

# Contribution of Contract Farming to Improve Smallholder Seed Multipliers Access to the Market In Rwanda

Jean Pierre *NDUWIMANA*<sup>1\*</sup>

<sup>1</sup>Rwanda Agriculture and Animal Resources Development Board, Huye - Rwanda

**Abstract.** This study assesses the effectiveness of contract farming in improving smallholder maize seed to have multipliers income so that the improvement strategies can be established. Contract farming is seen as linking and maintaining smallholder maize seed multipliers on the seed market and ensures sustainable maize seed supply to the Rwandan farmers after the decision of the government to pull out from bull buying of maize seeds. The results show that Contract farming could contribute to increasing maize seed production. They were reducing transaction costs and marketing risks due to different factors, such as the experience of smallholder multipliers involved. The study finds various factors that can hinder the performance of contract farming, such as limited quantity, low availability of pre-basic seeds essential for certification, pricing mechanism excluding smallholder multipliers, long process, and bureaucracy in seed payment and distribution.

## 1 Introduction

The Rwandan economy is highly dependent on the agricultural sector, which accounts for around 33% of national GDP, and almost 50% of all exports come from agriculture. However, only 2% of agriculture is exported. The sector also includes 90% of the total workforce [1]. Rwandan agricultural sector is dominated by small-scale subsistence farming as part of old farming practices and dependence on rain to farm. It faces a set of restrictions, including mainly its reliance on climatic conditions. Weak linkages to the markets and low level of productivity are mostly due to the low use of required inputs such as seeds and fertilizers [2].

Maize is one of the staple foods, and it is consumed in different traditional food preparation. The consumption of maize has been increasing, and it is becoming an important cash crop for smallholder farmers. This condition put maize in major crops in the country and it is ranked second to the sorghum among the important cereals and third in all crops. The maize crop covers 100,000 ha, which means 10% of the total cultivation land and is grown in all country's ecologies with an average of production 1.2 tons per ha [3]. According to the national seed policy of 2007 of Rwanda, the government through the

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\* Corresponding author: [jp.nduwimana@gmail.com](mailto:jp.nduwimana@gmail.com)

Ministry of Agriculture (MINAGRI) intends to encourage the private sector actors in seed production and marketing activities. It can gradually withdraw from this trend and focus its efforts on coordination, regulation, quality control, and other key activities such as agriculture services delivery that cannot be carried out by the private sector [4].

To help and maintain smallholder seed multipliers and ensure the sustainability of seed supply to the Rwandan farmers, the government set different interventions such as organizing training sessions on seed processing, subsidy of processing materials, and help in the smallholder seed multipliers cooperative formation. Contract farming is one of these interventions to address this challenge of limited capacities of smallholders seed multipliers. Contract farming is an agreement between farmers, processing, and or marketing firms to produce and supply agricultural products. It is under forwarding agreements and predetermined prices for smallholders. Contract farming is expected to reduce market uncertainty, improve access to inputs, knowledge, services, and provide higher income [5].

This intervention still requires in-depth research to determine the capacities of smallholder seed multipliers, opportunities or alternatives, needs, trust, and willingness of smallholders towards seed companies. This research will also help understand the level of government facilitation that can lead to the type of contract farming necessary to ensure the farmers' availability and sustainable supply of maize seeds. This study focuses on maize seeds due to their importance as a staple food in Rwandan traditional food preparation. It also serves as a cash crop for small farmers since it is currently grown in all Rwandan ecologies. However, productivity is still very low due to the low adoption of new technologies and limited use of improved maize seeds, impacting annual production. As mentioned [3], maize grain must be imported in 2006 to supplement domestic production to satisfy local market demand. This study assessed the effectiveness of contract farming in improving smallholder maize seed of multiplier income to improve strategies.

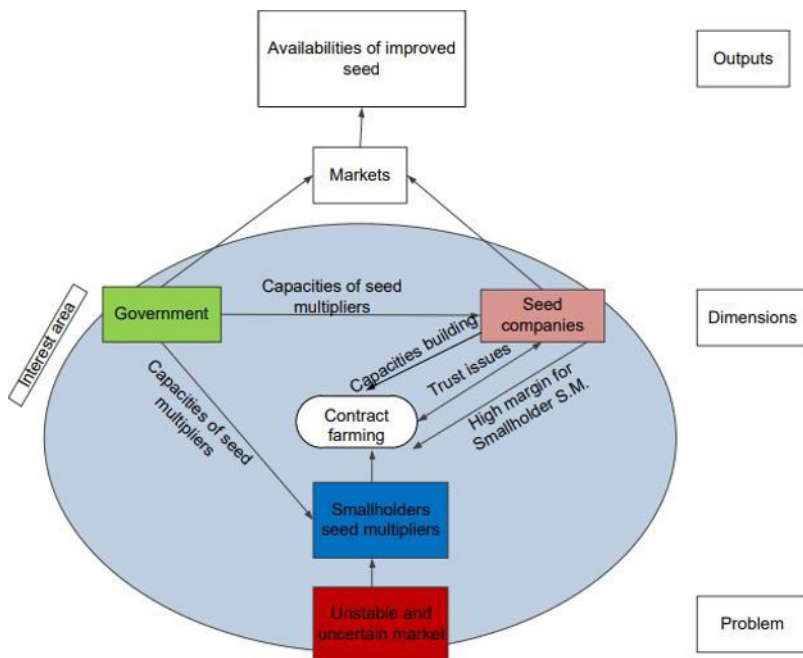


Fig. 1 Research framework

## 2 Literature Review

Contract farming is an arrangement between farmers and processing and or marketing firms to produce and supply agricultural products under forwarding agreements, often at pre-set prices [6]. [5] define that contract farming is an agreement between farmers, processing, and marketing firms to produce and supply agricultural products. Under forwarding agreements, it is frequently predetermined prices for smallholders. Contract farming is expected to reduce market uncertainty, improve access to inputs, knowledge, and services, and provide higher income. For this study, contract farming will be defined as an agreement between individual seed multipliers and seed companies to produce and supply maize seeds. For smallholders, Contract Farming will be the way to reduce uncertainty in the market.

The arrangement usually involves the buyer in providing certain production support through, for example, the delivery of inputs and the facility of technical advice. From this agreement, the farmer undertakes to supply specific produce in quantities and according to quality standards within the agreed deadlines. On the other hand, the company agrees to support the farmer's production and buy the produce at a predetermined price. According to [7], concerns of exploitation in the forms of large agribusiness firms using contracts to take advantage of cheap labor and transfer production risk to farmers. Despite these critics, it is also proven that contract farming generates high incomes and many other benefits for smallholder farmers. However, contract farming can answer the problems of market disappointment, the provision of credit, and agricultural inputs because the contracts often involve the provision of seed, fertilizer, and technical assistance on post payments and a defined price at harvest [7].

Contract farming is a form of “vertical coordination aimed primarily at correcting the market failure associated with spot markets due to imperfect information” [6]. The strict management and coordination of the agriculture value chain due to Market competition, consumer demands, technology development, government policies, and product traceability require a high level of organization, leading to vertical coordination in agriculture chains [5]. According to [8], contracting between producers and processing or marketing firms remains a practical method to strengthen vertical coordination in the agriculture value chain. The motives for undertaking CF vary for buyers and farmers, but all parties want to reduce market uncertainty and transaction costs. Farmers are motivated by access to markets for their product, technical assistance, and pre-financing for inputs by the contracting company on practical price. Farmers are also motivated by the new technology and innovations from the firms, which are adapted to their needs and help them satisfy market requirements. For the firms, their motivation is to protect a consistent and predictable supply of the needed product that meets their specifications in terms of quality and quantity.

## 3 Methodology

### 3.1 Desk Study

Secondary data acquired from different sources such as books, scientific journals, official reports, and the Internet were used to find information from the current literature review related to this topic. These data were very important to confirm the foundation of this research and the results. It also helps identify the stakeholders' roles, decision-making, and leading power in the seed value chain.

### **3.2 Survey**

The survey was carried out in four districts, Muhanga, Ruhango, Kamonyi, and Rwamagana, where the Smallholder seed multipliers were the main target group for the study. A sample of 40 smallholder maize seed multipliers was randomly selected from a list of all maize seed multipliers working in 4 Districts. To understand the different 16 capacities of smallholder seed multipliers to produce the required quantity and quality seed and to get from smallholders' perspective the factors that can make contract farming successful and what can be done to increase trust between them and seeds companies. Given the current trend of the COVID-19 pandemic, the researcher couldn't travel to the field for data collection. A substitute data collector with a bachelor's degree in statistics applied to economics was hired to collect quantitative data. To ensure the validity and accuracy of quantitative data, the commissioner has made an employee available to assist the data collector to the extent possible. The researcher conducted a meeting with both to discuss and clarify the questionnaire and to follow up through a telephone call. The data was filled in using an online form so that the researcher could verify and cross-check the data collected every day.

### **3.3 Interview**

Key informants from government institutions (RAB) and other actors involved (seed company and individual seed multipliers) were purposively selected according to their role and position were consulted and interviewed at the time of research. To contribute to high income to smallholder seed multipliers and how contract farming can increase trust between actors. Given the pandemic period, to maintain the validity and accuracy of the qualitative data. A semi-structured online interview was conducted with highly focused questions. According to the interviewee's consent, some interviews were recorded as 40 Smallholder seed multipliers and 6 Key Informants (1 RAB, 3 Seed companies, and two individual seed multipliers).

## **4 Results**

### **4.1 Stakeholders' role, decision making, and leading power in the Maize seed value chain**

The maize seed sector has different stakeholders playing a crucial role in this sector, from production, processing, and distribution to last users. In this sector, there are supporters and influencers. All these stakeholders have different levels of decision and power in the coordination chain. The organization of the chain, position, and different functions of stakeholders is presented on the chain map (Figure 2).

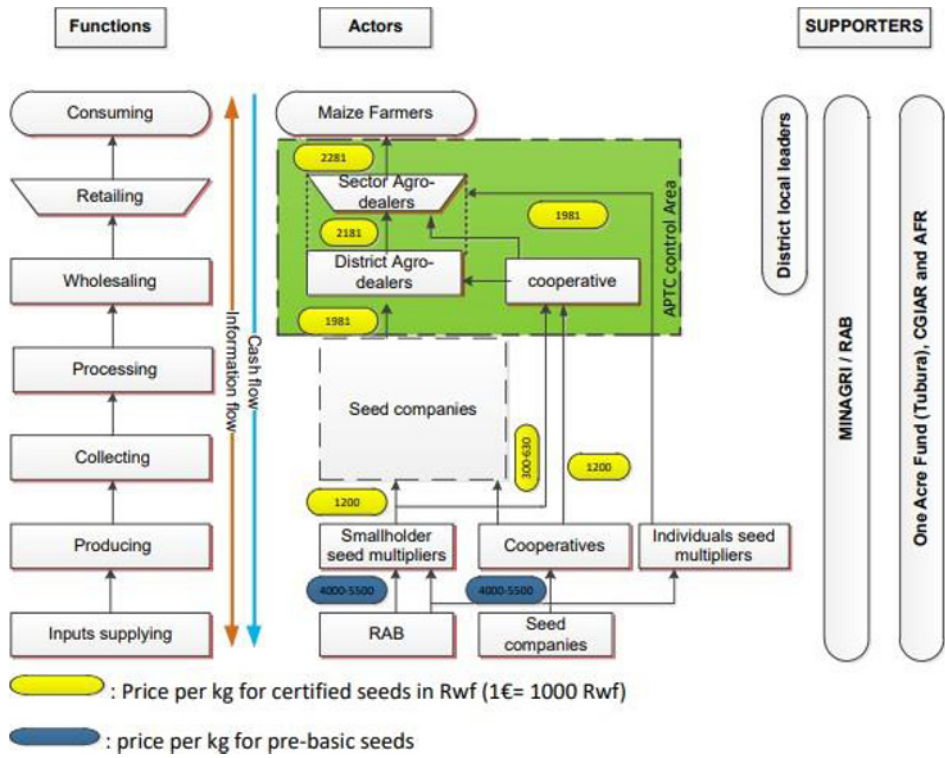


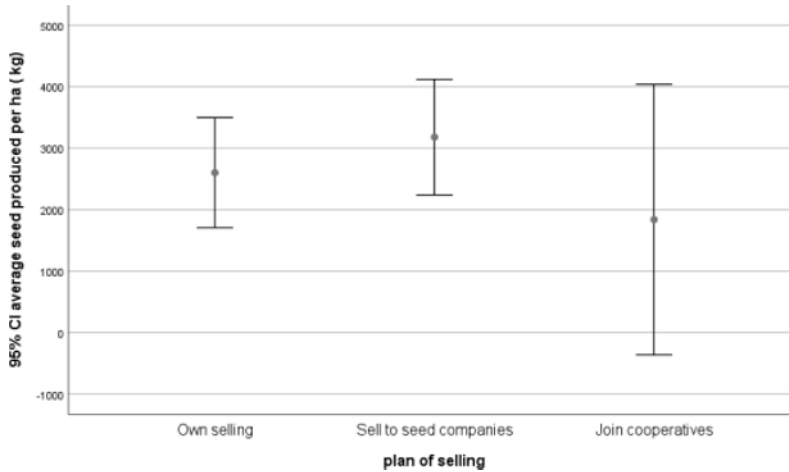
Fig. 2 Maize seed new value chain map

**4.2 Success and failure factors that can affect contract farming**

The survey shows that 40% of smallholder multipliers are motivated by the price in the first place, 47.5% the time of payment in the second place, and 30% are motivated by the consistency of the buyer on the third time. The results also show that 70% of the respondents do not have yet contract with their buyers. They only communicate via meeting and delivery notes after supplying their products. Most of them, 97.5% are using amicably and local leaders as a way of mediation. Only 2.5% plan to enforce their contract using courts, local leaders, and amicably as mediation.

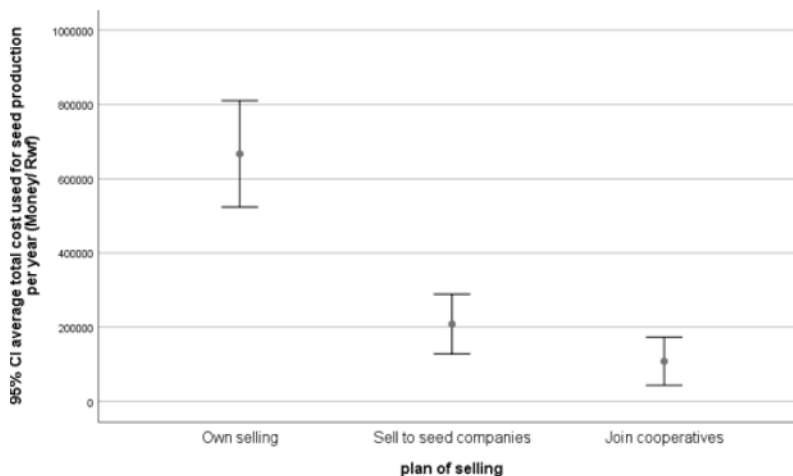
**4.3 Contribution of contract farming to the higher income of smallholder seed multipliers**

The survey results show that 72.5% of smallholder seed multipliers are planning to sell their hybrid maize seeds through seeds companies. 20% of respondents join the cooperatives to sell their maize seeds, and only 7.5% have a plan of selling themselves their seeds direct to the open markets. The statistical test was used to verify whether there is a difference in production per ha between multipliers selling to companies, multipliers selling to cooperatives, and multipliers selling themselves to the open markets.



**Fig. 3** Average seed produced per ha

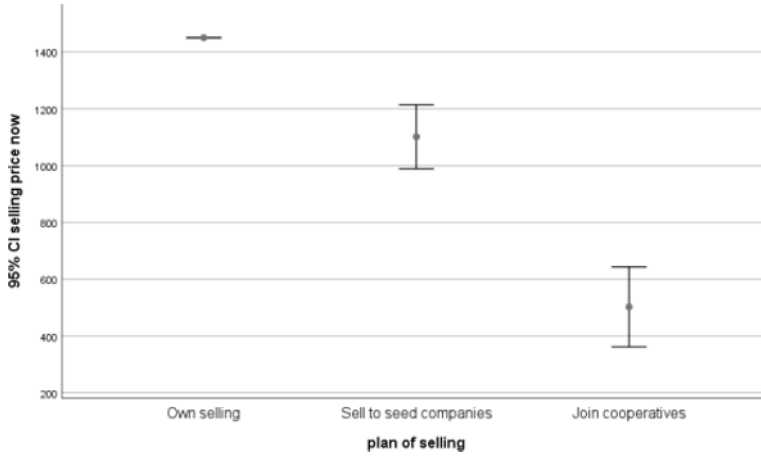
The statistical test was also used to verify whether there is a difference in average total cost used for seed production per ha, between multipliers selling to companies, multipliers selling to cooperatives, and multipliers selling themselves to the open markets. After a one-way ANOVA test, the resultant shows a difference in average total cost used for seed production per ha, between multipliers selling themselves to the open markets and multipliers selling to companies, and between multipliers selling to the cooperative. However, there was no difference in the average total cost used for seed production per ha between multipliers sold to seed companies and multipliers sold to cooperatives.



**Fig. 4** Average total cost for seed production

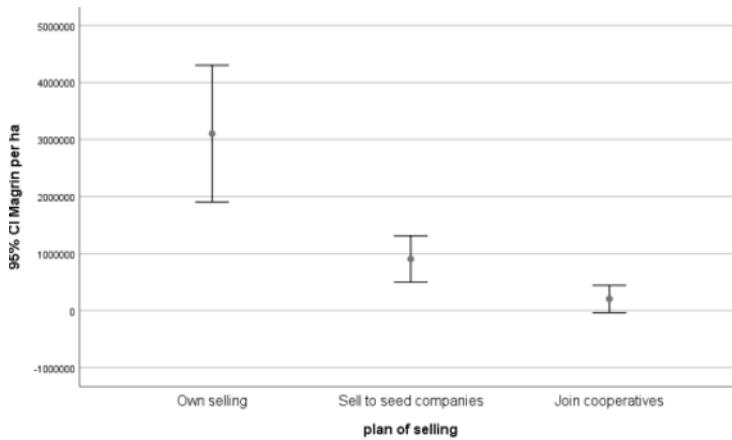
The statistical test was also used to verify whether there is a difference in selling price between smallholder multipliers according to the buyer partners. There is a significant difference in selling price between multipliers selling their seeds to seeds companies and multipliers selling their seeds through cooperative, but they were no significant difference

in selling price between multipliers selling themselves to the open markets and multipliers selling to the seed companies.



**Fig. 5** Selling price

This difference in selling price inspires verification also where there is a difference in margin rate between multipliers according to the buyer partners. After a statistical test, the result shows a difference between multipliers selling to seeds companies, multipliers selling through cooperative, and multipliers selling themselves shown by p-value (0.000).



**Fig. 6** Margin rate

## 5. Conclusion

Hybrid maize seed is also a highly valuable commodity with specific knowledge and investment for production. Strict control that prevents the high level of maize seed trafficking and smuggling to all bordering countries, will highly contribute to the success of contract farming. On the other hand, the study finds various factors that can hinder the performance of contract farming, such as limited quantity and low availability of pre-basic seeds essential for certified/ commercial seed multiplication, pricing mechanism excluding smallholder multipliers, long process, and bureaucracy in seed payment and distribution, and finally accessibility of smallholder seed multipliers. All these factors can be the high risks of failure for contract farming.

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