

Research Application Summary

Fostering inter-disciplinary research to enhance rural smallholder farmer innovation and technology uptake intention using the farmer group approach: A review

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Abstract

In Uganda, carrying out successful agricultural enterprises by rural smallholder farmers continues to meet production challenges unless actors are assisted to work collectively in groups to use innovative ideas and address them. Research shows that a group approach would facilitate farmers' quick access to innovative agricultural services and technologies and participation in livelihood improvement. To many resource-poor farmers, it would be among the good agriculture practices that will ensure their food security, sustainable farming and income stability. Based on this, a review study was conducted on the context and the potential of the farmer group approach towards collective action and uptake of innovative technologies to improve agricultural production, food security and market-oriented farming. The reviews involved surveys, thematic and content analysis of variables of interest. The findings indicated that many farmers continue to work individually hence facing production constraints, challenges in value addition and marketing. This undermines extension programme efforts aimed at poverty reduction. This calls for an inter-disciplinary approach to try and address these bottle-necks. There is a need to come up with informed innovative scientific solutions using strong and robust farmer groups that will transform and make farmers entrepreneurial and commercial. It will involve capacity building and access to relevant innovative technology transfer to develop a pro-development scientific critical mass in the country. The main objective of this study is to use an inter-disciplinary approach to enable development of innovative ideas from a wider berth, that can be used to train and enhance local capacity that promotes farmer group innovation and technology uptake. This is based on the study findings that showed that farmer groups (FGs) perceptions and intentions individuals hold towards innovativeness, can mediate between introduction of innovations and transformation of the social context in which smallholder farmers live.

Key words: Collective action, farmer groups, innovative technology adoption, inter-disciplinary approach

Résumé

En Ouganda, la réalisation d'entreprises agricoles réussies par de petits exploitants ruraux continue de relever des défis de production à moins que les acteurs ne soient aidés à travailler collectivement en groupes pour utiliser des idées innovantes et y remédier. La recherche montre qu'une approche de groupe faciliterait l'accès rapide des agriculteurs à des services et technologies agricoles innovants et leur participation à l'amélioration des moyens de subsistance. Pour de nombreux agriculteurs pauvres en ressources, cela ferait partie des bonnes pratiques agricoles qui garantiront leur sécurité alimentaire, leur agriculture durable et

la stabilité de leurs revenus. Sur cette base, une étude de synthèse a été menée sur le contexte et le potentiel de l'approche des groupes d'agriculteurs en faveur de l'action collective et de l'adoption de technologies innovantes pour améliorer la production agricole, la sécurité alimentaire et l'agriculture orientée vers le marché. Les examens comprenaient des enquêtes, des analyses thématiques et de contenu de variables d'intérêt. Les résultats ont indiqué que de nombreux agriculteurs continuent de travailler individuellement et sont donc confrontés à des contraintes de production, à des défis en termes d'ajout de valeur et de commercialisation. Cela sape les efforts des programmes de vulgarisation visant à réduire la pauvreté. Cela nécessite une approche interdisciplinaire pour essayer de remédier à ces goulots d'étranglement. Il est nécessaire de trouver des solutions scientifiques innovantes et informées en utilisant des groupes d'agriculteurs forts et robustes qui transformeront et rendront les agriculteurs entrepreneurs et commerciaux. Il impliquera le renforcement des capacités et l'accès au transfert de technologies innovantes pertinentes pour développer une masse critique scientifique en faveur du développement dans le pays. L'objectif principal de cette étude est d'utiliser une approche interdisciplinaire pour permettre le développement d'idées innovantes à partir d'un poste plus large, qui peuvent être utilisées pour former et renforcer les capacités locales qui favorisent l'innovation des groupes d'agriculteurs et l'adoption de la technologie. Ceci est basé sur les résultats de l'étude qui ont montré que les perceptions et les intentions des groupes d'agriculteurs (FG) envers l'innovation peuvent servir de médiateur entre l'introduction d'innovations et la transformation du contexte social dans lequel vivent les petits agriculteurs.

Mots clés : action collective, groupements d'agriculteurs, adoption de technologies innovantes, approche interdisciplinaire

Introduction

Globally, agriculture is becoming increasingly influenced by complex interactions among public, private and civil society actors, and by the rapidly changing markets, policy regimes and climate (World Bank, 2006; FAO, 2009). These factors have influenced the way farmers access and adopt new knowledge, skills, finances and technologies to innovate (FAO, 2009). To help smallholder farmers address these problems and improve and develop rural agriculture, developing countries like Uganda came up with new extension programmes anchored on the Agricultural Innovation Systems (AIS) framework. The AIS model is "a network of individuals, organizations and enterprises focused on bringing new processes, products, especially new forms of organization, into economic use; and these are influenced by institutions and policies that affect their behavior and performance". The aim was to involve many actors based on a multi-actor approach to improve rural smallholder livelihoods through use of *inter alia* farmer groups (FGs). The FGs were intended to promote innovations through collective access to agricultural advisory services (AAS) and resources. Resources like knowledge, skills and finances, when accessed by farmers collectively and used to adopt innovative technologies would improve agricultural production to ensure food security and market-oriented farming. While farmers adopted innovative technologies they would add value to products and collectively exploit ever evolving market opportunities in various agricultural value chains. Similarly, while group collective action would increase perceived economies of scale, it was expected to promote equity and transparency in services delivery and in group governance. Hence farmer horizontal and vertical relationships in value chains involving diverse stakeholders would be strengthened and sustained.

Whereas the group approach appeared a useful tool to mediate between the introduction of innovation and transformation of the social context in which smallholder farmers live, there are still gaps in

understanding exhaustively the roles various social, geographic, economic and group dynamic factors play to influence innovativeness in farmer agricultural enterprises and the FG collective action. This is based on observations where most farmers still avoid groups and opt to work individually, despite persistent challenges in production, value addition and marketing. Additionally, other actors in the AIS approach have failed to complement smallholder farmer effort to develop agricultural enterprises. Using an inter-disciplinary approach will help us understand *inter alia* how the various social and economic factors influence individual farmer implementation intentions regarding use of groups and innovative technologies. For instance what compels women to be resilient in group dynamics and why farmers abandon groups; and it is important to know the extent psycho-social factors that influence collective action and innovativeness in various contexts.

The study focus and approach

This study is being conducted in selected districts with different socio-cultural orientations. This is aimed at establishing influences from local conditions and perceptions individual farmers hold towards a farmer group approach and intended innovations. There is need to examine social and cultural influences in uptake of innovative technologies in selected geographical areas of the country. This will lead us to get a more generalizable explanation of the farmer intentions towards technology uptake. There is a need also for an in-depth understanding of the intra and inter gender dynamics regarding use of innovative technologies to ensure food security in the different cultural contexts of the study areas. Much as extension programmes encourage gender equity, it appears most farmer groups are dominated by women. This study therefore examined the motivational factors of men and the youths in order to encourage them to participate and play a role in agricultural enterprise development. The study also examined four enterprises, i.e., two crop and two livestock based which were implemented under the NAADS programme.

A comparison was done to study farmer groups working under private arrangements. The results from this study would help determine if for instance perception factors in public supported enterprises and private ones behave in a similar way. This would enable us establish whether social demographic attributes (in public and private arrangements) and perception factors determine farmer uptake of innovative technologies or practices. This study is thus informed by sociological, psychological, economical and environmental models to determine their level of influence on farmer innovation and technology uptake within their farmer groups.

Additionally, there is need to establish a longitudinal technological adoption curve of the farmers who have received innovative knowledge. This can be done by measuring at different stages the technological adoption e.g. after one month of intervention by service providers, how much will the farmers have innovated to e.g ensure food security, then after six months and one year. This would result into formulation of an adoption curve. We examined the patterns, the differences and similarities in adoption and the different work environmental factors/contexts responsible for these variations if any. It is hoped that the study results will help in understanding the processes and underlying mechanisms that support uptake intentions.

Additionally, this study captures the influence of predictor variables on the actual farmer behavior. It is guided by the farmer implementation intentions to understand the goals they hold and the strategies they employ in case they face challenges in the process of innovations (Lopez-Mosquera, 2016). The intention is to ascertain the extent farmers can use the results from predictor variables of intentions towards constructive implementation intentions, procrastination, action and/or inaction towards innovativeness.

Results and discussion

The results presented in this paper represent a review of previous research work on the farmer group extension approach and intended collective innovations in agricultural development in Uganda. This section gives the context of extension reforms and how the farmer group approach fit in the ever changing extension system.

Extension models perspective. Many extension models have been designed to address smallholder farmer needs especially those in the rural areas, however, many have proved inefficient and ineffective (World Bank, 2006; Hailu, 2009; Jelsma *et al.*, 2017). The failure of most agricultural programmes appeared to be a result of inappropriate government policy designs that focused more on unidirectional knowledge and technology transfer to recipient smallholder farmers (Turyahikayo and Kamagara, 2016; Sebuliba-Mutumba *et al.*, 2017). Policies based on theoretical frameworks like the ‘Linear, Participatory, Agricultural Knowledge and Innovation System’ (AKIS), failed to address agricultural development and transformation. Even use of one source of knowledge to answer a multitude of problems resulted into failure to achieve intended goals. Only a few of the model trials yielded practices or products that improved what was already in use (Hailu, 2009).

Many approaches failed to address farmer problems in absence of an inter-disciplinary approach which often minimized wider consultations and farmer-participation; yet ignoring farmer contributions, perceptions and innovation in technological development create unworkable solutions (Hailu, 2009; Kilelu *et al.*, 2016). Belatedly, including farmers and other actors in technological development and its dissemination would help in solving some of the problems most rural farmers face. On realization of these weaknesses, countries adopted new agricultural extension programmes anchored on the Agricultural Innovation System (AIS) thinking (Hailu, 2009; Turyahikayo and Kamagara, 2016). The AIS promoted the use of knowledge and participation from diverse actors to enhance sector productivity and growth (Hailu, 2009), though this also had its challenges.

Agricultural Innovation Systems (AIS) and policies on farmer groups as institutions for collective action. According to various studies (Hailu, 2009; Kilelu, 2016), AIS model is “a network of individuals, organizations and enterprises focused on bringing new processes, products, especially new forms of organization, into economic use; and these are influenced by institutions and policies that affect their behavior and performance”. One major tenet of the AIS and the agricultural programmes that were anchored on it, was the advocacy for innovation enhancement through *inter alia* actor organizations that promoted groups more than individuals. The thinking was that groups would promote farmer participation through collective action, quick farmer access to agricultural services and quality resources. Within the AIS thinking, innovation was regarded as anything new (variation), successfully introduced (selection) into an economic or social process or order, for example, a technical, economic or social component (Spielman, *et al.*, 2009; Kilelu, 2016). Innovation hence results from actor-adoption and use of innovative technologies (innovativeness) resulting in the ability to introduce new ways or products meant to improve production, services, processes and competitiveness (Phasuk, 2014). Innovativeness is thus regarded as an input and innovation as an output (Phasuk, 2014; Sebuliba-Mutumba *et al.*, 2017) and thus, innovativeness is a method used to create something new, which is different from innovation.

The innovation system framework distinguishes institutions from organizations. Hailu (2009) define organizations as formal structures with an explicit purpose and consciously created. The examples he

gave included: companies, universities, and government and non-government bodies. In contrast, institutions are sets of common habits, routines, established practices, rules, or laws that regulate the relations and interactions between individuals, groups and organizations (Hailu, 2009). They state institutions are the crucial elements in the innovation processes because they shape the actions of the organizations and the relations between them (Hailu, 2009).

Most countries therefore have promoted the development of farmer groups as institutions to enhance collective action among farmers, purposely to encourage their unity, uniformity and quick access to services. Through adoption of innovative capacity, farmers are expected to improve their agricultural enterprise management, development and eventually produce for domestic consumption and the market, to fight poverty (Hailu, 2009). The adoption of innovative capacity was to expose smallholder farmers in Africa not only to new production knowledge and skills but to promote their ability for value-addition and market opportunities (Sebuliba-Mutumba *et al.*, 2017). This would enable farmer entry into agricultural value-chains and their use of available opportunities to encompass the diversification and promotion of non-traditional agricultural products too. Value-addition which is driven more by the changing markets for farmers' products, would then be possible through groups (Kilelu, 2016; Sebuliba-Mutumba *et al.*, 2017). The urgent need to address poverty, food security and market-oriented farming in Uganda, underscored the need to evolve new agricultural extension programmes, one of which was through the National Agricultural Advisory Services (NAADS). This emphasized a farmer group extension approach (FGEA) that underscored the enhancement of collective action based on the AIS framework.

The farmer group extension approach (FGEA). In using the farmer group extension approach, the farmers had to form groups which they registered and later used to select their agricultural enterprises. However, despite the sustained efforts to offer agricultural advisory services (AAS) to farmers through groups, farmers have continued to face production constraints. Most problems arise due to a narrow focus of most programmes that appear to minimize participation of various actors from various disciplines, coupled with meager and scarce resources. Faced with the mounting production challenges, majority of farmers opt to work individually. Yet in advocating for farmer groups (FGs) as institutions for collective action, these were supposed to accelerate farmers' access to services; and the thinking was that farmers would tackle most challenges easily when they work with other actors as a team. Doing so, by interacting with other actors in the value-chain, would increase farmers economies of scale, improve their skills, knowledge, and innovativeness; and enable them to overcome poverty (NAADS Act, 2001; MAAIF, 2013b).

Additionally, in spite of the advantages of the AIS, the innovation system in developing countries is poorly developed and is known to be subject to widespread systemic dis-articulation. Five broad types of systemic weaknesses were highlighted by Hailu (2009) including rigidities in organizations - reflected in the presence of obsolete or inappropriate institutions; sub-optimal Knowledge Networks-there may be no interaction, little interaction or inappropriate types of interaction among critical actors. The resulting information asymmetry, among others, lead to poor flows of information and knowledge among critical economic agents within the system of innovation; path-dependent System Failure-organizational inefficiency may thus stem from their history and their connectedness to previous environments; Organizational ineffectiveness –the relevance of existing research and training institutes, for example, has been questioned; and Institutional Gaps- in developing countries, the systemic weakness found in the innovation system is, in part, a result of the fundamental weakness of political-policy institutions and processes (Hailu, 2009).

Challenges of collective action. The idea of an innovative farmer in this instance had presupposed one that goes far beyond merely receiving/acquiring technology and/or education/ knowledge. It meant a farmer

empowered through joining strong farmers' groups, to develop partnerships in developing technology and deal amicably with environmental and market issues (MAAIF, 2013b). The shift from public to a decentralized private advisory service delivery was also intended to make such farmer fully participate collectively in group governance issues. This had to begin from groups towards a vertical integration: where the groups would gradually meet part of the costs of advisory services needed for tackling production challenges (Turyahikayo and Kamagara, 2016). Limited farmer success, while using Farmer Groups as an extension approach to adequately access services, raises questions regarding the assumptions about their significance in driving collective effort motivation, to improve rural farmers' livelihood (Kilelu, 2016; Sebuliba-Mutumba *et al.*, 2017). It also raises questions on the belief that farmers' production challenges, and/or failure to achieve food security and economic emancipation, is a result of working individually. Since promoters of the Farmer Groups approach believed that working individually could not enable a farmer to address production problems efficiently, and could fail a farmer's transition from subsistent to market-oriented farming. This was because of the perennial constraints ranging from high production costs, bottlenecks in accessing inputs and extension advisory services, transportation, to participation in output markets, which were too much for individual operators to bear, in the absence of collective action (Kilelu *et al.*, 2016).

Overall, it would appear that farmers have been able to appreciate the value of advisory services, with respect to working together and improving their incomes using the FG approach. Similarly, one would expect such farmers to be more innovative and benefiting more (both economically and socially) from the value chains and marketing than they did before. However, this apparently seems not to be the case, as the various studies on farmer performance have shown (NAADS, 2011; Sebuliba-Mutumba *et al.*, 2017). Farmers continue to work individually and are faced with many challenges. Furthermore, despite an abundance of literature showing the contribution of Farmer Groups towards access to agricultural resources, there is by comparison relatively little research examining the psychological factors that influence farmer perceptions towards AAS delivery and innovativeness.

Conclusion

Challenges facing the extension systems cannot be easily addressed by policy on reforms, design and resource investment. But on how well the approaches, their frameworks and other tools fit the context and more especially how they involve other players. Even their implementation to enhance collective farmer participation and adoption of innovative technologies needs attention. Most extension programmes have failed to foster inter-disciplinary approaches and solutions, and seem to ignore farmer involvement especially perceptions, experiences, and local initiatives and innovations farmers have indulged in. Yet, social, cultural and other inter-disciplinary attributes influence agricultural development. It is concluded that evaluations of extension systems have not focused on how well the approaches and tools can be applied in various contexts. Based on this, there is a need for more understanding of how well use of an inter-disciplinary arrangement can influence collective action and the farmer group approach in agriculture extension. Findings could help efforts directed at capacity building among actors in facilitating collective group action. The capacity building interventions should be preceded by capacity needs assessments, both individual and institutional. This also calls for systematic assessment and understanding of the technical and institutional factors that are likely to affect the potential and effective use of groups in extension. The influence of the Farmer Group approach on farmer innovativeness, i.e., farmers' behavioural beliefs, and mechanisms that influence collective farmer success and/or failure in agricultural production, value-addition and marketing innovativeness need to be understood. The ultimate purpose is to suggest interventions

policy designers and implementers could consider regarding some of the identified factors responsible for influencing collective adoption of innovative technologies among farmers. This would ultimately assist farmers to participate constructively in the national economy as stakeholders.

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