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TELEPHONE FARMING A NEW APPROACH FOR AGRICULTURAL DEVELOPMENT, A PROJECT WITH THE LATIA RESOURCE CENTRE, KENYA

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1. Introduction

The traditional agricultural development cooperation focuses on the improvement of the self-sufficiency of the smallholder farmers through investments in crop research, infrastructure, market development and policy support systems (Pingali, 2012). Subsequent, the increase in crop productivity previously led to reduced food prices for consumers in some regions, mainly in Asia and Latin America. Yet, the crop modifications and technical recommendations, such as fertilizers, were not suitable with the climate change, growing population and increasing input prices, which triggered the World Food Crisis (Leenstra, 2014), in African nations.

Research has shown that more is needed to overcome the critical issue of food scarcity alongside with poverty reduction (Diao, et. al, 2008). For this reason, a consortium, led by Maastricht School of Management (MSM), and its subcontractors Latia Resource Centre (LRC), Strathmore Business School (SBS), Aeres Group (Aeres) and the Netherlands African Business Council (NABC) was developed to research the impact that support systems may have on the agricultural output of the farmers involved. The project was funded by the Royal Dutch Embassy in Nairobi. The project and the consortium focuses on reaching telephone farmers, who are considered to belong to the 'middle-sized farm' category, i.e. in between the small-scale, semi-subsistence farmers and large-scale farmers. A telephone farmer may have the capital to develop their farms, but they do not have the required farm management skills nor the ability to frequently be present on the farms. These landowners, often supplement their absence by hiring farm operators or farm managers to be in charge of overseeing the farm activities. They are oftentimes disregarding their level of farm management skills, leading to varied levels of as successful agri-businesses (Foeken and Owuor, 2000; Casaburi et. al., 2014; Leenstra, 2014).

Hence, members of the consortium work together to offer a selected group of telephone farmers with guidance in the form of technical, social and business skills to ensure that both the telephone farmers and their employees are capable of efficiently operating the farm. The main objective of the project is to improve the performance of these farms. It is believed that improving the performance of these farms will have an impact on smaller farms and workers surrounding the farm on the one hand, but also benefitting the medium size farms in industrializing and linking with more global value chains on the other hand. This will furthermore have a positive influence on the contribution to food security in Kenya by increasing the commercial food production and the agricultural land use productivity.

Additionally, the project will research to what extent this approach provides (telephone) farmers with the required services and which services should get priority. Moreover, it will disclose to what extent this approach provides for sustainability and inclusiveness, and would thus deem to be a proof of concept; which could be extended further in the country and the region of East-Africa, albeit with some modifications.

Thus, the main objectives of the research to assess are:

1. The characteristics of the so-called telephone farmer and their farms;
2. The level of sustainability (Socially, Environmentally and Economically);
3. The different service priorities and their effectiveness related to productivity;
4. The level of inclusiveness;
5. The relational aspects influencing the farm performance;
6. The proof of concept for the business model;
7. The eco-system in which the farms operate;

Overall, the telephone farmers project reveals whether it is more beneficial to aid the group of farmers known for their characteristics resembling those of a 'telephone farmer', or the missing middle segment, in terms of productivity and efficiency improvements in relation the smallholder farmer. The current research report is the second measurement moment and will be analyzed in comparison to the knowledge gained from the first measurement moment.

2.0 Literature review

2.1 Food insecurity and lack of inclusiveness

This research reflects on the issue of famine in sub-Saharan Africa and the strategies which could positively influence this. Accordingly, the concepts of global food insecurity with a focus on sub-Saharan Africa and inclusive agricultural value chains will be discussed in this section. These act as a foundation for the necessity of the research to overcome the harmful factors influencing the development of the people, economy and environment.

2.1.1 Food insecurity

Sub-Saharan Africa suffers from the highest prevalence of undernourishment with signs of further deterioration between 2015 and 2016 (FAO, 2017). Current climatic change and conflict affect negatively the ability of the population to access food as poverty increases. The impact of the inability to access nutritious food affects other areas such as resistance to disease, capacity to work, children's mental development and educational achievements (Clover, 2003). Hence with this negative trend occurring in food security, clarification is needed on this subject.

Stemming from the global food crisis discussion of 1974, the issue of food security was widely discussed during the World Food Summit. It focused on the ability to offer adequate food production at the global and national level, stating that food security should pertain:

> *"Availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices."*

However, food security is not merely a problem of production, as it is also a problem of access. So although the agricultural sector is capable of increasing the food production, it is inefficient as long as at household-levels families are not guaranteed to have access to sufficient nutritious food. Hence, in 1996 the World Food Summit (FAO, 1996) adopted a more inclusive definition of food security as:

> *"Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life."*

Alongside this definition of food security in 1996, targets were set by the world food summit for the reduction of food insecurity and hunger. Yet, previous efforts to improve the food security in developing countries could not prevent that between 1980 and 1998 the per capita food consumption declined in the 48 least developed countries rather than improved (Clover, 2003). During that period the food production grew significantly faster than the world population. Nonetheless, by 2003 840 million people were still malnourished, with the majority residing in sub-Saharan Africa. The first wave of food security programs was mainly technological, hence the production capacity and to some the price stability of food improved, rather than the equitable distribution of food (FAO, 2017). This came to light when research revealed that the issue of health and hunger amongst the majority of the undernourished population was not improving, but rather taking shape in other problematic issues such as nutritional deficits in daily food consumption.

It could thus be argued that challenges cannot be concurred separately from other issues such as nutritional value, institutional voids and global climate change. In line with the definition of food security by the FAO in 1996, food security should account for affordability, availability and access on all measurement levels including that of the individual household. By cause of that an increase in production does not automatically correlate with improved access for the under-represented part of the population suffering from malnourishment and price increases. To assure that the improvements in the food security programs reach the affected population, cooperation with stakeholders such as farmers, government and value chain actors need to be achieved. Hence the agricultural value chains need to become more inclusive to account for a positive impact on the affected population beyond yield improvements in environments affected by poverty, climate change and conflict.

2.1.2: Inclusive agricultural value chain

There are several challenges in the agricultural value chain in sub-Saharan Africa which deprive small and medium sized farmers from properly integrating and upgrading their position in the value chain. Farmers in developing countries are experiencing a lack of an enabling environment (Pingali, 2012). They are systematically pushed back by challenges such as lack of support and negligence from institutions, multinationals and even regulations.

Current agricultural value chains are highly influenced by international corporations and regulations dictating quality and safety standards for the global value chains. This entails that local small- and medium sized producers need to adhere to these standards when aspiring to sell to international parties. However, that would mean that they need to control their production, trade and distribution more professionally (Dolan and Humphrey, 2004). Furthermore, these standards and regulations often require investments that

are too demanding or expensive for the farmers if not supported by institutions. Hence, it becomes increasingly difficult for small- and medium-sized farmers to achieve inclusiveness on their own.

There are global incidences stimulating the potential of small- and medium-sized farmers to become inclusive partners in the agricultural value chain. Some of these are the decreasing barriers on international trade, technological innovations, improved communication systems and declining transportation costs (Gibbon et al. 2008). All of these improvements were however not capable of managing the asymmetric power relationships as producers in developing countries are still excluded from value adding activities, or more importantly vertical integration (Gereffi, 2005). To assure vertical integration, one needs to address these challenges for value chain upgrading and inclusiveness also known as institutional voids. The institutional voids oppressing the small- and medium-sized farmers consist out of: a) access to finance, b) access to training, c) access to technology, d) access to subsidized inputs and, e) access to markets (Porter, 1990, Scott 1995, Grunert et al. 2005).

2.2: Food security programs

Many decades of research on poverty alleviation, food security and lack of inclusive value chains have preceded. Although successful in their own way, we can conclude that a more drastic change is needed to get to the next level. For this reason, previous efforts will be construed to highlight the necessity for present research. An overview of current famine alleviation programs active in the sub-Saharan African region and their objectives which have been initiated during or after the less effective traditional green revolution.

2.2.1: Famine alleviation programs

Due to the lower levels of food security in sub-Saharan Africa, research organizations in cooperation with governments, NGO's and international partners introduced famine alleviation programs encompassing related threats of poverty, inclusiveness and environmental consciousness through investments in the agricultural sector. First, the project of the international institute of tropical agriculture (IITA) will be discussed as this research-for-development organization provides solutions to hunger, poverty, and the degradation of natural resources in Africa, since 1967. Second, we will discuss the food and business knowledge platform (F&BKP) focus on the dissemination of knowledge of food and nutrition security initiated by the Dutch Ministry of Foreign Affairs by utilizing and co-creating the knowledge of different stakeholders. Lastly, the HortImpact project of SNV is discussed as it is a Kenyan market-led horticulture program which combines private sector expertise with social impact solutions for small and medium-sized farms.

One of the organizations focused on improving the livelihoods of the small-scale farmers, enhancing food security, increasing employment and preserving natural resources in sub-Saharan Africa is the international institute of tropical agriculture (IITA). This research-for-development organization strives to 'lift 11.5 million people out of poverty and revitalize 7.5 million hectares of farmland by 2020' (iita.org/about, 2018). To be able to do this, they focus their efforts in four research areas: Biotechnology and genetic improvement, Natural resource management, Social science and agribusiness, Plant production and plant health, lastly, nutrition and food technology. Together with international partners they assure that each project pays attention to the following five core values: gender empowerment, youth in agribusiness, commercializing technologies, capacity development and genetic resources. Each of these aspects assure that the projects will have a sustainable impact on the farmers as well as the community in which they farm.

Another platform focused on food security is the international platform for food and business knowledge (F&BKP). F&BKP is one of the five Knowledge Platforms for global development initiated by the Dutch Ministry of Foreign Affairs, particularly interested in the knowledge for food and nutrition security. They act as a linkage between networks, businesses, researchers and institutions (both public and private) in order to create, exchange and use knowledge for inclusive and sustainable food systems ("F&BKP vision and mission", 2018). Where organizations such as IITA are focused on natural resources preservation, the creation of opportunities and inclusiveness of the smallholder farmer; F&BKP is operating on the level of policy development for food and nutrition security. The activities of F&BKP are divided in three fields: food and nutrition security; strategic partnerships and thematic networks; and knowledge platforms. To assure the successful implementation of research, partnerships and platforms, F&BKP involves stakeholders such as policymakers, practitioners from the profit and non-profit sectors, and researchers.

Even though research has shown that there is an increasing group of medium- and large-scale farmers and holdings, the small-scale farmer's group remains the most prominent in Kenya. The third project, engaged in improving food security, is the HortImpact project from SNV in sub-Saharan Africa. In line with improving the livelihoods of communities in remote areas by enhancing their agricultural and entrepreneurial capacities and performance, SNV introduced the HortImpact project to teach small-scale farmers how to become more efficient and sustainable, as well as climate-resilient. Especially in the rural areas of the country in which higher numbers of poverty and lower levels of education still prevail, investments in this group are needed. Support to this group can locally improve the self-sufficiency, employability prospects and lead to blossoming markets. The solutions stemming from this Kenyan-Dutch collaboration project aspire to improve the access to markets, increase production as well as food safety and reduce post-harvest losses, to boost economic growth and social benefits of the associated small-scale

horticulture farmers as they become inclusive partners in the horticulture value chain (SNV). Hence, the HortIMPACT project addresses the systematic challenges related to inclusiveness for the small-scale farmer in the global horticulture value chain. Moreover, the HortIMPACt project cooperates with national and county government institutions to formulate policies that enables an inclusive environment. Innovations and good practices to enable upscaling of successful methods stemming from this project are subsequently shared with farmers, Kenyan and Dutch agribusinesses and policy makers.

2.3: New strategic intent

The question remains: why have decades of long research-inspired initiatives, aimed at solving the challenges of the food insecurity, poverty and poor food safety not accomplished their goals, even with intensive policies to promote research and innovation in the agriculture? Moreover, why did the focus on the smallholder farmer to push African agricultural development, during the World food crisis of 2008 (Leenstra, 2014), as a policy priority not yield the anticipated results? Seeking to solve bigger environmental and social inequality problems, new research initiatives should include constructs such as sustainability and inclusiveness in the respective environmental context, as well as analyze different approaches to account for a more optimal result.

2.3.1: Telephone farmer

As already alluded, this present study shifts the focus from aiding the small-scale farmer to the medium-sized telephone farmer. This strategy has been chosen because prior research has shown that the efforts and intentions of food security policies for African agricultural development seem to be eradicated by numerous challenges, barriers and discouraging outcomes. Entrepreneurial medium-sized farms should be more equipped to deal with these obstacles as their backgrounds, knowledge and resources should make them more robust.

To recapture, research has shown that past projects results in sub-Saharan Africa are affected by numerous challenges, barriers and slightly discouraging outcomes. One of these reasons was a contradiction to the age-old believe that helping small-scale farmers by offering them the resources to overcome the troubled situation they are in, such as inputs in the form of fertilizers, would seem to be incorrect (Harris & Orr, 2014). Oftentimes, the resources were not the solution, as the farmers operated in a complex agro-climatic environment including cultural influences and a lack of proper technical knowledge hampered their overall success. Hence, it became a common strategy for such small-scale farmers to utilize the subsidized inputs for other means, such as selling them to other farmers or utilizing them for another crop than intended (Pingali, 2012). Next to this, climatic stress situations caused disappointing yields of production and

investment, causing them to barely breakeven or even make a financial loss. Hence, past strategy seldom led to poverty alleviation or agricultural production increase.

Moreover, looking at the evolution of the agricultural occupation, we notice a strong shift in sub-Saharan Africa. The formation of small-scale farming in Kenya has changed from a full-time occupation and lifestyle to a more part-time endeavor in the form of semi-subsistence livelihoods. This is due to the rural livelihood diversification & deagrianization trend in the country (Leenstra, 2014). In order to account for the risks farmers face, such as: market risks, climate risks (e.g. droughts) and social risks (e.g. theft), they start to diversify their livelihood income by engaging in off-farm activities. This translates into the rural-urban migration, where the population is seeking employment elsewhere. Furthermore, for small-scale farmers, agriculture is seen as a default option rather than an entrepreneurial decision. However, to accomplish agricultural success and promising yields, it is increasingly important to shift the mindset and see it as a professional commercial venture.

A proposed method by Leenstra (2014) is to change strategy from aiding the small-scale farmer to the telephone farmer. Firstly, the telephone farmer is someone who is seen as an aspiring commercial farmer. They are willing to invest resources into their farms in order to make them financially viable operations. Due to their ability to invest resources in their farm, they also have a higher likelihood of implementing sustainability practices which are beneficial for people (both on the farm and in the society), the planet (by having environmental friendly farming policies), and their profit (though cost reducing and profit maximizing strategies). In line with the ideology from the small-scale farmer, some telephone farmers commence with farming as they see it as a retirement scheme. Others may see it as an additional income stream. Regardless of their aspiration, overall, these telephone farmers often lack business and technical skills to properly manage their farms. This partially stems from the fact that they generally have other professional careers prior to engaging in agriculture. Secondly, the shortcomings they encounter in both skills and experience as well as their absence require them to hire farm operators or farm managers to guarantee that the farm activities will operate properly. However, even under the management of a farm operator or farm manager, they can still come across difficulties. Equal to other business relationship trust is a key requirement, but when communication and positive results are lacking we find that the relationship experiences complications. Thirdly, a key attribute is the size of their land; often making them medium-sized farmers. The amount of acres in their possession allows them to engage in commercial agriculture through different sales channels, such as contract farming. Contract farming is highly popular due to increased security as the price, quality and quantity are negotiated and contractually documented

beforehand. The acquired financial stability puts them in a beneficial position where they are able to evaluate and readjust their farm strategy.

Choosing to refocus the aid on telephone farmers will positively affect the small-scale farmer as well. It is anticipated that support services, enabling telephone farmers to improve their skills as well as their employees' skills, will shine through in their immediate environment. For example, the envisioned increase in profitability, through the business development support, can lead to a need to upscaling the farm activities to adhere to growing demands, which again asks for an increase in employability on the farm, especially of staff with technical skills. Hence, the growing demands in employment can ignite labor migration in productive environments. These spillovers may cause wage equalization, which is seen as one of the main drivers for investing in regions such as sub-Saharan Africa (David, 1994). Furthermore, the newly acquired skills by staff may enhance their productivity, efficiency and proficiency in the agricultural sector. Subsequently, the skills gained from these teachings can be transferred and utilized on affiliated small-scale family farms. What is more, creating awareness of the opportunities that a telephone farmer may have, can concentrate the interest in a certain area, opening up the possibility to explore complementary services in these regions, both business-wise and society-wise. This concentration can therefore enhance the livelihood of the community far beyond the increase in employability and skills.

3. Setting – Latia resource center

The project is a consortium between different organizations, with the local Kenyan partner being the Latia resource Center. The Latia resource Center (LRC) exists since 2008, to provide training and business support services to farmers, pastoralists and agribusinesses in Africa. Their cooperation in the project is paramount to accomplish the participation, training, mentorship and management of the telephone farmer's service group and other farmer groups. The vision of LRC is in line with the project goals of modernization of agriculture and improvement in food security by supporting a group of farmers through effective practical training, adequate dissemination of knowledge and technology and the provision of business support services. All of this should be achieved in an economically, socially and environmentally sustainable manner. As the project evolved LRC assessed the market need to form a new for profit subsidiary company in 2016, which would allow for an expansion of their programs targeting more commercial activities. In April 2017, the Latia Agribusiness Solutions (LAS) was opened to take over the commercial activities undertaken by LRC previously. This will also allow for the continuation of support offering to the modern medium scale farmers at the end of the project in March 2019.

LBS provided the following services:

1. Latia prepares a business plan and signs an agreement with the farmers to implement the plan.
2. Latia supports selected Telephone farmers by paying them visits regularly and giving them advise.
3. Latia has a 'headhunting' service designed to market young well educated and motivated farm managers that are willing to work hard and launch new approaches in agriculture.
4. Latia prepares cropping or dairy development plans for its customers and pays visits to see whether the advice is implemented.
5. Latia may function as an intermediary to establish a contract between a farmer and a company interested to buy the products of the farm.
6. Latia introduces accounting tools such as Quick book to aid farm owners and managers in this process. Moreover, they are developing a management software system for farmers for farm related activities.
7. Latia also provides customers the opportunity to learn how to do agriculture by using a piece of its land and cultivate it under supervision of Latia staff.
8. Latia offers farm owners, who are struggling to manage their farm successfully, the opportunity to hire Latia for the overall farm management in exchange for a profit-sharing scheme.

We focused this study on the interventions of Latia in the framework of the Telephone farmers project, also called the Agricultural Incubation Project (AIP). We documented the current practices and in the framework of earlier field visits (Van Dijk, 2017 and 2018 and Limpens et al., 2018). From the previous measurement moment, we learned that it would be impossible for Latia to be good in everything. Furthermore, not all the farm owners are acting upon the advice they got from Latia. In practice, both Latia and the farm owners needed to adjust their expectations and strategy to make the relationship work.

The required changes make it more difficult to measure the effects of different interventions. This project has several unintended effects of development cooperation (Koch and Schulpen, 2017). We refer to all the off springs, the contribution to the development of an eco-system for farmers in Kenya and the large number of training courses for farm owners, farm managers and workers, who may currently apply these skills on their own or on other people's farms. These changes do not solely occur within Latia and the project strategy but also within the sample group of the 'telephone farmer service group' over the duration of the project.

There are several reasons for the change in the 'telephone farmer service group': one of the start-ups never got off the ground, two farms collapsed and four of the other original 17 farmers were dropped because they had no time to attend the training given by Latia, or they were not cooperative. Finally, a group of 13

telephone farmers (TFS-group) and 13 telephone farmers from the pipeline farmer group were willing to contribute to the research in the second measurement moment.

4. Methodology

4.1 Introduction

This study investigates the influence of service offerings on the productivity and inclusiveness of the telephone farmer in Kenya (See figure 1; the conceptual model). Within this framework we pay attention to the efficiency and effectiveness of the service offerings and the business model in which this is provided, the eco-system in which it operates and the relationships that influences all of it. This research reports on the findings of the second measurement moment. In total 51 small- to medium sized farmers were interviewed for this research. These interviews are distributed among three farming groups; the 'Telephone farmers service group', the 'pipeline farmer group' and the 'HortImpact group'. During this second measurement moment 13 farms belonging to the 'telephone farmers service group', 13 farms belonging to the 'pipeline farmer group' and 6 'horti-impact farms' enabled us to interview either the farm owner and/or the farm manager. All of the farm owners and managers interviewed had some form of experience with service offerings, whether they already received services or were seeking more help from professional parties. However, the extent to the service received differs per farming group. Furthermore, in 9 farms, both the farm manager and the farm owner separately offered their perspectives on farm characteristics and relationships within a farm. This will ensure a more holistic image on the farm itself, its relationships and the services needed.

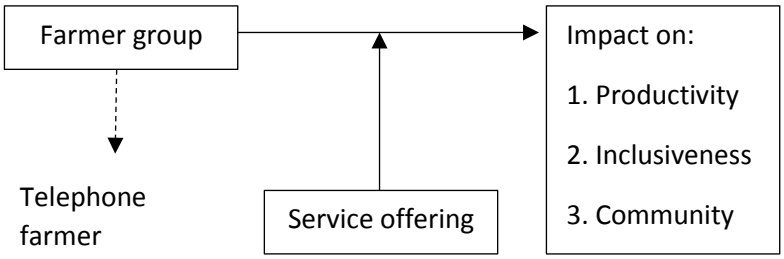

Figure 1. Conceptual model

The 'farmer group' is the independent variable, where we mainly focus on the analysis of the telephone farmer. The dependent variables are the 'impact that the farmer groups have on productivity, inclusiveness and the community (measured by improvements in the amenities, services and opportunities)' around them. This relation is moderated by the variable 'service offerings'. By seeking help for certain business, technological and educational elements of the farm and the staff, we anticipate that the impact will increase. In the end, this impact could assure an improved food security. To ensure that the objectives of the project are met, this section clearly defines the research strategy, the data collection, the data processing and data analysis.

4.2 Research strategy

The present research is interested in the phenomenon of the telephone farmer in relation to diminishing the food insecurity and lack of inclusiveness in the value chain. The chosen research strategy for this is dependent on primary data collection with both qualitative and quantitative analysis. For the research method we mainly utilize a deductive approach in the shape of a survey. However, the qualitative strategy needs a combination of a deductive and inductive approach.

4.2.1 The survey – questionnaire method

The quantitative data collection of the research highly depends on information gathered through a survey. A survey enables the collection of large quantities of data from a sizeable target population (Kahneman, 2004). The questionnaire, containing both open-ended and close-ended questions, is designed by multiple researchers with great care and went through multiple iterative processes and test-pilots before used on respondents. Depending on the section in the questionnaire, one could say that the majority of the questions are open-ended. The close-ended questions often have a follow-up question which is not predefined, making this part of the questionnaire semi-structured.

The interviews were in the majority of the cases conducted on location of the farm. This was done to minimize the non-response bias of the questionnaire and simultaneously verify the authenticity of the responses of the interviewees. Hence, during all the interviews a representative of Latia (the expert service support organization) accompanied the interviewer. Moreover, this assured that all participants of the research could answer freely in their native tongue when desired, this was then translated for the interviewer on the spot to guarantee that misconceptions were avoided. Besides the interviews on location, workshop have been organized to bring together a big group of farm managers and farm owners. These workshops discussed issues related to the questionnaire and left time for each respondent to document individually on paper the responses for their own farm. These events assured that the participants were able to interact with the researcher and ask for clarification when needed. The responses were validated by a follow-up interview, telephone call or email contact.

This being the second measurement moment of the research, the survey was slightly adjusted and collected from participants corresponding to the previous sample group (of the first measurement moment). Hence this classifies as ‘panel data’. The choice for multiple measurement moments is based on the desire to examine the causal relation between variables over time in their social environment. In order to achieve

answers on the impact of service offerings to telephone farmers in terms of food security and inclusiveness, one needs to compare the results at different moments in time.

4.2.2 The narrative inquiry

Besides using quantitative research methods, there are also moments of qualitative research methods. One of the used methods is the narrative inquiry. Clandinin et. al. (2007) refer to this method as viewing the stories being paramount to the experiences of the participants of the study. These narrative inquiries provide an opportunity to understand how respondents may interpret a certain situation and create a reality that they, in turn, act upon (Tracy, 2013). Hence, when talking about experiences, or personal opinions on relationships, of both the farm owner and the farm manager, it becomes less relevant if the experiences of an event don't match with each other, since there is more than one truth in this incidence.

This method offers a way to analyze the existing relationships or farm dynamics, and different service needs of the respondents by including their personal experience and the related emotional impact that this may bring upon them (Bleakley, 2005). This method will enrich the analysis by assuring that both the positive points and the point for improvement are detailed and captured to move towards innovations in line with the desires of the farmers and their business goals. In some cases, the method was supplemented with the method of coding the results to fully capture the essence of the stories and refer to them individually as well as in an aggregated form.

4.3 Data collection

4.3.1 The sample selection

The sample of the present research has been constructed though purposive sampling. This technique of non-probability sampling results from the first measurement moment and the accompanying sample of respondents. After the selection procedure of Latia and some changes to the group, a total of 13 telephone farmers making up the 'Telephone farmer service group' have been interviewed in the second measurement moment after 16 were initially chosen to train and participate in the research. Within the selection of the telephone farmers, special attention has been paid to the construct of gender. The Kenyan parliament is deliberating to implement gender-equity rules to assure a better representation of females in workplaces. In line with the proposed Kenyan constitution and the two-thirds gender rule (Kaimenyi et. al., 2013; Domingo et. al., 2016), we managed to interview 38,46% female telephone farmers and 61,54% male telephone farmers.

Two additional groups have been selected to include in the research to provide a more holistic image of the farmer of Kenya. The first group, named the 'pipeline farmer group', is a group of farmers who are interested in, and potentially already paying for, services similar to the telephone farmer service group. This group also manages their farm remotely and are reaching out to service providers to improve their productivity and efficiency level, which indicates that they have resources to make improvements. The main differentiator is the lack of intensity in services provided among the different groups, enabling the 'Telephone farmer service group' to benefit more from the expertise of the service provider. The similarities to the telephone farmers group enables a comparison of impact of the service offerings received. For the second group, we have selected the group of farmers receiving services from Latia under the 'HortImpact' project in cooperation with Delphy and SNV. These farmers tend to have smaller sized farms, and deal with common issues such as water management, lack of knowledge and/or resources. This group of farmers receives training on improved production techniques and demonstrate smart farming technologies including fertilization, greenhouse climate control, integrated pest management and efficient irrigation systems. These small-scale farmers will act as controlled substitutes of the Kenyan small-scale farmer. Although they already receive services, they still deal with similar problems which can offer us insights in service needs, service wishes and comparative profiling of this group.

Overall, a combined number of 41 interviews have been conducted for this research among 32 farms. Out of these 41 interviews: 53,65% have been conducted with the farm owner and 46,35% have been conducted with the farm manager. In 9 cases (21,95%), both the farm owner and the farm manager were interviewed, yet always separately. The separate interviews of the farm owner and the farm manager assures that both parties can speak freely and frank, providing us with their insights on the questionnaire topics and beyond. Moreover, interviewing both parties assures a holistic image of the challenges, opportunities and needs from different positions within the farm. In all cases the farm owner indicated that the person involved in the interview was qualified and knowledgeable to answer the questions. Hence, the interviewee was the person most fitting to interview due to their high involvement in daily farm management and their comprehensive knowledge profile of the farm.

4.3.2 The questionnaire

The questionnaire for this research was designed in cooperation with representatives from Latia. This cooperative approach resulted in a 4-page questionnaire enquiring about information on farm characteristics, farmer characteristics, agricultural economic subjects such as farm expenses and revenues and previous farm investments made. Furthermore, it offers a clear overview of sustainability issues within the farm activities related to the planet (environmental issues), the people (human resource issues) and

profit (financial issues). Differently from the first measurement moment, the questionnaire contained a broad range of questions regarding the relationship between the farm owner and the farm manager, as previous research indicated that this highly influences the efficiency of the farm. Moreover, the questionnaire enquired in detail about the service needs of the farmers as well as previous experience with these types of services.

The objective of the questionnaire is to create a holistic image of the current situation in which farmers operate as well as account for future changes needed or desired which require the help of professional organizations like Latia in the area of support services. A special interest has been devoted to the concept of telephone farmers, as we believe that this group of farmers is able to have a bigger impact on constructs such as food security, knowledge transfer, and community impact. Ergo, one of the main objectives is to make a comparison between the telephone farmers, the image of the 'general farmer' and the other farmer groups in terms of differences and possibilities.

4.4 Data processing

Since the interviews were conducted by a team of 3 people, the data needed to be processed to assure uniformity, integrity and usability as well as eliminating possible constraints. This was done in several steps focused on verifying, organizing, transforming, integrating and extracting data in order for it to be used for any analysis.

After collecting the data, one researcher became responsible for combining the output and integrating it with each other. During this process, several adaptations have been made to the dataset to address minor inaccuracies. These mainly stemmed from the manner in which the different interviewers recorded the responses of the interviewees. Regarding the measurement levels, some variables with continuous measurement scales were converted to variables with a nominal measurement scale for the purpose of reporting results. Furthermore, in some cases it was necessary to recode a variable in a new variable compounding the results of multiple items in one new variable.

Moreover, some interviewees either provided unclear or incomplete answers. In some cases, this came from a lack of knowledge about the issue, a lack of responsibility from the respondent in the farming organization or simply a lack of existence in the farming organization of the construct asked about. In order to correct for the problem of missing data, the corresponding respondents were either asked to provide the data later on via the partner (Latia) when possible. Given a code in SPSS for either 'missing data' or for 'not applicable'.

4.5 Data analysis

The information gathered from the interviews and the delivered both qualitative and quantitative valuable insights. The quantitative data is processed with SPSS software, while the qualitative information is documented in storylines of the interview as mentioned before.

The goals of the data gathering mission dictate the required statistical analysis. For this second mission, this entailed that the information for the telephone farmer groups was important to assess the impact of the services offered by Latia and other providers. For the objective of documenting the telephone farmers and farm characteristics, we mainly relied on descriptive statistics that quantitatively describe the features making up this profile. This was further expanded by the usage of chi-square test, crosstabs and linear regressions to explore possible correlations between variables and differences between groups. Additionally, the anecdotal information was added to the analysis to verify the strength of the profiles. The objective of sustainability followed the same steps, initiating with a descriptive statistics test, followed by either Anova's or regression models. The objective regarding the different service priorities was a combination between quantitative and qualitative analysis methods. As already mentioned before narrative inquiry and coding methods further clarified the needs, desires and challenges of the farms along with the services required to improve on the situation. These methods were also used to document the relation of the farm owner and the farm manager, their responsibilities, the decision making process as well as the involvement of the family. For the objective of inclusiveness of the telephone farmer in the agricultural value chain, descriptive statistics and Anova's are used to compare the performance of the telephone farmer with the other farming groups. This also contributed to the unraveling the eco-system in which the farms operate. Finally, the proof of concept was assessed through qualitative and deductive analysis, by interpreting all objectives and their combined impact on the research subject of the telephone farmer.

5.0 Analysis

5.1 Telephone farmer characteristics

After assessing the data of both measurement moments, we could paint a picture of the average telephone farmer. To do so we combine the results of the TFS-group and the PF-group. Previously we would define the telephone farmer as a part-time farmer interested in commercial farming, able to invest in terms of resources, yet not capable of spending more than 50% of their time physically on the farm. The previous definition of the pipeline farmer was someone who just started out, interested in services but not fully financially capable to explore all their needs, and still discovering the requirements to make it in the industry.

Nowadays this differentiation has slightly changed. The main difference between these groups stems from the different points in time and experience they currently are. The TFS-farmer tends to be a more experienced farmer, already engaged in farming for an average of 10 years and capable to make the recommended changes to their farm. While the PF-farmer tends to be either a start-up farmer or with less than 5 years of experience. Both farm groups recognize the need to seek help in the form of professional service providers. Yet, they are not equally capable to pay for this need. Additionally, both farm groups are passionate about farming, but not fully capable of spending all of their time on the farm due to other obligations like their regular careers. During this research these groups will be combined to represent together an accurate representation of the phenomenon of the telephone farmer. Moreover, time and effort could assure that a more unexperienced telephone farmer (PF-group) is able to climb up to the level of productivity and efficiency of a more experienced farmer (TFS-group). Services like those of Latia would enable these farmers to grow and excel as they receive knowledge, skills, mentoring and other instrumental tools to advance themselves.

Results from both measurement moments revealed that indeed, time spend on the farm was not an adequate differentiator. Both groups did not differ much in terms on physical attendance on the farm. Moreover, we could not determine that this was the main influences of their production levels. More interesting was the qualitative results and the change that occurred between both measurement moments. Nowadays, many farmers live on the farm as they retired, inherited the management of the commercial activities on the farm, or transitioned to full-time farming after receiving the intensive services from Latia (TFS-group). This is reflective in the increase in the time spent on the farm by the telephone farmers as they used to spend an average of 138.5 days on the farm in 2017 and now they spent an average of 153.55 days on the farm (2018). For the less-experienced farmers (PF-group), we mainly noticed a decrease in the attendance on the farm. This may be due to the fact that many farms prefer the headhunting service of Latia, instead of

converting to more fulltime farming. It can be observed that the more successful an investor becomes, the more time the farm owner is spending on his farm and is willing to give up his job in the city. If the farm is improving, we see farm owners moving to their farms. But if a trial is not working out the investor stops and remains in his job in town.

If time spent on the farm is not the such an important characteristic, then what is vital to the profile of the telephone farmer? It has been found that the mind-set and the capability to convert to more modern and innovative agricultural practices and technology is a more typical characteristic of a telephone farmer. This is one of the main differentiators between the telephone farmer and the traditional small scale farmers growing traditional crops like maize for self-subsistence. Given this type of agriculture is more complicated, they could benefit more from technical advice, support services and positive government policies. The eco-system currently developing in Kenya should target these small land size farms as well, as long as the farmers are entrepreneurial, willing to invest and willing to think from the demand, or the market side. The telephone is not the essence (although has a technical purpose), the essence is this agro-entrepreneurial attitude, the willingness to use modern technology, including irrigation technologies and working for the market.

5.2 Farm characteristics

Besides the telephone farmer's profile, farm characteristics may also differ between the selected farm groups and the measurement moments. Hence, the questionnaire inquired about several farm characteristics. These consists of subjects such as having a business plan; land ownership; farm activities; water source, utilization and sufficiency. Although the focus will be put on the overall profile of the telephone farmer consisting out of the TFS-group and the PF-group, significant differentiations between these two groups will also be provided to offer a more transparent image. This contributes in some extent to the visualization of the service offerings which the TFS-group already receives.

1) Operational business plan

An operational business plan acts as a guidance for future strategic decisions, vision and mission. However, unlike western standards, many African farmers still lack having an operational business plan. Hence, to transition farms into efficient operating entrepreneurial organizations, service organizations should guide farms into creating operational business plans. After the second measurement moment we see a shift in the organizations committed to this purpose.

There is a noticeable difference between the two different measurement moments a year apart. Starting with the telephone farmer service group, there is an increase in the implementation of the operational business plan, from 62% in 2017 to 67% in 2018. Still this would not be the anticipated result as this was a requirement of the service provider to focus on, as it would be the foundation for the other services such as crop plans, budget schemes and human resources. The main reason why not all telephone farmer service farms have an operational business plan is because of challenges with the practicalities attached to the implementation. Some farm owners have indicated that the plan was to ambitious or not specific enough. Hence, they are working on it to make it more compatible with their vision, mission and needs. Some farmers have also indicated that although they received an operational business plan, they do not follow it. In this case, we coded the response as no operational business plan present. These farms either work with a budget plan, crop plan or something else similar, which is created in cooperation with Latia.

Furthermore, we see that the pipeline farmer group has a similar growth pattern as this group also improves their usage of an operational business plan from 62% to 67% in 2018. Similar reasons could be given for the absence of an operational business plan for the remaining 33% of the pipeline farmer group. On the other hand, in line with previous comments on the business plan being the foundation of the service offering package that customers may seek, we see that there is no differentiation between the TFS-group and the PF-group. The combined telephone farmer group experiences a similar growth pattern in which the percentage of farms having an operational business plan improves to 67% in 2018. In comparison.

2) Land ownership

Land ownership is determined by a totality of possible ways that land of farmers is used. First of all, there is the land owned and used for farming activities, followed by the land leased, next the land used for other purposes and finally the total land is reported.

Looking at the land owned and used for farming activities for the telephone farmer, it becomes noticeable that the average amount of acres owned and used for farming comes to 161.98 acres for this group. This statistic is slightly inflated as more than half of the combined telephone farmer group has less than 25 acres of land used for farm activities. There is a big discrepancy between the average land ownership and usage of the telephone farmer service group and the pipeline farmer group. The TFS-group has more than double the amount of acres in use for farming activities, 100.65 acres versus 223.31 acres in 2018. These results are influenced by several large-scale farms included in the TFS-group. However, when assessing the results of the combined telephone farmer service group in relation to the small-scale farmer, like a horti-impact farm, we can conclude that there is a significant difference between the group as the horti-impact farmers

have 6.67 acres of land in use for farming activities. Compared to the data of 2017, there has been an increase in the land ownership and usage among all groups besides the horti-impact group. Moreover, the horti-impact farmer reduced the land they used for agricultural purposes. One of the reasons may be the climatic shocks that heavily impacted the small-scale farmers (there was a severe drought in Kenia from January till March/April 2018) as they are more vulnerable to the financial ramifications of them.

Furthermore, it may be that farmers need more land to uphold their farming activities besides their own land. In this case they have two options. They either try to buy more land or they can lease land from neighbors to expand their operations. When looking at the amount of farmers leasing land we find that very few farmers actually lease any land. Among the combined telephone farmer group only a small portion has land leased in 2018. In comparison to 2017, there is one farmer who leased additional land to expand their farming operations. However, they mentioned that this would only be a short-term solution, as they preferred to own the land themselves.

Besides owning land for agricultural purposes, some farm owners may have land which they use for other purposes or choose not to cultivate for variable reasons. Within the combined telephone farmer group only a small portion of the farmers have any land which they do not use for agricultural purposes. We could argue that farmers selected for the TFS-group have utilized the capacity of their land efficiently, by designating the role of agricultural land to it. Especially when comparing the statistics from 2017 to 2018 we can conclude that previously idle land has been allocated a more productive purpose in terms of agricultural usage.

Overall, the total land ownership, as interpreted by the accumulation of all previous land categories, of the combined telephone farmer group has increased over the past year. At the second measurement moment, the total land ownership has grown to an average of 171,08 acres of land. In 2017, the total amount of acres owned by a combined telephone farmer was 171.08. Although one could argue that the total acreage of land has increased drastically, an independent t-test signals that this difference is not significant.

Table 1: land ownership 2018

2018	**Combined**	**Telephone**	**Pipeline**	**Horti-impact**	**All**
Used land	161.98	223.31	100.65	6.67	132.86
Land leased	6.6	0.77	12.42	0	5.36
Other land	2.5	4	1	1	2.22
Total land	171.08	228.08	114.08	7.67	140.44

3) Water coverage

An important element of the farms is related to water source, utilization and sufficiency. Due to the climate changes that Kenia undergoes, farmers need to become more innovative as well as persistent in acquiring the necessary amount of water and the management of this water along with it. To have a clear overview of the effect which water may have on the farms and the decisions that farmers make, questions are asked about sources of water, type of irrigation, and percentage of water sufficed.

For the combined telephone farmer group this manifests itself in 83% of the farmers having enough water to properly manage their farm and to execute their farming activities in 2018. Compared to 2017, this is an increase of 6% of farm owners reporting to have enough water. When delving into the average percentage of water coverage that all the combined telephone farmers have, we notice a small increase of 2.33%. This is remarkable as 2018 was marked as a turbulent year in terms of climatic shocks. Many farms have indicated that they had to deal with long periods of drought as well as heavy rains which even caused floods. Hence, even with the misfortune of naturel distress harming their farming operations and the related production levels these combined telephone farmers mentioned that their water coverage increased during this past year. The results for the other groups are readable in the table depicted below.

Table 2: Water coverage 2018

2018	Combined	Telephone	Pipeline	Horti-impact	All
Enough water	83%	91%	75%	17%	69%
Water coverage	93.48%	98.18%	89.17%	62%	87.86%

4) Expenses

There are many expenses which a farmer has to deal with on a continuous basis. The costs included in this research can be categorized as: salaries, fertilizers, pesticides, animal feed and seeds. Finally, the total costs will be examined for the telephone farmer. Some farmers were not able to offer specific costs and thus provided an accumulated expense post.

Salaries

The salaries are divided in three parts. On the one hand farms have permanent staff, including the farm manager, and on the other hand there are cases in which temporary staff is hired as an aid for farm activities during busy periods. the combined telephone farmer group had an average of 6 (6.16) permanent male workers on the farm. Additionally, on average, there is 1 female (1.72) worker as permanent staff on the farm. Making the average amount of permanent staff working permanently on the farm consists out of 7

people. These are receiving an average salary of 2.477 Kes. Here again, the average amount of permanent workers is higher for the telephone farmer service group than for the pipeline farmer service group. However, this can be expected, as the average size of the farms of the TFS-group is also almost double the amount of acres than the one from the PF-group. We can furthermore argue that the average TFS-group is now offering their employees a salary which is in line with the minimum wage as determined by the Kenyan government for agricultural employees. In contrast, the PF-group pays on average more than 500 Kenyan shillings less to their permanent staff. See table 3 below.

Table 3: Permanent staff 2018

2018	**Combined**	**Telephone**	**Pipeline**
Permanent male workers	6.16	10.17	2.46
Perm. female workers	1.72	2.58	0.92
Total perm. Workers	7.88	12.75	3.38
Wage permanent staff	2477	2750	2179

Many farms also employ temporary staff ('casuals') on a daily basis besides offering permanent jobs. The farms tend to employ these casuals when the intensity of the work on the farm increases, for example during a harvest-period. The temporary workers will thus not work for a whole year on the farm. On average they will work a total of 17 weeks out of the year. The telephone farm owners will hire an average of 5 (5.71) male temporary workers and 17 (17.10) female temporary workers. The reason for this reversed gender preference for farm work stems from the fact that many farmers indicated that female staff is more delicate, thus less likely to damage the crops. Here, the temporary staff will earn on average 2068 Kenyan shillings per week when they work for a combined telephone farmer. This is an improvement of the average wage of a casual woker in comparison to the 2017 results which stated that temporary staff will earn on average 1832 Kenyan shillings per week. See table 4 below for the salaries of the temporary staff in 2018.

Table 4: temporary staff 2018

2018	**Combined**	**Telephone**	**Pipeline**
Temporary male workers	5.71	6.33	5.25
Temp. female workers	17.10	8.33	23.67
Total temp. workers	22.81	14.67	28.92
Wage per week (temp)	2.068	2.030	2.100

Then there are also farms that employ farm managers to supervise the activities on the farm and oversee the staff and the inputs required. For the profile of the combined telephone farmer we see that the average

yearly income of a farm manager is 255.654 Kenyan shilling (See table 5). This entails that the farm managers would earn on average around 21.304,55 per month. Again, there is a difference between the TFS-group in terms of monthly salary of the farm manager and the PF-group, with the TFS-group paying an average of 7600 Kenyan shilling per month more. Moreover, some of these farm managers may receive an additional benefit in the form of a bonus next to earning a monthly income. For the combined telephone farmer this comes down to 35%. Here, the PF-group seems to prefer the supplementation of the monthly salary in the form of (financial) bonus more than the TFS-group farm owners, as 42% versus 25% offer this to their farm managers.

Table 5: Manager 2018

2018	**Combined**	**Telephone**	**Pipeline**
Manager's income (M)	21.304	25.450	17.850
Bonus	35%	25%	42%

Fertilizers, pesticides, animal feed and seeds

Besides the fixed monthly expenses of the employee salaries, the farm owners also have to process expenses related to farm inputs. These farm inputs range from fertilizers, pesticides, animal feed and seeds.

For the combined telephone farmer group, the average total expenses accumulated are 1.517.035 per year. This is divided in the following expenses: for fertilizers the combined telephone farmer had an average cost of 369.683 per year. This was supplemented with an additional cost item of 169.861 for the pesticides for crops and 159.493 for the pesticides for animals. The expenses for animal feed were 566.997,69 in 2018 for the combined telephone farmer and the total expenses for the seed were on average 251.000 Kenyan shilling in 2018. For the combined telephone farmer group, the average total expenses per acre of land are 8867 Kenyan shilling per year. Adding the expenses of the employees and the farm manager would bring the total expenses for the average telephone farmer to 3.511.632.

When comparing the two groups that make up the combined telephone farmer group we see a significant difference in the average expenses for the TFS-group and the PF-group. Due to the difference in average farm size it would be expected that the costs for the TFS-group would be significantly bigger. Thus we divided the average amount of acres by the average total expenses. For the TFS-group the average total expenses per acre of land are 12190 Kenyan shilling per year, while for the PF-group the average total expenses per acre of land are 6360. This means that the average expenses for the TFS-group are significantly higher per acre of land, in comparison to the pipeline-farmer. One of the big expenses is related to the

expenses for animal husbandry. Farmers part of the PF-group seem to be less dependent on external sources of animal feed and other costs as the TFS-group farmer seems to be. See table 6 below.

Table 6: input expenses 2018

2018	**Combined**	**Telephone**	**Pipeline**
Fertilizer	369.683	608.385	214.606
Pesticides crops	169.861	274.571	103.227
Pesticides animals	159.493	345.900	35.222
Animal feed	566.997	1.152.513	215.688
Seed	251.000	398.978	156.831
Total inputs	1.517.035	2.780.349	725.575

5) Revenue

Lastly, when discussing the observed results for the revenue of the farm-groups it was found that, the investments made and the percentage of farms having a loan decreased, especially in comparison to the 2017 results (see table 7 and 8). These results are highly influenced by the climatic shocks that occurred in 2018, leading farms to scale down their operations, deal with their losses and even build up their production from scratch. These shocks came in the form of long periods of drought and extreme rain. Some of the farmers were able to absorb the shock by using modern farm practices and proper irrigation systems. However, even the most advanced farmers had to deal with these negative external influences. Additional to the climatic distress situations, many farms have indicated that they were also hit by pest and disease, such as the Thuta fly harming the tomato production. However, overall, we could argue that the average farmer was able to recover in their own way from these influences as the drop-out rate of the farms is less than could be expected.

For the combined telephone farmer group, the average gross revenue in 2018 was 5.423.717 Kenyan Shilling (see table 7). In comparison to 2017, the revenue strongly decreased as it used to be 12.773.309 Kenyan shilling for 2017 (table 8). It should however be noted that not all contract farmers have received any revenue from the crops they harvested for seed companies such as the Kenya Seed Co.ltd. Moreover, it is hardly possible to speculate on the revenue stream the produced seed would yield as quality and quantity (dry versus wet kilograms) dictate the price the farmers may receive for their crops. The resilience of the TFS-group, which is more mature in their agricultural endeavor versus the PF-group, which is often still developing the right strategy is also visible in their revenue when the results of both years are compared. The TFS-group saw their revenues decrease by roughly 50% while the PF-group had a decrease of more than 55% in their revenue.

This decrease in revenue is also reflected in the willingness of the farm owner to make new farm investments. The combined telephone farmer group decreased their annual average investment to 7.882.222,22 in 2018. This used to be 12.297.480,00 in 2017. Furthermore, there was also a decrease in the percentage of farmers having a loan with the bank. Although many contract farmers have some sort of arrangement with their contract organizations to use input for their farm on credit, not many were able to make an arrangement with the bank to lend money for their farm activities. This could be influenced by the climatic shocks as well, since we expect that there would be an increase in demand for a loan in the agricultural sector. Overall, 27% of the combined telephone farmer has a loan to supplement their own investments.

Table 7: Revenue, investment and lending 2018

2018	**Combined**	**Telephone**	**Pipeline**	**Horti-impact**	**All**
Gross revenue	5.423.717	8.311.363	2.776.708	1.180.646	4.545.840
Investment	7.882.222	17.012.500	578.000	733.750	5.682.692
Lending	27%	36%	18%	0%	21%

Table 8: Revenue, investment and lending 2017

2017	**Combined**	**Telephone**	**Pipeline**	**Horti-impact**	**All**
Gross revenue	12.773.309	19.126.391	6.420.227	1.948.638	10.608.375
Investment	12.297.480	18.366.666	6.695.153	3.635.600	10.853.833
Lending	57%	64%	50%	20%	50%

5.3 Sustainability

The objective of sustainability is an important indicator of impact for this study. It is being measured by the three constructs: ecological sustainability activities, social sustainability activities and economic sustainability constructs.

Ecological sustainability activities

Looking into the sustainability issues that farmers can introduce on their farms to be more environmentally responsible, we see that many of these practices are known amongst the farmers but are not always seen as practical. This may be due to constraints such as financial investments needed, tangible resources at hand and time intensity needed to accomplish them. Table 9 offers an overview of the presence of these ecological sustainability activities on the farm of the telephone farmer of 2018 compared to 2017. The

activities researched are: minimum tillage, crop rotation, cover cropping, agroforestry, integrated pest management control, water harvesting and organic farming.

Table 9: ecological sustainability practices

2017 vs 2018	All		Telephone		Pipeline		Horti-impact		Combined	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Minimum tillage	43.8%	37.5%	30.8%	46.2%	53.8%	23.1%	50%	50%	42.3%	34.6%
Crop rotation	75%	78.1%	76.9%	84.6%	69.2%	61.5%	83.3%	100%	73.1%	73.1%
Cover cropping	37.5%	43.8%	23.1%	53.8%	46.2%	30.8%	50%	50%	34.6%	42.3%
Agroforestry	56.3%	53.1%	76.9%	69.2%	38.5%	38.5%	50%	50%	57.7%	53.8%
IPM	56.3%	50%	69.2%	53.8%	53.8%	46.2%	33.3%	50%	61.5%	50%
Water harvesting	50%	62.5%	69.2%	84.6%	46.2%	30.8%	16.7%	83.3%	57.7%	57.7%
Organic farming	18.8%	18.8%	23.1%	7.7%	23.1%	23.1%	0%	33.3%	23.1%	15.4%
Total planet	3.38	3.44	3.69	4	3.31	2.54	2.83	4.17	3.5	3.27

There are slight increases in the overall implementation of crop rotation on farms among our sample group of farmers (+3.1%). This is also the case for cover cropping which increases from 37.5% to 43.8%. Lastly an increase of 12.5% for water harvesting was observed. The other variables: minimum tillage, agroforestry, IPM and organic farming have decreased with 6.8%. 3.2% decrease for agroforestry, 6,3% decrease for IPM and the percentage of implementation has remained equal for organic farming.

The change the telephone farmers service group underwent in their engagement in the sustainability activities over the past year is slightly different than the one we saw in the whole sample group. The telephone farmers service group mainly increases their activity level in the ecological sustainability practices, however some were less popular. The construct minimum tillage increased with 15.4%. Crop rotation increased with 7.7% and water harvesting increased with 15.4%. Furthermore, farmers have increasingly increased their engagement in cover cropping, as it increases with 30.7%. On the other hand, the constructs of agroforestry, integrated pest management and organic farming have decreased. Agroforestry decreased with 8.7% in comparison to the first measurement moment. Integrated pest management has decreased by 15.4% among the telephone farmers service group. Lastly, organic farming also decreased in popularity among the telephone farmers service group with 15.4% to a value of 7.7% still engaging in this activity. It could be that the engagement in organic farming has decreased to drastically due to an increase in farms that need to supplement their organic fertilizers with non-organic products to

control the pest and disease. This is in line with the comments of the telephone farmers about the usage of fertilizers alongside other chemicals to increase the productivity levels of their farms in a period which suffered highly from extreme weather conditions, such as long periods of droughts and long periods of rain. In the end, the telephone farmers service group indicated that the disappointing returns may affect their farm strategy, with regards to sustainability practices, to overcome hardship in the short-term. Although this would not be advised for the long-term where they are still committed to implementing ecological sustainability practices.

In comparison the pipeline farmer group, which is similar in characteristics to the telephone farmer service group however not a recipient of the extensive services offered under this project, showcase a different pattern in their involvement in ecological sustainability practices over the past year. In 2018, this group of farmers was less engaged in the usage of minimum tillage, a decrease of 30.7% is noticeable. Additionally, they experience a slight decrease of 7.7% in the usage of crop rotation. For the ecological sustainability activity of cover cropping, the pipeline farmers decreased their interest in cover cropping in 2018 with 15.4% in comparison to 2017. The representation of farmers engaged in agroforestry remained the same among the pipeline farmers in 2018 as 38.5% engaged in agroforestry. The interest in organic farming also remained the same as 23.1% of the pipeline farmers were engaged in this. The interest in IPM has decreased to 46.2% and water harvesting even further to 30.8%. This result is surprising after hearing in the first measurement moment that water was one of the biggest issues. In line with the finding that a majority of the pipeline farmers (75%) feel that they have enough water coverage to manage their farms accordingly, with an average water coverage of 89,17% among this group, it would seem that they sought out other means to improve on this issue.

For the combination group of the telephone farmer service group and the pipeline farmer group, that together make-up our profile of a telephone farmers, we notice a decline in the usage of minimum tillage, as 7.7% fewer farm owners did this. For the activity of crop rotation still 73.1% of the combined telephone farmers group has implemented this practice on their farm. The representation of farm owners implementing water harvesting has also remained the same in 2018 at 57.7%. However, this does not properly indicate the differences between the groups, as the telephone farmer service group increased their engagement in water harvesting drastically and the pipeline farmer group reduced it drastically. Moreover, a slight increase (7.7%) is noticeable in the usage of cover cropping as an ecological sustainability practice as more farmers use for instance maize along the borders of a field as a windbreaker for their main crops. On the other hand, the usage of agroforestry, IPM and organic farming has decreased. Agroforestry decreased with 3.9%, the

usage of IPM even further with 11.5% and organic farming with 7.7% in 2018 among this combined telephone farmers group.

Social sustainability activities

For the sustainability items geared towards fair treatment of staff and community, we see that the division between implemented and not implemented is roughly the same for the groups making up the telephone farmer's group. Table 10 offers a comprehensive overview of the percentage distribution for the different groups.

Table 10: social sustainability practices

2017 vs 2018	All		Telephone		Pipeline		Horti-impact		Combined	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Training	59.4%	71.9%	69.2%	84.6%	61.5%	61.5%	33.3%	66.7%	65.4%	73.1%
Holidays	40.6%	65.6%	38.5%	76.9%	53.8%	61.5%	16.7%	50%	46.2%	69.2%
Gender policy	15.6%	43.8%	23.1%	46.2%	15.4%	46.2%	0%	33.3%	19.2%	46.2%
Community contribution	62.5%	56.3%	23.1%	61.5%	53.8%	46.2%	50%	66.7%	65.4%	53.8%
Contract workers	31.3%	43.8%	46.2%	69.2%	30.8%	38.5%	0%	16.7%	38.5%	53.8%
Decent salaries	18.8%	25%	23.1%	30.8%	15.4%	15.4%	16.7%	33.3%	19.2%	23.1%
Total people	2.28	3.19	2.85	3.69	1.31	1.70	1.17	3.20	2.54	3.19

All values for the social sustainability constructs have increased in 2018 among the whole sample group except for community contribution, which decreased from 62,5% to 56,3%. The increases for the other constructs ranged from an increase of 10% to 36.5%. Among the whole sample group we noticed that an additional 12.5% of the farmers invested in training for employees, making the total percentage of farms training their employees grow to 71.9%. For holidays we found that this number even further increased as an additional 25% of the farms granted their employees time of beyond the national determined holidays. Furthermore, we see an increase of 28,2% among the whole sample group in terms of installing a gender policy in their farms. What is more, there is an increase of 10% of farm owners having written contracts for their employees over the last year. Finally, 36,5% more farms are now paying their employees decent salaries as determined by the minimum wage in the agricultural sector of Kenya. It should be noted that the standards of the minimum wage may fluctuate per region in the country as living standards and the costs of living in rural areas are different from those in urban areas. This research maintains the standard for the minimum wage of 10.000 Kenyan shillings per month for the permanent staff members.

It is positive to note that all of the social sustainability variables significantly increased in comparison to their 2017 values for the telephone farmer service group. The constructs of holidays, gender policy, and community contributions increased by 20%. While the constructs of training and contracts for the workers increased with roughly 15%. Finally, the construct of decent salaries increased by 7.7%. All of these increases indicate that there is a positive trend in the awareness about social sustainability activities among the telephone farmer service group. When we compare this to the pipeline farmer group, which exists out of both people interested and already paying for agricultural aid services, we notice that the telephone farmer service group is experiencing a more significant growth of attentiveness towards implementing these social sustainability practices on their farms. One of the potential reasons for this could be the extensive mentoring of these farmers under the telephone farmer service project. They are furthermore regularly exposed to a big network of like-minded people in this group that meet-up, discuss and learn with each other about good farm management. Whereas, the pipeline farmer group also improves on their implementation of these social sustainability practices, they lack the intensity in the support from both the service organization (Latia) and the broad network of like-minded farmers.

For the pipeline farmer group, we see some slight changes in the representation of farmers in this group that engage in social sustainability constructs. First of all, there is no increase or decrease of farmers that train their employees as in 2018 61,5% do this. The same goes for the salary that the employees receive, as the representation of pipeline farmers offering a decent salary based on the national minimum wage in this sector was only reached by 15.4% of the farm owners in 2018. Secondly, there is a slight increase (with 7.7%) in the farmers that give their employees additional holidays or time of work. This is also true for the provision of written contracts to the permanent staff members where the representation grows to 38.5%. Thirdly, there is a big increase in pipeline farmers pursuing a more inclusive representation among their staff, as in 2018 46.2% now have a gender policy in place. Lastly, the only social sustainability construct that decreased in popularity among the pipeline farmers is the community contribution that they provide.

Analyzing the results of the combined telephone farmer group with regards to the social sustainability constructs, we mainly notice an increase in the implementation of these activities. All but the construct of community contribution experienced an increase in implementation. For the construct of training an increase of 7.7% occurred, yet this stems all from the increase in training among the telephone farmer service group. A more drastic increase in implementation happened for the farm owners offering their employees holidays or time of work as the implementation of this activity grew with 23%. Such a drastic improvement also happened for the construct of gender policy which grew to an average of 46.2% in 2018,

coming from 19.2% in 2017. Additionally, more workers received a written contract in 2018, as now more than 50% of the farms offer this to (some) of their permanent employees. It should be noted that, in some cases not all employees receive a written contract, but rather the more experienced and loyal employees. Hence, although some employees are now more protected and certain of their jobs, this is not the case for all of them and remains an area of focus. Finally, the construct of decent salaries also experienced an improvement as an additional 4,1% of the farms now offer decent salaries. The only construct experiencing a decline is community contribution; as 11.6% of the combined telephone farms now do not offer any community contribution anymore.

Economic sustainability activities

For the construct of profit in terms of sustainability, 4 items are measured for the different farmer groups. These constructs are contract farming, buying in bulk, having a proper cash flow and record keeping (see table 11).

Table 11: economic sustainability practices

2017 vs 2018	**All**		**Telephone**		**Pipeline**		**Horti-impact**		**Combined**	
	2017	2018	2017	2018	2017	2018	2017	2018	2017	2018
Contract farming	65.6%	59.4%	92.3%	92.3%	53.8%	38.5%	33.3%	33.3%	73.1%	65.4%
Buying in bulk	46.9%	40.6%	69.2%	61.5%	23.1%	30.8%	50%	16.7%	46.2%	46.2%
Proper cash flow	25%	31.3%	46.2%	46.2%	7.7%	23.1%	16.7%	16.7%	26.9%	34.6%
Record keeping	78.1%	93.8%	84.6%	84.6%	61.5%	100%	100%	100%	73.1%	92.3%
Total profit	2.09	2.22	2.77	2.85	1.46	1.85	2	1.67	2.12	2.35

For the economic sustainability constructs only the record keeping and the proper cash flow have increased for the whole sample group. Proper cash flow increased by 6.3% and record keeping by 15.7%. For the constructs of contract farming we see a decrease of 6.2% and buying in bulk also decreased by 6.3%. It could be that after improving on the record keeping that farmers acquired knowledge about their expenses versus their revenue and that they saw no need to buy in bulk. As mentioned by several farmers in the sample group: buying in bulk is only financially attractive when you are able to use the products you bought within the intended time frame, otherwise it becomes a loss. Some farmers also reduced their usage of inorganic chemicals such as fertilizers and opted to use manure more regularly. Others simply indicated

that due to disappointing sales, they were unable to invest in buying in bulk as their financial means were insufficient.

The telephone farmer's group showcased that in terms of the economic sustainability practices they could engage in, not a lot has changed over the year. The only difference between the measurement moment at the end of 2017 and the measurement moment at the end of 2018 is a slight decrease in the number of farmers buying in bulk with roughly 7.5%. It thus seems that although there was a decrease in contract farming in the overall sample group, the telephone service farmers did not experience this. On the other hand, it is troublesome that still a few telephone farmers do not properly engage in record keeping. This should not be the case anymore, as all of the services provided by Latia focus on the importance of proper record keeping as a prerequisite for proper farm management.

A noticeable growth in engagement in sustainability activities among the pipeline farmer group is in the economic sustainability category. All but the construct of contract farming experienced significant growths. The engagement in contract farming decreased from 53,8% in 2017 to 38.5% in 2018. This could be due to the competitive landscape in which the farmers pursuing contract farming, as they now also have to deal with strong competition from other countries in the region. However, the construct of buying in bulk increased with 7.7% to 30.8% in 2018. Furthermore, pipeline farmers were able to improve their cash flow in 2018 as 23.1% are now able to earn a regular income with their farming activities. Lastly, the construct of record keeping received the most drastic change as now 100% of the pipeline farmers are making sure that they keep their records actively.

The results for the combined telephone farmer group indicate that the economic sustainability constructs undergo some changes in the level of representation on these farms. For contract farming we notice that there is a decline of 7.7% among the combined telephone farmer group. This decline entirely stems from the pipeline farmer group, whom we have seen experienced a decline in their possibility to engage in contract farming. The same number of farms buys their products and farm necessities in bulk (46.2% in 2018). However, we see an increase in farms having a proper cash flow and being able to keep records. For the construct of having a proper cash flow an increase of 7.7% occurred, while record keeping improved with 19.2% in 2018. For both constructs, the increase stemmed from the increase in engagement in these economic sustainability activities among the pipeline farmer group.

Summary: Overall it can be argued that the telephone farmers are likely to engage in sustainability activities regardless of the focus area of these activities. This applies especially to the TFS-group who do regularly

significantly differ from the PF-group in implementing certain sustainability practices. Especially for the sustainability of the farm management in terms of profit we see a big difference, as 3 out of the 4 activities are widely implemented. There is still room for improvement as not all the farmers in the TFS-group have any form of record keeping, which is alarming. For the category of ecological sustainability constructs we also see an improvement with up to an average of 4 out of 7 activities implemented. For the social sustainability constructs we see a similar pattern where mostly the TFS-group experiences an improvement in their implementation of sustainability practices, while the PF-group only experiences a slight increase.

5.4 Service needs

Major challenges telephone farmer:

To adequately assess the service requirements of the telephone farmers, one also needs to inquire about the reasons behind their service needs. What is inhibiting these farms to maximize the potential of their farm or to commercially engage in agriculture? Hence, the 4 most referred to challenges of the telephone farmer will be described below:

1. Extreme weather conditions are the main challenges telephone farmers have to manage. The climate shocks of 2018 had a devastating impact on the farms. The long periods of heavy rains and droughts in 2018 extorted water reserves or flooded the farms to the point that the planned production goals were unachievable for most telephone farmers. One of the outcomes was the restructuring of the farm and reinvestment in farm structures, inputs and production plans, often on a smaller scale. It can be argued that telephone farmers have an advantage over the small-scale farmers as their resources are more accommodating to these situations.
2. Telephone farmers also indicate that they often lack skilled labor capable of enhancing the production efficiency. They require employees instilled with specialized knowledge and skills to proactively combat inefficiency and challenges. One of the advantages of having skilled and specialized staff members is the diminished need to hire external specialized services for certain problems. These skilled employees could even offer hands-on training to other farm employees. However, due to high turnover in permanent staff, telephone farmers seem to be apprehensive to offer new employees the required training as the fear of losing them after a short period trumps the potential which can be achieved in operational efficiency through training.
3. Marketing has been identified as the third major challenge. Telephone farmers struggle with the unstable market in which steep price fluctuations are diminishing the profit margin. This is furthermore influenced by the competition from imports coming from Uganda and other countries in the region. The farms therefore need to focus on reducing their costs, as controlling for the price

in the farming plan deems highly difficult. In addition, these prices are negatively influenced by the governmental support to farms. There are instances in which the farm owners and manager have indicated that the agreed upon quantity of inputs was not coming in time, leading up to delays in their production plans and a decrease in the quality of their production. Hence, the original plan of the government to reduce the stress of the costs that farmers experience by offering subsidized inputs,

4. Proper infrastructure in the region (road and electricity networks). Even when the farm is operating professionally and efficiently, it may be experiencing hindrance from a lack of proper infrastructure. Several farms struggled to reach their markets or buyers as the roads leading up to their farms were not well maintained, making them unpassable. Moreover, some farms are lacking proper electricity connections, resulting in the inability to invest in post-harvest processing facilities running on electricity.

Priority services according to the telephone farmer

Besides, we would like to discuss the priority services as indicated by the telephone farmers that lead up to telephone farmers approaching service providers to engage with them. The identification of the priority areas according to the farm owner or the manager may be beyond the scope of capabilities of service providers. However, they are able to aid in diminishing the hardships that they are experiencing, or making the farms more resilient in the long-term. The priority services most commonly identified will be discussed below:

1. Business plans. For those farms still lacking a proper business plan, this is one of the most requested services and priorities. The business plan will aid the farm owner and the farm manager to evaluate their own capacity level, create plans to improve the yield, and track the costs and revenue.
2. A one-stop shop for farming information. There are a lot of services and sources of information on farming practices out there. Farm owners aspiring to grow their commercial business are struggling to identify the right sources. They try to gather information from all sorts of people and organizations, but are noticing that the implementation of the advice received is not always useful for their personal situations. They would benefit from customized advice catered to their own farming needs and challenges. Hence a one-stop shop that would aid in the identification of the challenges, the provision of knowledge through experts, and fine-tuning and follow-up on progress made is a desired service for telephone farmers.

3. Training of staff. In line with the previously indicated challenge of a lack of skilled staff, a lot of telephone farmers are seeking help in training their staff. These trainings range from specialized knowledge on irrigation systems and pesticides to trainings about hygiene and the seed nursery.
4. Market advise. One of the challenges of a lot of telephone farmers is finding a market for their produce. Often, they are not satisfied with their current partners or sales channels and want to find better options. Hence, one of the priority services is identifying new partners to work with, ideally in the form of contract farming.

Services used and the satisfaction level

There are services that the telephone farmers are already interested and involved in. These services range from accountants auditing the finances of the farm, to certifications of the farm to be able to engage in export contracts to creating and formulating the business plans. For those services that the telephone farmers already received, an assessment can be made of the strengths and weaknesses. These evaluations concern the strong points and the weak points of all services out there, and do not only relate to Latia. An overview has been given in the table below (table 12).

Table 12: services used and their strong and weak points.

Services used	Strong points	Points for improvement
Accounting systems / external accountant	Track records and being able to have a financial overview. To have a software system that allows for good book keeping (Quickbooks).	Could be improved to be able to track within the Quickbooks systems. As it is: too complicated and lacks flexibility.
Business plan	Plan which should help you to strategize; offers visibility across the enterprise, focus and a good prospect.	Difficult to incorporate emerging issues such as market crises or weather changes. There are often adjustments needed.
Training	Useful for teaching specific skills like: spraying and scouting of pest and disease. These trainings enable the staff and the farm as a whole to improve and increase production. Overall, the trainings offered by Latia receive high praise for their content and high practicality level.	Deemed to be too expensive in the eyes of some farmers. Should give a wider variation of trainings: also on farm management or a wider selection of crops. Also, the consistency and frequency is too dispersed, there is a need to strengthen interactions/meeting forums. Moreover, knowledge gained from the trainings are

		not easily implementable due to financial investments needed.
Recruitment staff	Offers the placement of highly trained/skilled farm managers on farms. The owners appreciate their proficiency and efficiency, ability to motivate staff and idea generation. The farm managers like the possibility to gain experience on a high potential farm.	The farm owners are relatively pleased with this service. However, before assigning a farm manager to a farm, more attention needs to be paid to synergizing the objectives, responsibilities and incentives within the newly found working relationships. Currently, there is a high turnover of farm managers within this program due to extremely demanding working conditions for farm managers.
Marketing linkages	Reliability and prices pegged on market forces with min-max range. Contracts offer assurance and steady cash flows in a fluctuating market environment where competition from regional countries is big. Decreases the risk of investing in niche markets as the buyer is locked in.	The contract requirements often need clarification for things such as quantities and quality levels. For instance an improvement would be universal guidelines on information to include in the contracts, e.g. specifications.
Certification	Good to have in place. Puts the farm on their toes and gives them advise on proper policies and systems to have in place.	It is expensive to acquire. A lot of investments needed. The process also takes up a long time.

In conclusion, the most utilized services by telephone farmers are related to business planning and accounting, training and recruitment of staff, marketing linkages and certifications. The accounting systems and business plans are needed to assure that the farm strategy is feasible and cost-effective, leading up to production- and profit maximization. These services could benefit from more incorporated flexibility as emerging issues are difficult to intermingle in the current systems or plans. Furthermore, telephone farmers often use training and recruitment services to upscale the potential and efficiency levels of their workforce and to improve the on-farm knowledge to deal with challenges ad-hoc. These services can be improved by the provision of mutually agreed contracts between the farm owner and the hired employee, as well as by expanding the scope of the trainings available. The marketing linkages service offers reliable and steady prices for the production and sales of a certain product by finding a buyer interested in arranging a contractual agreement. However, these contracts sometimes lack the required information to make the

contract a workable covenant between the two parties. It may be that the contracts require the farms to obtain certifications, which will guide the process of policy implementations, facilitate work condition improvements and staff training on issues such as food processing and hygiene. Although, these requirements would install good practices in the farms, they do require big investments and take a lot of time to effectuate.

5.5 Inclusiveness

Besides improving the food production and sustainability of farms by supporting agricultural entrepreneurs in their quest for knowledge, skills and services, the intention is also to improve the inclusiveness. This can be analyzed by looking into the institutional voids which hamper telephone farmers to effectively and sustainably participate in the global agricultural value chain.

The telephone farmers were able to ameliorate their percentage of sales through the preferred sales channel: contract farming. This can either be related to national or international contractual agreements. Overall, the usage of these sales channels has a positive influence on the level of inclusiveness of the telephone farmers. The share of produce sold through contracts and export agreements is 41.72% in 2018. In comparison, the TFS-group was able to increase their sales through contracts and export agreements to 59.58% in 2018, while the PF-group were able to sell 33.85% through similar sales channels. Thus, although all farmers wish to have some form of contract farming, the telephone farmer belonging to the TFS-group is the one capable of selling a bigger quantity of their produce via this channel. This could partially be influenced by the years of experience, the ability to investment in certification and technological advancements and the level of professionalization achieved.

The disparity between the preferred sales channels and the used sales channels could be influenced by institutional voids farmers may experience. Institutional voids are identified by factors such as access to finance, access to training, access to technology, access to subsidized inputs and access to markets. This last factor, access to markets tends to be more accessible for telephone farmers due to the size of their operational capacity and the resources at hand to adhere to requirements needed for contract farming. Smallholder farmers often lack resources to do so, thus fail to attract any form of contract farming. From the information on the services that Latia offers, we can furthermore conclude that telephone farmers are also more prone to have access to training and access to technology, both due to higher financial freedom to acquire them and the awareness that such services exists. This allows them to invest in the optimization of their farm, freeing up finances to explore opportunities related to innovation, market orientation and additionally improve their sustainability practices.

On the other hand, a telephone farmer has limited access to subsidized inputs. Many telephone farmers owning large farms have indicated that they cannot access subsidized inputs as the government perceives them as too advanced and too large to apply for this support, although very much desired by these farmers. The question remains of course whether these farmers should be offered these inputs when small-scale and medium-sized farms may need them more. Additionally, one of the benefits of having access to markets such as contract farming allows telephone farmers to gain access to subsidized inputs via their contract, as measures are installed by the contract company to safeguard the quality. With this, their dependency on access to finance from formal institutions is also decreased as their inputs are often subsidized or disbursed by the contract company, as an informal money lender. Hence, we could argue that overall the telephone farmers already benefit from an increased inclusiveness due to their involvement with organizations such as Latia as mainly their access to training, access to technology and access to markets can benefit from current service offerings.

5.6 Relation of the Farm owner to the farm operator

Leenstra (2014) describes the relation between the farm owner and the farm manager as problematic. The experience in the past was that the relationship between the farm owner and the farm manager is full of friction. This mainly stems from a lack of trust on both sides. The farm owner believes that the farm manager is unreliable and will steal. The farm manager indicates that that the owner is not transparent and too demanding. They often work without a shared business plan, lack skills and do not receive proper incentives. This led to the identification of this alarming relationship dynamic as a main destructor of farm productivity, efficiency and growth. Current research found another layer in this dynamic which alters the impression created by Leenstra (2014).

We could argue that the intervention of a service organization in the form of headhunting, training and monitoring of the farm manager puts trust in the equation as a professional, unbiased party intervenes. A service provider could introduce a farm manager with a match to the profile of needed skills as set by the farm owner. These farm managers receive specialized training and the opportunity to gain experience. The farm owners receive an all-round professional farm manager vouched for by a professional organization. This service offering by Latia is very popular among entrepreneurial farm owners, like the telephone farmers. Yet it still needs some adjustments. Latia should enable contractual agreements between the farm manager and the farm owner. Within this process they should involve both parties to assure that there is an understanding and alignment of organizational goals, strategic plans, responsibilities and incentives. These contractual agreements between the farm manager and the farm owner will lay the foundation for mutual

trust since the farm manager is empowered to strive for organizational excellence based on the action plans and the farm owner is motivated to communicate and deliver clear guidance.

However, even when the official contracts between the farm manager and farm owner is missing, we could argue that the relationship is initiated based on a mutual understanding of a need and desire to work together. Farm owners, and especially telephone farmers, choose to hire a farm manager when in need of technical and specialized knowledge, as well as to ease their own work and lack of presence without reducing their organizational performance. The farm manager will coordinate and manage the daily operations and activities on the farm. Their motivation to work for the farm owner stems from their ambition and passion for the agricultural profession. In several cases the farm manager was either introduced by an acquaintance or worked for the farm manager before. In other instances, they were indeed recruited and trained by Latia. In general, the farm managers wish to work for farm owners whom are also passionate about farming and able to have a good understanding in their working relation.

According to the interviews, the 5 attributes instilled in a farm manager of importance to the farm owner are; dedication, self-driven, competency, honesty and leadership. The farm managers prefer farm owners whom showcase fairness, transparency, trust in employees, cooperation and good communication skills. Most of the time, both farm managers and farm owners agreed that the respective other party embodied these attributes and skills. However, there are also situations in which there was a mismatch between the farm owner and farm manager based on the merit that one of the parties, or both, did not uphold high relational or operational standards. A clear example of this situation is the placement of a trained farm manager at a telephone farmer, which later on deemed inefficient and toxic for the farm manager as the farm owner was highly controlling and demanding beyond reason. Consequently, service providers offering headhunting services should not only ensure the selection of adequate farm managers but also regulate the expectations of farm owners.

A good balance of the expectations and the responsibilities will guarantee that both parties can initiate and grow their working relation in line with the organizational goals. The telephone farmer is in favor of giving a lot of responsibilities to the farm manager. They are interested in highly skilled managers whom are capable of record keeping, planning, concrete decision making, employee management and specialized activities such as designing spray programs and crop plans. Successful relationships have in common that the farm owner co-creates and communicate strategic plans and decisions with their managers. In general, we could argue that the younger farm managers trained by Latia are to a lesser extent involved in the decision making, they are however regularly briefed and asked for feedback. More experienced farm

managers appreciate the trust they receive to make decisions themselves and tend to be more empowered and motivated to maximize the organizational potential when involved in the creation of these plans. Sometimes the farm owner desires to make the decisions without the input of the farm manager. Under these circumstances, it becomes highly difficult for the manager to understand, commit and thrive in his/her position. Moreover, it could be that the decision making process becomes more difficult and inefficient when family is involved. For the telephone farmer group, roughly halve of the group include relatives in the decision making process. Only rarely do the farm owners believe this may be a hindrance. They rather see it as a preparation or implementation of a succession plan. However, a few managers mentioned that they experienced the negative consequences of family involvement, as it could delay the decision making process beyond a reasonable time frame, which hampered the farm production. Hence, it could be argued that the involvement of relatives should be limited to participation in major decisions or an advisory role, instead of daily intermingling.

In general, we could argue that the relationship between the telephone farmer and the farm manager is perceived as relatively satisfactory according to the perspective of the farm owner. The telephone farmer has indicated that as long as the farm manager communicates well and is able to observe and manage the farm problems they think that the relationship works well. Communication is key in the responses of the farm owners. This indicates that in general, telephone farmers are able to trust and rely on the expertise of the farm manager when there is continuous communication and feedback. However, in some relationships the farm owner believes that the farm manager should perform better, they dedicate this to a lack of appropriate skills, experience and transparency. According to the perception of the farm manager, we could argue that the satisfaction level is not up to par. The farm manager tends to feel underappreciated and underpaid for the work they deliver. Some farm managers are therefore interested in finding new job positions. Others receive benefits beyond their salary, like: ownership of pieces of land, land to grow their own produce on or they get the produce for free, free housing, financial performance bonuses and school tuition fees for their children. Finally, the farm managers feel appreciated when they are involved in the decision making and planning process, when there is communication and honesty, and the production is thriving. Overall, the farm owner is more satisfied with the working relation than the farm manager (according to the interviews). Previously mentioned contractual agreements representing clear responsibilities, operational goals and incentives could improve this significantly.

5.7 Proof of concept Latia

To assess the proof of concept of supporting the medium sized modern telephone farmer, a number of indicators need to be evaluated. These indicators are related to the level of impact that they have on the

farm itself, the impact the program has on the society and the satisfaction level with the service organization offering the support. For the indicator 'farm impact' the increase in economic variables like higher productivity and turnover could be used, as well as the increase in sustainability practices. The impact on the society can be assessed through the trickle-down effect that the improved situation of the telephone farmer has on betterr amenities and knowledge sharing.

Overall, we could argue that the success and impact of the telephone farmer's project, whether on the farm or the society, is influenced by other factors besides Latia's services and the project approach. In general, the economy is growing and in 2017 the political situation was tense due to the elections. In 2018 the weather has been quite unpredictable. In April there were very heavy rains, while during the summer there was long period of drought. The farmers furthermore had to deal with pest and disease infestations. All these factors also influenced the demand and supply of agricultural products. However, for the telephone farmers the project influenced their ambitions and results, as reflective in the farm impact and the community impact.

1. **Farm impact:**

The data of the research has revealed that there are various ways in which the service interventions of Latia had an impact on the farm performance of telephone farmers and their operations and strategy. The quantitative economic data in itself is not able to provide an unified answer. The previously discussed environmental shocks and pest and disease infestations highly impacted the production and the expenses related to farm input to manage the situation. Nonetheless, we will refer to the financial outcomes as discussed in section 5.2.

Overall, the expenses, of the telephone farmer, for the pesticides have substantially increased in 2018 for both crops and animals. This is in line with the notion that farmers needed to control the infestation of pest and disease. The expenses for pesticides for crops more than doubled over the year, for the pesticides needed for the animals an increase of 5 times the amount of investment which was required in 2018. Additionally, the investment required for the seed procurement was significantly higher than previous year. This relates to the required reinvestment in crops to build up the farm production after the devastated climate shocks that happened several times last year.

In line with the increase in costs for farm input, there is also a noticeable decrease in farm production, gross revenue and new investments made. For the telephone farmers group, we could argue that there has been a significant decrease in gross revenue and investments made. More specifically, the telephone farmer service

group had a decrease in gross revenue of 50% but a relatively similar investment pattern compared to last year. For the pipeline farmers group, it was found that the gross revenue has decreased by even more than 50% while the investment pattern has remained only a small fraction of the investments made in 2017 (roughly 10%).

Apart from the economic variables, there is also a need to look into the improvements of the sustainability practices. For the combined telephone farmer, we could argue that there has been a significantly positive influence of the support services on the overall sustainability of the farm. This is mainly reflective in the increased percentages of farms engaged in the field of social and economic sustainability. Overall, there has been a clear improvement of the social sustainability practices among the telephone farmers group. Here the engagement substantially increased over the past year. And this is reflective in constructs like having a gender policy, offering additional benefits to the workers such as holidays and offering them official contracts. These improvements have a real impact on the satisfaction level of the employees and on inclusiveness. Focusing more on the TFS-group we see that they improved the implementation of all constructs making up this factor. The only initiative which is less popular in 2018 is community contribution beyond offering employment to local residents on a permanent or temporary basis.

We could also argue that there have been improvements in the implementation of economic sustainability practices among the combined telephone farmers in 2018. These mainly relate to the improved implementation of record keeping and the cash flows. We see that the same percentage of farmers buy their inputs in bulk, as this may not be financially interesting to do so. Furthermore, the percentage of TFS-group farmers still is highly involved in contract farming in one way or another, while the PF-group was less capable of assuring contracts to strategize their farm operation.

More concretely there is a high desire to obtain contracts. For the telephone farmers this is an important business model to engage in. It can be structured in different ways. Overall, it involves a steady arrangement between a customer (organization, trader or exporter) for the production of a certain crop, seed or other farm product of a certain quality in exchange for a stable and favorable price, and required quality and quantity standards. On the one hand, there are instances where such an arrangement does not properly function, however this is then often related to a lack of formal contracts, like when the farmer operates on the notion of a purchase arrangement of a product which later on is not honored. On the other hand, it may be that the farm is not able to deliver in time. In such circumstances, farmers may seek an arrangement to purchase quality products of other small/medium scale farmers to fulfill their contractual agreements. These small scale farmers then become suppliers to medium-scaled farmers who have official contracts with

buyers. For the telephone farmers group, the support in contract acquisition and the overall marketing of products is a desirable service. Where possible, Latia aids in the linkage to interested buyers or certification bodies to oblige to standards for contract farming such as Global Gap. Overall, contract farming is important for telephone farmers due to the consistency in their cash flow and the consistency in the needed operational inputs to deliver on this contract. Hence, it increases the resilience to environmental, market and operational shocks and improves the viability of the farm.

Beyond the sustainability practices, telephone farmers have indicated that the specific service offerings of Latia have enabled them to improve the productivity, profitability, efficiency and quality of the farm and its products. The services often led to a professionalization of the organization, as business plans directed the operational focus and the required activities to achieve the business goals. Trainings improved the strategic alignment within the farm and specialized knowledge among employees. They could even result in installing negotiation skills beneficial to market positioning and establishing contracts. Telephone farmers that introduced modern technology improved their operations by making them more cost- and time effective. Additionally, financial accounting systems for record keeping and data analysis initiated prudence and proper decision making. Furthermore, an assessment of the inputs established appropriate production methods and tools to improve production.

2. Impact on the society

The support offered to the telephone farmers also has an impact on the community in which they operate. The proof of concept highly relies on a trickledown effect of the support given to the telephone farmers to the local community. This could range from being an inspiration to small scale farmers to empowering them with knowledge transfers. The observed community impact will be discussed below.

The services offered to telephone farmers have various implications for the society. First of all, the training that farms receive are disseminated to employees of that farm to improve their efficiency levels and the production. These employees could use this gained knowledge to use on their own family farms. However, there are also farms that actively engage with the community to teach about their newly found knowledge. Some telephone farmers have opened up their facilities to offer specialized trainings in green house management and pig farming to eager small-scale farmers or educational institutions. Other telephone farmers spread the knowledge they were able to gain in the training sessions with local small-scale farmers in more informal settings. Secondly, the telephone farmers also provide drinking water or water for animals, for example a farm in a typical Massai area has agreements with the community on how often people can come to him to get water from his borehole. Thirdly, as mentioned previously, several farmers outsource,

or buy products from small farmers, for example if their contract requires bigger quantities than they can deliver themselves. Fourth, the general awareness about the possibilities of commercial farming and increased knowledge about the impact that services may have on the production levels has improved among community members of telephone farmers. Fifth, the success of the telephone farmers gained after improving their production through service support may influence the community by improving the amnesties available in their immediate vicinity. For instance, the achieved success and expansion plans of a telephone farmer, initiated the donation of farm land to the police to build a local police checkpoint. This will improve the safety of the farm employees and the community. Another example is the support that telephone farmers give to schools and pupils in need, in the shape of milk, food, tuition and other donations. Sixth, exposure visits to the Netherlands and best practice cases contribute to a greater variety in agricultural products, producing products like fruits, vegetables and spices. Employees of telephone farms take the knowledge about these modern products and ways of working to their own farms and apply them. It furthermore improves the diversity in food available to the community ensuring varied nutritional benefits. Lastly, the impact on the community is also visible in the existing and expanding eco-system for agricultural-entrepreneurs. All sort of services became available, which were rarely used in the past like: financial linkages, soil research, product specialized processing firms and irrigation companies. It was noted that former employees of Latia involved in offering the service to the telephone farmers have started their own advisory services like the ones above, specialized in a certain sector, trade or region.

5.8 The eco-system

The telephone farmer's project operates within a broader context in which it has to deal with environment influences and stakeholders. Nowadays farmers have the ability to seek support in many forms as an eco-system for modern farmers is developing in Kenya. All kinds of support activities are available, ranging from government extension services to private sector advice on how to keep records for a medium size farm. Latia has become a service centre for the middle size modern farmers in the agricultural sector of Kenya. There are however other suppliers of services that either act as competitors or information disseminators:

a. There are traditional development cooperations, focusing on the poorest farmers (Small farmers). They offer similar services to empower small scale farmers by teaching them methods to increase their productivity yield.
b. Modern support through innovations developed by industry-crossing institutes and organizations. This may either vary from seed-developers, to agricultural conferences for new farming

technologies, to financial data sourcing initiatives aimed at mobilizing private capital into financial services for the farmer.

c. Networks operating through WhatsApp. A network of like-minded telephone farmers enables farm owners to ask questions about operational problems such as pest and disease control, share information on market prices and assess the desire and potential of coming together as a group to buy in bulk or hire services. The bond between the telephone farmers has grown due to this tool and even inspired them to continue as a unity after the finalization of the project.
d. Agricultural information provision through the 'Seeds of Gold'. This is a comprehensive agri-business publication in Kenya that teaches farmers methods to improve their productivity and solve agricultural related challenges.

Latia has become one of the players in the eco system, providing a number of services. The telephone farmers' project has supported the development of such an eco-system in different ways:

a. A support system for modern medium size farmers, introducing new forms of support which hardly existed in Kenya (such as a market for farm managers) has been developed.
b. Latia has taken the role of a broker by connecting farmers to relevant parties when LBS cannot provide the service itself (for example connecting farmers to banks, soil testing organizations and agro-industries).
c. A number of their former employees started their own companies for providing that type of support.

Overall, the rapid increase in supply of support and the variety of service providers that farm owners may come in contact with offers the possibility of finding the adequate expertise for each situation. However, the developing eco-system should be regulated by (inter)national standards and certifications to minimize disappointing experiences in case of illegitimate service offerings. In line with this, clear communication policies, media coverage and partnerships on the authenticity of these services is required to increase the awareness among the farming population.

6.0 Conclusion: Food security

In the framework of this project, we could argue that enabling the knowledge, skills and services given to medium-scale modern farmers, in line with the telephone farmers profile, would be beneficial in the grander scheme of improving the food security. The different sections of this paper explain the different characteristics of the farm owner, their farm and the working relationships they have with staff. Furthermore, the beneficial factors stemming from the support services have been explained through an assessment of the sustainability, inclusiveness, the eco-system and the overall observed changes originating from service support introductions on the farm. Moreover, this believe is influenced by external factors that influence the overall food security of Kenya. Further classification of the different types of telephone farmers are shared in the policy brief on this project.

The initiatives based on production improvement of small-scale farmers is not going to solve food insecurity in Kenya. Programs aimed at supporting medium-scale farmers would enable the acceleration of food security as the sustainability and scope of the support seems to be more influential. They support these farmers received focusing on the commercialisations and optimisation of the farms. Hence, the knowledge, skills and other inputs received aided in the process of transforming farms into high-potential commercial endeavours. Together with the background and available resources of the selected medium-scale farmers, the support services ensure that the yield of the farms is increasing substantially in a sustainable and inclusive manner. First, the effect of the program is visible on the food security as medium-scale farmers learned to produce different products, diversifying into unknown fields attractive to contract farming partners such as an exporting firm or a food processing firm. The diversification also ensures that the local communities are being exposed to a wider range of foods with varying nutritional benefits either in diet shifts or in farming interests. Contract farming could be repeated between the medium-scale farmers and the smaller local farmers as quota's need to be reached and knowledge is transferred. Moreover, the diversification of food production through contract farming and export generate foreign exchange. This would enable the Kenyan government to buy cheaper products in the world markets to fill their food security needs.

However, this is a double-edged sword since the import of inexpensive products like grains dilute the national market and lower the prices offered to Kenyan farmers for their identical products. Secondly, many farmers part of the project had a shift in their mind-set. After making use of the different service offerings, they became more aware and interested in commercial farming. Services such as training sessions, virtual guidance and employee recruitment allow for a streamlined operational system that increases the resilience towards internal and external challenges. The annual data has shown that there has been an increase in

willingness to invest in modernization of farming techniques and infrastructure/machinery to optimize the productivity level. This also entailed that some farmers made the switch to become fulltime agricultural entrepreneurs leaving behind their previous occupations. Thirdly, the modern medium size farmers train their farm employees to operate more modern methods of cultivation, harvesting and processing, which they may also use for their small plots, contributing indirectly to food security in the country. The required mechanization could come from utilizing the full capacity of the machines purchased by medium-scale farmers through leasing contracts with local small scale farmers. Hence, the presence of medium scale farmers is key to facilitating transfer of technology from the frontier to the smallholder farmers (also shown in video material available on this project).

For the future it is important to have a harmonized eco-system containing service providers with clear business models showcasing their strong points. The emerging business support system available for all farmers, in Kenya, allows them to optimize their productions, contribute to the national food security and upgrade the value chain. Especially in regions in which a large share of cultivated land is under medium-scale farm management, this can be stimulated by an attraction of large scale traders and their investments. According to Sitko et al (2017), these large scale traders are interested in buying larger volumes per transaction to reduce transaction costs. Once they set up, they engage with processors downstream and have contracts with smallholder farmers upstream to coordinate supply chain activities. These large scale traders provide smallholder farmers with services, including extension advice, price information, and input credit. What is new is that this is that the focus is shifted from the traditional extension system, which used to be geared towards the smaller farmers, to the medium-scale modern farmer eager to make the switch to commercial farming. This is needed as the rapidly growing rural population are putting pressure on smallholder farming system and food security becomes an ever increasing problem.

7.0 References

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