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Assessment of Agricultural Advisory Messages from Farmer-to-Farmer in Making a Case for Scaling Up Production: A Qualitative Study

Nana Afranaa Kwapong and Daniel Adu Ankrah
Department of Agricultural Extension, University of Ghana, Legon, Ghana

Dominic Boateng-Gyambiby
Department of Agricultural Extension and Extension, University of Cape Coast, Ghana

Joseph Asenso-Agyemang
International Development and Research Consult Ltd., Ghana

Lydia Oteng Fening
University of Energy and Natural Resources, Ghana

Inadequate access to agricultural extension services often results in poor farm practices, affecting yields and subsequently the income and wellbeing of smallholder farmers. Given the high demand for agricultural information and the limited capacity of extension services, a farmer-to-farmer extension approach has been explored by many underserved farmers. In this study, we use a qualitative case study approach explore how cassava farmers who had limited access to agricultural advisory services from public extension agents managed to up-scale their farming business. Our research question was: what lessons can be learned from the lived experience of these farmers to address current challenges of cassava farming? The results of our study revealed diversity in advisory messages from farmer to farmer and agricultural extension agents. Farmers' messages focused on encouraging farmers' commitment and motivation towards farming business, availability of needed financial resources for the entire production season, willingness to reinvest profits, and access to farmland for future expansion. In contrast, the traditional messages from agricultural extension agents focused on encouraging group formation to address marketing challenges, diversification of farm operations, and good agricultural practices. These results show the need for pluralistic extension approaches to ensure farmers get access to necessary information. Keywords: Agricultural Extension, Case Study, Farmer to Farmer Extension, Social Learning

Introduction

Agricultural extension services play a crucial role in providing smallholder farmers with knowledge and tools about modern agricultural practices, linking them to new technology and proving them greater access to finance and market solutions (Kristin & Franzel, 2018). Smallholder farmers' access to extension services has served as a tool in boosting agricultural productivity, improving livelihoods, and promoting agriculture in many developing countries (Birner et al., 2009). However, smallholder farmers remain disadvantaged when it comes to

accessing quality extension and advisory services (Glendenning, Babu, & Asenso-Okyere, 2010; Manfre et al., 2013). There is inadequate access to extension services, mostly resulting from high farmer to extension ratio, poor access to timely, accurate and relevant agricultural information which results in poor farm practices affecting yield and subsequently the income and wellbeing of smallholder farmers (Davis et al., 2018; Rivera & Qamar, 2003; Swanson, Bentz, & Sofranko, 2003).

Given the high demand for agricultural information and the limited capacity of extension services, most farmers rely on their fellow farmers as primary sources of information about agriculture (Franzel et al., 2018). A farmer-to-farmer extension approach is defined as the provision of training by farmers to farmers, often through the creation of a structure of farmer-trainers (Scarborough, Killough, Johnson, & Farrington, 1997). The approach is based on the premise that farmers are more efficient in communicating and disseminating information to other farmers than the trained formal agricultural extension agents (Kiptot & Franzel, 2014). These model or lead farmers face similar situations and farming conditions as other farmers and are able to better package information and communicate to facilitate understanding of their fellow farmers. There is a higher level of trust among the farmers and the lead farmer facilitates the receptiveness and acceptance of the message and prompts further action such as adoption of technology.

Farmer-to-farmer extension is based on the concept of social learning. Social learning or “learning from others” is defined as “an understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interaction between actors within social networks” (Reed et al., 2014, p. 4). Social learning is considered a higher form of learning, a process of participation with others which occurs within wider social units. Learning occurs through dialogue as a means to generate new ideas, negotiate understanding, and build knowledge (Hedegaard & Flear, 2008; Sewell, St. George, & Cullen, 2013; Wells, 2000). Through dialoguing, individuals with similar issues meet and interact to co-construct shared understanding (Sewell et al., 2013). Dialoguing facilitates integration of information from different actors with different perspectives by questioning, clarifying, contradicting, and debating to achieve a broader understanding. Actors involved in the learning process go through stages of discovery to resolve knowledge conflicts and fill knowledge gaps to analyze and draw conclusions and decide on outcomes and application of new knowledge.

According to Reed et al. (2014), for social learning to occur, it must be possible to demonstrate that a change in understanding has taken place in the individuals involved. Through social learning, individuals’ understanding, intentions, and behaviors may change. Social learning approaches used in agricultural extension have proven effective in facilitating information and disseminating technology to farmers. There is evidence that social learning processes involving farmer-to-farmer social networks has increasingly resulted in the effective dissemination and adoption of new technologies (Adegbola & Gardebroek, 2007; Bandiera & Rasul, 2006; Maertens & Barrett, 2012).

Farmer-to-farmers extension approaches have been promoted in Ghana by the Ministry of Food and Agriculture (MoFA) as one of the strategies to address the challenge of many underserved farmers due to the high farmer to extension agent ratio which is estimated at about one agricultural extension agent serving over 1,500 farmers (MoFA, 2015). This farmer to extension ratio is above the Food and Agricultural Organization recommended ratio of 1 extension agent serving 500 farmers. The Ministry of Food and Agriculture (MoFA) farmer to farmer extension approach has included the use of “proven farmers” who have faced the same challenges as their fellow-farmers in the locality but have managed to deviate positively, and are willing to demonstrate and encourage adoption by peer farmers and farmer groups, “nucleus farms” where the primary farm operator often provides support to the nearby smallholders, in purchasing the inputs and marketing the crop outputs, and registered farmer based

organizations (FBOs) which can gather and coordinate smallholder farmers who share a common interest in raising their productivity and revenues (MoFA 2017).

Purpose of the Study

Cassava farmers in Ghana have less access to agricultural information services from public extension agents and often rely on information from other farmers and other information sources (Anaglo, 2011). Antwi (2015) reported a large proportion (88%) of cassava farmers seek agricultural information from fellow farmers. Given the high demand for agricultural information and the limited capacity of extension services, a farmer-to-farmer extension approach has been explored by many underserved cassava farmers. In this study, we use a qualitative case study approach to understand how cassava farmers who had limited access to agricultural advisory services from the public extension agents had managed to up-scale their farming business. Our research question is: what lessons can be learnt by other cassava farmers from the lived experience of these farmers to address current challenges of cassava farming and encourage other smallholder farmers to transition to larger farm sizes towards commercialization of their farming activities? We further explore the difference in advisory messages from farmer-to-farmer and from agricultural extension agents to farmers. Knowing the sources of information available to farmers and their channel of communication will enable agricultural program developers to channel interventions targeted at farmers through the appropriate medium. It is also important for policy makers to understand the existing information services providers to ascertain their usefulness in disseminating new technologies. This will serve as a guide to policy makers in agricultural development to develop appropriate strategies that could be pursued to ensure farmers' access to information.

Conceptual Framework

We used an adapted framework developed by Lang *et al.* (2012) shown in Figure 1, for analyzing and providing insight into knowledge generation and transfer among farmers to provide solutions to collectively identified farming problems. A conceptual model of this transdisciplinary research process involves three phases: collaborative problem framing and team building (Phase 1); co-creation of solution oriented transferable knowledge (Phase 2); integration and application of co-created knowledge (Phase 3). The first phase of collaborative problem framing and team building involves collaboratively identifying and framing the research problem, which is done through participation of research team involving all relevant actors to the problem. The second phase of is the co-creation of solution oriented transferable knowledge. This is the actual research process where the research plan is implemented through a collaborative process involving all relevant actors through a dialogue process. The aim is to generate solution-oriented and transferable knowledge to solving the defined problem in Phase 1. This phase involves the process of integrating and applying the outcomes of the collaborative research process to solving the defined problem. Transdisciplinary teams can generate new knowledge to address complex problems while integrating multiple disciplines and stakeholders (Botha, Klerkx, Small, & Turner, 2014; Harris and Lyon, 2014)

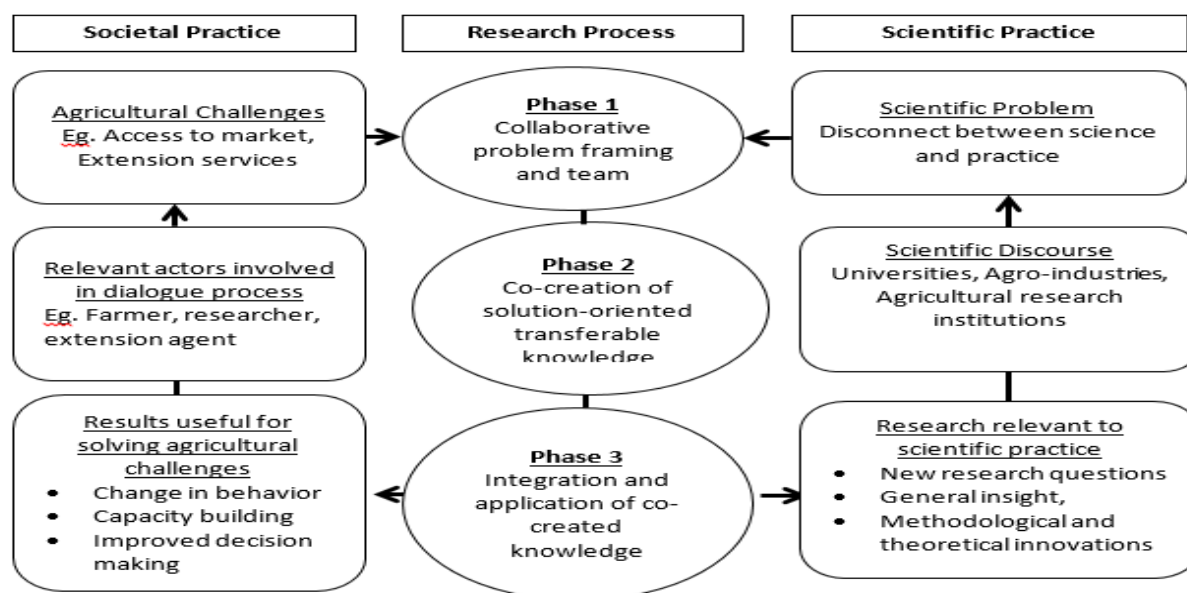


Fig. 1: Conceptual model of a transdisciplinary research process adapted from Lang et al. 2012 showing agricultural challenges and collaborative research approach to solving the challenges

We apply this framework to this study by integrating actors along the cassava value chain with researchers to collaboratively identify major challenges to cassava farming through a participatory dialogue process which integrates the different perspectives, experiences, and knowledge of these actors. This facilitates co-creation of knowledge to address the identified challenge. In the context of this research project, the research team was composed of small, medium, and large-scale cassava farmers, researchers, agribusiness entrepreneurs, agricultural extension workers, policy makers, community leaders, and agricultural transport operators. These actors, through dialogue, discussed their experiences in detail, and learned from the success stories of farmers who have been able to overcome the challenges of agriculture. The outcome of the dialoguing process provided insight into cassava farmers learning processes and experience in addressing challenges.

Role of Researchers

The research team consisted of five (5) co-investigators. The first, second and third investigators are agricultural extension researchers who have experience in studying and understanding farmers' attitudes, behaviors, and learning processes. The investigators have been involved in a number of research projects, teaching and building the capacity of agricultural extension agents and smallholder farmers in areas on participatory approaches, extension program planning, farmer based organization management and development, farmer risk assessment, and agricultural value chain development. The other team members are researchers who provided support in developing the guiding questions, in facilitation of group discussions, in data analysis and writing the manuscript.

Method

Study Design

We chose a qualitative approach for this study to better understand the knowledge transfer processes from farmer to farmer through dialoguing and integration of other actors in the cassava value chain. Qualitative methods have potential to provide deep insight into the

understanding and experiences of individuals (Thomas, Nelson, & Silverman, 2018). We took account of particular occurrences based on the participants' account of their lived experiences. We used narrative interviews in documenting farmers lived experiences. Narrative interview is a form of qualitative research method that uses narrations to elicit information on personal experiences from the informant with a detailed focus on events and actions, making reference to place and time (Jovchelovitch & Bauer, 2007). Unlike the question-answer schema where the interviewer imposes the theme, orders the questions, and words the questions in his or her language, with narrative interview, the influence of the interviewer is minimal. The focus is on the informant (interviewee) who narrates the stories from his or her perspectives using his own language. We did content analysis to classify text data into clusters, identify patterns and to take into account attitudes, values and motivations of the participants (Given, 2008; Payne & Payne, 2004). Content analysis is a qualitative research method which aims to provide knowledge, new insights, a re-examination of facts, and a guide for action (Elo & Kyngäs, 2008). We also gathered data from focus group discussions to understand collective as well as individual experiences.

Participants

We purposively recruited among farmers who had transitioned from small farm sizes of less than 2 acres to larger farm sizes of more than 5 acres. The farmers were identified with the assistance of agricultural extension agents and other farmers in the chosen community who confirmed the selected participants to be model farmers. Our aims were to understand how these farmers had transitioned to their current farm sizes, how they had addressed the challenges to their farming activities, and the consequences of their actions. We further established a platform where other farmers interacted, shared experiences, and learnt from fellow farmers, agricultural extension agents and other key actors in the maize value chain. We selected twenty (20) cassava farmers to participate in case study research to document their life stories and draw lessons. The common characteristics of the selected farmers who were interviewed and shared their experience with others were; (1) having more than ten years of farming experience; (2) having the ability to successfully transition from small farm size of less than 2 acres to current farm size of more than 5 acres; (3) demonstrating the unique ability to address challenges of farming including marketing, postharvest management, production practices and (4) provision of advisory services to other farmers in the community. The 14 male and 6 female farmers selected had an average of twenty-seven years of farming experience, an average farm size of 14 acres, and sold their cassava on the markets and to processing companies. Six (6) agricultural extension agents were also interviewed for this study. The extension agents had over twenty years of experience providing advisory services to farmers. We additionally included 25 smallholder cassava farmers who had farm sizes of less than 2 acres to participate in the experience sharing focus group discussion to learn from the other farmers. We also included 5 agro-processors, 4 transport operators and 4 cassava traders. The criteria for inclusion of these actors was the active role they played in production, marketing and processing of cassava, and their knowledge and experience of the cassava value chain. The researchers who facilitated the process had knowledge of the cassava value chain, and prior experience conducting case studies and facilitation of stakeholder dialoguing processes.

Data collection

To gather the data, we used a combination of case studies, individual narrative interviews and a focus group discussion. We gathered information on selected farmers

including farmer characteristics, economic activities, goals and aspirations, land acquisition, land ownership/control, land use, production practices, access to finance, farm planning, budgeting, records keeping. The selected farmers were asked of their willingness to participate in an experience sharing focus group discussion. Upon consenting, farmers were invited to participate in the focus group session and to share their experiences with other participants. An important aspect of the dialoguing process is providing a platform for experienced successful farmers to share their experiences on how they had successfully addressed farming challenges (marketing and postharvest management) and expanded their farm sizes, and to provide the opportunity for other farmers and value chain actors to dialogue and learn from the experience of these farmers.

The focus group for experience sharing was composed of participants in the cassava value chain together with researchers and agricultural extension agents. During the focus group discussion, the selected farmers were asked to share their experiences with the other participants. For this study, narration was done in the preferred language of the informant (mostly Twi) to gather a rich context of the stories from their perspective. The narration centered on the following areas: a) farmer motivation or goal for farming; b) how farmer has progressed over the years from small farm size to larger farm size; c) what are the challenges and how did farmer overcome the challenges? d) advice from farmers on how to be address farming challenges to be successful in farming. The narrations of the experiences of the farmers were video taped and audio recorded. Each narration took between 10 to 20 minutes.

The team was asked to identify a number of challenges they face in their farming activities and discuss in-depth how these challenges had been addressed. Participants deliberated on the challenges and ranked the most pressing challenge. The team were then tasked to collaboratively identify the solutions to the prioritized challenge taking advice from the experiences of the model farmers. The study was conducted in the Eastern region of Ghana, specifically Suhum Krabao Coaltar district and Ayensuano district.

Data analysis

For the analysis, the recorded narrations from the interviews and focus groups were transcribed. The text was paraphrased and key words or codes identified and clustered. We used NVivo software to incorporate the interview responses into emerging themes based on responses given during the interviews and discussion sessions. We also examined the focus group transcripts for possible additional categories (Fereday & Muir-Cochrane, 2006). We further read through the transcripts to understand the ideas and perceptions directly from the lived experiences of the farmers and agricultural extension agents. The analysis provided emerging themes regarding strategies and approaches to be successful in farming. We checked the outcome of the content analysis and emerging themes to assess consistency with other findings discussed in literature. We then formed conclusions based on our interpretations of the data.

Findings

The major themes emerging from the data analysis from farmers' narratives and focus group discussions centered on farmers being hardworking, having available all the financial resources to go through all the stages of production and harvesting, having access to farm land, reinvesting profits into farm, arrangement for market for produce, access to extension advisory services, and good agronomic practices.

To be successful in farming, farmers have to be hardworking, determined and committed to their farming business.

For several farmers (n=15), to be successful in farming, farmers have to be hardworking, determined and committed to their farming activities. Farmers used words such as “hard work,” “dedication,” “interest,” “committed,” “passionate,” and “determination” when advising other farmers on essential ways to ensure successful ups-scaling of their farm business. For several farmers, they described farming as very difficult and requiring much time and dedication from the farmer. The farmers’ statements included:

“You need to have a great interest in farming to continue farming in spite of the many challenges to be successful.”

“Your farming goals will motivate you to continue farming in spite of the many challenges.”

“You should properly plan at all the stages in farming and be timely in preparing the land, planting, harvesting, postharvest management and marketing. Also, you should have knowledge on all the farming methods and practices relating to cassava production.”

Farmers commented on the difficulty in farming and noted that to continue farming, the farmer needs to be passionate and committed to doing farming as a business.

Arrange for markets for produce

During discussions on the challenges faced by farmers, it was often mentioned by farmers (n=18) that even though there may not always be a ready market for farmers’ produce, farmers should not use that as an excuse not to continue farming; rather they should continue farming and look for markets for the produce. It was exemplary from farmers who shared their experience, that they continued farming even during seasons when they did not have a market for their produce. They equally made effort to look for market with traders or processing companies. Some of the farmers also went into processing of the cassava into Gari and cassava dough to reduce on the postharvest losses. During experience sharing sessions, farmers shared their experiences on how they had made market arrangements to sell their produce to local cassava processing factories in the district and other local markets. These are some examples of the farmers’ experiences:

“I have over 40 acres of cassava. I was the district best cassava farmer in 2016. I went to the Ayensu Starch factory to talk to the managers and make arrangement to sell my cassava to the factory. For this factory if you have over 50 acres of cassava today they can buy all. I mobilized a number of farmers in my community and we harvested the cassava and transported it to the factory.”
(Farmer, 30 years farming experience—Focus Group)

“I have made market arrangement with local market women to buy my produce.” (Farmer, 27 years farming experience—Focus Group)

“I sell my cassava produce to a Gari processing company in the district.”
(Farmer, 22 years farming experience—Focus Group)

In addressing the challenge of marketing, agricultural extension agents (n=6) were of the strong opinion that farmers should form groups of about 25-30 farmers and collectively market their produce. As one Agricultural extension agent noted that collective marketing will give farmers strong bargaining power to negotiate for better prices. Also, traders will have a contact point to buy bulk cassava. Two (2) agro-processors also mentioned that their need for a large supply of cassava produce is presently unmet. The processors urged farmers to form groups and market larger volumes collectively.

Have the financial resources to go through all the stages of production and harvesting

Several farmers (n = 14) cited availability of the financial resources for acquiring inputs (seed, fertilizers, agrochemicals) and to hire labor services for planting, fertilizer application, weeding, harvesting, as crucial to success of farm operation. The farmers' statements included:

“You should have all the financial resources to go through all the stages of production, harvesting and selling. If you don't have the money, you may reach mid-stream and be stacked.” (Farmer, 20 years farming experience—Focus Group)

“Farming is costly! You need money for every stage of the production cycle.” (Farmer, 20 years farming experience—Focus Group)

“You need money to pay the laborers for weeding, spraying weedicides, applying fertilizer, harvesting, and transporting produce to the market.” (Farmer, 18 years farming experience—Focus Group)

“The financial institutions do not give grant loans to farmers, so we have to finance our farming activities.” (Farmer, 25 years farming experience—Focus Group)

Market oriented farming requires capital for which the farmer should plan how to finance his/or farming activities. During discussions, farmers (n=15) who shared their experiences informed the group that they re-invested their profits in their farms in expanding on their farm sizes. For those who attempted to secure bank facilities (n=4), they were mostly not successful as commercial banks were reluctant to give agricultural loans. These farmers preferred to take loans from the local market women and repay with harvested produce.

Be prepared to reinvest profit into farm business

Farmers (n=14) who shared their experiences strongly emphasized the need to reinvest profit from farming activity into the next farming season activity. The main point highlighted by the farmers was that to be successful as a farmer:

“You should be prepared to plough back your profit into the farm business.”

“After sales of your farm produce, reinvest the money into ploughing more land for planting.”

“Use the profit you earn from sale of produce to purchase agro inputs and save some for paying laborers during the next planting season.”

“If you have a non-farm income source, consider investing some of the income into your farming business.”

Farmers make gradual incremental expansion by reinvesting the money from sales of their farm produce into buying the required seeds, fertilizer, agrochemicals for the next planting season and save some of the money for hiring labor where labor services is used. For farmers who had over the years up-scaled production, they reinvested their profit into clearing additional plots of land or acquiring additional farmlands for farming. Farmers often fully financed their farming activities. Farmers who had other non-farm income sources (n=6), mentioned investing some of the income from these non-farm activities into buying agro-inputs and paying for labor services.

Have access to farmland

During experience sharing sessions, farmers’ (n=8) advised fellow farmers to plan and acquire farmland needed for their farming activity. Farmers expressed the following:

“You should acquire the land you need for your production. If you don’t have ownership over the land you can easily be ejected from the land after you have invested in the land.” (Farmer, 29 years farming experience—Focus Group)

“You cannot expand on your farm size if you do not have the farmland.” (Farmer, 15 years farming experience—Focus Group)

“For shared cropped farmers, you have to plant large portions of land to make some profit since you will be sharing harvested produce with the owner of the land.” (Farmer, 12 years farming experience—Focus Group)

Access to land and ownership of land plays an influential role in farmers’ decisions to farm and expand on farmland. The land tenure system and nature of land influences the decision of farmers to increase their farm sizes. Farmers involved in shared cropping arrangements (n=8) had to farm larger acreages as they had to split the harvested produce with the landowner. For farmers renting land (n=5), they planted produce on all the rented land and paid a fee to the landowner. Thus, the farmer rents the size of land for which he is prepared and capable of farming in the immediate term. Farmers who had inherited land (n=7) continuously expanded their farm size and rented or went into shared cropping arrangement after exhausting their farmlands.

Seek advice from agricultural extension agents and from other fellow farmers.

It was evident from the discussion that farmers accessed extension services from both agricultural extension agents and from fellow farmers. For several farmers (n=12), learning from other local farmers was mentioned as important source of information because many of the farmers were unable to reach the agricultural extension agents. Farmers exchange ideas and knowledge with other farmers and learned from each other. Some farmers who shared their experience indicated that for effective learning, the experienced farmer should invite the fellow farmer to his or her farm and practically demonstrate and involve the farmer in the learning process. Some of the comments made by the farmers were as follows:

“I started as a laborer on the farm of the district best farmer. He taught me all the basics of farming. Since I started farming on my own, I always go to him for advice anytime I need assistance with farming challenge.” (Farmer, 18 years farming experience—Focus Group)

“When someone comes to me for advice on farming, I take the person to my farm and teach him/her all the basics of farming, from planting to harvesting.” (Farmer, 25 years farming experience—Focus Group)

“The extension officer has never visited my farm. Anytime I have a problem on my farm, I call on my other fellow farmers.” (Farmer, 30 years farming experience—Focus Group)

Some of the farmers (n=7), however, mentioned having received extension services which has helped them in improving on their farm productivity. They mentioned having the agricultural extension agent visit their farm or attending training sessions organized the agricultural extension agents to receive advisory services. The farmers’ statements included:

“Anytime I have a challenge, I call on the agricultural extension agent. When I couldn’t find market for my cassava (16 acres), I called on the agricultural extension agent, and he helped me to find market for my produce with a local market woman.” (Farmer, 12 years farming experience—Focus Group)

“The agricultural extension agent visits my farm anytime I call on him.” (Farmer, 17 years farming experience—Focus Group)

“I have attended training sessions organized by the agricultural extension agent. From the training session, I learnt how to keep records of my farming activities.” (Farmer, 20 years farming experience—Focus Group)

Agricultural extension agents (n=6) at the focus group discussion advised farmers on a number of issues. Their advice to farmers mostly focused on diversification of farming activities (n=5), farmer making market arrange for their produce (n=6), farmers forming groups to market their produce (n=3) and farmers engaging in good agricultural practices (n=4). The agricultural extension officers (n=3) also advised farmers not to be reliant on one crop only but to diversify their farming activity. The agricultural extension agents’ statements included:

“When farmers relied on one crop, in the event of crop failure or lack of market, they are likely to lose their investment. The farmer could combine rearing of farm animals together with growing of crops to always have an income source.”

“Farmers should establish market linkages with traders before harvesting of produce and keep to informal contractual agreement with the traders and avoiding side selling.”

“Farmers should focus on proper planning of farming operations, including the keeping of farm records to track farm progress and proper planning of farm activities.”

“Farmers should form groups of about 25-30 farmers and collectively market their produce. Collective marketing will give them strong bargaining power to negotiate for better prices. Also, traders will have a contact point to buy bulked cassava.”

Discussion

This study revealed that a farmers’ motivation and commitment to his farming business promotes successful up-scaling of the farm business. These findings are consistent with other previous studies which found farmers’ intrinsic and extrinsic motivations promoted sustainable behaviors in sustainable agricultural practices (Bopp, Alejandra, Poortvliet & Roberto, 2019; Ryan & Deci, 2000). The farmers’ personal motivation to engage in particular actions, associated with having personal joy in farming or considering the rewards such as profits from sales of produce, encourages farmers to consider up-scaling production. Such farmers are motivated to properly plan at all the stages in the production cycle and, in addition, actively participate in marketing and postharvest handling of the produce.

We also found that farmers who had available all the needed financial resources for the entire production season were likely to up-scale and increase their productivity. This is consistent with other studies, which found that credit constraints may prevent farmers from undertaking desired levels of productivity as such farmers are unable to purchase critical levels of farm inputs (Awunyo-Vitor & Al-Hassan, 2014; Guirkingner & Boucher, 2008). According to Awotide *et al.* (2015), farmer access to credit has a significant positive impact on cassava productivity. Farmers who are credit constrained during the production cycle tend to use lower levels of inputs in their farming activities, which, in turn, affects optimum levels of production (Dorfman & Koop, 2005; Petrick, 2004). This illustrates the need to improve farmers’ access to agricultural loan facilities. This could be done through arrangements with the rural banks and other microfinance institutions which are located in the farming communities. In addition, there should be intensive education on financial literacy for farmers to reduce on the default rates and to ensure that farmers put to good use the credit facilities.

Farmers, on the other hand, should be prepared to reinvest some of their profit back into their farm business for expansion. Farmers who had over the years expanded the size of their farm, did so by reinvesting their profit into clearing additional plots of land or acquiring additional farmlands for farming, purchase of agro inputs and saving money for payment of labor services during the next planting season. It was evident from this study that farmers often fully financed their farming activities without accessing credit from formal institutions. It was interesting to note that farmers who had other non-farm income sources invested some of the income from these non-farm sources into buying agro-inputs and paying for labor services. Other studies have shown farmers having the tendency of moving income from non-farm activities into farming activities (Cossar, 2015; Houssou *et al.*, 2013). This shows the capital requirement for farming and emphasizes the need for the farmer to plan on financing his farming activities.

Another finding from this study was that farmers needed to have access to farmland for future expansion. Land provides the basis for food production and is an indispensable input for economic livelihoods in rural areas (Lambrecht & Asare, 2019). The land tenure system and nature of land has been found in other studies to have an influence on farmers’ decision to increase their farm sizes and hence their productivity (Lambrecht & Asare, 2019; Meinen-Dick, Quisumbing, Doss, & Theis, 2019; Narh, Lambini, Saabi, Pharm, & Nguyen, 2016). Our results indicate farmers involved in shared cropping arrangements had to farm larger acreages as they had to split the harvested produce with the landowner. For farmers renting land, they had planted produce on all the rented land and paid a fee to the landowner. Farmers who had

inherited land continuously expanded their farm size and rented or went into shared cropping arrangement after exhausting their farmlands.

Our study also found that sufficient market demand for agricultural produce is a key driver for a farmer to increase his scale of production. Without an assured market for farmers' produce, farmers will be reluctant to expand and commercialize (Chamberlin, Jayne, & Headey, 2014). The farmer being certain of having an assured market is a good incentive for the farmer to consider expansion. When farmers have market for their produce at a good price enabling them to make profits, they are motivated to increase their acreages. Farmers expressed their views that they would likely increase their farm size in the next farming season if they made profit from the previous harvest sales. When farmers made a loss due to poor harvest, low prices or difficulty in marketing, they were likely to reduce on the acreage farmed in the next farming season. This shows the need for linking farmers to markets.

This study revealed the need for farmers to access advisory services from various sources including fellow farmers and agricultural extension agents. It was surprising to note that key messages from agricultural extension agents differed from that of farmer to farmer messages. While farmer to farmer messages focused on encouraging other farmers to be hard working and to plan and put in place measures to finance farm operations, agricultural extension agents' messages to farmers centered on providing the traditional technical advice on group formation to address marketing challenge, diversification of farm operations and agricultural management practices. The diversity in the key messages from the two sources of farmer information reflects the need for a pluralistic approach to extension service delivery. Public extension services mostly focus on production issues (Spielman, Davis, Negash, & Ayele, 2011). Extension services for farmers should integrate farmer to farmer approaches and the private and public agricultural extension advisory delivery. Model farmers should be empowered and provided training to deliver information to fellow farmers. In addition, groups such as farmer groups and cooperatives should be capacitated to articulate farmers demand for information, empower them economically, and improve service delivery to the farmers (Davis & Heemskerk, 2012).

As farmer-to-farmer messages centered on motivating farmers to become business oriented and financing of farming activities, this indicates the need for entrepreneurial training for farmers and the need to improve farmers' access to credit. Also, knowing the sources of information available to farmers and their channels of communication will enable agricultural program developers to channel interventions targeted at farmers through the appropriate medium. It is also important for policy makers to understand the existing information services providers to ascertain their usefulness in disseminating new technologies. This will serve as a guide to policy makers in agricultural development to develop appropriate strategies that could be pursued to ensure farmers' access to information and upscaling of production.

Limitations

The limitation of this study has to do with the sampling of respondents which was purposive rather than random sampling, therefore further research is needed to generalize the findings. The responses depended on the participants' ability to accurately verbalize their experiences and perceptions of their experiences within a limited time frame. We used triangulation of information combining the narratives of participants and information from focus group discussions to increase the credibility of the results.

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Author Note

Dr. Nana Afranaa Kwapong is a lecturer at the Department of Agricultural Extension, University of Ghana. Correspondence regarding this article can be addressed directly to: nkwapong@ug.edu.gh.

Dr. Daniel Adu Ankrah is a lecturer at the Department of Agricultural Extension, University of Ghana. Correspondence regarding this article can also be addressed directly to: dankrah@ug.edu.gh.

Dr. Dominic Boateng Gyambiby is a PhD Candidate at the University of Cape Coast, Ghana. Correspondence regarding this article can also be addressed directly to: boatenggyambiby82@gmail.com.

Mr. Joseph Asenso Agyemang is a researcher at the International Development and Research Consult Ltd, Ghana. Correspondence regarding this article can also be addressed directly to: senso_ai@yahoo.co.uk.

Ms. Lydia Oteng Fening is a researcher at the University of Energy and Natural Resources, Ghana. Correspondence regarding this article can also be addressed directly to: fetondia2008@yahoo.com.

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