Influence of Study Circle Extension Strategy on Technology Dissemination in Kenya

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ABSTRACT

Agriculture extension workers in various countries adopt various strategies to disseminate technical information to farmers so that they can improve their livelihoods. One such extension strategy, study circle (SC), was introduced in Kisumu County, Kenya by Livelihood Improvement and Family Empowerment (LIFE) Project in 2002 to dissemination Dairy Goat Technologies (DGTs). The present study investigated the influence of SC extension strategy on dissemination of DGTs among smallholder farmers in the County. Data was gathered using a pretested questionnaire administered to 110 respondents consisting of 50 SC and 60 Non Study Circle (NSC) farmers which were obtained by stratified random sampling technique. Data was subjected to Chi – square test (X2) to draw valid inferences. Analysis was done using Statistical Package for Social Sciences (SPSS) Version 11.5 program. Dissemination was measured using index developed for the study. The index ranged between 0 (no dissemination), 1 (low dissemination), 2 (medium dissemination) and 3 (high dissemination). It was observed that farmers under SC performed better than NSC farmers. Non Study Circle participants had low dissemination (1.16) while Study Circle participants had medium dissemination (2.13). The study has, therefore, made a contribution to the practice and principles of participatory extension in Kenya and is thus recommended. The study can be adopted by extension agents, farm scientists and government policy makers in re-formulating participatory extension strategies to improve the existing conventional approaches and up-scaling agricultural technologies transfer not only in Kenya, but also in other parts of the World.

Key words : *Study circle, Dissemination, Dairy goat technologies, Smallholder, Participatory, Kenya.*

Initially extension services were often structured and operated on the assumption that farmers were largely passive, illiterate and ignorant; and therefore unable to innovate or integrate new cropping and livestock practices into their farming systems [Technical Centre for Agriculture and Rural Cooperation (CTA) 2011; Chowa et al., 2013]. This conventional Ministry of Agriculture-driven technology transfer failed to promote rural development in much of the world, particularly in agro-ecologically diverse resource poor regions (Khan, 2013). There is thus an on-going search for institutional arrangements that will foster sustainability and participation of the rural community.

The participatory approaches emerged in the late 1980s after it was realized that most technologies developed by researchers alone were inappropriate for smallholder farmers (Teixeira et al. 2004; Jurgen et al., 2000).The government of Kenya and other stakeholders (SH) had used several extension approaches that included model farm approach, research centred approach, farmers' training centres, catchment's approach, Training and Visit (T&V) among others (Onyango, 1987; Venkatesan, 1995; GOK, 2005). The above extension approaches achieved minimal success and had largely not been effective in meeting farmer's demand for extension services as expected. Due to this, the government of Kenya embraced participatory and demand-driven approaches to effectively tap farmers' participation and private sector contribution in running extension services (GOK 2004), for example, Agricultural Information Technology Response Initiative (ATIRI) by Kenya Agricultural Research Institute (KARI) in the 1990s and later in the year 2000, National Agriculture and Livestock Extension Program (NALEP) by Ministry of Agriculture (MOA).

Study Circle (SC) concept started in Sweden in the beginning of the 19th century by two organizations that were active in the non-formal adult education (Kindstrom, 2000). The strategy is based on active thinking and learning techniques and participatory training methods (Dilts & Pontius, 1998; Miagonstovich, 1999; Mwagi, 2004). It began to play a major role in giving members knowledge and ability to make their voices heard thus firmly establishing it as a unique feature of the Swedish educational structure (Kindstrom, 2000). The strategy has had enormous impact in other regions of the world, such as Europe and USA, and is currently emerging initiatives in Africa. According to Markham (1999) SC provide valuable lessons and experiences on how farmer-led study groups can contribute to effective demand-driven extension.

The strategy has been used to ensure participation of different social, cultural and class forces including gender and age balance thus covering every aspect of livelihood. For example, as of June 6, 2006, the Moorhead Justice Circle listed on its website http://www.studycircles.org that the strategy was successful in enhancing equal opportunity, promoting rural and ethnic justice in Minnesota, U.S.A, thereby dramatically increasing citizen participation in community development efforts. In Cuba it was used to transform messages to the population, develop policies to consolidate agricultural links such as share

principles of ecological (organic) farming that contributed to environmental protection [Asociacion Cubana de Tecnicos Agricolas Forestale (ACTAF) 2005]. Other initiatives that have used farmer-led (participatory) study groups as an entry point for agricultural development and empowerment are the SC applied by Swedish Cooperative Centre (SCC) and Farmer Field Schools (FFS) (Bunyatta, 2004).

In Kenya, Study Circle was introduced by SCC through Livelihood Improvement and Family Empowerment Project (LIFE) around Lake Victoria basin of Western Kenya and parts of the Rift Valley [(LIFE), 2005]. By the year 2002, LIFE project had implemented a pilot dairy goat project in Nyando, Muhoroni and Nyakach districts of Kisumu County where 19 SC groups were established [Ministry of Livestock and Fisheries Development (MoLFD), 2005]. The technologies disseminated included dairy goat management, housing, fodder production, disease control and value addition. However, little is known about its influence on the dissemination of livestock production practices. This study sought to investigate the influence of SC strategy on dissemination of dairy goat technologies among smallholder farmers in Kisumu County.

Theoretical framework

Dissemination and adoption of dairy goat technologies can be based on four theories: perceived attribute theory, innovation decision process theory, transfer of technology model and technology characteristics user context models. However, the perceived attribute theory and innovation decision process theory were found to be most suitable for this study. Perceived attribute theory assumes five attributes upon which an innovation is judged. The technology can be adopted if it can be tried out, its results can be observed, has an advantage over other innovations or the present circumstances, it is not overtly complex to learn or use and if it fits in or is compatible with the circumstances into which it will be adopted (Rogers, 1995).

Conceptual framework

This study was based on Rogers's innovation decision process theory and perceived attribute theory. The dependent variable was the dissemination of dairy goat technologies while the independent variable was study circle extension strategy. The dependent variable was measured using a scale developed for the study consisting of three components of dissemination namely output (productivity), knowledge and skills which were selected based on their relevancy.

Institutional factors, agro-ecological conditions and policy environment were assumed to be common to all dairy goat farmers in the study area. The choice of the two divisions was to help control for any agro-ecological differences.

METHODOLOGY

The study area

The study was conducted in Nyando and Muhoroni districts of Kisumu County, Kenya. The study area covers a total area of 1,168.4km2 with a total population of 332,137 people giving an average population density of 284.4 persons per Km2 (CBS, 2009). It lies between longitude 34041 East and latitudes 00231 South and 00501 South. The altitude ranges from 1800m above sea level in Nyabondo Plateau to 1100m above sea level along Kano Plains and experience bimodal rainfall with long rains received between March and May and short rains coming in September to November. The mean annual rainfall ranges between 600mm to 1630mm while temperature ranges between 200C to over 350C (GOK, 2012; 2002).

Target population and sample size

The universe for the study consisted of 261 farmers involved in dairy goat production from the two districts in which a sample of 110 farmers was drawn. The formula recommended by Leads (1989) was used to calculate the sample size. Proportionate sampling technique was used to identify 50 SC and 60 NSC farmers involved in the study (Fraenkel & Wallen, 2000; Gal et al., 2007; Kothari, 2014). Selection of respondents was done through the use of a table of random numbers (Gupta, 2014):

Farmers' group dissemination index

To assess the influence of SC on dissemination of dairy goat technologies an index, Farmers Group Dissemination Index (FGDI), was developed using a geometric mean of variables used to define it as indicated in the following formula below. Three components of dissemination of dairy goat technologies namely knowledge, skills and output (productivity) were selected based on relevancy

$$FGDI = (x1 \times x2 \times x3 \text{ ---------- } \times xn)\ 1/n$$

Where: x1 is Dairy goat output indicator (DGOI)
x2 is Dairy goat skills indicator (DGSI)
x3 is Dairy goat knowledge indicators (DGKI)
1/n is nth root of the total number of indicators for dissemination

Parveen and Leonhauser (2004) followed the same procedure to measure women empowerment in Bangladesh by developing a cumulative empowerment index (CEI). Maxwell (1996, 300) affirmed the same procedure to measure food insecurity by developing a Cumulative Food Security Index (CFSI).

Data were collected using a questionnaire of which only about 110 questionnaires were returned representing a return of 91%. Quantitative and qualitative data analysis was employed using both descriptive and inferential statistics. A t – test and Chi-

square (X2) was applied to detect significant differences between the two groups that is, SC and NSC.

RESULTS AND DISCUSSION

Profile of sampled study circles

The mean size of SC sample was 23; minimum size was 15 and maximum was 45. These were existing groups that were converted to SC. The groups had existed for an average of 11 years from time of formal registration. The younger SC group was five years while the older was 19 years. A study carried out in Botswana by Heinrich (1993) about groups; found that groups should not exceed 40 members if they are to be manageable and to facilitate interaction between farmers and researchers. Burkey (1996) also reported that groups of less than 10 are unviable while those of more than 25 quickly become non participatory. Sixty eight percent (68%) of the participants joined SC after the year 2002 probably through the initiative of LIFE project.

A comparison of dissemination between SC and NSC participant shows that all groups had some level of dissemination. Generally, disseminations levels were low: neither NSC nor SC group achieved high dissemination levels. In total, 74.5% of all the respondents interviewed had low dissemination, 25.5% had moderate dissemination. Forty four percent (44%) of SC farmers had low dissemination while 56% had moderate dissemination. On the other hand, among the NSC farmers, 100% had low dissemination. The main reason for the above trend of moderate to low dissemination levels can be explained by the fact that dairy goats technologies were newly introduced into the study area and therefore most farmers were probably still in the awareness creation stage in the adoption continuum.

However, the better results for SC participants compared to NSC could be due to the fact that SC extension strategy was a participatory approach that encouraged group members to work as a team. Amudavi (1993) points out that, 'participation helps members to develop contact with external organization for resources and technical knowhow'. Studies by Eberle and Shroyer (1997) in their study of 'Using Farmer Focus Groups to Assess Cropping- system' showed that working with clusters of farmers is much more effective than working with single farmer to multiply impacts. This is further supported by MOA (2004) who affirmed that groups, when well managed, play a key role in empowering farmers by pooling them together to benefit from economies of scale. Likuyu, et al. (2012) also demonstrated that participatory approach has the potential to disseminate technologies to farmers in a cost-effective way that is sustainable beyond project lifetimes. World Bank (2013: 1993) also commented that participation has been one of the drivers towards the critical successes of projects in irrigation and livestock production.

Influence of study circle extension strategy

Chi square was used to test for the influence of study circle extension strategy on dissemination of dairy goat technologies among smallholder farmers in Kisumu County:

Ho_1: SC extension strategy does not significantly influence the level of dissemination of dairy goat technologies among smallholder farmers in Kisumu County, Kenya.

The Chi – square test results confirms that SC extension strategy had significant influence on dissemination of dairy goat technologies (Calculated $X^2 = 45.073$; tabulated $X^2 = 3.84$; df = 1); hence the null hypothesis is rejected and the obtained difference between the two groups is regarded significant. SC extension strategy could have influenced dissemination of DGTs since it is participatory and encourages individual members' on self defined interests. This is in agreement with the findings of World Bank (2001) that there are evidences that long economic and environmental successes are coming about when people's ideas and knowledge are valued and power given to them to make decisions independently. Further, participation is an important tool through which people have "buy-in" benefits into a project. That people commitments are enhanced and there is sense of ownership in the project by the people hence adoption of the disseminated technologies.

Farmers group dissemination index (FGDI)

The key variable constructed in this study was FGDI. This was developed using dairy goat dissemination indicators of knowledge (DGKI), skills (DGSI) and output (DGOI.). The mean scores, with respect to DGKI, DGSI and DGOI, were 1.82, 2.14, 2.54 and 0.99, 1.86, 1.66 respectively for SC and NSC. Study Circle farmers outperformed their counterparts in all the indicators of dissemination. Upon incorporating these values so as to arrive at the FGDI, the index for SC and NSC was 2.13 and 1.16 respectively. Non Study Circle participants had low dissemination (1.16) while Study Circle participants had high dissemination (2.13). The SC extension strategy, therefore, had more influence on the dissemination of DGT than NSC. These findings confirmed that SC extension strategy is quite effective on influencing dissemination of technologies.

To enable a comparison on the dissemination levels of DGT based on the statistical objectives of the study, the formulated hypotheses tested in order to establish any significant difference in dissemination of DGT between SC and non-SC farmers using t-test which revealed that the mean dissemination index for SC respondents was statistically significant ($t = 12.032$; $df = 108$; $p = 0.000$) hence the null hypothesis was rejected and the obtained difference between the

two sample means regarded as significant.

CONCLUSION

Study Circle as an extension strategy has a significant influence on dissemination of dairy goat technologies. It plays a role in giving members knowledge and skills through active thinking, demonstration and participatory training methods. It is therefore, recommended that the use of SC strategy should be enhanced not only in the current dispensation of promoting dairy goat but also in the transfer of other crop and livestock based technologies.

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