

# Agricultural Cooperatives as Innovation Brokers: The Case of Climate Smart Agriculture in Uganda

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## BACKGROUND

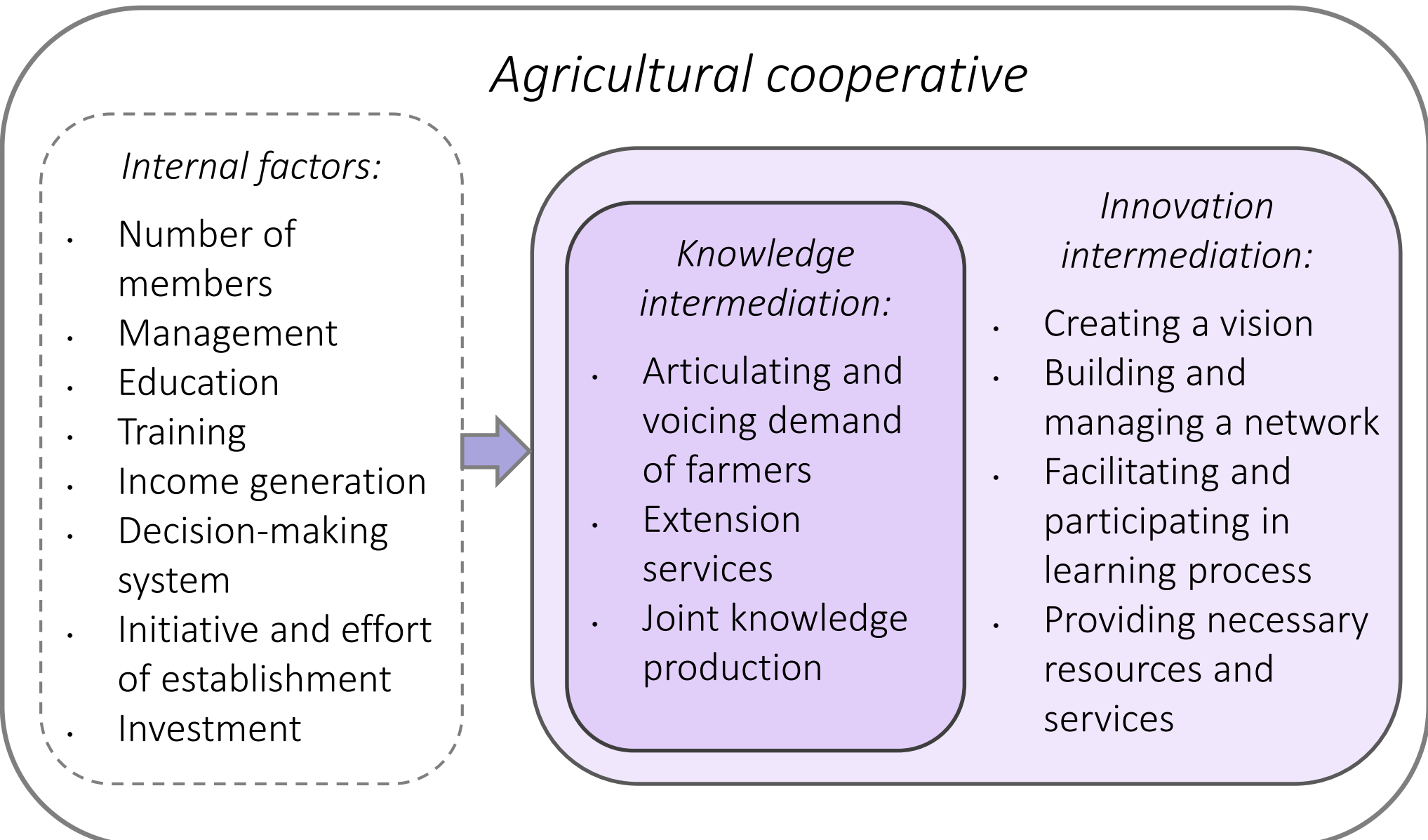
One of the largest challenges in rural development is the dissemination of agricultural technologies and innovation to smallholder farmers, especially in regions such as Sub-Saharan Africa, where technological efficiency remains low. Climate Smart Agriculture (CSA) is an example of an innovative approach to improve agricultural efficiency, which at the same time tackles climate change.

Agricultural cooperatives are often used to aggregate and coordinate rural smallholders, and up-scale the adoption of agricultural innovations such as CSA across Africa. Through agricultural advisory services and collaboration with government, civil society and research organizations, cooperatives can function as **knowledge and innovation intermediaries**, promoting and facilitating the adoption of improved farming practices among large numbers of smallholders.

However, African cooperatives are often under-performing, failing to provide their members appropriate services over time. Improving cooperative governance could therefore be beneficial for the dissemination of agricultural innovation. This research aims to contribute by identifying the underlying reasons why some cooperatives succeed and other fail in providing services for innovation dissemination.

## RESEARCH MODEL

**RESEARCH QUESTION:** Which key factors in the organizational design of agricultural cooperatives have a positive influence on providing knowledge and innovation services over time?



The shaded part of the conceptual model shows the functions of a cooperative for ‘knowledge intermediation’ and ‘innovation intermediation’. These functions are translated into dependent variables in the form of 11 services for innovation that cooperatives provides to their members. The left part shows the predictor variables included in the analysis.

**HYPOTHESIS:** Cooperatives are more likely to provide innovation services when they have more members, a manager, a better educated and trained board, autonomous income generation, a democratic decision-making mechanism, when they are founded by an internal member and when founding members invested in the cooperative.

## DATA & METHODS

- Quantitative data from 99 Ugandan cooperative managers and leaders. Surveys are collected at the Cooperative Leadership Event, May 2-6, 2016 in Uganda ([www.EDC.coop](http://www.EDC.coop)).
- Case study on the introduction of ‘climate smart agriculture’ as an innovation in Mukono. Semi-structured interviews are held with leaders, management, staff and members of the coop.

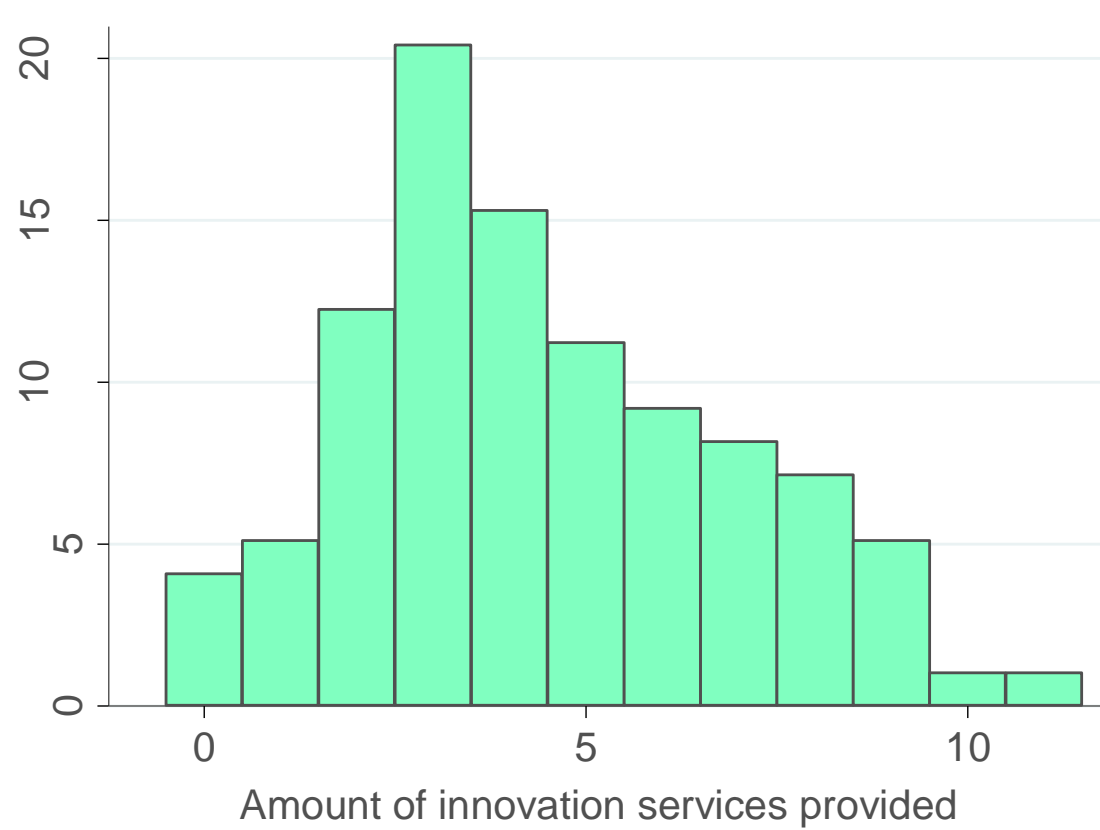
- Predictor variables are converted into binary variables to compare the services provision of different groups in the data sample.
- The dependent variable ‘innovation services’ is measured by the total of three knowledge and innovation services and eight supporting services.
- Besides, the three knowledge and innovation services are used as separate dependent variables as well.
- Independent samples T-tests were conducted to compare the average amounts of innovation services that different groups of cooperatives provide.
- Odds ratios (OR) are calculated to find out which internal factors increase the likelihood that cooperatives provide extension, training, and advocacy services.

Knowledge and innovation services	% of coops providing the following services:	
	Extension, advisory and information	71.28%
	Training and demonstrations	85.11%
	Advocacy for agricultural programs and policies	46.81%
Supportive services for innovation	Processing/manufacturing	26.60%
	Grades and standards	19.15%
	Certification	11.70%
	Input supply	47.87%
	Financial services (credit/insurance)	26.60%
	Transportation	19.15%
	Storing/warehousing	41.49%
	Collective marketing	68.09%

## RESULTS

On average, cooperatives in the data sample provided 4.4 different services for innovation.

- Cooperatives with a manager** ( $M=5.73$ ,  $SD=2.23$ ) provide significantly more services for innovation than cooperatives without a manager ( $M=3.66$ ,  $SD=2.29$ );  $t(97)=-4.38$ ,  $p=0.000$
- Cooperatives that received professional training** ( $M=4.67$ ,  $SD=2.46$ ) provide significantly more services than cooperatives that did not receive professional training ( $M=3.27$ ,  $SD=2.28$ );  $t(96)=-2.06$ ,  $p=0.04$
- Cooperatives founded by an insider** (a member) ( $M=4.77$ ,  $SD=2.49$ ) provide significantly more services than cooperatives founded by an outsider ( $M=3.71$ ,  $SD=2.10$ );  $t(95)=2.06$ ,  $p=0.04$
- Cooperatives whose founding members made own investments** ( $M=5.20$ ,  $SD=2.52$ ) provide significantly more services than cooperatives whose founding members did not invest ( $M=3.80$ ,  $SD=2.10$ );  $t(91)=-2.91$ ,  $p=0.005$
- Cooperatives with income from retaining revenues from collective marketing** ( $M=5.06$ ,  $SD=2.55$ ) provide significantly more services than cooperatives that do not retain revenues ( $M=3.39$ ,  $SD=1.98$ );  $t(96)=-3.39$ ,  $p=0.001$
- Having board members with a higher education degree** increases the odds that the coop provides extension services (odds ratio 2.45 \*\*)
- Collective marketing** increases the odds that a coop provides training and demonstration (odds ratio 3.26\*\*) and extension services (odds ratio 4.58\*\*\*)



## RESULTS CASE STUDY

### INTRODUCTION OF CSA IN MUKONO DISTRICT FARMERS ASSOCIATION

Multi-purpose district cooperative, operational since 1992. Climate smart agriculture introduced by the Ugandan National Farmer Federation (UNFFE) in 2014. Climate smart practices include soil conservation and agro-forestry. The project started with a trial phase of 200 farmers with plans to further disseminate climate smart technologies in the district.

Mukono District FA showed to fulfill all three functions as knowledge intermediary and four functions as innovation intermediary. Their mechanisms for innovation dissemination are:

- Before CSA was introduced, the cooperative organized demand-led sessions at community level for problem identification.
- Farmer-to-farmer learning processes are

facilitated by special-interest-groups and contact farmers for different crops.

- Extension-linked farmers are responsible for knowledge dissemination to the smaller farmer groups. They also do demonstrations of climate smart technologies.

**Key factors for services provision:** Mukono District FA has well-educated staff and management. The large network is actively and regularly maintained by the manager. This provides opportunities for innovation, especially from NGO's, farmer unions and research institutes.

**Challenges** include limited financial means of the cooperative, which leads to a low staff-member ratio. The coop does not do collective marketing, limiting their income as well.

## POINTS FOR DISCUSSION

This research aims at identifying the key factors in the organizational design of agricultural cooperatives that have a positive influence on providing knowledge and innovation services. The results from the T-tests and the Odds ratios partly confirm the hypothesis:

- Having a manager, board members with a higher degree and professional training have positive and significant effect on service provision.
- Cooperatives founded by an insider and cooperatives whose members made upfront investments provide more innovation services to their members.
- Generating income from collective marketing has a positive effect on service provision.

However, the amount of services does not necessary reflect the quality of services provided. Additional research could further investigate this. Also, regression analysis is necessary to understand the possible combined effects of the predictor variables on the provision of innovation services, before making final conclusion or recommendations.

The results from the case study highlight the importance of the network of the cooperative to connect farmers with suppliers of innovative technologies. A next step in this research will be to analyze the effect on service provision that different contacts in the network of cooperatives have.