

MANAGEMENT FRAMEWORK OF ON GOING SELF-SUSTAINING AGRICULTURAL EXTENSION SYSTEM AND TRAINING OF FARMER PROMOTERS AND FARMERS IN RWANDA

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Abstract:

This study reviews the organizational setting of the self-sustaining agricultural extension system adopted by the Ministry of Agriculture and Animal Resources in Rwanda. The main objective of the self-sustaining agricultural extension system is to make the farmers themselves to act as the resource persons without having to depend on people from outside. This report deals about the strengthening of the different aspects of self-sustaining agricultural extension systems like Institutional development of self-sustaining agricultural extension system Improving the supply of relevant services to respond to the farmers, Capacity Building of FFS farmers and FP farmers, Evaluation of performance of farmer groups, Capacity development of critical mass of frontline extension and Extension Methods used. The self-sustaining system was provided with stakeholder's collaboration with sound purposes, which resulted in meeting the expected results like crop productivity. Stakeholders offered 74.2% of information to farmers through training of farmers. It was found that 40.8% of the training mode was village mobilization meeting. Stakeholders used 83.9% of the training by group meeting and 42.9% was done by the Farmers Field School (FFS) plots. The survey identified that 87.2% farmer promoters were in groups while 65.3% of the farmers were in self-sustaining extension groups. The study revealed that 75.6% farmers were attending the regular meetings conducted and 34% farmers attended the regular monthly group meetings. The Local Government Extension staff trained 64.6% of Farmer Promoters in extension systems among them 72% of the trained Farmer promoters established the demo plots. The success of the self-sustaining extension system in Rwanda is mainly due to its 91% of the farmers visited the demo plots at least one time in the season and 82% of the farmers used improved seeds.

Keywords: Self-sustaining– agriculture – extension system – Training Farmers – Rwanda

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1. Introduction

Rwanda is a land locked country in East Africa. The Govt. of Rwanda sees agriculture development as a key catalyst to engender long-term sustainable growth and remove thousands out of poverty. The extension services to the farmers are inadequate and almost unavailable in some areas. The current numbers of extension service providers are grossly inadequate to effectively-serve the farming community with the current ration of farmer to extension agent at approximately 1:840. The Ministry of Agriculture has realized that the way forward is to equip farmers with particular technical knowledge and training, which lie outside purview of their own indigenous knowledge. In this way the farmers themselves, will act as the resource persons without having to depend on people from outside. In simple terms the farmers themselves must be their own extension agents if the extension service is to be successful in the country. By training those farmers who are recognized as good communicators, information can be effectively disseminated through the farmers' local social networks and information exchange mechanisms. Villagers were therefore trained either as farmer field school facilitators or farmers' promoters and were supported to become extension agents and trainers of other farmers. The main objective of the research is to describe the organizational setting of the ongoing self-sustaining agricultural extension system implemented in Rwanda and to assess the increased knowledge and skills of farmer promoters (FP) and the farmers in the groups to get the agricultural information.

2. Review of literature

Brief reviews of literature pertaining to Self-Sustaining Agricultural Extension system are discussed in this section as per the report of Bertus and Remco (2016). Alston et al., (2000) provide an extensive review of the economic returns to investment in agricultural research and development. The analysis included over 1,128 estimated rates of return, and while 512 of these were for research and extension, only 18 were from extension only investments. The results of the analysis showed an average rate of return of 47 per cent for research and extension investments, while for extension only investments this was 80 per cent. However, as with other reviews, the methodology of the included studies is varied and few follow high quality impact evaluation methodologies. In the 21st century, agriculture continues to be a fundamental instrument for sustainable development and poverty reduction. Agriculture remains the main source of income for around 2.5 billion people in the developing world (FAO, 2003). A range of approaches to extension delivery have been promoted over the years. Early models focusing on transfer of technology using a 'top

-down' linear approach were criticized due to the passive role allocated to farmers, as well as the failure to factor in the diversity of the socio-economic and institutional environments facing farmers and ultimately in generating behaviour change (Chambers and Ghildyal, 1984).

According to Anderson and Feder (2003) productivity improvements are only possible when there is a gap between actual and potential productivity. They suggest two types of 'gaps' contribute to the productivity differential – the technology gap and the management gap. Extension can contribute to the reduction of the productivity differential by increasing the speed of technology transfer and by increasing farmers' knowledge and assisting them in improving farm management practices (Birkhaeuser et al., 1991). Additionally, extension services also play an important role in improving the information flow from farmers to scientists. A number of models have been implemented since the 1970s, combining approaches to outreach services and adult education, including the World Bank's Training and Visit (T&V) model (Anderson et al., 2006), participatory approaches and most recently farmer field schools (FFSs) (Van den Berg and Jiggins, 2007).

Since the emergence of the Farmer Field School (FFS) approach in Indonesia in the late 1980s, this approach to extension has become increasingly widespread and has been introduced in some 78 countries (Van den Berg and Jiggins, 2007). The FFS approach draws on the participatory approach in terms of its focus on farmer experimentation and problem solving. Van den Berg (2004) provides a synthesis of 25 evaluation studies of integrated pest management (IPM) FFSs. Most studies focused on rice and measured immediate impact of the FFSs in terms of reduced pesticide use and changes in yields, reporting considerable reductions in pesticide use, with some studies also showing an increase in yields. However, in common with other reviews of extension services, the methodology of the studies is varied, highlighting the complexity of estimating impact for such interventions and the lack of an agreed conceptual framework for doing so. The review revealed that studies were either designed to be statistically rigorous, but with limited scope, or comprehensive, but with limited coverage. Van den Berg (2004) argues that by combining the results of different sources the comprehensiveness of the overall evaluation was improved. Building on this, Van den Berg and Jiggins (2007) reviewed studies evaluating FFS and pest management, finding that FFSs have had additional benefits to that of IPM including facilitating collective action, leadership, organization and improved problem-solving skills. Noting that discussions on the fiscal sustainability of FFSs should include considerations of who will pay for the externalities of pesticide use, they conclude that the evidence gathered in the review suggests that FFSs

can be a cost-effective way of increasing farmers' skills and thus contributing towards escaping poverty. Van den Berg and Jiggings (2008) stated that public policy in developing countries has failed to invest in educating farmers on how to deal with variable agro-ecosystems and a changing world. It presented an assessment of a participatory training approach in changing crop protection by farmers from chemically dependent, to more sustainable practices in line with the tenets of Integrated Pest Management (IPM). The evidence from the studies on an educational investment designed to capacitate farmers to apply IPM, and discussed these data in the light of an on-going policy debate concerning cost effectiveness. The results indicate substantial immediate and developmental benefits of participation in Farmer Field Schools.

3. Materials and Methods

3.1 Organization of Self-sustaining Agricultural Extension systems

Most of materials used for the study were collected from the Ministry of Agriculture and Animal Resources (MINAGRI) and Rwanda Agriculture Board (RAB). Discussions with concerned officers, trainers and trainees were also sources of information. The researcher himself was a senior officer in charge of organizing, executing and implementing the self-sustaining extension system in the entire country. The various data collected and reports produced under the guidance of the researcher in the ministry form the basis for the analysis of the extension system in Rwanda. The methodology adopted to analyze the self-sustaining extension system consists of developing the institutional development of self-sustaining extension system. The self-sustaining extension system was based on a pluralistic approach involving farmer to farmer extension model with many actors from both public and private sector playing different roles. Operating within the decentralization system, agriculture committees at village, cell, sector, district, province and national levels ensure that agricultural development agenda is prioritized in overall development agenda. Village is the entry point of self-sustaining extension system in Rwanda as shown in Figure 1.

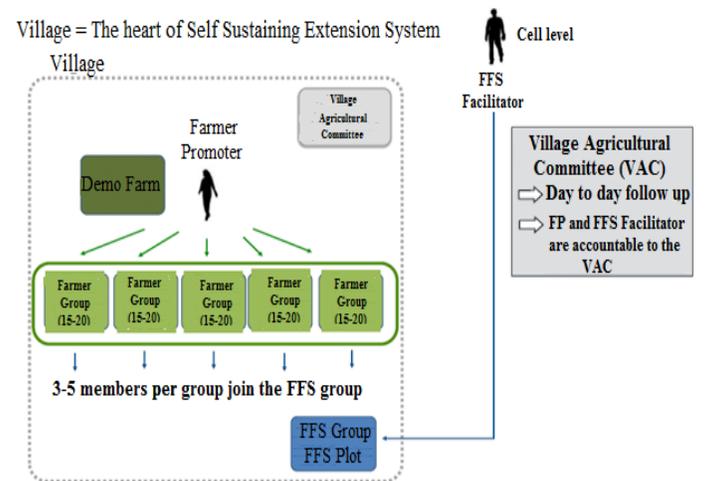


Figure 1. Village as the entry point of Self-sustaining extension System

Farming communities were mobilized to form farmer-based institutions for agricultural extension. Grass root institutions were developed for the agricultural extension in the entire country. Grass root institutions are particularly important in harnessing the power of collective farmer's action in procurement of inputs as well as in marketing of the farmers produce. The organization of self-sustaining agricultural extension system is shown in Figure 2. Institutional development component will empower and further strengthen farmers through their organizations to achieve farmer demand-driven support services; strengthen farmers' participation in implementation of program activities; strengthen farmers knowledge and organization at the grass-root level; active participation in development issue and timely and relevant support to the farmers by other stakeholders, including extensionists, researchers, agro-dealers, marketers/traders and processors.

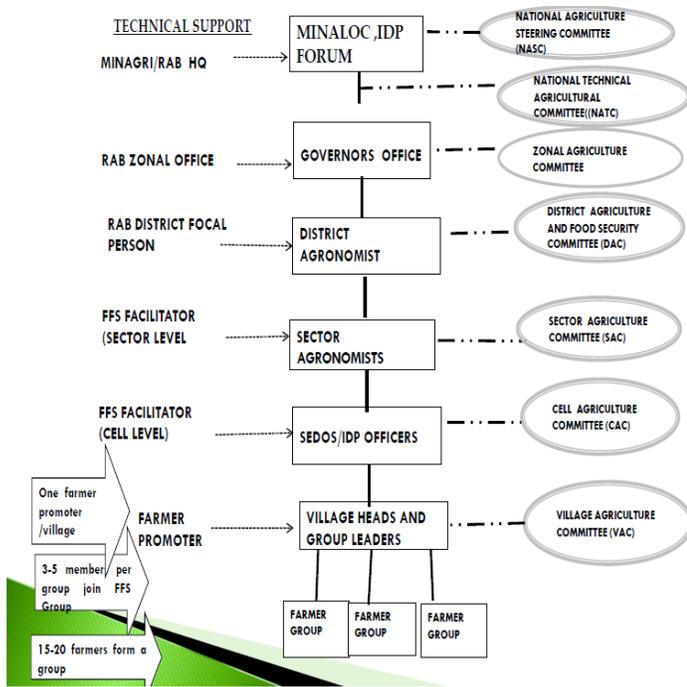


Figure 2. Organization of Self-sustaining Agricultural Extension systems

3.2 Survey Settings adopted: The survey was carried out by Rwanda Agricultural Board with 34 data enumerators and 5 field coordinators. The survey form developed was first used for pre-testing in the Kigali. The locations selected for pretesting was excluded from the final performance because it served to improve the evaluation survey.

3.2.1 Data Collection: Data collection was through field visits, informal and/or structured interviews and observations. Data was collected from randomly selected farmer groups within representative locations. Data collection took 5 days to visit targeted locations by 34 data enumerators. The survey included 30 districts, 68 sectors (pilot and non-plots), 125 Cells and 857 villages. A sample of 2 sectors per district and 2 cells of per sector were used. The study used 13 farmer promoters and 15 farmers in pilot sector while 12 farmer promoters and 14 farmers were used in non-pilot sectors. There were a total of 2000 respondents, including 217 stakeholders, 857 farmer promoters and 926 farmers. This activity was carried out in June 2015.

3.2.2 Determination of Sample size: The sample size was determined based on 0.95 significance level with a confidence level of 2.12% and 95% confidence interval, which assures that the true percentage of the population is between 43% and 51%. The study population includes 142,465 from district, sectors, agronomists, farmers, farmer promoters, SEDO (Social Economic Development Officer) and NGOs across the country.

3.2.3 Organization of farmers groups for improved extension services: The survey was conducted with 2000 respondents including 217 stakeholders like district agronomist, sector agronomist, SEDO and local NGOs, 857 farmer promoters and 926 farmers.

3.3 Methodology to assess the increased knowledge and skills of farming community: The percentage of males and females were analyzed among the different stakeholders involved in the survey. The percentage of university graduates and the completed secondary schools were computed because they are the respondents, who are capable of understanding different guidelines given in the implementation of self-sustaining agricultural extension system. The percentages of increased knowledge of different stakeholders like district agronomist, sector agronomist, SEDO and local NGOs involved in the survey of self-sustaining agricultural extension systems were worked.

3.4 Extension Methods used: Some of the extension methods used to disseminate information and messages on agricultural technologies to the farmer groups. *Community mobilization campaigns:* Community mobilization campaigns (CMCS) were conducted at the onset of the seasons to address the identified agricultural problems as well as to promote adoption of technologies such as use of compost, farm yard manure, fertilizers and certified seeds. *Demonstrations:* This is one of the commonest extension method used by extension workers to disseminate information and message on agricultural technologies to farmers. Farmer promoters will establish a demonstration farm in every season. The purpose of village demonstration plots is to show farmers the production potential when one apply good agronomic practices on a variety with a proven track records. Farmer Promoters will create partnership in planning and mounting of demonstrations with the private sector such as seed and fertilizer dealers. The farmer groups will visit the demo plots for learning purposes at least three times per group in each season. *Farmer Field School (FFS):* The FFS plot was the learning place for the members of the FFS group. The FFS Facilitator guides the FFS group members through a process of experimental learning by conducting weekly assessments of the crop growth in various comparative trials. Farmers get deep understanding of crop production in FFS plots and also learn how to make good decisions based on observations and analysis. FFS groups at the rate of one per village were established across the country. *Print and audio extension materials:* It were developed and disseminated to the farmers. This includes priority crops production booklet guides, posters and fliers on good agronomic practices. *ICT Tools:* The program will embrace ICT tools in dissemination of extension and advisory messages especially the mobile phone. In this

respect, a two-way SMS system used to send extension and advisory messages to FFS facilitators and farmer promoter.

4. Results and Discussions

This review paper discuss the various results in issues connected with Purpose of the institutional development including expected results of institutional development and Institutionalization of the farmer groups; Improving the supply of relevant services to respond to the farmers; Capacity Building of Farmer groups including capacity building of FFS; Evaluation of performance of farmer groups; Capacity development of critical mass of frontline extension agents including purpose of capacity development of critical mass of frontline extension agents; stakeholders collaboration in self-sustaining extension system like purpose of stakeholders collaboration and the results obtained from stakeholders collaborations including the survey results conducted by Rwanda Agriculture Board (2015) season B.

4.1. Evaluation of performance of farmer groups

The points considered for the evaluation of performance of farmer groups are a) Grading of the farmer groups which have been operational for more than one year-setting grading criteria and training grading committees b) Build capacity of the graded groups based on the gaps identified during grading c) Grading of lead farmers/group leaders and provision of motivation/facilitation and capacity building accordingly and d) Upgrade farmers organization to cooperative level based on grading of farmer groups.

4.2. Stakeholders collaboration in self-sustaining extension system

The stakeholder cooperation will promote private sector involvement to improve synergies of respective stakeholders' efforts. The stakeholder cooperation is inclusive and not excluding any actor with potential for development of the agricultural sector. The stakeholder collaboration will be enhanced at all levels throughout the country. Involvement of NGOs, Extension Officers, and farmers will be the best way of improving the extension services. The stakeholder collaboration will not aim at substituting private sectors for public extension services. It is planned to incorporate the all connected organizations into agricultural extension delivery in the country. The stakeholder collaborators will have opportunity to perform higher in those areas where it has comparative advantage over others in providing enhancing specialization with its inherent advantages. The agricultural committees at the village, cell, sector, districts and national levels were connected with all public and private stakeholders involved in agricultural development. The Institutional roles and

responsibilities of MINAGRI, RAB, Districts and Zones are shown in Figure 3.

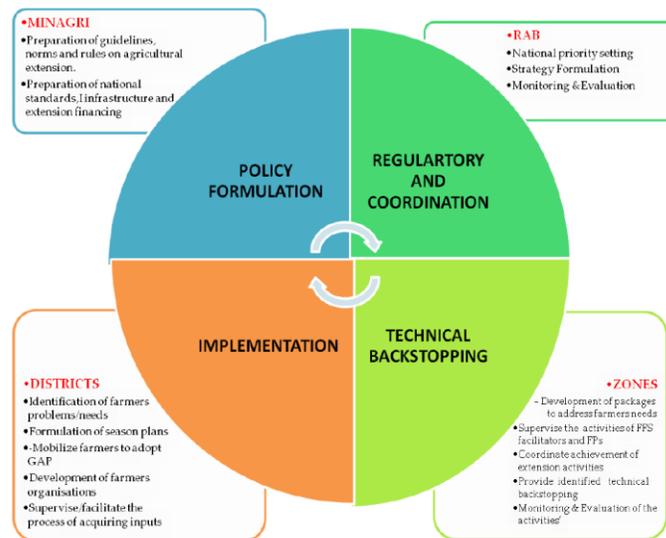


Figure 3. Institutional roles and responsibilities in agricultural extension

4.3 Assessment of the survey results held in 2015 season B

Percentage composition of male and female respondents of the survey

The percentage of males and females were analyzed among the different stakeholders involved in the survey and is shown in Figure 4. Among the Farmer Promoters, there were 88.1 % males and 11.9% females. Among the different stakeholders, there were 66.8 % males and 33.2% females and among the farmers, there were 67.8% males and 32.2% females. The analysis shows that there are low percentage of females among the Farmer Promoters. The highest percentage of 33.2% females present among the different stakeholders, it was due to the fact that the stakeholders include the district agronomist, sector agronomist, SEDOs and NGOs. Among the farmers also, there is 32.2% were females and it is one of the positive factors for the survey because women are the dominating work force in agriculture.

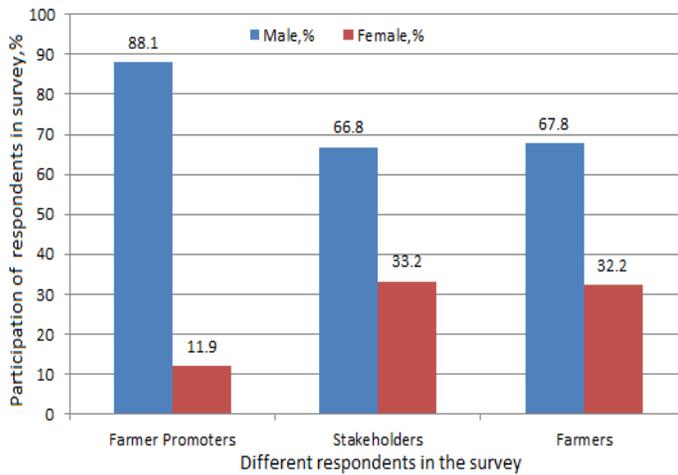


Figure 4. Percentage of male and female stakeholders participated in the survey

4.3. Percentage composition of different stakeholders involved in the survey

The percentages of composition of the different stakeholders are reported in Table 1.

Table 1. Percentage composition of different stakeholders involved in the survey

Education Levels in %		Percentage of different stakeholders involved in the survey			
Secondary Completed	University Graduates	District Agronomist	Sector Agronomist	SEDOs	NGOs
42.9	57.1	12	27.2	57.6	3.2

There were 57.1% university graduates and 42.9% secondary schools completed stakeholders. These well qualified respondents were capable of understanding different guidelines given in the implementation of self-sustaining agricultural extension system. There were 12% district agronomist, 27.2% sector agronomist, 57.6 % SEDOs and 3.2% local NGOs involved in the survey of self-sustaining agricultural extension system implemented.

4.4. Percentage of roles played by stakeholders in delivery of knowledge in the survey

The different roles played were 1) training of farmers 2) deliver agricultural inputs 3) visit farmers field and 4) Organize meetings. The percentage of roles played by different stakeholders were worked out based on the data collected in the survey during 2015 season B. Figure 5 show the ppercentage of roles played by stakeholders in delivery of knowledge in the survey.

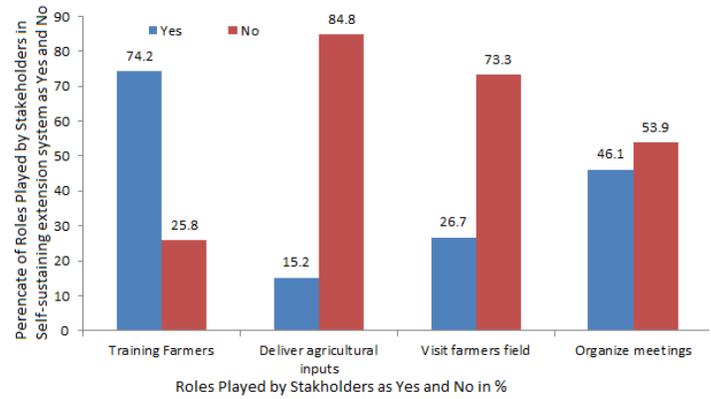


Figure 5. Percentage of roles played by stakeholders in delivery of knowledge in the survey

Figure 5 show the fact that training farmers was 74.2% and the delivery of agricultural inputs was found as low as 15.2%, visit to farmers field was only 26.7% and organize the meeting was 46.1%. It was found that the stakeholders performed well in training the farmers. There are more scope to further improve the delivery of agricultural inputs to 848% and visit to farmers field has to be increased to 73.5%. There should be more concentration in doubling the number of organizing the meetings so as to improve the self-sustaining agricultural extension system.

4.5. Modes and Methods adopted by stakeholders to provide of information to farmers

Modes and methods of extension methods used by stakeholders to provide information to farmers were studied in the survey. Figure 6 is shown with three different modes and six different extension methods used to provide information to farmers.

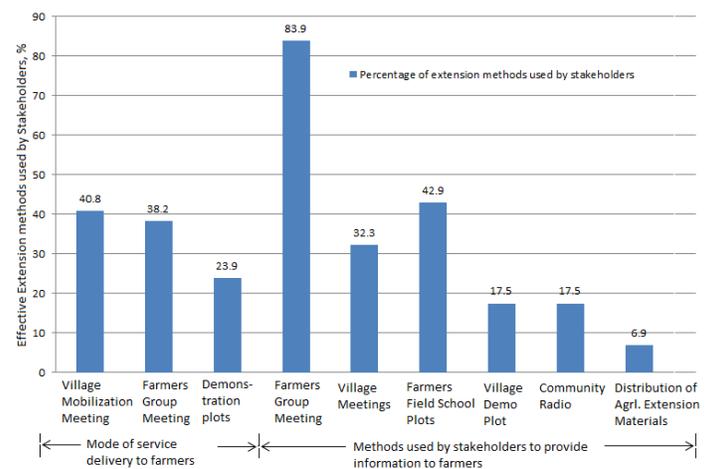


Figure 6. Modes and methods adopted by stakeholders to provide of information to farmers in %

Figure 6 shows that there were three different modes of service delivery to farmers. They were Village mobilization meeting, Farmers group meeting and Demonstration plots. It was found that the percentage used by the stakeholders were 40.8% Village mobilization meeting, 38.2% Farmers group meeting and 23.9% by Demonstration plots. Six different methods were used by stakeholders to provide agricultural information to farmers. It was found that farmers group meeting was 83.9% used by the stakeholders to provide information to farmers, which is the most widely used method. FFS plot was used 42.9% by the stakeholders, which is the second highest used extension method. Village meeting had 32.3% effect in providing information to farmers. Distribution of agricultural extension materials is the lowest 6.9% among the methods. Village demonstration plots and Community radio occupied only 17.5% each in providing information to farmers.

4.6. Organizing Farmers into Self-Sustaining Extension Groups

Organizing the Farmer Promoters and the Farmers into self-sustaining agricultural extension system groups to provide information to farmers were studied in the survey. Figure 7 is shown with percentage of Farmer Promoters and Farmers in groups for sharing extension information.

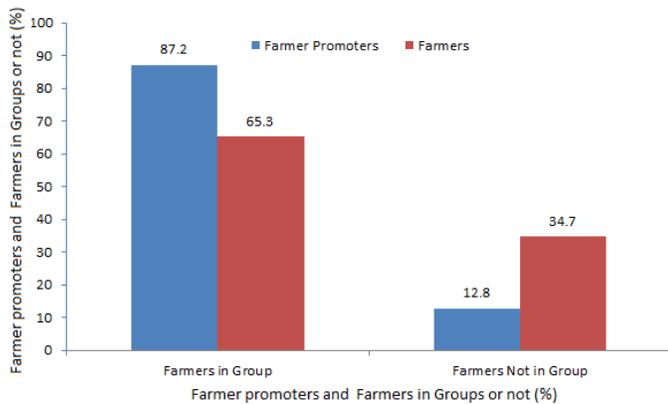


Figure 7. Farmer Promoters and farmers in self-sustaining extension groups, %

87.2% farmer promoters were in groups and the 12.8% of them were not in groups. It also revealed that 65.3% of the farmers were in self-sustaining extension groups and 34.7% of the farmers were not in any of the self-sustaining extension groups. These percentages were worked out by surveying 926 farmers among them 604 farmers were in groups and 857 farmer promoters. The reason for not joining the extension groups was the low level of mobilization of farmer promoters explaining self-sustaining extension to farmers and the other reason may be farmers were not aware of self-sustaining extension groups.

4.7. Farmers Participation in group meetings and their frequency of attendance

Farmer's participation in group meetings is one of the essential ways to get the information from the self-sustaining agricultural extension system. Figure 8 show the percentage of farmers attended the group meetings Data were collected about the frequency of group meetings during the survey in 2015 season B was analysed because it was one of the ways and means of exchanging agricultural information to farmers. Figure 9 show the frequency of group meetings.

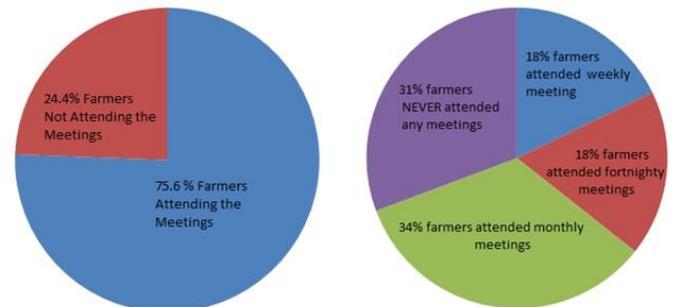


Figure 8. Farmer's Participation in self-sustaining extension group meetings (%) Figure 9. Frequency of meetings attended by farmers (%)

75.6% farmers are attending the regular meetings conducted to get information for increased knowledge and skill and 24.4% of the farmers are not attending the meeting. 34% farmers are attended the regular monthly meetings conducted to get information for increased knowledge and 31% of the farmers never attended the group meetings. It was found only 18% of the farmers attended the weekly and monthly meetings(Figure 8 & 9). The reason for not attending the meeting may be either due to lack of advance information about the date, time and venue of the meeting or due to coincidence of other farm activities of the farmers. There is a need to provide information about the meeting well in advance.

Farmer Promoters trained to establish demo plots

The percentage of Farmer Promoters trained by different stakeholders viz., Local Extensionist RAB Extensionist, Cooperatives, Other farmers and NGOs' were analysed based on the data collected during the survey in 2015 season B. Figure 10 show the Farmer Promoters trained to establish demo plots by different stakeholders.

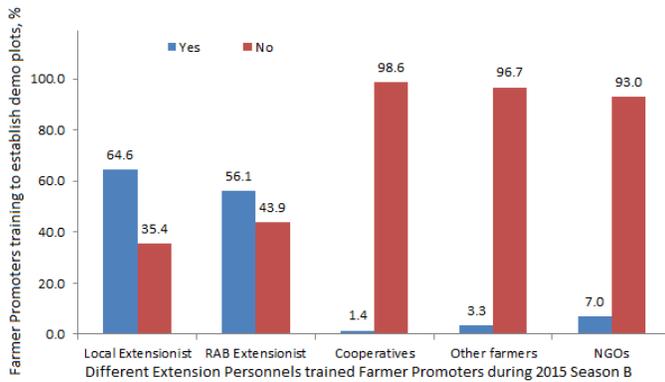


Figure 10. Farmer Promoters trained to establish demo plots by stakeholders (%)

Figure 10 show various sources of trainings on establishment of demo-plots. It was found that 64.6% of Farmer Promoters were trained by Local Government Extension staff like agronomist or SEDOs and 56.1% of the Farmer Promoters were trained by RAB extension personals. Very low number of Farmer Promoters was trained by the Cooperative, Other farmers and NGOs. The reason for low percentage of farmer promoters trained by Cooperative, Other farmers and NGOs were due to the fact they are not the professional extension agencies.

4.8. Demonstration plots visited by farmers during 2015 season B

Demonstration plots were established by the trained Farmer Promoters. Farmers used to visit the demonstration plots during different times. Their visits were recorded and analysed. Data collected during the survey in 2015 season B was analysed. Figure 11 show the Farmer Promoters trained and farmers visited the demo plots.

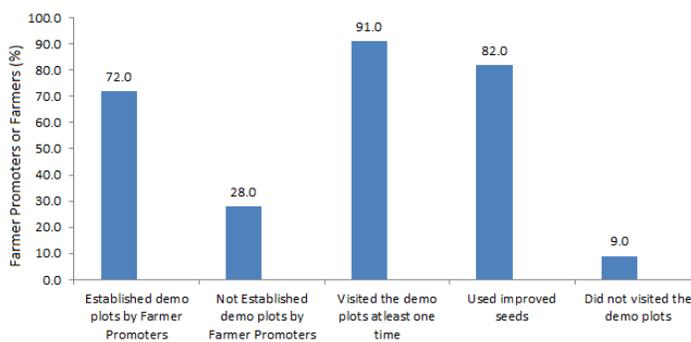


Figure 11. Farmer Promoters and Farmers established and visited the demo plots (%)

Figure 11 show the fact that 72% of the trained Farmer promoters established the demo plots and 28% of them did not established the demo plots during 2015 season B. It was found that 91% of the farmers in the group visited the demo plots at least one time in the season and 82% of the farmers

used improved seeds as learned during the visit of the demo plots. It was found that very few farmers, that is 9% did not visited the demo plots due to various reasons.

5. Summary

The self-sustaining agricultural extension system implemented in Rwanda has two pillars FFS and FP groups. These groups are spreading the improved agricultural technologies from one to another through supply of inputs and field demonstrations. This review paper concludes that there is an appreciable improvement in the spheres of institutional development and institutionalization of the farmer groups. There is development of the supply of relevant services to respond to the farmer needs. The new organizational setting was useful to provide Capacity building of farmer groups, capacity building of FFS. The self-sustaining extension system has provisions for evaluation of performance of farmer groups. There was capacity development of critical mass of frontline extension agents through trainings. The new and innovative extension methods used are community mobilization campaigns, field demonstrations, Farmer Field School (FFS), supply of print and audio extension materials and ICT Tools. The self-sustaining systems were provided with stakeholder's collaboration with sound purpose, which resulted in meeting the expected results like crop productivity. The survey report conducted during 2015 season B showed that 88.1% of the Farmer promoters were male and 66.8% of the stakeholders were male. The percentage of the females in farmer promoters and stakeholders are less in percent while women are the dominating work force in agriculture. This imbalance in gender participation has to be corrected in future. The stakeholders consisted with 57.1% university graduates and 42.9% secondary schools completed stakeholders. Stakeholders offered 74.2% of information to farmers through training of farmers. The delivery of agricultural inputs was done by stakeholder at 15.2%, visit to farmers field was only 26.7% and organize the meeting was 46.1%.

Village mobilization meeting was the top ranking mode of training with 40.8%, followed by 38.2% farmers' group meeting and 23.9% by demonstration plots. Stakeholders used 83.9% of the training by group meeting, which was followed by 42.9% by FFS plots. The survey showed the fact that 87.2% farmer promoters were in groups and the 12.8% of them were not in groups while 65.3% of the farmers were in self-sustaining extension groups and 34.7% of the farmers were not in any of the groups. It was interesting to note that 75.6% farmers were attending the regular meetings conducted among them 34% farmers attended the regular monthly group meetings. The Local Government Extension staff trained 64.6% of Farmer

Promoters in extension systems among them 72% of the trained Farmer promoters established the demo plots. The success of the self-sustaining extension system in Rwanda is mainly due to its 91% of the farmers visited the demo plots at least one time in the season and 82% of the farmers used improved seeds.. Hence the system has to be made more impact by training more farmer promoters and establishment of demo plots which can strengthen the self-sustaining extension system in the days to come.

6. Acknowledgements

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