

An Evaluation of the Farmer-Training Programme in Jamaica: Opportunities for use of ICTs in training delivery and in farming activities

Completed Research Paper

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ABSTRACT

The purpose of this research was to evaluate the Rural Agricultural Development Authority's (RADA) farmer-training programme, in order to ascertain the value to its clients. The Kirkpatrick evaluation approach was used to evaluate the training programme under four levels namely: reaction, learning, behaviour and results, guided by six evaluation questions. The sample size used in this study was $n = 208$ (200 farmers and eight extension specialists). Data collection methods included questionnaires, interviews, observations and document reviews. The findings showed that the majority of the farmers were satisfied with the training programme. More field demonstrations and an integrated model to improve the delivery of training, through the inclusion of Information and Communication Technologies (ICT) were needed. It was recommended that a proper evaluation system along with an integrated (ICT) model to deliver training programmes be designed, in order to enhance the value of the training programme to more rural farmers.

Keywords

ICTs, training programme, agricultural extension, Kirkpatrick's evaluation framework

INTRODUCTION

The Rural Agricultural Development Authority (RADA), the chief extension arm of the Ministry of Agriculture and Fisheries, was established in 1990 by the Government of Jamaica. RADA seeks to improve the livelihood of farmers and farm families through an efficient, dynamic and relevant extension service. The extension services over the years have suffered massive cuts. For example, the extension personnel have declined from 1,000 in the 1970's to 2000, by the year 2000. (bin Yahya, 2000). Budgetary allocations were reduced from 2.3% for the 81/82 fiscal year to 1.4 % in the 08/09 fiscal year (Campbell, 2009). Some farmers have expressed dissatisfaction with the extension services.

Despite these concerns mentioned above, nothing much has been written on farmer-training programmes in Jamaica. A review of the literature showed that some of the studies on training programmes for farmers were written by bin Yahya (2000) who documented the historical development of the agricultural extension programmes in Jamaica; and Chung (2004) who wrote about the farmer field schools in Jamaica and the Caribbean. Additionally, Feder, Murgai and Quizo (2003) studied the impact of sending farmers back to school in Indonesia, while Amedezro and Youdeowi (2005) investigated the non-formal training programmes in Ghana, West Africa.

The obvious gap in the existing literature, and the concerns expressed by the farmers, as well as the fact that Johnson (1979) commented on the seriousness of the absence of a formal evaluation of the RADA training programme, pointed to a need for a study of this nature.

The overall aim of this study was to evaluate the adequacy of the RADA training programme in meeting the needs of the farmers, and to make recommendations for improvement.

The general question addressed in this study was: How adequate is the RADA training programme in meeting the needs of the farmers in St Andrew, given the reduction in financial and human resources? From this overarching question, six specific questions were developed: (1) What are the views of the farmers on the effectiveness of the RADA training programme? (2) To what extent did the reduction in financial and human resources affect the RADA training programme for farmers? (3) What are the views of the farmers, on the value of what they learnt in the RADA training programme? (4) Are there diverse views among farmers about the effectiveness of the teaching/ learning strategies used in the RADA training programme? (5)

To what extent did the behaviours of the farmers change as a result of participating in the RADA training programme? (6)
 What are the views of the farmers, about the increase in crop production, as a result of knowledge and skills learnt in the RADA training programme?

The study was limited in two ways. Firstly, only the farmers in the parish of St. Andrew (n=200) as well as the extension personnel (n=8) were used due to lack of research funding, as well as time constraints. Secondly, the data available for the last five years were assessed, and as such the findings could not be generalized to farmers outside this parish.

LITERATURE REVIEW

The literature reviewed in this section, included RADA documents and existing materials on the extension services. The review is organized under four main headings, beginning with the RADA training programme.

The RADA Training Programme

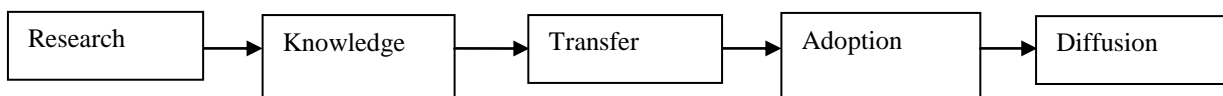
RADA has been training farmers since its inception in 1990. Each extension officer is expected to execute a minimum of two training sessions per month. The training content delivered is usually motivated by the farmers' needs assessment. According to Martin (1999), farmers take part in training sessions chiefly for financial gain, relevance and training need. Indeed as adults, they prefer practical exercises and seek to learn novel technology to improve efficiency and profit. Training should result in "quality and quantity improvement in goods" and should encourage farmers' empowerment (Amedzro & Youdeowei, 2003 p. 8).

Officers are expected to use keen extension methodologies to deliver training sessions, including group methods. Additionally, the extension officers distribute technical guides to farmers and are expected to give follow-up visits after every training session, to monitor the adoption of new technologies transferred. When funds are available, a demonstration plot, showing best practices, is established on a farmer's holding for other farmers to view and hopefully adopt the technique proposed. On-farm demonstrations of new concepts are facilitated when extension specialists seek to encourage adoption of a new technique by farmers (Leeuwis, 2004). Adoption of the new techniques transferred, usually indicates a positive behavioural change (Leeuwis, 2004).

Agricultural Extension Methodologies

Ison and Russel (2007, p. 19) described agricultural extension as an activity that was initiated in the late nineteenth century in most industrial countries. Extension was seen as a linear extension equation beginning with "research" and finishing with "diffusion" as noted in Figure 1. This linear equation was further explained as follows:

Figure 1. Linear Extension Equation by Ison and Russel, 2007, p.19



The knowledge is primarily garnered through extensive research, transferred to the extension personnel by the researchers, and is subsequently disseminated to the farmers by the extension personnel to promote adoption and subsequent diffusion of technology. The extension officer is the link between the farmers, the research and the market. Extension as viewed by the Dutch as "lighting the pathway ahead to help people find their way (voorlichting)". The British views it as being advisory in nature, rendering "expert advice" on the most suitable way to attain one's goal (Ganpat, 2005). Ganpat, and Oakley and Garforth (1985) posited that the different extension methods include (1) individual (training or interaction usually done one on one in the form of a farm visit), (2) group (training and interaction usually done with farmer groups, by having planned meetings), (3) mass methods (use of various media, for example communication to farmers through the newspaper, radio, television and use of multimedia equipment) and (4) participatory (for example, the Farmer Field School). As noted in Figure 2 below, extension "extends" scientific inquiry to a way that farmers can understand, that is, through practical application.

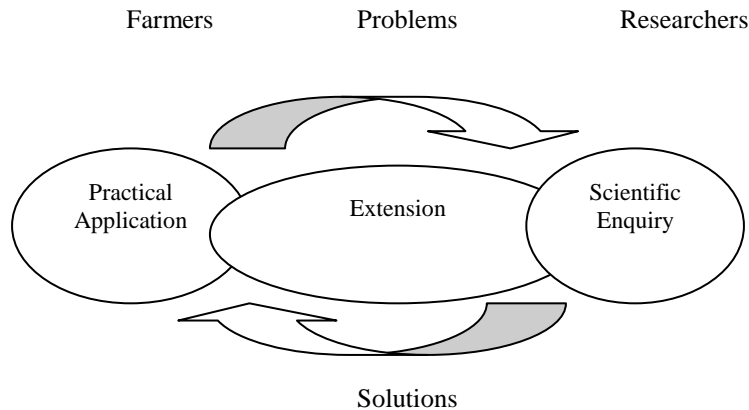


Figure 2: Extension: The Vital Link (Adapted from Jacobsen, p. 18)

The Training and Visit Method

The Training and Visit system (T & V) was initiated by the World Bank during the 1970s and '80s. This “top-down” approach has been used widely in the Caribbean, and Africa. In this system, standard messages are disseminated to groups of farmers, promoting the adoption of technologies. This approach is organized to disseminate relevant technologies to farmers within a specified time. Strategic partnerships are forged with research institutions and input suppliers. The “T & V system is based on the premise that a combination of factors, such as the right technology, effective and timely delivery of messages, regular extension- farmer contact, and regular training are pre-requisites for an effective agricultural development programme” (Ejembi, Omoregbee & Ejembi, 2006, p. 207). Additionally, Ilevboaje (2004) also posited that most of the work time of the extension staff should be spent in the field, as they seek to disseminate current information, liaise with farmers regularly, and advise them on farming issues.

Extension officers in Nigeria have stated that when the T & V system is properly organized structurally and institutionally, it encourages professionalism and an efficient monitoring and evaluation system. The system is viewed as very flexible and encourages widespread interaction with other farmers (Ilevbaoje, 2004). Jamaica’s extension services adopt most of the concepts of the T & V method in executing the RADA farmer - training programme.

FAO Farmer Field School (FFS) Model

The Farmer Field School (FFS) concept proposed by the Food and Agriculture Organization of the United Nations (FAO) involves the assembling of farmers in groups, who gather periodically to learn the “how and why” of a specific subject area. (Gallagher, 2003). This participatory methodology has been practiced in Ghana, Indonesia, Trinidad and Tobago and Jamaica. As postulated by Feder, Murgai, Quizon (2004), “Farmer Field Schools employ an intensive training approach introduced in the last decade in many developing countries to promote knowledge and uptake of ecologically sensible production approaches, and in particular, Integrated Pest Management, which minimizes pesticide use” (p. 217). This methodology requires adequate time and human resources to be effective, but has been proven to promote adoption of technologies, and includes areas such as Organic Agriculture, Animal Husbandry, to income – generating activities such as handicrafts (Gallagher, 2003).

The FFS is really specific though to “field study” as particular hands-on skills are imparted and farmers or relevant participants are expected to comprehend key concepts. Feder, Murgai and Quizon (2003) also stated that in Indonesia “the programme’s strategy was not to train all farmers in the community, but rather to rely on the spread of knowledge through farmer-to-farmer diffusion” (p. 50).

The Use of ICTs in Enhancing Agricultural Extension Methodologies

RADA embraces new and appropriate technologies, which have improved knowledge management in the dynamic agricultural domain. Information Communication Technologies (ICTs) have been used to enhance learning and knowledge transfer to farmers, through the use of mobile phones as a platform to transfer information through voice and text messaging, marketing facility (Jamaica Agriculture Marketing Information System - JAMIS), farmers’ registry (Agri-business Information System- ABIS), the use of Global Positioning Systems GPS, laptops equipped with wireless technology, weather stations and the use of multi-media technologies to include projectors, radio and television. Adoption of these technologies

has been encouraged, but is still considered relatively low due to vicissitudes in farmers' attitudes and financial constraints (Aker, 2011).

ICTs have been described as "technologies used by people and organizations for their information processing and communication purposes" (Zhang, Aikman & Sun, 2008, p. 628). They essentially include "hardware, software, networks, and media for the collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services" (The World Bank, 2009; Zuppo, 2012).

Jamaica's use of technology is quite good and other countries such as Trinidad and Tobago seek to adopt and continue to use ICTs in their extension service. As reported by Renwick (2009), once financial resources are made available, the use of SMS messaging will be adopted.

Use of mobile phones for text and voice messaging.

Aker (2011) posited that more than 60% of the sub-Saharan African, Asian and Latin American nations were able to gain use of mobile phone technology since 2009. Aker purported further that "mobile phones significantly reduce communication and information costs for the rural poor".

RADA initiated the use of text and voice messaging, through the strategic collaboration with the Commonwealth of Learning Lifelong Learning for Farmers (L3F) Project. A senior official from the Ministry of Agriculture and Fisheries (MOA) reported that 2,274 voice messages were used to transfer technical information on potato production to 105 farmers in four weeks, while 20 text messages on hurricane preparedness tips were sent to 175 farmers (MOA, 2011). This project was piloted in three parishes.

Additionally, as a result of the implementation of the Agricultural Business Information System, ABIS, which is the national farmers' registry comprising of a network of over 180,000 farmers' contact information and farming details island-wide, 80,000 text messages were disseminated to farmers, offering information on emerging developments in agriculture and pest and disease outbreaks (MOA, 2011). Farmers have found these technologies very useful and further stated that they appreciated the use of the voice messaging more, due to issues associated with literacy rate.

Marketing facility – Jamaica Agriculture Market Information System

The Jamaica Agricultural Market Information System (JAMIS) is a network that facilitates strategic linkages among farmers, buyers, distributors, producers in the international and local sale of agricultural produce. As noted by the Ministry of Agriculture and Fisheries (2009), "the mission of JAMIS is to supply to the agricultural sector, accurate marketing information, reflecting current price data, so as to promote fair marketing and enhance competition" (p. 1). JAMIS is still evolving, but continues to provide stakeholders with market prices bi-weekly and link farmers to buyers. JAMIS is similar to the National Agricultural Marketing Development Company (NAMDEVCO) system in Trinidad and Tobago. While Jamaica has 5,000 stakeholders registered to this system, Trinidad and Tobago had production data for 550 certified farmers and has an average website hit of 38,000 per month (Renwick, 2009).

Computerization programme

The extension staff has been equipped with laptop computers, Global Positioning Systems (GPS) units to store location of farmers and pests. Additionally staff has access to multi-media equipment such as projectors, to aid in the dissemination of technical information to farmers in their training programmes. The former Chief Executive Officer further articulated that "officers are now equipped with digital cameras, GPS units, and soil testing metres. This has enabled our officers to capture, communicate, diagnose and remedy agricultural related problems in a timelier manner" (Agronews, 2011). The use of multimedia presentations as a training aid has enhanced the delivery of the content, as farmers are able to view the content in a more interactive manner, through the use of images (including pictures and video).

METHODOLOGY

The evaluation framework used in this study was based on the Kirkpatrick's (KP) four-level model (as explained in table 1). This model classified areas of evaluation into four levels: reaction, learning, behaviour, and results. This model was used because evaluation is seen as a "systematic process with several key components" (Phillips, 1997, p. 51).

Table 1: Kirkpatrick Levels with Evaluation Questions

| Level | Meaning | Evaluation Questions | Data Collection methods used | Example of instrument items |
|-----------|--|--|---------------------------------------|--|
| Reaction | The participants' satisfaction with the training programme | 1. What are the views of the farmers regarding the effectiveness of the RADA training programme? | Questionnaire | "The training content (topics) is important to me", "I am satisfied with the structure of the programme", "I am getting adequate training from RADA", "On a scale of 1-6, to what extent is the RADA training programme meeting your farming needs?" |
| | | 2. To what extent did the reduction in financial and human resources affect the RADA training programme for farmers? | Interviews with extension specialists | "How effective is the programme delivery, given the reduction in financial and human resources?", "Describe the adequacy of the equipment used in the programme". |
| Learning | The knowledge learnt by the participants as a result of the training programme | 3. What are the views of the farmers on the value of what they learnt in the RADA training programme? | Questionnaire | "I found my training experience valuable", "The training I received from RADA has increased my knowledge of farming", "Which courses in the training sessions do you believe have helped you the most?" and "Which courses would you like to see covered in future training programmes?" |
| | | 4. Are there diverse views among farmers about the effectiveness of the teaching/ learning strategies used in the RADA training programme? | Questionnaire | "The officer uses training methods, for example, demonstrations, and lecture aids, including PowerPoint presentations, to help me to understand better" and "I am able to use the technologies taught in the training programmes" |
| | | | Observation (n=4) - training sessions | Training methods used, farmers' reaction during session, relevance of content, officers' presentation skills |
| Behaviour | The level of participants' change in behaviour based on what was learnt | 5. To what extent did the behaviours of the farmers change as a result of participating in the RADA training programme? | Observation (n=2) - farm visit | level of pest infestation, farmer's cultivation practices |
| | | | Questionnaire | "As a result of participating in the RADA training programme, I have been able to solve more of my farming problems", "The training I received was effective as I have improved my farming practices." and "The training programme has improved my farming skills" |
| Results | The effect of the change in behaviour on the organization | 6. What are the views of the farmers about the increase in crop production, as a result of knowledge and skills learnt in the RADA training programme? | Document Review | Document title, area being reviewed, objective evidence |
| | | | Questionnaire | "I have seen an increase in my income as a result of applying knowledge learnt in the RADA training programme" and "My crop yield and production has improved since I have received training" |

Adopted from Source: Fitzpatrick, Sanders and Worthen, 2004

The population consisted of 3,491 farmers and eight extension personnel in St. Andrew. Farmers were selected through the use of stratified random sampling, initially (in four extension areas) and simple random sampling method. All eight extension personnel were asked to be a part of the study. The total sample size was n=208. Firstly, the study employed the use of a survey instrument (questionnaire), which included 15 Likert-type items, where the farmers were asked to rate their responses on a 4-point scale, to include strongly disagree (1), disagree (2), agree (3) and strongly agree (4), and three structured questions. The data was collected by the researcher, along with an assistant. The questionnaires were administered to the farmers in the field, by the research team. For farmers with literacy issues, the questions were read to them and the responses recorded. The reliability coefficient (Cronbach alpha) for the 15 Likert-type items used in the questionnaire was 0.861. Secondly, the structured interviews with extension specialists were conducted at a mutually convenient time and location. Thirdly, structured observations (through farm visits and session assessment) were done with another complete observer to reduce bias. Fourthly, document review was done on the Ministry's documents. All instruments were designed by the researcher, reviewed by experts, pre-tested (and revised), using a small group of respondents, similar to the respondents under study. The data was analyzed using the Statistical Programme for Social Sciences (SPSS), and the Excel programme. Descriptive statistics, such as graphs, percentage, mean (M), and standard deviation (SD) was used to report the data according to the six evaluation questions.

RESULTS

The response rate was 84% for the farmers and 100% for the extension specialists. It was noted that the majority of the farmers and extension specialists were male (see Figure 3) as seen in figure 3. Additionally, 60% of the farmers were above 41 years of age.

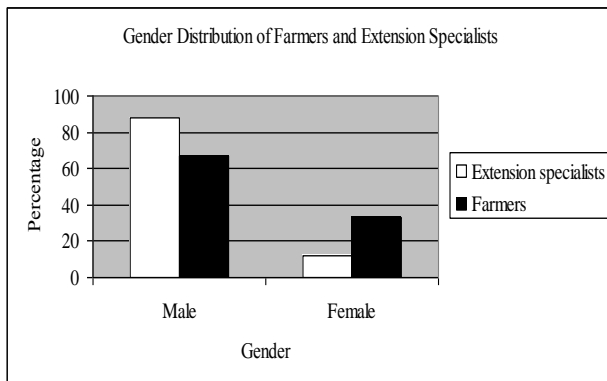


Figure 3: Gender Distribution of Farmers and Extension Specialists

The document review conducted on one of the RADA's records showed that there were fluctuations in the domestic food crop production in the parish of St. Andrew (as noted in figure 4).

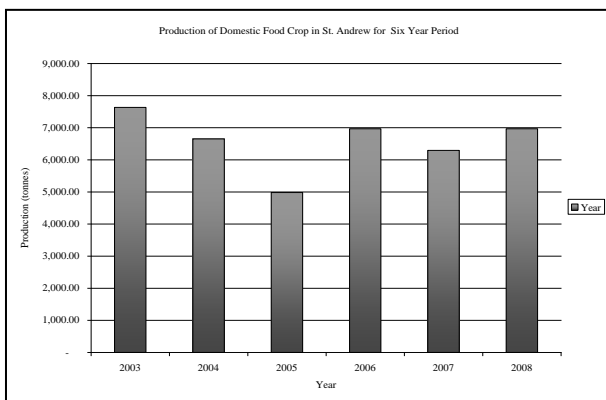


Figure 4: Production of Domestic Food Crop for St. Andrew over a six year period

Source: Comparative Estimates of Domestic Food Production and Area Reaped for Jan-Dec 2004/2003, 2005/2004, 2006/2005, 2007/2006, 2008/2007.

The results are further explained under the different levels of the Kirkpatrick framework, as noted in Table 2 and Figure 5.

Table 2: Findings of Evaluation according to the Levels

| Level | Evaluation Question number | Themes of Question areas | Percentage of respondents' views (%) | M | SD | Remarks (interview, document review and observation) |
|--------------------------------|----------------------------|--|--------------------------------------|------|------|--|
| % farmers who were satisfied | | | | | | |
| Reaction | 1 | Training content | 94.6 | 3.40 | 2.37 | |
| | | Programme structure | 88.7 | 3.09 | 0.64 | |
| | | Adequacy of Training | 62.7 | 2.77 | 0.73 | |
| | | Value of Training | 96.4 | 3.23 | 0.52 | |
| | | How questions were addressed | 84.6 | 3.09 | 0.64 | |
| | | Adequacy of meeting needs | 69.9 | 2.80 | 0.81 | |
| | | Extent of meeting needs | 73.8 | 4.39 | 1.21 | |
| Average | | | 81.5 | | | |
| % extension specialists' views | | | | | | |
| Reaction | 2 | Equipment inadequate | 66.7 | | | |
| | | Training delivery ineffective | 80 | | | |
| | | Budgetary constraints impacted quality of sessions | 80 | | | |
| | | Meeting farmers' needs to an extent | 80 | | | |
| | | Other factors affect training programme | 40 | | | |

The findings noted in table 2, indicated that the highest level of change occurred in the behavior level (average of 93.3%) and the lowest level of change occurred in the results level (average of 75.1 %).

Table 2 cont'd: Findings of Evaluation according to the Levels

| Level | Evaluation Question number | Themes of Question areas | Percentage of respondents' views (%) | M | SD | Remarks (interview, document review and observation) |
|------------------------------|----------------------------|---|--------------------------------------|------|------|---|
| % farmers who were satisfied | | | | | | |
| Learning | 3 | Objectives clearly articulated | 89.9 | 3.07 | 0.66 | |
| | | Programme increased knowledge of farming | 95.2 | 3.25 | 0.56 | |
| | | Benefitted from Good Agricultural Practices the most | 41.1 | | | |
| | | Need training on Marketing of Farm produce in future programmes | 52.1 | | | |
| | 4 | Understand better when teaching aids are used | 94.6 | 3.22 | 0.57 | |
| | | Able to use technologies taught | 92.2 | 3.14 | 0.57 | |
| Average | | | 77.5 | | | |
| Behaviour | 5 | Able to solve more farming problems | 92.9 | 3.09 | 0.57 | The observation (training sessions) showed that the farmers were more responsive to the lecture training method, aided by multimedia presentations and demonstrations (1 session) versus lecture aided by multimedia presentation integration (3 sessions). |
| | | Training effective as farming practices were improved | 92.9 | 3.15 | 0.57 | |
| | | Farming skills improved | 94 | 3.20 | 0.55 | Through the observation (farm visits), one farmer indicated that he had adopted the technique transferred in the training programme, and one farmer diffused knowledge learnt to her husband. Good Agricultural Practices were noted on both farms. From the document review, it was noted that 35% of the registered farmers participated in the RADA training programme (ABIS, 2009). |
| Average | | | 93.3 | | | |
| Results | 6 | Increase in income | 72.9 | 2.80 | 0.77 | It was noted that one farmer indicated that he improved his yield. Another farmer stated that he enjoyed financial savings by using less fertilizer and applying it properly. |
| | | Increase in crop yield and production | 77.3 | 2.89 | 0.8 | |
| Average | | | 75.1 | | | |

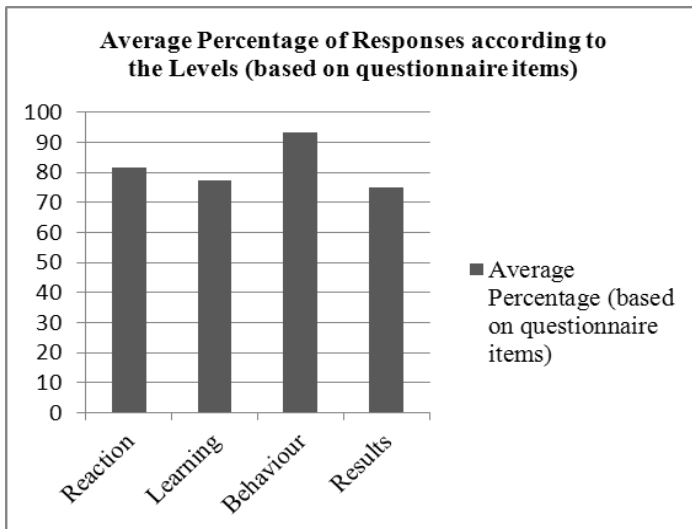


Figure 5: Average percentage of responses according to the levels

DISCUSSIONS

Reaction Level

The majority of farmers were satisfied with the RADA training programme, even though it was noted (from the extension specialists) that the reduction in financial resources affected the training delivery somewhat. According to Martin (1999), adults' motivation to participate in a programme and their level of satisfaction depended on its relevance. Based on the findings, and the views of Martin, the farmers found the training programme relevant and the content important (94.6%).

Learning Level

It was noted that the farmers' views were slightly diverse on the teaching/learning strategies used in the RADA training programme. Approximately, 95% of the farmers understood better, when officers used demonstrations, and training aids, such as multimedia presentations, while 93% stated that they could use the technologies transferred in the training programmes. The use of this form of ICT was very effective and needs to be further explored. Demonstration of agricultural concepts is one of the recommended methods of delivery to promote adoption (Leeuwis, 2004). The farmers learnt from the programme, as 95.2% stated that their knowledge of farming increased. A majority of farmers stated that they learnt *Good Agricultural Practices* the most and *Marketing of Farm Produce* the least. Farmers were engaged in the more integrated learning strategies and participated more in the sessions.

Behaviour Level

The majority of farmers were able to make better farming decisions. Amedzro and Youdeowei (2003) purported that the effective transfer of best practices to the farmers is advantageous, as they become empowered to make better farming decisions. The findings of this study concurred also with Leeuwis (2004), who stated that adoption of skills and innovations proposed in training programmes indicated that a positive behavioural change has occurred. It was also noted through observation (farm visits) of the two farmers, one indicated that he had adopted the concept and the other stated that she had diffused the technology (through farmer-to-farmer diffusion) to her husband.

Results Level

The majority of farmers stated that they realized a moderate increase in production and yield. Training should result in "quality and quantity improvement in goods" (Amedzro & Youdeowei, 2003, p. 8), a considerable improvement in production and a good return on investment (Martin, 1999). Two farmers stated that they had beneficial results. Improved yield and financial savings would facilitate enhancing farmers' livelihood. This level could be improved, as it was noted to have the lowest level of satisfaction by the farmers (77.5%).

CONCLUSION AND RECOMMENDATIONS

The majority of the farmers were satisfied with the RADA training programme, as it helped them to meet their farming needs. However, the extension specialists felt that the equipment and resources were inadequate, and impacted the programme effectiveness. Furthermore, most of the farmers stated that they understood better, when teaching aids such as demonstrations and multimedia presentations were used and they were able to use technologies learnt in their farming activities, thereby improving their cultivation practices.

The evaluation showed that the RADA farmer-training programme was effective. However, there are a few of the farmers who were not satisfied with the training that they received. Some stated that they needed to see more demonstrations in the training sessions. It was recommended that more use of ICTs, demonstrations and learning resources be used more to enhance the delivery of the content, especially to farmers in remote locations. An empirical study of adoption rate can be done for future research.

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