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Original article

Factors influencing involvement of peri-urban farmers in mini-livestock farming in south-western Nigeria

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ARTICLE INFO

Article history:

Received 15 September 2012

Accepted 25 September 2012

Available online 30 September 2012

Keywords:

Capacity building

Factor analysis

Management practices

Socio-economic status

Credit facilities

Sustainable livelihood

ABSTRACT

The study focused on factors influencing involvement of peri-urban farmers in mini-livestock farming in South-Western Nigeria. Specifically, the peri-urban farmers' socio-economic characteristics were described, their level of involvement in rearing mini-livestock were determined and constraint associated with mini-livestock farming were examined. 182 respondents were interviewed through the use of structured interview schedule and Focus Group Discussions (FGDs). Data analysis was carried out using frequency counts, percentage, and factor analysis. The results of the study showed that more males were involved in mini-livestock rearing than females, while the mean age of a farmer was 46 years. Majorities were literate and information sourced from fellow farmers was most common and reliable source of information accessible by the respondents, while there was low extension contact. Problems confronting the respondents include inadequate credit facilities, untimely supply of inputs, improper management skill and low extension contacts. Results of the factor analysis revealed eleven factors which contributed to farmers' involvement in mini-livestock farming. These include community influence, farmland acquisition, characteristics of mini-livestock, personality factor, and economic status. Other factors were capacity building, household composition,

external orientation, farm characteristics, social group orientation and communication tool. The study concluded that policy making on mini-livestock development should focus at enhancing the socio-economic status of peri-urban farmers through improved access to credit facilities and capacity building through training on improved management practice. This could have a profound influence on increased production, sustainable livelihood and alleviation of poverty among the populace.

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1. Introduction

Many small animals, such as rodents and giant snails, are threatened by extinction in Nigeria and African countries as a whole. Rearing these types of animals in captivity does not only help to protect and preserve them from going into extinction, but also serve as a source of protein and income for peri-urban farmers. The rearing of such small body size animal that requires moderate nutrition and management is referred to as Mini-livestock (micro-livestock) production (Akinnusi 1998). Mini-livestock keeping according to Technical Centre for Agriculture and Rural Cooperation (CTA) 2008 can also be described as the farming of small wild indigenous species such as grass cutter *Thryonomys swinderianus*, Giant African snails (*Achatina spp* and *Archachatina spp*) and other rodents. Globally, wildlife has great potentials for meat production and serves as an important source of the highly desired animal protein to the people of Africa, both in urban areas and rural communities (Opara 2010).

Rearing these types of livestock will help to improve conservation of these animals in the bush. It is a known fact that most mini-livestock are being reared in peri-urban areas of South-western parts of Nigeria as coping strategies in a situation where reliance on one economic activity is not sufficient to meet the needs of the people. Studies (CTA 2008; Akinola et al 2008; Yeboah and Adamu 1995; Adu 2002) have also shown that in some parts of Central and West Africa, consumers prefer meats of mini-livestock animals, popularly referred to as 'bush meat', and consider them a great delicacy compared with beef. Small-scale farming of certain breeds of rodent is now widely seen as an invaluable asset in the fight against malnutrition and poverty.

The Forestry Research Institute of Nigeria (FRIN), Ibadan, have the mandate to conduct research into all aspects of forestry, forest products utilization, wildlife, watershed management and agro-forestry. It also involved in the training of technical and sub-technical staff in the country to disseminate their research output to farmers (FRIN, 2005). The Agricultural Development Programmes (ADPs) of South-Western Nigeria, also has the mandate of disseminating new technologies received from research institutes (such as FRIN), claimed to have introduced and trained peri-urban farmers in mini-livestock keeping and their management practices. The above scenario notwithstanding, there has been low level of involvement in mini-livestock farming among peri-urban farmers (Ogunjimi, et al 2012 and Imran et al 2007). Based on the foregoing, this study sought to assess factors influencing involvement of peri-urban farmers in mini-livestock production in South-Western Nigeria.

The main objective of the study was to assess factors influencing involvement of peri-urban farmers in mini-livestock production. The specific objectives were to:

- (i) describe personal and socio-economic characteristics of peri-urban farmers involved in mini-livestock production
- (ii) Determine peri-urban farmers' level of involvement in this mini-livestock
- (iii) Examine constraints associated with mini-livestock farming.

2. Materials and methods

The target populations of this study were mini-livestock farmers such as grasscutter and snail farmers. Four states namely Osun, Ondo, Ekiti and Oyo were purposively sampled in Southwestern Nigeria because extension agents claimed to have disseminated technologies on minilivestock to peri-urban and urban farmers in these states. Multistage sampling procedure was used to select respondents from the four states. In the first stage, two Local Government Areas (LGAs) were randomly selected from each state making a total of 8 LGAs in the four

states. These LGAs are Ife East and Ife Central in Osun State, Ondo West and Ile-oluji/Oke-Igbo in Ondo State and Ise Orun and Gbonyi in Ekiti State and Ibadan North-East and Ibadan North-East in Oyo state. At the second stage, three peri-urban communities were randomly selected from each of the LGAs based on the list of communities that are raising mini-livestock collected from the agricultural officers in the state ministry of agriculture, giving a total of 24 communities. At the third stage, all the 38 grass cutter farmers (Table1) in the sampled communities were purposively selected with 10 percent of snail farmers in each of the 24 communities using snowball sampling technique. A total of 144 snail farmers and 38 grass cutter farmers were selected and interviewed for the study.

Structured interview schedule was used to collect relevant quantitative data while Focus Group Discussions (FGDs) was used to elicit qualitative data. The data collected were edited and coded. Statistical Package for Social Sciences (SPSS, version 14) was used for data analysis. Descriptive statistics such as percentages, mean and standard deviation were used to summarize the data. Exploratory factor analysis procedure was used to identify crucial factors influencing involvement of peri-urban farmers in mini-livestock farming. The socio-economic variables enumerated by the farmers were grouped using principal component analysis with varimax rotation. The cut-off point for constant loading was 0.30 and the constant loading less than 0.30 was discarded (Anselm et al 2010, Ashley et al 2006 and Madukwe 2004). Also, Kaiser's criterion was used to determine which factor to retain in the result of the analysis, thus factors with Eigen value greater than one were retained.

The factors, were thereafter named based on the following criteria as employed by Farinde (1995), Farinde and Jibowo (1996b), Ajayi (2002) and Soyobo (2005).

- (i) Picking synonyms of the highest loaded variables on each factor.
- (ii) Joint explanation or interpretation of the meaning of the positive and highly loaded variable on each factor and/or retaining the name based on the similarity of the features reposed in the variables contributing to the factors.
- (iii) The researcher's subjective interpretation of experiences from literatures.

Table1

Distribution of grass cutter farmers per local government area.

Local government areas sampled	Number of grasscutter farmers
Ibadan Northeast	10
Ibadan Northwest	8
Ife central	7
Ife East	5
Ile Oluji/Oke-Igbo	4
Ondo West	2
Ise Orun	2
Gbonyi	0
Total	38

3. Results and discussion

Results in Table 2 show that the majority of farmers (65.7%) were between the ages of 30 and 60 years. This indicates that the majority of the peri-urban farmers in the three states were within productive age range. Also, the majority (64.3%) were male, while 36.7 percent were female. The finding corroborates that of Ogunjimi (2011) who reported that the majority of farmers that engaged in mini-livestock farming in South-Western Nigeria were male. The mean number of household size was 8.0 with a standard deviation of 5.4. The small size of household may be due to the fact that the majority of the respondents were monogamist. This may be attributed to their level of education and religious affiliation. This finding is in line with that of Kolawole (1998), where it was reported that mean household size of rural areas of Lagos State in South-Western Nigeria was 8.0. Majority (61.7 %) of the farmers were Christians while 35.0 percent were Muslims. This finding is an indication that Christianity and Islam were the common religious practices in the study area. Unlike some bush meat which may not be killed or touched because of religious dictates, traditional taboos or prejudices (Vos 1978), the grass cutter meat transcends religious prohibitions and even Muslims who do not consume guinea pig are known to consume grass cutter (Annor and Kusi 2008 and Adoun 1993).

Majority (76.6 %) were literate. This indicates that farmers can easily comprehend whatsoever they learnt and can read instructions and manuals about feeding, breeding materials and other management practices. Above average (53.7%), claimed to have attended training organised by Local and state ministry of agriculture, while 42.3 and 32.6 percent have attended training and workshop organised by University and Research institutes. Results of Focus Group Discussions (FGDs) conducted indicates that some of the farmers had attended seminar workshops and training from research institutions such as Forestry Research Institute of Nigeria, Ibadan; Department of Agricultural Extension of the Obafemi Awolowo University, extension units of the Local Governments and the State Ministry of Agriculture. One of the discussants at Basorun in Ibadan Northeast, Oyo State said *'we have attended training on grasscutter rearing and snail farming by trainers from the Ministry of Agriculture Oyo State at the Ibadan Northeast LGA headquarter, but there is no follow-up from the trainers'*.

The implication of this is that, despite the fact peri-urban farmers attended training that could assist in raising their economic status and empower them to use their locally available resources in improving their livelihood, the lack of follow-up of such training programmes would not help consolidate the gains of organising such training programmes.

Result in Table 2 also shows that majority (67.3 %) of the respondents had contact with extension agents to discuss issues concerning selected mini-livestock production and their management practices less than five times in a year, while 23.3 percent had no contact with extension agents. The implication of low extension contact is that farmers may not be well exposed to requisite training on the management practices, which may subsequently affect production of the mini-livestock in the study area. The result also shows that majority (63.8 %) sourced for loan from farmers' cooperative societies, which shows the importance of this organization as a good source of financial empowerment to farmers. The mean annual income realized by grass cutter farmers was ₦76, 000 with standard deviation of ₦15, 610, whereas the mean annual income of the snail farmers was ₦69, 335 with standard deviation of ₦12, 452. Majority (59.7 % and 52.7 %) of the respondents in Table 3 indicated that they sourced information related to snailery and grass-cutter farming from other farmers while other sources of information includes radio, extension agents and research institutes. Information sourced from other farmers was thus most common and reliable source of information among the respondents. Agricultural Development Programme (ADP) and Research Institutes need to be always on the ground to give reliable information to farmers on the technical skill they required to assist the farmers on the management practices required.

3.1. Involvement in mini-livestock

Results in Figure 1 show that a higher percentage (79.1%) of respondents was involved in snail farming, while a small percentage (20.9%) were into grass cutter (cane rat) farming, respectively. The findings indicate that the number of peri-urban farmers engaged in snailery were more than those involved in grass cutter farming. Low involvement in grass cutter rearing might be due to inadequate technical know-how on their management practices and farmers attitude towards rearing of this animal. The finding is in line with Annor and Kusi (2008) report that in the 1970s the Wildlife Department in Ghana provided interested farmers with a seed stock of male and female grasscutters and other supporting incentives, but despite this effort many farmers still failed to adopt the initiative.

3.2. Categorization of peri-urban farmers by level of involvement in mini-livestock production

Results in Figure 2 show that majority (75.0 %) who claimed to be involved in grass cutter rearing were involved at a low level, while almost average (48.8%) had a high level of involvement in snail rearing. The finding shows that snail farming had high patronage of the respondents in the study area. On the other hand, while majority of the respondents were well informed about the domestication of the selected mini-livestock, surprisingly, few of them were actually fully involved especially grass cutter farming. This might be as a result of inadequate technical skill on breeding, feeding, disease and pests control, processing, packaging, storage, marketing, and other management practices.

3.3. Constraints associated with mini-livestock farming

Most of the problems confronting peri-urban farmers that were involved in mini-livestock were stated in the order of severity which includes inadequate credit facilities, untimely supply of inputs, inadequate management skill, inadequate information, low extension contact, high cost of production materials and inadequate processing

technology. The finding is in line with Yeboah (2009) report that grasscutter farmers were confronted with problems ranging from a high cost of housing and lack of access to credit.

Table 2

Distribution of peri-urban farmers according to socio-economic characteristics

Variables	Frequency	Percentage
Age (Years)		
Below 30	39	21.4
31 – 60	110	60.4
61and above	33	8.10
Sex		
Male	115	63.3
Female	67	36.7
Marital Status		
Single	22	12.1
Married	138	75.8
Divorced	6	3.30
Widowed	16	8.80
Household size		
None	22	12.9
1-5	65	35.7
6-10	86	47.3
11 and above	9	4.90
Religion Affiliation		
Christianity	92	50.8
Muslim faithful	74	40.7
Traditional religion	16	8.90
Year of schooling		
1-6	52	28.6
7-12	66	36.3
13 and above	41	22.5
Never	23	12.5
Extension contact		
1-4	93	51.1
4-8	28	15.4
9 and above	19	10.4
No contact	42	23.1
*Participation in social organization		
Religious organization	139	76.4
Cooperative association	124	68.1
Occupational organization	88	54.9
Thrift society	69	37.9
Fraternal organization	14	7.7
Income realized from Mini-livestock		
	Mean	Standard deviation
Grasscutter farming	76,000	15,610
Snail farming	69,335	12,452

*Multiple responses

Table 3

Distribution of peri-urban farmers according to sources of information

*Source of information	Frequency	Percentage
Snail farming		
Other farmers	85	59.0
Radio and television	71	49.3
Newspaper	44	30.5
Extension agents	65	45.1
Research institution	57	39.6

*Multiple responses

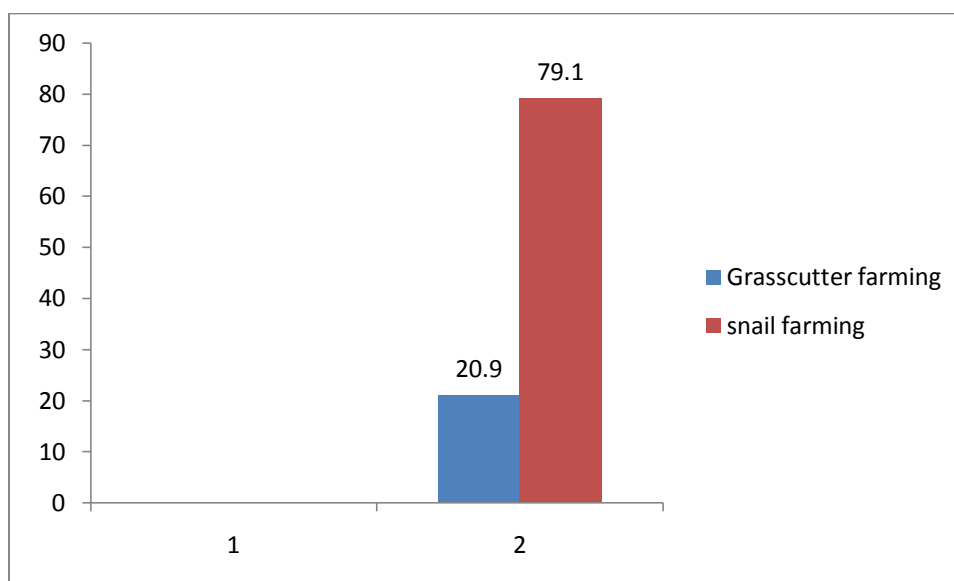


Fig. 1. Distribution according to peri-urban farmers' involved in mini-livestock farming.

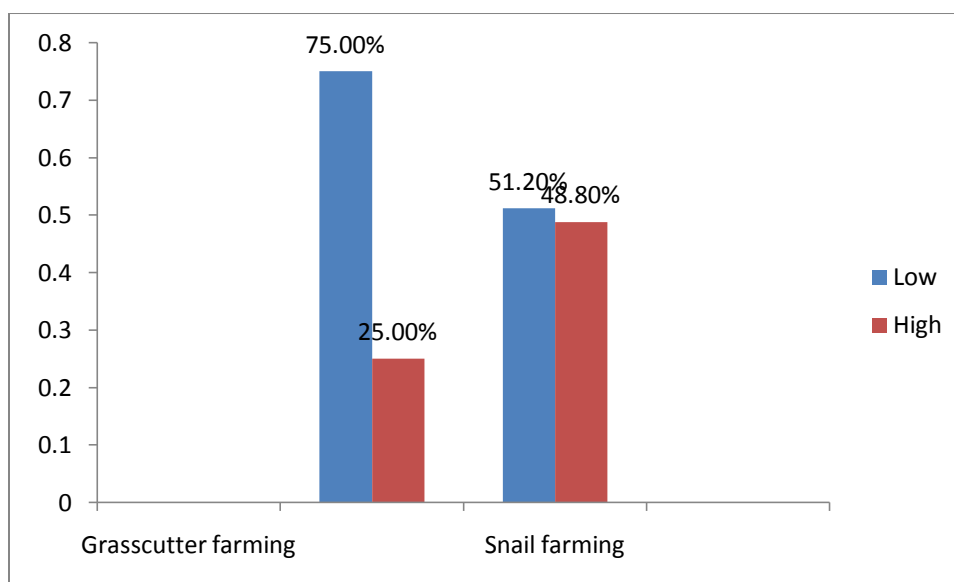


Fig. 2. Categorization of the level of involvement of peri-urban farmers in mini-livestock production.

Table 4

Distribution of respondents according to the problems encountered on involvement in mini-livestock.

Constraint	Mean	Rank
Inadequate credit facilities	3.79	1 st
Credit facilities are not timely	3.74	2 nd
Untimely supply of inputs by government	3.46	3 rd
Inadequate management skill method	3.38	4 th
Inadequate information on production	3.19	5 th
Low extension contract	3.19	5 th
High cost of production materials	2.83	7 th
Inadequate labour supply	2.78	8 th
Inadequate processing technology	2.67	9 th
Unavailability of market	2.50	10 th
Inadequate storage facilities	2.23	11 th
Inadequate farmland	2.04	12 th
Bad weather	1.94	13 th
Inadequate infrastructural facilities	1.89	14 th

3.4. Factors that influencing peri-urban farmers' involvement in mini-livestock

The result of the varimax factor rotation pattern with the measures that were highly loaded on each of the factor isolated is shown in Table 4. Eleven factors were isolated based on principal component analysis. These factors includes community influence (19.0 %), farmland acquisition (7.9 %), characteristics of mini-livestock (7.5 %), personality factor (4.6 %), economic status (3.8 %) and capacity building (3.6 %). Others are: household composition (3.5 %), external orientation (3.0 %), farm characteristics (2.8 %), social group influence (2.6 %) and communication tools (2.6 %).

Table 4

Names of extracted factors associated with peri-urban farmers' involvement in mini-Livestock farming and respective Eigen values and percentage variation accounted for by each factor

Factor label names	Eigen value	Proportion variance	Percentage variance	Cumulative percentage
Farmland acquisition	3.33	0.079	7.90	26.9
Characteristic of mini-livestock	3.14	0.075	7.50	34.4
Personality factor	1.95	0.046	4.60	39.0
Economic status	1.59	0.038	3.80	42.8
Capacity building factor	1.47	0.036	3.60	46.4
Household composition	1.41	0.35	3.50	49.9
External orientation	1.26	0.030	3.00	52.9
Farm characteristics	1.19	0.028	2.80	55.7
Social group orientation	1.11	0.026	2.60	58.3
Communication tools	1.07	0.026	2.60	60.9
Other factors (Unknown)			39.1	100

Table 5 shows the measures of loading of each of the factors isolated and the percentage contribution of each of them to mini-livestock farming among peri-urban farmers.

3.5. Community influence

Results in Table 5 show that the latent root of the factor was 4.092. The variables loading significantly at $P < 0.01$ were cultural and social ceremonies, gender composition in community, membership of traditional title holder, ascribed role, decision making in community, infrastructural facilities, status in society, membership of influential social organization, societal value, ethnicity and reference group could have influence level of

involvement. This implies that community as a factor has a great impact on the level of involvement of peri-urban farmers in selected livelihood coping strategies. Gerland (1991), in his study identified people issues which included cultural traditions as among the major barriers to diffusion and adoption process. Contrary to belief that community factors such as membership of traditional title holder and ascribed roles attached to traditional title holder would have a positive influence on the involvement of farmers in mini-livestock farming, the reverse is the case. Research has shown that there is negative significant correlation between involvement of farmers in mini-livestock as a means of livelihood coping strategies and the membership of traditional title holder and ascribed role in the community (Ogunjimi 2011). The higher the roles ascribed to an individual in a community, the lower level of involvement and vice-versa.

3.6. Characteristics of mini-livestock

Table 5 shows variables such as complexity, divisibility, availability, openness, compatibility and economic desirability were contributive to the characteristics of livelihood coping strategies factors. Availability, openness, compatibility, divisibility, economic desirability and less complex activities will arouse the interest of the peri-urban farmers to be involved in the mini-livestock mentioned.

3.7. Farmland use

In determining the level of involvement of peri-urban farmers in selected mini-livestock, means of acquiring farm land, size of the livestock reared and type of crop planted play an important role. Farmers who inherited the farm would have the opportunity of using it without limitation on the type of crop planted or animal to be reared on the farm.

3.8. Personality status

The fourth factor was named personality factor. The variables contributing to the personality factor include age, years of residence in the community, household size, year of schooling, marital status, type of marriage and sex. This factor had influence on the degree of level of involvement. A farmer with low level of education, age, and large household size may not want to try an innovation because of technical know-how and the cost of production.

3.9. Economic status

Economic status is another factor which affects the involvement of peri-urban farmers in the mini-livestock production. These were income realized from mini-livestock, labour, credit facilities, household size and type of marriage. Variables such as credit facilities available to farmers might determine the amount of income that can be realized annually. The amount of income realized and availability of labour could determine the farmers' level of involvement.

3.10. Capacity building factor

The variables contributing to the capacity building include year of schooling, level of education and extension contact. The higher the knowledge of the peri-urban farmers about the management practices of mini-livestock, the higher their level of involvement. This implies that as the years of schooling increases, the level of involvement also increases. From the above, the factor is significant to level of involvement.

3.11. Household composition

Results in the Table 5 show that the factor named household composition was loaded by such variables as household size and marital status could affect the level of involvement in the min-livestock. A family with a small size tends to be more involved in these activities. This could be as a result of the fact that such families may be able to finance the activities because of less burdensome family size.

3.12. External orientation factor

Another factor identified as significantly associated with involvement of farmers in min-livestock is external orientation. The extent of travel and the place travelled to could determine the level of involvement in these activities. The farther farmers travel, the more exposed they are to sources of information and skill.

3.13. Farm characteristics

Farm characteristics is another factor identified as significantly associated with level of involvement of peri-urban farmers in mini-livestock farming. The factor was loaded by the following variables farm size, income from selected mini-livestock and extension contact. The larger the size of farmland used, the higher the level of mini-livestock farmers' involvement. Farmers with large farm would practice new innovation and bear more risk than smallholding farmers.

3.14. Group influence factor

From the results in table 6 group orientation remains a major factor contributing to level of involvement which could be explained by 2.64 percent of the variation in level of involvement in mini-livestock. The higher the level of farmers' social organizational participation and extension contact, the higher the level of involvement in selected mini-livestock farming.

Table 5

Showing variables contributing to each factors associated with involvement of peri-urban farmers in mini-livestock farming

Factors and contributing variables	L	L²	ΣL²
Community influence			
Cultural/social ceremony	0.670	0.45	
Gender composition in community	0.636	0.45	
Ascribed role	0.620	0.38	
Membership of traditional titleholder	0.620	0.38	
Decision making	0.615	0.38	3.62
Infrastructural facilities	0.578	0.33	
Status in society	0.570	0.31	
Societal value	0.551	0.30	
Ethnicity	0.537	0.29	
Reference group	0.438	0.19	
Characteristics of mini-livestock farming			
Complexity	0.961	0.92	
Divisibility	0.762	0.92	
Openness	0.728	0.53	
Compatibility	0.690	0.48	3.29
Availability	0.663	0.44	
Economic desirability	0.583	0.34	
Farmland use			
Farmland acquisition	0.872	0.76	
Category of farmland	0.850	0.73	
Indigenous status	0.840	0.71	3.12
Major occupation	0.698	0.49	
Farm size	0.653	0.43	
Social personality status			
Age	0.766	0.59	
Year in community	0.762	0.58	
Marital status	0.690	0.48	
Year of schooling	0.510	0.26	2.138
Type of marriage	0.490	0.24	
Level of education	0.452	0.24	
Sex	0.338	0.12	

Significantly contributing at P ≤0.01; L = Loading for factor; L² = the square of loading; ΣL²= Latent root for factor

Table 6

Factor analysis showing variables contributing to factors associated with peri-urban farmers' involvement in mini-livestock farming

Factors and contributing variables	L	L ²	ΣL ²
Economic status			
Income from mini-livestock	0.892	0.86	
Labour	0.630	0.40	
Credit facilities	0.611	0.37	2.16
Household size	0.593	0.35	
Type of marriage	0.491	0.24	
capacity building			
Year of schooling	0.896	0.80	
Level of education	0.886	0.79	2.00
Extension contact	0.564	0.32	
Age	0.311	0.10	
Household composition			
Household size	0.805	0.65	
Martial status	0.737	0.54	
Sex	0.801	0.64	2.03
Indigene	0.301	0.09	
Religion	0.332	0.11	
Communication tools			
Sources of information	0.753	0.57	
Decision making	0.493	0.24	1.28
Participation in social organisation	0.506	0.26	
Extension contact	0.454	0.21	
External orientation factor			
Place visits	0.778	0.61	
Time travel	0.671	0.45	1.15
Indigene	0.301	0.09	
Group influence factor			
Participation in social organization	0.747	0.56	
Extension contact	0.564	0.32	1.11
Decision making	0.479	0.23	
Farm characteristics			
Farm size	0.892	0.80	1.01
Extension contact	0.338	0.11	
Income from mini-livestock	0.313	0.10	

Significantly contributing at $P \leq 0.01$; L = Loading for factor; L^2 = the square of loading; ΣL^2 = Latent root for factor

3.15. Communication related tools

Communication tools, which indicate exposure to source of information, had a latent root of 1.045. The variables that contributed to the factor are the source of information (L=0.753), extension contact, participation in social organization and decision making. This is an indication that if farmers were exposed to different sources of information, extension contact and participation in social organization, involvement in the selected coping strategies would be increased. From the above, communication tools would influence the level of involvement.

4. Conclusion

Based on the findings of the study, the following conclusions were made: Majority of farmers (65.7%) were between the ages of 30 and 60 years and were males. Also, majorities were literate, and have attended training organised by local and state ministry of agriculture, university and research institutes. Other farmers were the most common and reliable source of information, and there was a low extension contact. Majority of the farmers interviewed were engaged in snail farming while minorities were practicing grass cutter farming. Majority of those involved in snailery and grass cutter farming and their management practices were involved at a low level of production. Problems confronting respondents in rearing mini-livestock include inadequate credit facilities, untimely supply of inputs, inadequate information, improper management skill, low extension contact and inadequate processing technology. Factors influencing involvement of peri-urban farmers in mini-livestock production include community influence, farmland acquisition, characteristics of mini-livestock, personality factor, economic status, formal education, household composition, external orientation, farm characteristics, social group orientation and communication tools.

Since one of the factors influencing involvement of farmers in mini-livestock was capacity building of the farmers, there is need for adequate training on management practices. Such training should cover production, packaging, processing, storage and marketing. There should be follow-up visits to ensure the desired result among peri-urban farmers. Other major factors that influence involvement were economic status, access to credit facility and amount of income available to farmers. Farmers should be encouraged to join a functional cooperative society in order to access information on the selected livelihood coping strategies and to be able to source credit facilities from government and other relevant financial institutions. If these recommendations can be adhered to, more farmers will be encouraged to adopt mini-livestock farming which will consequently lead to an increase in production, enhanced sustainable livelihoods and poverty alleviation among the populace.

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