

Extension and the Adoption of Commercial Rabbit Production in Hai District

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ABSTRACT

Extension is the term, which is open to many interpretations. Every extension personnel have a unique interpretation of extension, based on experience and agent's field. Generally, there is no single definition of extension, which is accepted worldwide. Briefly, extension is informal educational process directed toward rural community. The process offers information and advice that help rural population to make their decisions and solve their challenges. The main aim is to improve productivity and hence better living standard of farming families. This paper aims to show the relationship between extension and the adoption of commercial rabbit in Hai District as a means of improving livelihood and productivity of rabbit products and by-products. Rabbits are kept for both food and commercial purposes. Commercial rabbit production refers to raising rabbits for income-generation or for business. Commercial rabbit production has numerous advantages that all the products and by-products are of commercial value. For example, rabbit skins are used to make blankets and many items of useful clothing for children and adults, such as shirts, leggings, socks, hoods, purse, and handbags. Rabbit urine and manure are used in manufacturing organic booster and pesticide. Commercial rabbit production has been in Hai District since 2018 as initiated by the Saore Company Limited. Despite its numerous benefits and efforts made by Saore Company Limited to promote commercial rabbit production in the district, only about 0.001 per cent of the population is engaged in commercial rabbit production. Several studies have associated the adoption of innovations with extension. Taking commercialization of rabbit production as an innovation, this study determined the relationship between extension and the adoption of commercial rabbit production in Hai District. The study adopted a survey research design to collect data from 170 respondents (85 commercial and 85 non-commercial rabbit producers) using a questionnaire. Data triangulation was done through key informant interviews. Both descriptive and inferential statistics were used to analyse the data whereby cross tabulation chi-square test of significance was fitted. The study found a significant relationship between extension and the adoption of commercial rabbit production in the study area. It is, therefore, concluded that extension was significantly related to the adoption of commercial rabbit in the study area.

Keywords: Adoption, Agricultural extension, Commercial Rabbit, Extension.

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1. INTRODUCTION

Extension is a dynamic concept because its interpretation depends upon the extension agent's field in question. Thus, the term cannot be generally defined; instead, it can be illustrated as a continuous changing process in rural areas. Thus, there are two types of extension: Agricultural extension that deals with crops, livestock and fisheries

development and non-agricultural extension that deals with rural community development such as education, health, environment, and cultural development. The focus of this paper is relationship between extension and the adoption of commercial rabbit.

Extension enables the sharing of knowledge and experience between researchers and farmers [1]. Commonly

extension is done by extension agents visiting farmers in their homes, farms, and farmer field schools. It is an informal education process based on improving livelihood of rural population through improved agricultural productivity. The main objective is to change farmers' attitude toward their challenges. Extension is not only concerned with economic and physical achievement but also with development of people themselves. Generally, extension involves the use of extension agents who work with people, supports and prepare them to face their challenges and propose their own decisions. The extension agents act as a link between research stations and farmers. They allow information and experience sharing between researchers and farmers.

Despite that, farmers have a lot of knowledge and experience about their environment and their farming systems, extension can bring them more knowledge and information, which they lack. For instance, extension can bring new knowledge on commercialization of rabbit production as innovation to farmers.

Rabbits are kept worldwide with global rabbit meat production reaching 1.8 million metric tons a year [2]. Such production is in decreasing order concentrated in Asia (48.8%), Europe (28.4%) America (18.1%) and Africa (4.7%) [2]. China is the major rabbit meat producing country, producing 457 765 tons/year, mainly for export, followed by North Korea (166 879 tons/year), Egypt (44 893 tons/year), Italy (26 647 tons/year), Russia (17 948 tons/year), Ukraine (11 600 tons/year), and Algeria (8 569 tons/year) [2]. In Italy, rabbit production is the fourth largest sector, accounting for 9 percent of the gross domestic Product [3].

In Africa, most rabbit producing countries are the Mediterranean countries, Egypt, Algeria, Morocco, and Tunisia whereby Egypt and Algeria are among the major global rabbit producing countries. The other main rabbit producing countries are in the sub-Saharan.

Africa including Nigeria and Ghana. Other major rabbit producing countries in Africa include the Democratic republic of Congo, Cameroon, and Cote d'voire [2]. Commercial rabbit production in these countries is family based with part of the output for the market.

In Tanzania, rabbit production system is similar to the one practiced in Ghana where a small family unit keeps only three to six rabbits, which feed on local products such as kitchen leftovers, potato leaves, Sow thistle, and blackjack [3].

Commercial rabbit production has numerous advantages such as the provision of additional source of income, providing short break-even periods since they are prolific, have high price per kilogram live weight compared to other meat available on the market today, have rapid growth rate and are genetically diverse. Other advantages include the provision of the best white meat with high percentage of highly digestible protein, has the least amount of fat, is cholesterol free and therefore heart patients friendly, has less sodium content, has more phosphorus and calcium content than other types of meat. Additionally, rabbit meat increases potency in men and reduces infertility in women, it contains high amount of zinc, iron and omega three thus increasing brain functioning and memory [4]. Rabbit

skin is used to make blankets and many items of useful clothing for children and adults such as shirts, leggings, socks, leather boots (from rabbit fur), duvet, hoods, purses, and modern cases. Rabbit brain is processed to form Rabbit Brain Cephalin used in coagulation reaction in the laboratory [4].

1.1. Rabbit Production in Hai District

Rabbits are kept in all 62 villages in the district, but only 240 farmers are involved in the production of commercial rabbit [5] Saore Company Limited, with its headquarters in the district, has been promoting the commercial production of rabbits in the district. The Company offers rabbit breeds to farmers who have to follow the production standards of the Company on a contract basis [5].

The standards include rabbit babies at three months old must weigh 3 kg and above; for rabbit urine, the quality is assessed by using hydrometer with become ranging from 0 Be to 70 Be. The highest quality of rabbit urine is graded A, with hydrometer beaume range of 50 Be to 70 Be. This is followed by grade B quality of rabbit urine with beaume ranging from 40 Be to 49 Be, then grade C follows with hydrometer beaume ranging from 30 Be to 39 Be. This is followed by grade D, with the hydrometer beaume ranging from 20 Be to 29 Be. The last grade is grade E with the hydrometer beaume ranging from 10 Be to 19 Be. Rabbit manure has two grades: accepted and rejected; accepted grades are dry rabbit manure free from any plant materials and sand [5].

Rabbit products that meet the standards are bought at a contract price. For example, one kilogram of a live rabbit weighing 3 kg and above is bought at twenty thousand Tanzanian shillings. An A grade rabbit urine is bought at twenty thousand Tanzania shillings per litre; grad B rabbit urine is bought at ten thousand Tanzanian shillings per litre. Grade C is bought at five thousand Tanzanian shillings per litre, grade D grade is bought at two thousand Tanzanian shillings per litre, and grade E is bought at one thousand Tanzanian shillings per litre [5].

The company buys live rabbits; slaughter them, park and freeze the meat to supply to supermarkets. The rabbit urine and manure are processed to produce organic booster and pesticides named MKOMBOZI FERTILIZER. Rabbit skin is processed into various products such as handbags, hoods, leather boots from rabbit fur, rabbit brain Cephalin [6].

Despite numerous benefits and efforts made by Saore Company Limited to promote commercial rabbit production in the district, only about 0.001 percent of the population is engaged in commercial rabbit production. Different studies ([3], [7]–[15]) have researched and associated the adoption of technologies and extension services. This paper therefore, establishes the relationship between extension services and the adoption of commercial rabbit production in Hai District.

The findings in this paper will assist rural development planners to devise strategies for strengthening extension in improving the adoption and productivity of commercial rabbit production in Hai District. The findings are aligned with the National Development Vision 2025, to accomplish high quality livelihood. They are also aligned with the

National Strategy for Growth and Reduction of Poverty (NSGRP II). These strategies focus on poverty reduction among rural communities through improving the adoption and productivity of commercial rabbit (Tanzania, 2010), thus achieving the Millennium Development Goal number one (MDG I), which aims at alleviating poverty and hunger.

1.2. Research Hypotheses

H₀: There is no significant relationship between extension and the adoption of commercial rabbit production.

H₁: There is a significant relationship between extension and the adoption of commercial rabbit production.

2. LITERATURE REVIEW

2.1. Role of Extension in Adoption of Commercial Rabbit

Training farmers on particular innovations helps to integrate farmers' experience into practical relevance of farmers' environment. In China, technical training has been associated with farmers' adoption of agricultural technologies [11]. In Tanzania, low adoption of improved technology has been associated with poor awareness creation on that particular technology and/ or innovation.

Therefore, extension provides a link between research stations and farmers by booming and conveying knowledge grounded upon indigenous experience for supplementary enquiry [1]. Commercial rabbit extension provides commercial rabbit farmers and other stakeholders with educational support, which is paramount and suitable for meeting their needs as far as the production of commercial rabbits is concerned. In unindustrialized countries, including Tanzania farmers' failure to produce at a rate that can meet the requirements of the population has been associated with lack of access to crucial information on improved farming practices among other factors.

Rabbit extension offers a means of technology transfer by introducing change, transfer, and diffusion process of an innovation. The first stage of adoption is to be aware that innovation exists. The major role of extension is to help farmers make decisions through which they can realize their goals and learn from their experiences. The commonly used form of extensions in Tanzania is physical form, social media, community meeting, farmer group, and smart phones. This study intended to determine the relationship between training, extension, and the adoption of commercial rabbit in Hai District.

2.2. Extension Practices on Commercial Rabbit Production

Rabbit extension provides technical advice to farmers on recommended practices such as housing, breed selection, proper feeding and timely mating, sanitation, culling and replacement [3], [10]. These technical pieces of advice are given through regular training and extension visits [15]. The training is done through visits and on the farmer field school, and ICT based technology such as mass media and smart phone [16].

In Hai District, both individual and group extension is done by public and private extension agents. The individual extension is done by visiting farmers in their farm

families and on farmer field school and making office calls. Farm visit is the most common form of personal contact between the agent and the farmer. This practice takes much of the agent's time. Therefore, it needs careful prior planning of the purpose of the visit. Therefore, like farm visits, extension agents may expect farmer visits in the office. Such office visits are less time consuming for extension agent. The common group extension in Hai District is done through community meeting, farmers group, farmer voice radio, and social media.

2.3. Factors Motivating Farmers to Go for Commercial Rabbit Farming

Researchers have documented the potential of rabbit production on poverty alleviation and food security [3], [8], [10], [17]–[19]. It has been reported (see [19]) that, commercial rabbit production potential has been evident in China, Mexico, Egypt, Ghana, and Cameroon. In this paper, commercial rabbit production refers to keeping of rabbits for income generation.

According to [7], there is low adoption of rabbit technology, which is introduced to farmer, who is considered as a rational decision maker who normally strives for better standard of living and seeks ways of adopting new technologies.

Most farmers join commercial rabbit production to improve their livelihood through sells of rabbit products and by-products. In Ghana, farmers joined commercial rabbit farming because of the benefits associated with it, particularly high return to investment since they are prolific; and need low space and little time to manage them [8]. Others join commercial rabbit farming because of the low initial start-up capital involved in starting commercial rabbit production.

2.4. The Relationship between Extension and Adoption of Commercial Rabbit

The study by [20] in Enugu state in Nigeria on the obstacle to the adoption of improved rabbit technologies by small scale farmers revealed that extension designed on commercial rabbit production positively influenced the adoption of improved rabbit technologies. The study included only improved rabbit technologies but not reasons as to why other people were not keeping rabbit. Thus, this is the motivation of conducting the current study.

The study by [16] on changes in Agricultural Extension and Implications for Farmers' adoption of New Practices in Virginia in the United State of America found that farmer group and virtue networks play a great role in technology diffusion. They added that extension could exploit the said network by the application of the latest ICT technologies such as smart phone and mass media. This study is conducted to determine the relationship between farmers' groups, the latest ICT technologies, and the adoption of technologies in commercial rabbit production.

The study by [16] on determinants of farmer's access to extensions and adoption of technical inputs in India reported that, access to extension does not guarantee the adoption. Further, the study added that the contact form of extension is far more important than the ICT driven forms of extension contradicting findings in a study

by [16]. Thus, the study was conducted to determine the relationship between the contact form of extension as an individual method of extension and the adoption of commercial rabbit production technologies.

In a study on technical training and rice farmers' adoption of low-carbon management practices in Hubei China, [11] revealed a significant association between technical training and rice farmers' adoption of low-carbon technologies with an average treatment effect of 0.2078. The study was conducted to determine the relationship between training as the integral part of extension and the adoption of commercial rabbit.

The paper by [12] titled "Can training enhance adoption, knowledge, and perception of organic farming practices?" through randomized experiment in Indonesia reported that, intense training is a promising instrument of increasing the uptake of organic farming. Since, extension is regularly provided to farmers in Hai District, this study therefore intended to establish if access to these services has an association with the adoption of commercial rabbit production in the district.

2.5. Theoretical Framework

The current study was guided by the Unified Theory of Acceptance and Use of Technology. As reported by [21], for individuals to adopt a given innovation they must construct unique perceptions that influence their adoption decisions. For people in the study area to adopt commercial rabbit production as innovation, they must construct unique perceptions that influence their adoption of commercial rabbit production technologies.

UTAUT categorizes three direct determinants of an individual behavioural intention of using a technology-performance expectancy, effort expectancy, and social influence; two direct determinants of technology use-behavioural intention and favourable/facilitating conditions. Facilitating conditions for people to start commercial rabbit production in Hai District was Saore Company Limited which promotes commercial rabbit production in Tanzania and offers market for rabbit products and by-products. In addition, four contingencies were identified, gender, experience, age, and voluntariness that would influence intention and/or behaviour [22]. Two genders in this study were identified: male and females, the age of the study participants, which ranged from 13 years and above; and the experience of rabbit producers, which ranged from less than a year to four years.

Performance expectancy is the degree to which someone believes that using a certain technology helps to attain benefits. This is believed to be a positive determinant of behavioural intention among young men [23]. The performance expectancy in commercial rabbit production is associated with benefits entailed in commercial rabbits not forgetting the niche market, which Saore Company Limited provides, and which farmers access on contract basis.

Effort expectancy is based on the idea that there is a relation between the effort of performing a given technology and the benefits gained and this is believed to be strong among old women in early stages of experience [23]. In this commercial rabbit production, effort expectancy

is measured according to the number of breeders' a rabbit producer is able to purchase from the said company. During key informant interview, it was reported that, "one rabbit package that include one doe and a buck can produce an average of 11 kids monthly that can weigh at an average weight of 5.5 kg at three months of age that totaling 60.5 kg. One-kilogram live weight of rabbit costs ten thousand Tanzania shillings. Therefore, for one rabbit package, a rabbit producer can make minim of 60.5 kg multiplied by ten thousand Tanzania Shillings which equals 605,000/= (six hundred and five thousand Tanzanian shillings) on monthly basis. This is out the profit made from sales of rabbit urine and manure" [6].

Social influence is the way an individual accepts the technology to meet the demands of social group; and this is believed to be contingent on gender, age, experience, and voluntariness. Favourable condition is the degree to which someone believes that an organization and technical infrastructure exist to support the use of the technology [22]. The availability of Saore Company Limited in Tanzania to buy rabbit products and by-products constitutes favourable conditions.

A study by [24] on environmental training in an organization, suggested that different future research lines should focus on the creation and execution of training plans for the use of technology in order to aid in the development of unique construct perception. Furthermore, [25] proposed that training should be organised to enhance the use of behaviour and increase the benefits of using technologies. Therefore, from the theory, the unique construct of perception that influences individual adoption decisions among rabbit farmers may be related directly to training, which is an integral part of extension. In this study, independent variables were studied in terms of training, number of training and extension, the type of training, extension provider, and the form of extension. Therefore, livestock production policies, culture, and beliefs were intervening variables. Finally, the adoption of commercial rabbit production was a dependent variable.

2.6. Conceptual Framework

The conceptual framework is a diagrammatic representation of the theory showing the relationship between the variables identified for the study. It shows the relationship between independent and dependent variables. For this particular study, the adoption of commercial rabbit production by farmers is the dependent variable while the independent variable is extension (Fig. 1).

3. RESEARCH METHODOLOGY

3.1. Description of the Study Area

This study was conducted in Hai District in Kilimanjaro Region, which has 240 commercial rabbit producers. The district has 14 wards with 67 villages. Livestock production is among major sources of income and livelihood among the people. Livestock kept in the district includes cattle, pigs, goats, sheep, poultry, and rabbits. Currently, farmers have the market for rabbit and rabbit products from Saore Company Limited with its Headquarters in the district and hence the reason as to why Hai District was selected.

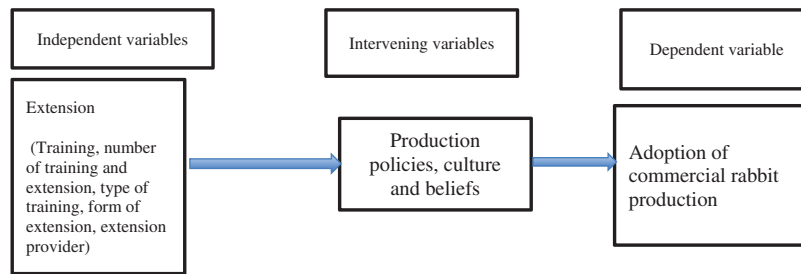


Fig. 1. Conceptual framework [24].

3.2. Research Design

This study used a cross-sectional research design. The design allowed data collection at a single point in time, making the exercise quicker and cheaper in terms of resources [26]. Additionally, the design is useful for descriptive purposes and the determination of relationship between different variables.

3.3. Sampling Frame and Sample Size

All 240 Commercial rabbit producers and their closest neighbours in all villages of Hai District constituted a sampling frame. All commercial rabbit producers in eight villages of Hai Districts were selected and one closest neighbour for each commercial rabbit producer constituted a sample size. The unit of analysis was an individual study participant. The study involved 85 commercial rabbit producers and 85 non-rabbit producers in all eight villages amounting to 170 study respondents.

3.4. Sampling Techniques

A purposive sampling was employed to select Hai District because it is the Headquarters of Saore Company Limited, which deals with commercial rabbit production in Tanzania. Simple random sampling was used to select eight villages. Then census was used to select all 85 commercial rabbit producers in all eight villages and one closest neighbour for each commercial rabbit producer making 85 neighbours who were non-rabbit producers. Village Extension Officer, the District Extension Officer, two Saore Company Limited staff (the General Manager and the Production Manager) were purposively selected as key informants.

3.5. Data Collection

The study used primary data, which were collected using questions in kobo Toolbox. Kobo Toolbox is intuitive and reliable software used to collect, analyse, and manage data for surveys and research. The tool enabled us to take GPS location for each respondent during data collection to locate enumerators and trace data collection process.

3.6. Data Processing and Analysis

A Statistical Package for Social Sciences (SPSS) computer program was used to analyse quantitative data. Cross-tabulation was used to analyse the relationship between extension and the adoption of commercial rabbit production, whereby Chi-square test of significance was fitted at 95 per cent confidence and $\alpha = 0.05$. Qualitative data obtained through key informants were analysed through content analysis.

3.7. Ethical Considerations

Participants were informed of the reasons for the study and, the importance of their contribution to the study. Participants were also assured of confidentiality for their responses and that their participation was voluntary and free from coercion. The research followed all the requirements beginning from writing the research proposal, securing research clearance from Sokoine University of Agriculture to finally securing research permit from Tanzania Ministry of local government, Kilimanjaro Regional Office, and Hai District Council Office.

4. RESULTS AND DISCUSSION

4.1. The Relationship between Extension and the Adoption of Commercial Rabbit

This study sought to determine the relationship between extension and the adoption of commercial rabbit production among farmers in Hai District. The respondents responded to various aspects of extension. Responses were analysed by cross tabulation where by chi-square test of significance was fitted and the results are shown in Table I.

4.2. Attending Training and the Adoption of Commercial Rabbit Production

The study results in Table I showed that 84 (98.8%) non-rabbit producers had never attended training on commercial rabbit production and 1 (1.2%) non-rabbit producer received training. However, 53 (62.4%) rabbit producer attended training on commercial rabbit production and 32 (37.6%) rabbit producers had never attended training. The chi-square test for significance results showed that there was highly significant relationship between attending training on commercial rabbit and engaging in commercial rabbit production [$X^2(5) = 73.384$, $P < 0.001$]. This agrees with the study findings by [20].

In Enugu State in Nigeria on the obstacles against the adoption of improved rabbit technologies by small-scale farmers. The findings revealed that “extension designed on commercial rabbit production positively influenced the adoption of improved rabbit technology.” According to the study findings, there was a significant relationship between attending training on commercial rabbit and engaging in commercial rabbit production.

4.3. Number of Training Attended and the Adoption of Commercial Rabbit Production

The study results in Table I showed that 16 (18.8%) rabbit producers had received training two times, 12

TABLE I: RELATIONSHIP BETWEEN EXTENSION AND ADOPTION OF COMMERCIAL RABBIT PRODUCTION

		Yes		No								X ²	df	P-Value		
		F	P	F	P											
Attended training	No	84	98.8%	1	1.2%							73.384	5	0.000		
	Yes	32	37.6%	53	62.4%											
		1 time		2 times		3 times		4 times		5+ times		No training				
Number of times attended training	No	1	(1.2%)							84	(98.8%)	77.310	5	0.000		
	Yes			16	(18.8%)	12	(14.2%)	2	(2.3%)	23	(27%)	32	(37.7%)			
		No		Yes												
		F	P	F	P											
Received extension	Yes	28	(33.0%)	57	(67.0%)							85.752	6	0.000		
		1 time		2 times		3 times		4 times		5+ times						
Number of times received extension	Yes	1	(1.8%)	6	(10.5%)	16	(28.1%)	7	(12.3%)	27	(47.4%)	85.752	5	0.000		
			Physical form		Physical form farmer group		Physical form smart phone		Physical form social media		Physical form social media farmer group		Physical form social media smart phone			
Forms of extension	Yes	5	(8.8%)	9	(15.8%)	1	(1.8%)	17	(29.8%)	6	(10.5%)	19	(33.3%)	85.752	6	0.000
		Government extension officers		Government extension officers Private/NGOs/Company extension officers				Private/NGOs/Company extension officers								
Extension provider	Yes	2	(3.5%)	32		(56.1%)		23		(40.4%)		85.752	3	0.000		

Key: P for per cent, F for Frequency, X² for chi-square, df for degree of freedom.

(14.2%) rabbit producers had received training three times, 2 (2.3%) rabbit producers had received training four times, 23 (27%) rabbit producers had received training more than five times, and 32 (37.7%) rabbit producers had never received training. On the other hand, 1 (1.2%) non-rabbit producer had received training once, 84 (98.8%) non-rabbit producers had never received training. The study findings showed that there was a significantly big relationship between the number of training attended and the adoption of commercial rabbit production [$x^2 (5) = 77.310, P < 0.001$]. The findings are consistent with the findings in a study by [12] that intended to find out whether training could enhance adoption, knowledge and perception of organic farming practices and which was conducted by randomized experiment in Indonesia.

4.4. Receiving Extension and Adoption of Commercial Rabbit Production

On receiving extension and the adoption of commercial rabbit production, the results in Table I Indicate that 28 (33%) rabbit producers were not receiving extension and 57 (67%) rabbit producers were receiving extension. Therefore, the study findings imply that people receiving

extension were more likely to engage in commercial rabbit production than those not receiving extensions. Findings showed a highly significant relationship between receiving extension and engagement in commercial rabbit production [$x^2 (6) = 85.752, P < 0.001$]. The findings are in contrast to the findings in a study by [15] on the determinants of farmer’s access to extension and the adoption of technical input in India. The study findings reported that ‘access to extension does not guarantee adoption’.

4.5. The Number of Extension Received and the Adoption of Commercial Rabbit

The study findings in Table I showed that 1 (1.8%) rabbit producer had received extension once, 6 (10.5%) rabbit producers had received extension twice, 16 (28.1%) rabbit producers had received extension three times, 7 (12.3%) rabbit producers had received extension four times, 27 (47.4%) rabbit producers had received extension more than five times. However, 28 (33%) rabbit producers had not received extension, and 85 (100%) non-rabbit producers had not received extension. The results in Table I showed that there was a significant relationship between the number of extensions received

and the adoption of commercial rabbit production [$\chi^2(5) = 85.752, P < 0.001$]. The more often producers received extension the more likely they were to engage in commercial rabbit production. Similarly, [27] did a study on information transmission in irrigation technology adoption and diffusion: Social learning, extension services, and spatial effects. The findings showed that “There is a threshold level of education after which additional schooling enhances faster adoption, but the opposite happens before this threshold. This could be because as farmers become more educated but remain below the threshold level, they have access to more information than they are able to process, and thus extension services could assist them in this task” (p. 342).

4.6. Type of Training Received and Adoption of Commercial Rabbit Production

The study findings in Table I showed that [$\chi^2(1) = 73.548, P < 0.001$]; therefore, there was a significant relationship between the type of training received and the adoption of commercial rabbit production. About 53 (62.4%) rabbit producers had received training on proper rabbit housing. This finding agrees with the finding in a study by [11] on technical training and rice farmers’ adoption of low-carbon management practices in Hubei China. The findings revealed a ‘significant association between formal technical training and low farmer adoption of low-carbon technologies’.

4.7. Extension Provider and the Adoption of Commercial Rabbit Production

The study results in Table I showed that 2 (3.5%) rabbit producers were receiving extension from government Extension Officers, 32 (56.1%) rabbit producers were receiving extension from both government and private Extension Officers, and 23 (40.4%) rabbit producers were receiving extension from private extension. The findings imply that people receiving extension from both private and government Extension Officers were more likely to engage in commercial rabbit production than those receiving extensions from either government or private extension alone [$\chi^2(3) = 85.752, P < 0.001$]. This is inconsistent to the findings in a study by [28] who found that “the ‘adoption decisions were mainly affected by extension-related variables—training, membership in a farmers’ group, and off-farm employment”. The study reported that the adoption is affected by variables such as training, membership in farmers’ groups and off-farm employment regardless whether the service comes from private or public extension.

4.8. Forms of Extension and Adoption of Commercial Rabbit Production

The results in Table I show that 5 (8.8%) rabbit producers received extension by physical form, 9 (15.8%) received by both physical form and farmer group, and 1 (1.8%) received extension by physical form and smart phone. The results show further that 17 (29.8%) rabbit producers received extension by physical form and social media, 6 (10.5%) received extension by physical form, social media and farmers group, and 19 (33.3%) rabbit producers received extension by physical form, social media and

smart phone. The chi-square results show that there was a significant relationship between the forms of extension and the adoption of commercial rabbit production [$\chi^2(6) = 85.752, P < 0.001$]. About 85 (100%) rabbit producers received physical form of extension. This finding is consistent with the finding in a study by [15] on determinants of farmer’s access to extension and adoption of technical input in India. The author reported, “The physical form of extension is far more important than the ICT driven form of extension. ‘This is in contrast with the finding in a study by [16] on farmers’ adoption of new practices at Virginia in the United State of America.

5. CONCLUSION

From the study findings, there is enough evidence to reject null hypotheses and hence conclude that extension had statistical significant relationship with the adoption of commercial rabbit production in Hai District. It is therefore concluded that extension is significantly related with the adoption of commercial rabbit production in the district.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this research.

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