

Small Ruminant Farmers' Training Needs on the Institute of Agricultural Research and Training Disseminated Technologies in Ondo State, Nigeria

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Abstract: *The development and dissemination of improved small ruminant technologies across southwestern Nigeria is essential for sustainable sheep and goat production and food security. However, the recent dissemination of the Institute of Agricultural Research and Training (IAR&T) technologies revealed low adoption of some technologies. Retraining small ruminant farmers on the previously disseminated technologies in the study area is essential to ensure farmers maximise benefits and improve productivity. Therefore, assessment of the training needs of small ruminant farmers in Ondo State concerning IAR&T disseminated technologies was carried out. This study adopted a multi-stage sampling procedure to select 80 respondents. An interview schedule was employed to elicit information, and the data obtained were analysed using descriptive (percentages & mean scores) and inferential statistics (Pearson Product-Moment Correlation). Results revealed that extension service (97.5%) was the primary pathway for receiving livestock information. Respondents possessed some knowledge of the use of tobacco leaf extract in the control of ecto-parasites. Awareness about the types of ecto-parasites that tobacco leaf extract could control was high (98.8%). The training needs of higher priority for small ruminant farmers were sourcing and selection of healthy foundation stock ($\bar{X}=2.24$). The highest constraints associated with respondents' training needs included high cost of capital investment ($\bar{X}=1.44$), the use of technical terminologies ($\bar{X}=1.20$), and poor accessibility of small ruminant technologies ($\bar{X}=1.19$). In conclusion, effective information dissemination is crucial for the acquisition of knowledge and skills of small ruminant farmers. Therefore, IAR&T should effectively provide more information on sheep and goat technologies to improve productivity through training programmes.*

Keywords: farmers, information, sheep and goats, technology accessibility, training needs

INTRODUCTION

On Earth, livestock is the largest land use sector (Herrero and Thornton, 2013). This makes livestock farming an important area of agricultural production. Besides being a major contributor to the income, it plays an important role in West African nations' economies, supplying not less than 44% of the GDP of the agricultural sector (Mensah *et al.*, 2017). The livestock sector in Nigeria supplied around 1.7% of the GDP and, in total, approximately 9% of the value of agriculture (FAO, 2019). Ruminants (cattle, sheep and goats) are the most reared livestock among other livestock in Nigeria by farm families. Sheep and goats, otherwise known as small ruminants, comprise the bulk of ruminants kept by smallholder farmers in Nigeria and other developing countries. In Nigeria, the countrywide population of ruminants is given thus: cattle–18.4 million, sheep–43.4 million, and goats–76 million (FMARD, 2017).

Benefits for keeping small ruminants include mainly as a source of income and for consumption. They contribute to the global supply of 33% of the protein content in the diets of humans, and 17% of per person daily calorie intake (Herrero *et al.*, 2009). As such, the production of small ruminants continues to rise, yet productivity needs to increase. This is in line with the demand increase for livestock products expected to result from population growth, expansion of cities, increases in individual income and purchasing power. Given that livestock farming is a management-intensive aspect of agriculture (Anyim and Odoemelam, 2018), achieving the national animal production goal of increasing productivity and attaining livelihood sustainability necessitates ascertaining and satisfying the training needs, among other things, of small ruminant farmers with respect to the use of improved technologies, thereby improving their competitiveness.

Training is described as a means of imparting requisite skills in individuals required in the performance of specific tasks (Dessler, 2017). In this context, training is considered the way of equipping small ruminant farmers with the knowledge and skills required for the smooth running of their enterprises. In other words, training is geared towards addressing gaps in knowledge and skills. Policies in the agricultural sector often aim at increasing production, with little or no consideration given to human resource development. Yet, for efficient livestock management, farmers require knowledge and skill competency, which can be acquired through training (Okwoche *et al.*, 2015). Bearing in mind that individuals need the latest knowledge and skills to effectively and efficiently perform certain tasks, it becomes essential for training to be provided so that they can perform such tasks (Sheeba and Christopher, 2020). Mahdi *et al.* (2019) suggested that if training fosters the sharing of knowledge, there must be minimal barriers to communicating information. Accordingly, pathways for communicating livestock information should be available and accessible to farmers with less hassle, so that they can acquire knowledge and skills emanating from training programmes, which are necessary for the successful operation of their enterprises. The delivery information will enhance the decision-making of small ruminant farmers (Nyaupane *et al.*, 2017).

Just like some organisations involved in the development of improved agricultural technologies through research (e.g. AGRA and CGIAR centres), the Institute of Agricultural Research and Training (IAR&T), Nigeria, has a Livestock Improvement Programme focused on the development and dissemination of improved small ruminant technologies. The IAR&T disseminates its technologies to farmers partly through research personnel, extension agents, radio broadcasts, training programmes, workshops and occasionally assesses the adoption and impact of the disseminated technologies with a view to determining where further efforts need to be directed. Recently, a survey on the disseminated ruminant technologies was carried out in the southwest zone of the country, and the result revealed the need to further build the capacity of farmers in some areas. Consequently, the authors conceptualised this study to examine small ruminant farmers' training needs on IAR&T technologies in Ondo State, Nigeria. Specifically, the objectives were to:

1. Identify small ruminant farmers' pathways for receiving livestock information;
2. Assess small ruminant farmers' knowledge of IAR&T technologies;
3. Establish small ruminant farmers' training needs on IAR&T technologies; and
4. Identify small ruminant farmers' constraints associated with IAR&T technologies.

METHODOLOGY

Ondo State, geographically situated in the southwest of Nigeria, served as the area of this study. This study adopted a multi-stage sampling procedure. The Institute of Agricultural Research and Training (IAR&T) small ruminant technologies have been disseminated in the State by the public extension service (i.e. Agricultural Development Programmes) and IAR&T. Two Local Government Areas (LGAs), in which 2 communities from each LGA were purposively sampled, based on high production of small ruminants. Ultimately, 20 farmers with the highest number of small ruminants in the communities were purposively sampled, bringing the total up to 80 respondents. An interview schedule was employed to elicit necessary information. Data elicited was based on pathways for receiving livestock information (yes=1, no=0); knowledge on IAR&T small ruminant technologies (correct response=1, wrong response=0); training needs on IAR&T small ruminant technologies (important=2, less important=1, not a need=0); and constraints associated with IAR&T small ruminant technologies (serious=2, less serious=1, not a constraint=0). Data obtained were analysed using descriptive (percentages and mean scores) and inferential statistics (Pearson's Product-Moment Correlation- PPMC).

RESULTS AND DISCUSSION

Pathways for receiving livestock information

Livestock information pathways are crucial to sustainable livestock production. These pathways are essential tools for increasing agricultural productivity (Tijani, 2019), as well as the acquisition and/or development of necessary skills by farmers. Table 1 indicates that extension (97.5%) was the primary pathway for small ruminant farmers to receive livestock information. Extension

agents, being the most important information pathway, are given credence because they are mostly government workers responsible for disseminating agricultural innovations and messages from research institutions to farmers. They facilitate effective use of the messages/technologies by translating them into a language that farmers understand. Since extension workers can evaluate the benefits of technologies for farmers (FAO, 2019), they bridge the gaps in farmers' training needs. About a quarter of the respondents got information through print media (17.5%) and fellow farmers (16.3%). The ability to access information from print media indicates that small ruminant farmers possess some literacy skills, and they also rely on other farmers as a source of information. Interestingly, IAR&T (0.0%) was not regarded as a livestock information source. Meanwhile, IAR&T disseminates improved technologies on small ruminants through its personnel, radio broadcasts and training programmes. The fact that respondents did not receive livestock information from the Institute suggests that it is an inactive information pathway, which has implications for the adoption of its technologies and, consequently, the training needs of small ruminant farmers.

Table 1: Small ruminant farmers' pathways for receiving livestock information

Information pathways	Yes (%)
Extension agents	97.5
Radio	3.8
Television	0.0
Internet	3.8
Fellow sheep and goat farmers	16.3
Print media	17.5
IAR&T (radio broadcast, personnel or training programmes)	0.0

Farmers' Knowledge on IAR&T Small Ruminant Technologies

Presented in Table 2 is the respondents' knowledge of IAR&T technologies on small ruminants. It was observed that farmers had some knowledge of the use of tobacco leaf extract in the treatment of ecto-parasites. Majority of the farmers were aware that tobacco leaf extract can control tick, lice and mite infestations (98.8%), while only 11.3% indicated that tobacco leaf extract should be diluted with water before applying topically on infested animals. This implies that relative to other small ruminant IAR&T technologies, control of ecto-parasites is primary to the respondents. Parasites (endo-parasites and ecto-parasites) negatively impact the health status and performance of animals. The use of tobacco leaf extract is encouraged, being a biological method that is cheap, user-friendly, devoid of pollutants in animal products and eco-friendly (Amusat, 2024).

Overall, these findings indicate that the knowledge of the respondents is inadequate and can limit the efficient management of their enterprises for optimum productivity. Okwoche *et al.* (2015) stated that low knowledge about improved technologies hinders the growth and productivity of the livestock sector. In addition, the non-possession of adequate knowledge suggests that the respondents would have more training needs on small ruminant IAR&T technologies. This agrees with the reality that individuals who possess more knowledge about a technology or production

process require less training than individuals who do not have much of the knowledge (Tijani, 2019).

Table 2: Small ruminant farmers' knowledge on IAR&T technologies

Statements	Correct response (%)
The raised platform housing system is made with what	0.0
List the materials used in making salt lick/ mineral lick	0.0
How do you use tobacco leaf extract in controlling ecto-parasites	0.0
Which of the crop residues do you incorporate into the ration for sheep and goats on your farm	0.0
Mention the type of ectoparasites that you use tobacco leaf extract to control	98.8
Do you need to dilute squeezed tobacco leaves with water before applying them on animals to control ecto-parasites	11.3

Training needs on IAR&T small ruminant technologies.

The training needs of the respondents are presented in Table 3. Except for housing construction, which had a mean of less than 2 (\bar{X} =1.80), all items on the scale were priority needs to the small ruminant farmers, while sourcing and selection of healthy foundation stock (\bar{X} =2.24) was the most paramount training need. Sourcing and selection of foundation or breeding stock is an important decision the small ruminant farmer has to face. Adequate training on desirable and valuable economic traits for the selection of foundation stock could assist farmers. Hence, breeding/foundation stock determines the quality of animals that will be produced and the income derivable by farmers (Nyaupane *et al.*, 2017). As regards feeding and feeding management (\bar{X} =2.05), livestock that are reared under low-input management (i.e. extensive and semi-extensive management systems) were stressed nutritionally during the dry season. As such, the utilisation of fibrous crop residues through improved supplementation strategies becomes a priority need to boost the performance and productivity of small ruminants. Healthcare (\bar{X} =2.03) as a priority need based on disease infections is are constraint to livestock production, which causes significant losses for farmers. An adequate information system that can assist small ruminant farmers in their decision making underscores the priority needs for marketing (\bar{X} =2.01), processing and value addition (\bar{X} =2.00). A similar study in India observed that marketing is a training need for small ruminant farmers due to improper marketing channels (Anupama *et al.*, 2018).

Table 3: Small ruminant farmers' training needs on IAR&T technologies

Training needs	Mean	Rank
Housing construction	1.80	6 th
Sourcing and selection of healthy foundation stock	2.24	1 st
Feed and feeding management	2.05	2 nd
Healthcare practices, disease control/prevention	2.03	3 rd
Marketing of sheep and goats and their by-products	2.01	4 th
Processing and value addition.	2.00	5 th

Constraints associated with IAR&T technologies

The high cost of capital investment ($\bar{X}=1.44$), the use of technical terminologies by research personnel ($\bar{X}=1.20$), and poor accessibility of small ruminant technologies ($\bar{X}=1.19$) ranked as the top constraints associated with IAR&T technologies (Table 4). A key factor, among others, that limits most smallholder farmers from adopting improved technologies is the associated cost (Dlamini and Ocholla, 2018). It is usually a norm for technological innovations to be accompanied by technical terminologies that end-users who are not literate may find difficult to understand. When such a scenario exists, extension workers can be quite handy with such innovations for farmers. Credence to this view is an earlier finding (Amusat, 2024), which affirmed extension workers as the most important information pathway to small ruminant farmers. Extension workers facilitate effective use of technologies by translating them into the farmers' local language. Concerning the accessibility of IAR&T small ruminant technologies, Chentouf *et al.* (2014) observed that accessibility of technology is a major limitation to livestock productivity.

Table 4: Small Ruminant farmers' constraints associated with IAR&T technologies

Constraints	Mean	Rank
Poor accessibility of small ruminant technologies	1.19	3 rd
Low education level/ illiteracy	1.14	4 th
Poor organisation of small ruminant markets	1.10	6 th
High cost of capital investment	1.44	1 st
Little understanding of the usefulness of technology	1.13	5 th
Inadequate access to the requisite inputs needed to use technology	1.00	8 th
Complexity of technology	1.01	7 th
Use of technical terminologies by research personnel	1.20	2 nd

Relationships between small ruminant farmers' knowledge, constraints and training needs

Findings revealed significantly positive relationships between small ruminant farmers' knowledge ($r=0.362$), constraints ($r=0.452$) and training needs on IAR&T technologies. Typically, respondents who had higher knowledge of IAR&T small ruminant technologies should require fewer training needs relative to those who possessed less of such knowledge. However, the positive correlation between knowledge and training needs implies that the more knowledge a small

ruminant farmer possesses, the higher the level of training required. This implied that respondents are insatiable as regards knowledge on small ruminant technologies; the more knowledge they possess, the higher they seek training to be more equipped in ruminant production. Similarly, the higher the constraints confronting farmers in the operation of their enterprises, the higher their training needs would be. Any form or level of constraints can limit the capacity of farmers to smoothly operate their enterprises. Hence, for efficient livestock production, training becomes necessary to circumvent any existing constraints (Tijani, 2019).

Table 5: Correlation analyses between knowledge, constraints and training

Variable	r-value	p-value
Knowledge	0.262*	0.019
Constraints	0.308*	0.005

* $P \leq 0.05$

CONCLUSION AND RECOMMENDATIONS

Small ruminant farmers' training needs on IAR&T technologies were quite high, specifically in sourcing and selection of healthy foundation stock. Unavailable livestock information pathways, poor knowledge on IAR&T small ruminant technologies, and constraints of high cost of capital investment, use of technical terminologies, and poor accessibility of technologies were reasons for the high training needs. Considering the crucial role information plays in the acquisition of knowledge and skill, IAR&T should effectively provide more information on small ruminant technologies to improve productivity. This can be achieved through the training/workshops, and effective communication of technologies by leveraging on public extension service, which is a realistic pathway for receiving livestock information.

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