by providing informed individualized attention. Consequently, the system provides a unique approach to monitoring project interventions and could also be used to understand whether the individualized extension assistance to farmers is having an impact on productivity, thereby informing development agents of alternative extension approaches.

Illiteracy posed one of the major hurdles since successful implementation of the system is dependent on ability of a farmer to read and write. In this case literate household members were trained to undertake recording on behalf of the household heads (in-charge of the households' farming activities). In addition, keen and frequent follow-up by the extension officers was proposed for such households. Translation into local languages significantly increased the accessibility of the mobile tool.

Communication infrastructure also plays a major role in ensuring success of the system. Given the nature of the system, a good mobile phone signal is vital. With the exception of one site in Uganda, all the implementation sites in Kenya and Uganda had good mobile phone signal.

There was a lot of interest from farmers who saw the platform as an innovative way of keeping records, as well as receiving information from the researchers. They were keen on using the system. The success of implementing this system of data collection, coupled with feedback to farmers from the data, presents a significant contribution to the process of project monitoring and implementation. The adoption of the technology is a major step in using mobile phones for on-farm recording by the farmers. It opens up a new chapter in the use of mobile phones in implementing research and development projects.

The project team in Uganda: ensuring adequate internet and data reception

Monitoring mobile phones use: not just extracting information but having informative conversations with farmers, at a lower cost

Monitoring project impact is a key undertaking of many donor-funded development initiatives. The finding assess the level of impact, hence inform management decisions in regards to project design. This process is both difficult and challenging as it usually requires intensive data collection activities within short periods of time, the assessment of progress and implementation of needed adjustments.
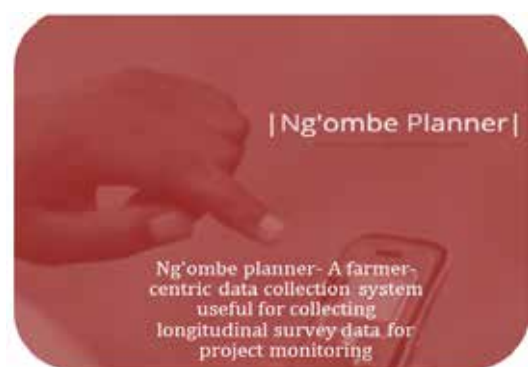
With increased mobile penetration in sub-Saharan Africa, there is a unique opportunity for researchers to use mobile phones as an efficient means of data collection. Data is collected electronically from the source and sent to a processing server where it is meaningfully analysed within a short span of time. In addition, the mobile phone presents an opportunity for researchers and scientists to disseminate their project findings, as well as information, directly to the farmers who most need it.

Mobile phones use in agriculture in Africa

In sub-Saharan Africa, mobile phones have been used in diverse ways to support agriculture. For instance, in Kenya, a mobile phone application dubbed SokoniSMS64 helps farmers lower the cost of market research: they can use mobile phones to access prices for their produce before travelling long distances to the markets; another application, iCow from M-Farm, enables farmers to monitor their cows' reproduction cycles; and Kilimo salama allows farmers to purchase a 'pay as you plant' type of micro-insurance using their mobile phones. In Tanzania, Tigo Kilimo gives small-scale farmers instant weather information combined with appropriate agricultural tips; and in Ghana, CocoaLink delivers important information to cocoa farmers.

Dairy Power, developed and implemented by KDFF in several dairy hubs in Kenya, is a recent development in the use of mobile phones by dairy farmer organizations in managing collective milk marketing businesses. It provides interactive information on the farmer's milk that is marketed through dairy hubs. It sends an SMS to a farmer whenever his or her milk is delivered at the dairy hub and a monthly statement detailing the transactions (milk volumes delivered and services acquired from the hub).

Ng'ombe planner system offers three explicit advantages to farmers, as well as monitoring teams:

Ng'ombe planner- A farmer-centric data collection system useful for collecting longitudinal survey data for project monitoring

Timely data collection and feedback information for decision making, both at project and at farm level

Reduces survey costs

Incorporates individualized farmer advisory services

- Enhancing timely decision making

In addition to having a systematic record of farm performance, the approach could also be used by the farmers as a diagnostic tool. Since recording is undertaken regularly, a drastic change in production could signal a health problem, reproduction or management issue. This presents a farmer with timely information to take a corrective action. Farmers will, therefore, be able to make informed important day-to-day farm management decisions, either short-term decisions on improving feeds or long-term ones such as improving breeds. Moreover, the data is available in a timely manner for project staff to make important management decisions.

- Cost reduction

The system provides a cheaper alternative for those with the frequent data collection needs, such as EADD where some data needs to be collected on a weekly and monthly basis. The traditional approach of having enumerators undertake face-to-face interviews would have required a huge budget to cover costs, such as wages, transport, supervision etc. With Ng'ombe planner, the farmer plays the role of the enumerator, eliminating all the face-to-face interview costs. The only cost to be incurred is the SMS sending charges which are meagre compared to face-to-face interview costs. The farmers only have to invest their time as the sending cost is borne by the project.

- Incentive to extension workers

The approach provides a unique opportunity for extension service providers to offer advisory services based on tangible on-farm data. With access to the system's menu and immediate SMS notifications, extension workers are equipped with the relevant information to attend to the needs of farmers as quickly as possible, particularly in cases of farm events requiring urgent attention, (e.g. disease incidences).

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