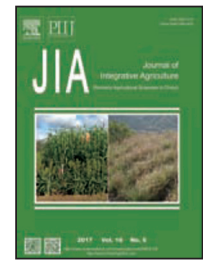




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RESEARCH ARTICLE

Factors influencing farmers' participation in crop intensification program in Rwanda



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Abstract

The crop intensification program (CIP) was introduced in Rwanda in 2007 by the Ministry of Agriculture and Animal Resources (MINAGRI), Rwanda, as a solution to the land fragmentation, low use of agricultural inputs and low access to extension services. However, due to the voluntary nature of farmers' participation and their reluctance to participate, this study aimed at assessing the factors that influence their participation. Data were collected from 340 respondents through a household survey in Mayange and Rusarabuye sectors. Descriptive statistics and binary logistic regression model were used to analyze the data. Results show that the factors that significantly influenced the farmers' participation in the CIP include gender, non-farm income, farmland size, farming experience, land acquisition means, market access, trust and agro-ecological conditions. In fact, the non-farm income significantly increased the farmers' decisions to participate in the CIP ($P < 0.001$) as it eases the financial capital needed to invest in the CIP activities. On the land acquisition means, the farmers who inherited or bought the land positively and significantly participated in the CIP ($P < 0.05$) because they had the land tenure security. However, the participation in the CIP was hindered by inadequate irrigation and mechanization facilities, lack of farmers' participation in the CIP planning process, inadequate extension services, inadequate agricultural inputs and inadequate post-harvest technologies. Closer collaboration between farmers, local leaders, extension agents and agricultural service providers as well as the farmers' practical skills in irrigation and mechanization could enhance the participation to the program. Therefore, there is a need on the part of policymakers to empower farmers with adequate knowledge on better cropping practices and agricultural technologies through appropriate extension services and bottom-up based program.

Keywords: chemical fertilizers, crop intensification program, extension services, improved seeds, post-harvest techniques, institutional factors, socio-economic factors, constraints

1. Introduction

Agriculture sector in Rwanda remains the mainstay of the Rwandan economy in terms of employment and income generation for the majority of households (NISR 2013). The country suffered from increasing population growth (though at diminishing rate) coupled with declining per capita agri-

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cultural land size (currently less than 0.5 ha), inadequate agricultural technology, soil erosion that causes soil fertility decline, over-cultivation and low use of agricultural inputs (Byiringiro and Reardon 1996). These problems are exacerbated by inadequate extension system, land fragmentation, imperfect financial market and poor infrastructure in rural areas (Bizoza *et al.* 2007). Therefore, the Ministry of Agriculture and Animal Resources (MINAGRI), Rwanda, through its implementing agency, the Rwanda Agricultural Board (RAB), initiated in 2007 the crop intensification program (CIP) in order to solve those problems, avoid the dependency on rain-fed agriculture and ensure food security and self-sufficiency (Kathiresan 2012).

Farmers participate in the CIP on a voluntary basis and its implementation involves four components such as land use consolidation, provision of extension services to farmers, distribution of agricultural inputs and improvement of postharvest handling and storage technologies (Kathiresan 2011). The aim of land use consolidation was to stop the land fragmentation caused by the high population pressure on the farmlands and to mitigate the causes of hunger and poverty by increasing the staple crop production and introducing irrigation and mechanization facilities. In consolidated lands, farmers grow specific food crops in a synchronized fashion. The CIP focuses on eight priority staple crops, that include maize, wheat, rice, Irish potato, beans, cassava, banana and soybean. The crop rotation system is based on crop suitability in a specific agro-ecological zone and its contribution to the overall food security (Mbonigaba-Muhinda and Dusengemungu 2014). Considering the agricultural inputs, the distribution of improved seeds and chemical fertilizers was facilitated by the MINAGRI through the RAB. Improved seeds of maize, wheat, cassava, beans and Irish potato and the chemical fertilizers for maize, wheat, rice and Irish potatoes were imported and distributed to farmers through agricultural service providers. The MINAGRI subsidized the cost of fertilizers at 50% and the farmers buy the fertilizers from agro-dealers by presenting the vouchers distributed by the CIP (Kathiresan 2011). On the agricultural extension services, the use of agricultural inputs, soil and water conservation measures and better cropping practices are carried out by agronomists who collaborate with agricultural service providers at the Sector and the District level. Each extension agent controls about 500 ha of consolidated lands (Kathiresan 2011). Considering the post-harvest technologies, the CIP aimed at addressing the market challenges and minimizing the postharvest loss by improving the handling and the storage of the staple commodities through the construction of public drying areas and food storage houses where the lands have been consolidated. Moreover, financial resources were mobilized in order to address the post-harvest inefficiencies in the supply

chain (Mbonigaba-Muhinda and Dusengemungu 2014).

Farmers' participation in agricultural program is an important factor in rural development as it plays a major role in poverty alleviation (Dercon *et al.* 2009), improvement of decision-making capacity (Yang *et al.* 2008), use of chemicals (Salameh *et al.* 2004), farm productivity improvement (Atreya 2007) and acquisition of new knowledge in agriculture (Karbasioun *et al.* 2008). Numerous studies indicated the factors hindering the farmers' participation in agricultural program. These factors include the farmers' socio-economic characteristics (Iqbal 2007), their real needs, the lack of time, uncomfortable feeling of their participation in agricultural education process, and the lack of trust towards agricultural extension agents (Lioutas *et al.* 2010). In addition, the factors negatively affecting female farmers' willingness to participate in agricultural extension program include the lack of trust towards the bodies offering the programs, the perception that all members of the rural society can't easily access the programs and underestimating the capacity of agricultural education programs to deliver the new knowledge (Charatsari *et al.* 2013a). These authors also mentioned other factors such as the belief that the target audience of the programs was men or well-educated farmers, the lack of confidence in the suitability of the program content or methods used in these programs and the fear to participate in agricultural education process due to the low education level or low social status. Thus, the findings from this study show that female farmers are discouraged from participating in agricultural education program due to self-perception factors and program design related factors. Other constraining factors include the lack of land ownership, inadequate technical knowledge and financial capital, high agricultural input cost, lack of commitment of extension agents and market inaccessibility (Nxumalo and Oladele 2013). In addition, the lack of participation of target groups in all stages of agricultural program leads to its failure or low adoption (Douglass and Sicilima 1997). Therefore, the success of agricultural program requires the cooperation among farmers, extension agents, scientists and other stakeholders (Cristóvão *et al.* 2009) and the farmers' knowledge and experience should be taken into consideration (Lioutas *et al.* 2010). Farmers should participate in the program design and have the rights to set up their own goals and outcomes (Roberts 2000). For example, the community integrated pest management in Southeast Asia is a successful strategy for sustainable agricultural development where farmers take initiatives and participate in the problem solving and decision-making processes and create opportunities for all farmers in the communities (Pontius *et al.* 2000).

The most successful agricultural programs are designed and planned based on people's attitudes and local social, economic and environmental conditions (Cao *et al.* 2009).

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