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LESSONS FROM THE DATABASE ON AGRICULTURAL EXTENSION PROVIDERS AND KEY STAKEHOLDERS IN MOZAMBIQUE'S FEED THE FUTURE ZONE OF INFLUENCE

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Background

Feed the Future is a United States Government initiative that addresses global food insecurity by supporting agriculture growth and nutritional status in 19 countries. USAID is responsible for leading the government-wide efforts to implement the initiative. The core investment areas are women's empowerment, diet quality and diversification, post-harvest infrastructure, high quality inputs, and financial services (Feed the Future, 2014).

Mozambique's agriculture sector has been historically characterized by a notably pluralistic agricultural extension since 1990s (Gêmo, Eicher and Teclemariam, 2005; Gêmo and Chilonda, 2013; Gêmo and Davis, 2015). This paper aims to highlight key issues as identified from a pluralistic extension database on extension providers and key stakeholders across the Feed the Future (FtF) Zone of Influence (ZOI) in Mozambique. The database was developed as one of various study/survey deliverables to be submitted to USAID-Mozambique, as part of the summative evaluation of FtF phase I (2011-2015) in the country, aiming to assess the main achievements and prevailing challenges.

As noted by Feed the Future (n.d.) in Mozambique, the FtF is targeting investments in specific regions for maximum impact. The districts in question are located in four provinces, namely Nampula in the North and Zambezia, Tete and Manica in the Central region of the country. While public extension operates in geographic areas of the 23 districts supported by FtF initiative, other extension providers and relevant stakeholders are also present in the same districts.

In Mozambique, FtF envisages to increase equitable growth of the agriculture sector; and to improve the nutritional status of the population, in particular women and children under five (Feed the Future, 2013). Value chain focus comprises: oilseeds (groundnuts, sesame and soybeans), pulses (beans, cowpeas and pigeon peas), cashews and other fruits (banana, mango and pineapple) (Feed the Future, 2013).

Database Objectives and Information Content

The database seeks to systematize information on existing extension providers and key stakeholders; their nature (public, private and NGOs), main activities carried out, extension approaches and models used, main extension methods, funding sources; their perceptions on the success of the approaches and models used and why; and means of verification. In summary, the database intends to respond to the following pertinent issues:

- To what extent is the FtF ZOI hosting operational extension providers and key stakeholders?
- What are the main approaches, models and methods used by the various extension providers in the FtF ZOI? What approaches and models appear to be innovative and why?
- How different extension providers define successful extension services?

This will make it possible to identify promising/successful experiences related to the provision of extension to smallholders that can eventually be further analyzed, adapted if need be, and replicated where possible.

Methodology

This paper summarizes key information from extension providers and key stakeholders database; as well as from pertinent issues raised during the stakeholders' workshop held in March 2016 (Nampula province capital) which, among other objectives, sought to present and discuss the database with relevant stakeholders operating in the FtF ZOI.

A database was built following a survey conducted through extensive field visits across the FtF ZOI. The visits covered three out of the four provinces of ZOI, and eight districts out of the 23. Two visiting and three local professionals were involved in data collection from mid- January to February 2016. A list of open-ended questions was prepared and tested and it was used as reference questions in interviews with extension providers and key stakeholders. The Provincial Rural Extension Services (SPERs), in particular in Nampula and Manica provinces were helpful in facilitating relevant contacts at district level

The criteria for selecting districts included accessibility/distance to and between visited districts; and level of presence of different extension providers (public and non-public); and the agricultural zones that significantly produced crops from the FtF key value chains. Additional information to enhance the database was collected via email and telephone interviews with relevant stakeholders.

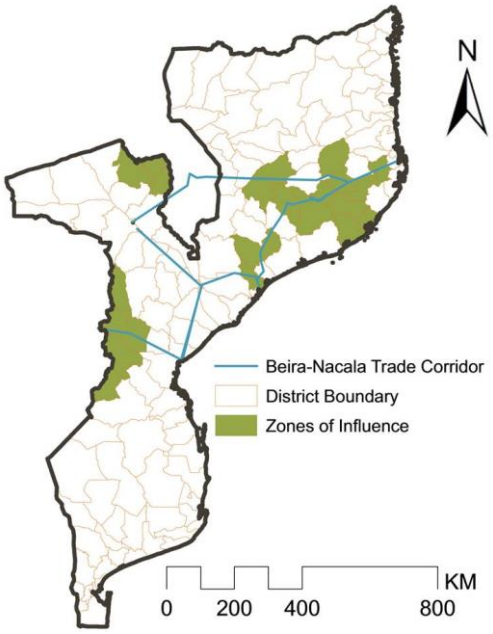
Moreover, the database was presented and debated during the above mentioned stakeholders' workshop (where other related studies were also shared) as part of its validation process. The objective was to get participants' views on pertinent issues related to the database and its future use by relevant stakeholders.

Literature review was used to complement these findings, namely reference books, (working) papers, Mozambique's public extension reports, research reports and some gray literature.

The Zone of Influence (ZOI) and Main Key Findings from the Database

The Ftf ZOI is illustrated in Figure 1 below. It should be noted that most of the 23 districts are located in agro-ecologically high to moderate potential rural areas which are suitable for various annual food crops (cereals, pulses, roots and tubers, and horticulture crops, the latter in winter) and for various livestock species such as cattle, chicken and goats in some of the areas. The coastal areas of the ZOI, in particular in Nampula province, are also of high to moderate potential regarding cashew production.

Figure 1: Feed the Future ZOI



SOURCE 1: FEED THE FUTURE (2014)

Despite such agriculture potential, many households across the ZOI area are still facing food insecurity problems and poverty. For instance, using the national poverty line and data from the Poverty Baseline Survey (PBS), the prevalence of poverty in the ZOI is 47.3 percent and the poverty gap is 15.2 percent. Government poverty estimation varies from region to region, and by rural/urban setting, and it is estimated in local currency (Metical) (Feed the Future, 2014). However, Feed the Future (2014) calculation on poverty, based on $ 1.25 per capita, per day at the 2005 purchasing power parity (PPP), shows that the prevalence of poverty is estimated at 62.0 percent in the ZOI. The poverty gap (at $ 1.25 per day) is 22.8 percent and the daily average per capita expenditures at 2010 parity is $ 1.42.

Therefore, the existing agriculture potential *versus* prevailing high poverty rates in ZOI area, makes the role of extension particularly important in contributing to harness the potential to increase agriculture output and farmers income towards their overall wellbeing.

Concerning the database that was shared and debated at the stakeholders' workshop, the key findings can be summarized as follows:

Considerable combination of extension models in the ZOI:

Extension models are defined by the approach of service delivery (supply-driven, demand-driven, participatory *versus* top-down); providers of extension services; and funders of extension. Most countries follow a combination of models (Nkonya, 2009). Mozambique in general and FtF ZOI in particular comprises a combination of models as follows:

- Government funded (in collaboration with some development partners (DPs) and supply-driven extension (although also addressing demand-driven extension(see IFAD, 2012))
- Private commodity-oriented extension funded and provided by private enterprises using out-growers schemes; and
- NGOs supply and demand-driven extension funded by bilateral donors and by other few large NGOs (at least one case).

Different bilateral development partners funding extension and some key stakeholders

Bilateral development partners (BDP), in particular USAID, DFID, Swiss cooperation, DANIDA, among others in ZOI play an important role in furnishing resources to some extension providers, in particular to

NGOs. USAID also plays a crucial role in ensuring collaboration/expertise from some research centers of the Consultative Group for International Agriculture Research (CGIAR). The International Institute of Tropical Agriculture (IITA) and Potato International Center (CIP) were key extension partners in the ZOI by contributing to the availability of improved genetic materials.

Limited input suppliers and services providers

Identified input suppliers in the ZOI are mostly involved in seed provision. In general, they operate at a limited scale in terms of annual volumes of seed sold. As noted by Marrule (2014) citing INOVAGRO (2012), the market for certified seed in Mozambique is very small. Of 90,000 tons of seed planted of food crops in Mozambique, it is estimated that 90% are grains retained by the producers from the previous year, which means that only 10% or about 9,000 tons are certified seed. Of these, 80% or about 7,200 tons are circulated through non-commercial channels such as government and NGOs, leaving only 1,800 tons for the commercial sector.

In addition, the high prices that often characterize improved inputs, impose the need for some subsidies to boost farmers' ability to purchase such agricultural inputs. On this regard, Marrule (2014) noted for instance that the high cost of certified seed, which can reach 30 times the price of grain retained by smallholder farmers, constitutes a real obstacle to the producer to decide to buy certified seed.

For instance, Benson et al. (2011) noted that the very low prevalence of fertilizer use by Mozambican farmers – below five percent – is evidence that farmers find it difficult to acquire fertilizers for their crops at a price that will allow them to obtain sufficient and reliable quantities. More broadly, Mozambique's agricultural market has a weak distribution network, making it difficult for farmers to access high-quality seeds and other inputs (Feed the Future, 2015).

Access to financial resources by input suppliers can be also a problem. At least three of them depend on commercial bank credits, which in general apply high interest rates in the country. In 2014, lending interest rate was estimated at 14.8% (Trading Economics, 2016a). Continuing to debate and identify functioning and sustainable mechanisms/partnerships to expand access to improved inputs by farmers is one of the key challenges in the ZOI.

Emphasizing group methods and participatory approaches under limited innovation systems and models

Individual methods are used where applicable (for instance for dispersed smallholders in accessible rural areas) but significant effort by most of extension providers have been addressed to group methods. Public extension, few NGOs and private extension providers have also been using mass media methods, in particular through district community radios where existing.

On group methods, the "seeing is believing" principle (see Carter Center Update, 1998) dominates extension implementation among most of extension providers: field/plot demonstrations followed by

field days are predominant methods of doing extension that were mentioned by at least 70% of the interviewed extension providers.

Most people that were interviewed mentioned the use of participatory/ farmer's empowerment-oriented approaches, while also promoting the involvement of women and youth in extension. To what extent such methods and approaches have been effective is an issue for future assessments and debate among extension providers in the ZOI.

While the modified T&V (focusing on famer's groups rather than individual farmers and with flexible extension workers agenda) is extensively used, including in public extension; other models such as the farmers field schools (FFS), farmer to farmer, and leading farmer's models have also been implemented and this is in part due to the fact that the latter models rely less on resources and more on farmers' participation, compared to T&V.

Although pioneered in early 2000 through public extension in collaboration with FAO (within the scope of South-South cooperation), FFS seems to be as yet implemented in a limited scale in Mozambique, including in the ZOI area. As there are on-going efforts aimed at scaling-up FFS in other rural areas out of the ZOI, in the future it could be of interest to promote learning from the experiences of other extension actors in the ZOI and from those out of it. For instance, in July 2016, the public extension sector with support from PRONEA's (National Agrarian Extension Program) Support Project, in collaboration with FAO, held a national technical meeting (Sofala province) with the view to discuss the achievements and challenges in scaling-up FFS (Direcção Nacional de Extensão Agrária(DNEA), 2015). ZOI extension actors engaged in FFS can take part in similar events in the future.

A new model under development by DNEA is the Integrated Program for Agricultural Technology Transfer (PITTA). Initiated in the 2012-2013 agricultural season, it comprises both crop production and livestock technologies. On livestock, the main innovation has been the introduction of improved poultry in rural areas, with the extension workers involved in practical demonstrations to local farmers. With regard to crops, field demonstrations that are in place must have a minimum size of 1.0 ha (for major visibility and impact on surrounding/visiting farmers) and poultry production is intended to reach a minimum of 2,000 chicks per production cycle. Thus, this is a model that implies adequate planning/budgeting at public extension, refresher training to public extension staff, and pragmatic logistic support and timely access to the required inputs. The aim is to get early adopters engaged with the disseminated technologies. A radical change in approaching targeted farmers is the expectation by the public extension "in getting farmers visiting extension workers large demonstrations" rather than "extension workers visiting farmers' plots". Being relatively new, it is difficult to argue on PITTA effectiveness and potential to be or not to be a promising extension model.

Very limited knowledge on ICT use in extension

Information gathered from interviewed stakeholders' points to little information on ICT – oriented interventions. As a result, information on extension providers and key stakeholders using ICT in

database is very scarce. Nearly 50% of recorded extension services providers have mentioned use of at least one type of ICTs in delivering extension support to their clients. However details on their actual use and effectiveness are lacking. Relevant developments (operational community broadcasting radios at district level, for example) combined with ICT initiatives in extension are a good start to reach more Mozambique's rural areas, including the FtF ZOI. However, existing infrastructure do not permit the full benefits that could potentially derive from digital inclusion. Despite progress made at national level, radio, mobile and internet coverage is still limited in remote areas. Limited access to electricity (11.7% of total population in 2009 (Trading Economics, 2016b) and 22% in 2012 (Sousa, 2012); limited investments on ICT by many extension service providers including public extension and low ICT skills among most of farmers in rural areas; block smallholders' perspective of ICTs as tools to boost their productivity and production.

Mixed perceptions on successful extension:

Successful extension is viewed differently by the various extension providers, which tends to mix some outputs, achievements and outcomes. Outcomes such as improved food security and increased income generation among targeted households were not mentioned by most of the extension providers when referring to successful extension approaches. Such outcomes constitute the core objectives of Feed the Future. Reasons for this are not clear. Box 1 below summarizes major stakeholder opinions on how they understand success in extension.

Box 1: How interviewed extension providers defines success

- Sustainability
- Number of active farmers reached
- Farmers' Self-reliance
- Regular interaction between extension agents and farmers/greater exposure
- Farmers being able to follow up or request assistance
- Increased understanding of producers
- Being close to farmers/decreasing the distance between extension in rural areas
- Integrating all aspects of the value chain from the access to inputs to the access to markets
- Local provision of technology
- Increase in the number of female farmers benefiting from extension services

Source: ZOI database on extension providers and key stakeholders

How to define successful extension approaches and models, based on the opinion of interviewed stakeholder's, was one of the topics at the workshop referred to above. The results from the workshop debate on this topic are described below.

Highlights from the Workshop

The highlights from the workshop are related to topics that were substantially emphasized by workshop participants, as follows:

- Need to include more information on the database
- Poor communication among services providers
- Limited use of ICT in delivering extension by most providers
- Research and extension linkages is a prevailing challenge to be addressed
- Successful extension as viewed by interviewed extension providers (database) should be improved

In detail:

Need for more information on the developed database

Workshop participants have considered the developed database as "a good starting point with valuable information, mapping extension providers and key stakeholders". However, participants recommended adding some more information in the future as the database is updated. Box 2 illustrates what exists and what information was suggested to be added.

Box 2: **Suggested information to add to the database**	
Existing information	**Suggested to add**
• Type • Name of the organization • Department or Project Name • Description of Activities • Examples of specific extension methods and approaches used • Method/Approach successful? (Y/N, why?) • Documentation or other resources available • Target Groups • Activities concentrated in (districts) • Use ICTs?(Y/N) • Which ICTs? (if any) • Financing Type • Financing source • Contact information • Contact person • Website	• Main projects (and duration) implemented by the extension providers (NGOs) • Lessons learned, including challenges (to extension projects/activities from one to two years) • Successful or not (for projects with more than three years)

Source: FtF ZOI Stakeholders workshop (Nampula, 08 March 2016)

Two aspects were emphasized by participants with regard to access and use of the database by relevant stakeholders:

First, access to the database by the extension providers, in particular, and by whomever will be interested in the future, in general (it is a deliverable for USAID as the Agency leading FtF implementation) is important. The database can help in terms of mutual awareness and knowledge about pertinent issues among existing extension providers and key stakeholders aiming at coordinating and complementing roles, where applicable. As noted in the New Agriculturist (2011a), one of the major challenges is that there are many service providers pursuing different objectives, coming from different organizations, with funding from agencies with different aims. So there are significant challenges in terms of coordination, ensuring quality of service provision and equity in service delivery. The FtF ZOI fortunately comprises pluralistic extension providers but exchange of information and potential coordination, as noted below, are still a challenge. Can the sharing of the database among the relevant stakeholders contribute to their major collaboration in future in the FtF ZOI?

Second, timing for the periodic updating of the database should be defined. Ideally the updates should be made every two years, as suggested by some participants, although it was not clearly decided how it would be made and who would be responsible.

Poor communication among services providers:

The pluralistic extension system across the FtF ZOI should constitute an opportunity for the extension stakeholders to exchange relevant information and pursue collaborative initiatives by interacting with targeted farmers, where applicable. However, the exchange of information and collaboration among different extension providers seems to be poor and will require significant mutual effort from potentially collaborative extension services providers. Poor information sharing was highlighted as a prevailing problem by many workshop participants. This is in line with the conclusion reached by Gêmo and Chilonda (2013) who mentioned that achieving a coordinated and collaborative national extension system (SISNE, *Sistema Nacional de Extensão*) has been an on-going challenge in the extension subsector.

SISNE intends to promote effective extension through coordination, collaboration and partnerships among extension providers and key stakeholders (*Ministério da Agricultura e Pescas* (MAP, 1998); *Ministério da Agricultura* (MINAG), 2007). Stakeholders include local governments, farmers' organizations and unions, input suppliers, output growers, research, among others.

Strengthening information sharing is important for three reasons: it can be useful in exploring and implementing potentially viable collaborative field work among extension workers; in boosting review, debate, adaptation and eventually scaling up successful extension approaches/models and relevant

technologies; and in contributing to document and share relevant extension cases/developments across and beyond the 23 districts, as part of the agricultural extension documented memory at national level.

Limited use of ICT:

The database shows a limited use of ICT by identified extension providers. But there exists a somewhat favorable environment for ICT developments in Mozambique's agriculture sector, which includes:

- Functioning community radio broadcasting units at district level in particular in many of ZOI districts. The district radio stations dedicate space to broadcasting extension messages, and the public sector seems to employ this tool to make announcements and send reminders along the crop and livestock (chicken) vaccinations calendars. IFAD and EU have been providing financial support to public extension aimed to boost use of community radio by public extension through the on-going PRONEA's Support Project, which is fully hosted at DNEA and operating in 42 districts of the ten provinces in the country.
- Operational provincial radio broadcasting stations which are provincial branches of the Mozambique's National Radio (*Rádio Moçambique*, RM). RM also provides time for extension messages based on the demand from extension providers, in particular by public extension, probably the major extension provider using provincial radio stations across the country (National Directorate of Agrarian Extension (DNEA), 2014; 2015). For instance, a total of 72 hours of provincial radio broadcasting were used by the Provincial Services of Rural Extension (SPER) at national level in 2015 (DNEA, 2015).
- Growing expansion of the cellular telephone network into rural areas and use by rural population, mainly farmers. Some NGOs are already collaborating with telecommunication companies to send alerts and market information to connect farmers to markets (inputs or sales).

The workshop debate on ICT suggested that the use of cellular telephone can be increased in innovative ways in particular by NGOs across the FtF ZOI. Participants suggested that cellular telephones can be used mainly among extension staff for reporting on and identifying pests (images) by competent entities, weather warning messages for the farmers and exchange of information on inputs availability and prices at different locations; among other purposes. Input suppliers can also make useful use of cellphones in interacting with extension providers.

In the FtF ZOI, only 24.9 percent of all households use mobile telephone. Usage differs according to the gender of the respondent (27.7 percent for males and 17.8 for females) and by socio-economic status of the household (16.9 percent for the households below the poverty line and 34.9 for those above the poverty line) (Feed the Future, 2014). This suggests the enhanced use of mobile telephones by field extension workers, under defined purposes, can contribute greatly to strengthen the flow of relevant information among extension workers, and between extension and key stakeholders such as research and input suppliers, rather than trying an immediate and massive expansion of mobile use by farmers.

However, this does not mean that increasing use of ICTs, and of mobile phones in particular, should not be viewed by the extension providers and key stakeholders as a fundamental innovation for the future interaction between extension providers and farmers. For instance, the Kenya government is mentioned as being mainstreaming ICT in its extension services systems, with the establishment of the National Agriculture Information System. Farmers can access market, animal husbandry and disease related information by just sending a text to a designated number from their mobile phones (New Agriculturist, 2011b). Can Mozambique undertake the same effort, even if as a pilot, in a bid to expand the use of mobile phones by farmers as they interact with extension?

Research and extension (R&E) linkages are still challenging

The Mozambique Agrarian Research Institute (IIAM) is the main research institution included in ZOI extension providers and stakeholders' database. R&E linkages where emphasized as crucial by most participants. Some suggested that in those cases where extension is implemented under effective R&E linkages, it could be considered as a successful extension experience. Debate on R&E linkages emerged during the presentation of the database as many workshop participants (stakeholders) stressed the need to strengthen such linkage.

Enhancing collaborative R&E on farm trials, plot demonstrations and field days is seen as a contribution to bring R&E together. However, it was also mentioned that these potentially joint field activities have been tentatively implemented over time, but it seems to be hampered by various factors (see Gêmo 2007; 2013). Understanding better the constraints negatively affecting R&E linkages is also fundamental, as part of stakeholders efforts aiming at ensuring effective R&E linkages. It is worth mentioning that recently public research and extension were involved in reviewing the main linkage mechanisms and activities implemented in past aiming at drawing lessons to strengthening their future collaborative work (Gêmo, 2013). However, the progress made in enhancing such linkage is still modest to date, despite the increasing efforts to that end by the two entities (IIAM and DNEA).

Successful extension should be seen more at outcome level

Workshop participants stressed that successful extension approaches and models should be viewed more at (intermediate) outcome level rather than outputs, as shown below in Box 3.

Box 3: Results from the workshop debate on how to define successful extension approaches and models
Sustainability (in particular post-extension projects sustainability)
Number of adopting farmers
Farmers' self-reliance
Farmers being able to follow up or request (needs/problem-based) assistance
Increased understanding of producers by the extension workers
Increase the number of female farmers and youth involved in relevant decision-making and implementation of related actions
Increased integration of all aspects of the value chain (from access to inputs to access to markets)

Increase yields of targeted crops

Source: FtF ZOI Stakeholders Workshop (Nampula, March 08, 2016)

Other views on successful extension mentioned in Box 1 above were suggested to be removed from the list. For instance, participants argued that "regular interaction between extension agents and farmers/more exposure is an output that is needed as one of the pre-conditions towards more effective extension coverage". The same was argued with regard to "being close to farmers/decreasing the distance between extension and farmers in rural areas"; while local provision of technology is fundamental (availability) it may not necessarily mean full access for such technologies by the farmers.

From the table above, it seems that there are four dimensions that were considered by most of the interviewed stakeholders as well as by those who attended the workshop to define successful extension approaches and models:

- Production dimension here focusing on adopting farmers and increase of crop yields.
- Farmer's empowerment which is reflected on farmers being able to ask or follow-up the course of assistance interventions; and major role of women and youth on relevant decision-making and action.
- Extension competence in understanding their clients (them and their working environment); and
- Value chains development as a fundamental factor for extension success

Importantly, "increase the number of female farmers and youth involved in relevant decision-making and implementation of related actions" (see Box 2), was seen by many extension providers and workshop participants as an issue that can be considered as a success in extension, seems to be an factor of interest across the FtF ZOI. As noted by Feed the Future (2014), poverty prevalence (i.e., people living on less than USD 1.25 per day) it is significantly lower among women with higher decision-making power than women with lower decision-making power.

Final Remarks

The development of a database on extension providers and relevant stakeholders in the FtF ZOI seems to be a useful exercise. It brings considerable information that helps one to be more informed on how pluralistic the ZOI is in terms of extension providers and key stakeholders such as input suppliers, food processors and research actors. What are the main extension approaches and models used, and what are the perceptions of the extension providers on how well they are performing in interacting with farmers. On successful extension, little reference, if any, was made to improved food security/ diet or to increased income generation; two issues that contribute to lift assisted farmers out of poverty, which are also core objectives pursued by Feed the Future.

Sharing the database with relevant stakeholders has resulted in an energized debate on the pertinent issue related to the work of extension providers in the ZOI, showing how stakeholders were interested in such information. With this said, the following issues seems to be of importance in future FtF support/interventions:

First, on the database, its future management, including regular updating and access by relevant stakeholders will be important to promote its usefulness. Usefulness is viewed as the extent to which relevant stakeholders will be using it to explore potential collaborative/complementing work based on comparative advantages of the various partners versus farmers needs/priorities; and as starting point to operationalization of an annual platform aimed to exchange relevant information, review progress and identify solution to address common faced challenges by the extension providers and relevant stakeholders in ZOI, in particular those benefiting from FtF funding across the 23 districts. An annual stakeholders' platform within the ZOI can contribute to major effectiveness and efficiency in extension provision through potential synergies and scaling-up of proven approaches and methods within and beyond FtF ZOI.

Full access to an updated stakeholders' database can be also of interest to potential funders of extension interested in specific services providers to pursue identified objectives. Academia can also use the database as a source for potential academic/dissertation topics, then contributing to generate valuable information and knowledge to FtF ZOI stakeholders and others.

Second, the diverse nature of extension stakeholders as well as remarkable effort in using participatory approaches and group methods shown by the database offers a basis for a profound study, which is recommended across the FtF ZOI aimed to identify eventual successful extension approaches and methods; as well key critical success factors to be taken into account by relevant stakeholders in delivering extension across the ZOI.

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