South Asian Journal of Agricultural Sciences

E-ISSN: 2788-9297
P-ISSN: 2788-9289
https://www.agrijournal.org
SAJAS 2023; 3(1): 30-36
Received: 18-09-2022
Accepted: 20-10-2022

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Socio-psychological and communication variables contributing to the knowledge level of backyard poultry farmers: A principal component analysis

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Abstract
In India, backyard poultry farming is a traditional system of keeping birds in backyard and is being practiced in rural and semi urban areas. The study was conducted in Dharwad and Belgaum districts of Northern Karnataka during 2021-2022. The study objective was to determine the factor loadings of independent variables and their contribution to the variation in knowledge level of backyard poultry farmers about poultry management practices, by applying principal compound analysis. A total of 120 backyard poultry farmers was selected for the study. Personal interview method was employed to collect the data. The results revealed that the first and second component together explained the variation to the extent of 35.89 percent. While, all the four components together explained 58.01 percent of variation. The factor analysis studied had resulted the eigen values of the four principal components as 2.51, 2.14, 1.58 and 1.29 respectively.

Keywords: Factor analysis, socio-psychological variables, management practices, backyard poultry farmers, knowledge level

1. Introduction
The economy of India is significantly influenced by livestock and poultry. Poultry farming makes a significant contribution to the rural economy, particularly for the socioeconomic improvement of the weaker societal groups. It creates independent employment, additional income and supplements in protein diet at a moderate cost. Backyard poultry farming primarily involves country chicken birds.

Backyard poultry production system is a low input business and is characterized by indigenous night shelter system, scavenging system, natural hatching of chicks, poor productivity of birds, with little supplementary feeding, local marketing and no health care practice. In rural poultry farming, birds are raised under a traditional extensive unscientific scavenging system without special management practices of feeding or housing and the flock size ranges from 5 to 50 birds. In rural areas, chicken reared in backyard are generally Desi type which are low producing with respect to egg and meat.

As per 20th animal census 2019 the country's overall population of poultry is 851.81 million. In total, backyard and commercial poultry have 317.07 million and 534.74 million birds, respectively. A growth of 45.78 percent is seen in backyard poultry and 4.50 percent in commercial poultry. This indicates that more enterprises rearing backyard poultry is increasing in the country recently (Anonymous, 2019) [2].

Today's popular breeds include a number of genetically improved varieties of indigenous low-input technology (LIT) birds such as: Vanaraja, Aseel, Kaveri, Chhabra, Swarnadara, Giriraja, Gramapriya etc., One of the fastest expanding segments of animal husbandry is the development of poultry. Poultry farming in India has evolved from being a household activity into a highly commercial business with scientific orientation. The intervention of the corporate sector along with policy environment provided by the Government of India / State Governments from time to time has led to this transformation.

2. Methodology
The study was conducted in Dharwad and Belgaum districts of North Karnataka. Sixty backyard poultry farmers were selected from each district for the study following simple random sampling technique, thus the total sample size constituted 120 backyard poultry farmers. Data was collected by using structured pre tested interview schedule by personal

interview method. The variables of the study included age, education, experience in backyard poultry practicing, flock size, participation of family members in poultry farming, extension contact, social participation, mass media exposure, decision making pattern, achievement motivation, economic motivation, scientific orientation, risk orientation. The data collected was analysed using statistical tool like frequency, percentage, statistical mean, standard deviation and principal component analysis.

3. Results and Discussion

3.1 Profile of backyard poultry farmers of North Karnataka

3.1.1 Age

It is evident from the Table 1 that more than half (63.33%) of the backyard poultry farmers belonged to middle age group (30 to 50 years), followed by 27.50 percent and 9.16 percent of backyard poultry farmers belonged to old age group (> 50 years) and young age group (< 30 years), respectively. The probable reason for medium age of the respondents could be that middle-aged groups in comparison to older and younger age group, are presumably very eager and actively participate in strengthening their families. They are typically better at taking care of the family. Similar finding was noted by Ahire *et al.* (2007) [1] in his study reported that 44.00 percent of the backyard poultry farmers belonged to middle age group.

3.1.2 Education

It is observed from the Table 1 that nearly one third (31.66%) of the backyard poultry farmers studied up to high school, followed by middle school (26.66%), PUC (13.66%) and primary school (11.66%). The results also revealed that 10.00 percent of the backyard poultry farmers were illiterate and 6.66 percent had graduation (Degree). The probable reason for medium level of education may be that enhanced literacy rate in the villages. Realizing the value of formal education had an influence on their way of life, as it empowers people and opens career options for subsidiary occupations. The similar finding was also made by Laxman (2012) [7] who reported in his study that 46.66 percent of the farmers studied up to secondary education (6^{th} to 10^{th} std.).

3.1.3 Experience in backyard poultry practicing

The results presented in Table 1indicated that nearly two fifth (37.50%) of the backyard poultry farmers had less experience in poultry practicing, followed by medium (32.50%) and high (30.00%) experience in backyard poultry farming. The probable cause for low experience in poultry farming could be that middle-aged respondents had medium experience in backyard poultry farming and enough maturity to make decisions for greater financial gain. Older people were unable to raise more chickens. While, younger individuals were more likely to pursue employment. Moreover, the study area is well connected with transport and marketing infrastructure, which made it easier for them to take up poultry rearing. The findings were in line with the investigation made by Prathap *et al*. (2017) [9] in their study observed that majority (81.30%) of the poultry farmers had two to six years of experience.

3.1.4 Flock size

The data presented in Table 1 showed that 53.33 percent of the backyard poultry farmers had medium flock size (17 to 49 birds), followed by small (32.50%) and large flock size (14.17%), i.e. less than 17 birds and more than 49 birds, respectively. The probable reason could be for medium flock size that as the number of birds increases, which makes an individual to adopt improved management practices in rearing of backyard poultry birds. The major limiting factor was low level of education as well as high rate of mortality of chicks, attack of predators and less egg production during summer. Backyard poultry farmers rearing poultry as subsidiary occupation than agriculture and dairy farming. Similar results were reported by Kavithaa *et al.* (2020) [5] in their research on backyard poultry farmers in Erode district of Tamil Nadu revealed that 52.92 percent of backyard poultry farmers had medium flock size (7 to 15 birds).

3.1.5 Participation of family members in poultry farming

The data pertinent to participation of family members in poultry farming presented in Table 1 revealed that majority (58.33%) of the backyard poultry farmers belonged to medium level of participation in poultry farming activities, followed by high (25.00%) and low level of participation (16.67%), respectively. The probable reason for medium level of participation in poultry farming might be that backyard poultry can be easily manageable by family members including children and even old aged people. Backyard poultry does not require any extra skill and manageable with family labours. Rural poultry can generate additional income as well as employment to landless and poor people. The present investigation gets the support from the finding of Mishra and Badodiya (2015) [8] they found that 62.50 percent of the rural women belong to medium level of participation in agriculture.

3.1.6 Extension contact

Results from the Table 1 revealed that nearly half (47.50%) of the backyard poultry farmers had low extension contact, followed by medium (28.33%) and high (24.17%) extension contact. The possible reason might be for low extension contact that majority of the backyard poultry farmers had low scientific orientation, lack of information about trainings scheduled by Krishi Vigyana Kendra and University of Agricultural Sciences. Birds were reared under traditional method of rural poultry farming. Do not need high initial invest for raising birds. Similar finding was noticed by Rameshchandra (2013) [11] in his research found that 53.75 percent poultry farmers had low extension contact.

3.1.7 Social participation

With regard to social participation, it is clear from the data presented in the Table 1 and that more than two fifth (42.50%) of the backyard poultry farmers fall under the category of medium level of social participation, followed by low (36.67%) and high (20.83%) level of social participation. The probable reason might be for medium social participation that agriculture being the respondents primary source of income. Backyard poultry keepers avoid socializing with other societal organisations due to the predominance of higher caste and higher socio-economic status groups. People were hesitated to participate in formal and non-formal organisations. The present study is also in line with the study conducted by Sabale *et al.* (2014) [12, 13]

in their study observed that more than half (56.00%) of the farmers belonged to medium social participation.

3.1.8 Mass media exposure

It is clear from the Table 1 that 40.83 percent of the farmers fall under medium level of mass media exposure, followed by high (30.00%) and low (29.17%) level of mass media exposure. The possible reason for the above findings might be that poultry farmers gained the information disseminated and telecasted on TV and radio. Also, digital media helped them to receive more information in speedy manner. The availability of farm literatures created by various agencies. The similar findings was reported by Jhirwal *et al*. (2018) [3] in their research found that 60.00 percent of the poultry entrepreneurs belonged to medium mass media exposure.

3.1.9 Decision making pattern

It is evident from the Table 1 that 40.00 percent of backyard poultry famers belonged to high decision making category. While, 30.83 percent and 29.17 percent farmers belonged to medium and low decision making category**,** respectively. The possible reasons for above findings might be due to medium level of education and low experience in poultry farming which might have helped them to change the foresight, developed confidence made them to choose good among available alternatives. Men oftenly engaged in poultry management practices. Backyard poultry farming is exclusively woman venture due to the ease of rearing poultry in the backyard and availability of family labours. The similar findings reported by Rameshchandra (2013) [11] in their study found that 58.75 percent poultry farmers had high decision making ability.

3.1.10 Achievement motivation

From Table 1 clearly showed that 42.50 percent of the backyard poultry farmers belonged to medium achievement motivation category, followed by high (29.17%) and low (28.33%) achievement motivation. The possible reason behind the medium level of achievement motivation that backyard poultry farmers belonged to middle age and medium level of economic motivation. A solid economic situation likely to reduce the risk factors and the barrier in adopting improved management practices. Thus, backyard poultry farmers had desire to earn more profit and maintain good social status in society. Now a days younger people are motivated to take up poultry farming as an occupation and their zeal, interest and enthusiasm to become financially sound. Similar conclusion was made by Suresh *et al*. (2015) [14] in their study reported that nearly half (43.33%) of poultry farmers had medium level of achievement motivation

3.1.11 Economic motivation

Results from Table 1 revealed that nearly two fifth (39.17%) of the backyard poultry farmer belonged to medium economic motivation, followed by high (33.33%) and low (27.50%) economic motivation. Medium level of economic motivation may have the following possible causes. Majority of the backyard poultry farmers belonged to middle age and low experience in rearing. Backyard poultry farming served as a handy business, additional source of income with minimum investment and nutritional security to family members. Rural women had money by selling fresh eggs or live birds at a better price than the market. The earnings were utilized to boost the family budget. The findings are in agreement with the study conducted by Ram *et al.* (2017) [10] in their study identified that 63.00 percent of the poultry farmers had medium economic motivation.

3.1.12 Scientific orientation

The data in Table 1 observed that 45.00 percent of the backyard poultry farmers had low scientific orientation, followed by medium (30.00%) and high (25.00%) scientific orientation. Low scientific orientation might be due to that backyard poultry farmers had low formal education. The lack of technical skills and low interest to adopt scientific methods. Majority of the backyard poultry farmers adopted indigenous practices during ill health situation of the birds. The results are in line with the study conducted by Karade *et al.* (2015) [4] in their study reported that 41.67 percent farmers had low scientific orientation.

3.1.13 Risk orientation

It is evident from the Table 1 that nearly half (42.50%) of the backyard poultry farmers fell under medium risk orientation category, followed by high (30.83%) and low (26.67%) risk orientation. The probable reason behind medium risk orientation is that backyard poultry farming has risk as well as promising subsidiary venture. Due to high mortality rate, sporadic and cyclical poultry diseases, fluctuation in market prices and high input costs. Farmers might have chosen to take calculative risk to avoid significant loss in poultry farming with a desire towards profit motive. Similar finding was reported by Sabale *et al*. (2014) [12, 13] in their study on entrepreneurial behaviour of farmers in Madhya Pradesh reported that great majority (71.20%) of the dairy farmers belonged to medium risk taking ability.

3.2 Factor analysis of profile of backyard poultry farmers with their knowledge of poultry management practices

The data in the table 2 represented that, the first component explained the variation of 19.36 percent. Whereas, the second, third and fourth components explained variation of 16.53, 12.17, and 9.94 percent respectively. The first and second component together explained the variation to the extent of 35.89 percent. Wherein, all the four components together explained 58.01 percent of variation. The principal component analysis was conducted to ascertain the influence of independent variables on knowledge level of backyard poultry farmers identified 4 principal components which together accounted for 58.01 percent variation in knowledge level of backyard poultry farmers of North Karnataka. The factor loadings obtained from the factor analysis for the knowledge level of backyard poultry farmers are presented in table 2 and 3.

3.2.1 Component I (Social participation, mass media exposure, scientific orientation and risk orientation)

Results in table 3 revealed that, out of 13 variables, four variables possessed higher factor loadings. Those variables are social participation (0.642), mass media exposure (0.803), scientific orientation (0.530) and risk orientation (0.623). The variation explained by the first component is 19.36 percent. This implies that higher exposure to social

organizations and mass media helps them to acquire more knowledge. Practicing scientific methods in poultry management reduces the risk in poultry farming and all these variables influenced on knowledge level of backyard poultry farmers in poultry farming.

3.2.2 Component II (Experience in backyard poultry practicing, participation of family members in poultry farming and risk orientation)

The results in table 3 showed that, out of 13 variables, three variables viz., experience in backyard poultry practicing, participation of family members in poultry farming and risk orientation possessed factors loading of 0.504, 0.598 and 0.524 respectively. The second component explained the variation of 16.53 percent. This indicated that experience in traditional poultry farming might have helped them to posses more knowledge about poultry management practices. Availability of family members to look after the birds and ability to bear calculative risk in poultry farming. All these variables had influence on knowledge level of backyard poultry farmers in poultry management practices.

3.2.3 Component III (Age and achievement motivation)

The component III showed that, out of 13 variables, age and achievement motivation had factor loadings of 0.566 and 0.649 respectively. The third component explained the variation of 12.17 percent. This showed that, middle aged farmers are more energetic and enthusiastic to try new idea and their 'n ach' was more scientific and profit oriented. Thus, these variables influenced the knowledge level of backyard poultry farmers (Table 3).

3.2.4 Component IV (Flock size and economic motivation)

Lastly out of 13 variables, flock size had factor loading of 0.524 and economic motivation had factor loading of 0.680. The third component explained the variation of 9.94 percent. This represents that having more birds requires more care and better management skills, scientific practices and finance. This in turn will help them to gain more economic gains. Hence, these variables contributed to higher knowledge of backyard poultry farmers in poultry management practice (Table 3).

Table 1: Profile of backyard poultry farmers of North Karnataka

(n=120)

Sl. No.	Variables	Category	Frequency (f)	Percentage (%)
A.	Socio-personal variables			
1	Age	Young (below 30 years)	11	9.16
		Middle (30 - 50 years)	76	63.33
		Old (above 50 years)	33	27.50
		Total	120	100.00
		Mean = 44.37 SD= 11.51		
2	Education	Illiterate	12	10.00
		Primary school (1st to 4th)	14	11.66
		Middle school (5th to 7th)	32	26.66
		High school (8th to 10th)	38	31.66
		PUC (11th to 12th)	16	13.66
		Graduation (Degree)	8	6.66
		Total	120	100.00
		Mean = 2.47 SD =1.33		
3	Experience in backyard poultry practicing	Less experience (Up to 10 years)	45	37.50
		Medium experience (11 to 20 years)	39	32.50
		High experience (above 20 years)	36	30.00
		Total	120	100.00
		Mean = 18.72 SD =10.18		
4	Flock size	Small (< 17 birds)	39	32.50
		Medium(17 to 49 birds)	64	53.33
		Large (> 49 birds)	17	14.17
		Total	120	100.00
		Mean = 32.94 SD = 29.51		
5	Participation of family members in poultry farming	Low (<10.00 members)	20	16.67
		Medium (10.00 to 12.00 members)	70	58.33
		High (>12.00 members)	30	25.00
		Total	120	100.00
		Mean = 11.27 SD = 1.78		
B.	Communication variables			
6	Extension contact	Low (<0.43)	57	47.50
		Medium (0.43 to 1.41)	34	28.33
		High (> 1.41)	29	24.17
		Total	120	100.00
		Mean = 0.92 SD = 1.15		
7	Social participation	Low (< 0.74)	44	36.67
		Medium (0.74 to 2.31)	51	42.50
		High (> 2.31)	25	20.83
		Total	120	100.00

		Mean- 1.53 SD- 1.78		
8	Mass media exposure	Low (<7.45)	35	29.17
		Medium (7.45 to 9.77)	49	40.83
		High (> 9.77)	36	30.00
		Total	120	100.00
		Mean- 8.61 SD- 2.74		
C.	Psychological variables			
9	Decision making pattern	Low (<56.62)	35	29.17
		Medium (56.62 to 60.74)	37	30.83
		High (>60.74)	48	40.00
		Total	120	100.00
		Mean = 58.68 SD = 4.84		
10	Achievement motivation	Low (<13.78)	34	28.33
		Medium (13.78 to 15.22)	51	42.50
		High (>15.22)	35	29.17
		Total	120	100.00
		Mean = 14.50 SD = 1.69		
11	Economic motivation	Low (<19.66)	33	27.50
		Medium (19.66 to 22.00)	47	39.17
		High (>22.00)	40	33.33
		Total	120	100.00
		Mean = 20.83 SD = 2.75		
12	Scientific orientation	Low (< 5.09)	54	45.00
		Medium (5.09 to 7.01)	36	30.00
		High (> 7.01)	30	25.00
		Total	120	100.00
		Mean = 6.05 SD = 2.26		
13	Risk orientation	Low (< 7.18)	32	26.67
		Medium (7.18 to 9.14)	51	42.50
		High (> 9.14)	37	30.83
		Total	120	100.00
		Mean = 8.16 SD = 2.31		

Table 2: Principal component analysis of profile of backyard poultry farmers with their knowledge of poultry management practices

(n-120)

Sl. No.	Code No.	Independent variables	Factors loading			
			I	II	III	IV
1	X_1	Age	.129	.285	.566	.419
2	X_2	Education	-.345	.365	.462	-.298
3	X_3	Experience in backyard poultry practicing	.161	.504	.324	.022
4	X_4	Flock size	-.311	-.101	.013	.524
5	X_5	Participation of family members in poultry farming	.334	.598	-.347	.362
6	X_6	Extension contact	.323	-.653	-.348	.095
7	X_7	Social participation	.642	-.547	.109	-.042
8	X_8	Mass media exposure	.803	.041	-.101	-.081
9	X_9	Decision making pattern	-.432	-.091	-.184	-.350
10	X10	Achievement motivation	.195	-.506	.649	.109
11	X11	Economic motivation	-.304	-.208	-.077	.680
12	X12	Scientific orientation	.530	-.047	.392	-.084
13	X13	Risk orientation	.623	.524	-.256	.033
		Eigen values (latent roots)	2.517	2.149	1.583	1.293
		Variation explained (%)	19.365	16.532	12.176	9.944
		Cumulative variation explained	19.365	35.897	48.073	58.017

Table 3: Socio-personal, psychological and communication variables contributing to backyard poultry farmers knowledge on management practices

(n=120)

Sl. No.	Variables	Label	Factor loadings
A	Component I		
i.	Communication variables		
	Social participation	X_7	.642
	Mass media exposure	X_8	.803
ii.	Psychological variables		
	Scientific orientation	X12	.530
	Risk orientation	X13	.623
	Variance explained		19.365
B	Component II		
i.	Socio-personal variables		
	Experience in backyard poultry practicing	X_3	.504
	Participation of family members in poultry farming	X_5	.598
ii.	Psychological variables		
	Risk orientation	X13	.524
	Variance explained		16.532
C	Component III		
i.	Socio-personal variables		
	Age	X_1	.566
ii.	Psychological variables		
	Achievement motivation	X10	.649
	Variance explained		12.176
D	Component IV		
i.	Socio-personal variables		
	Flock size	X_4	.524
ii.	Psychological variables		
	Economic motivation	X11	.680
	Variance explained		9.944

Note: Only variables with factor loadings more than 0.50 and above are considered

4. Conclusion

It can be inferred from the study that the principal component analysis carried out has revealed 4 principal components that determine the influence of pre-defined indicators on the knowledge level of backyard poultry farmers. The first component explained the variation of 19.36 percent. Whereas, the second, third and fourth components explained 16.53, 12.17 and 9.94 percent respectively. The first and second component together explained the variation to the extent of 35.86 percent, while all the four components together explained 58.01 percent of variation. Better utilization of different mass medias and participation in organizational activities helps to gain more knowledge in terms of knowing improved management practices. Youngsters are eager to have gain knowledge about scientific management practices and to adopt the same for higher returns. Higher the flock size more will be the returns. All these socio-personal, psychological and communication factors had contributed to knowledge level of backyard poultry farmers. Hence, there is need to impart training on good poultry management practices by Department of Animal Husbandry, KVK and KCPFL to the backyard poultry farmers.

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