



Research Article

LIVESTOCK OWNERS' PERCEPTION TOWARDS WILDLIFE CONFLICT: A METHODOLOGICAL APPROACH

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Abstract- Conflict between livestock owners and wildlife are reported to be increasing over the time that leads to negative consequences on local communities in the vicinity of protected areas. The shift in conservation resulted in restriction of access to natural resources, interference in traditional culture and increased crops damage and livestock depredation vis-a-vis displacement of inhabitant. Understanding the factors influencing perception is essential for designing strategies to mitigate livestock owners-wildlife conflict. In this perspective, a Likert's type scale was constructed to measure the livestock owners' perception towards wildlife conflict. A list of 42 positive and negative (60:40) statements representing the perception of livestock owners was prepared and on the basis of fourteen criteria suggested, fourteen statements were deleted and remaining twenty eight statement sent to the 50 judges who are the experts in the field of livestock owners-wildlife conflict for rating on five point continuums. For finalization of scale value aggregate statement score were calculated based on individual judge's score for each statement. The highest twenty five percent of aggregate statement value with highest score and lowest twenty-five percent of aggregate statement value with lowest score were considered for the scale. On the basis of calculated 't' values, 12 statements (8 positive and 4 negative) were retained in the final scale and finally reliability and validity of the scale also checked which are important characteristics indicate the consistency of the results.

Keywords- Livestock owners, Perception, Scale, Wildlife conflict.

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Introduction

Globally, Conflict between human and wildlife have been reported from all over the world in the recent year and contradiction between wildlife conservation and local people's perception are more serious. In developing countries human-wildlife conflict is more intense where agriculture and livestock farming are important part of people's livelihood and their income [2,3]. Wildlife conservation's success depends on people's perceptions and attitudes towards conservation [4], which shape protected area community relationships [5,6,7]. Information regarding perceptions and attitudes of local peoples living in and around secured areas is important to identify management programmes and strategies that best fit to protect biodiversity alongside the development of local public livelihoods [8,9,10,11]. Local ecological knowledge and its role in wildlife conservation are increasingly receiving much attention [12,13,14] while crop and livestock destruction by wildlife, and restrictions imposed by the reserve authorities in collecting forest products affecting the attitude and perception of the farmers[15]. Local people's knowledge and perceptions about conservation is vital in wildlife protection and also to evaluate the success of conservation projects [16,17]. The success of wildlife conservation depends on the support of local communities living adjacent to a reserve area and for community wildlife conservation to succeed an understanding of the attitudes and perceptions of local communities is paramount [18]. In many studies of wildlife conservation, the assessment of peoples' attitudes and perceptions has become an important aspect [19]. Success about wildlife conservation is influenced by the people's attitudes and perception [20,21]. In the context of protected area management understanding the human attitudes and potential for wildlife conflicts is critically important in designing long-term conservation strategies [8]. Hence, judging attitude and perception of

humans towards wildlife provides understandings on the degree to which peoples are ready to cohabit with wild animals [22]. In general, costs associated with conservation, such as crop damage and livestock predation by wildlife, have negative effects on local attitudes and perception while benefits from conservation may have positive effects. For future effective intervention, plans, which may acceptable to livestock owners an effort has been made to assess livestock owners' perceptions regarding destruction of crops and depredation of livestock.

Materials and Methods

Perception is mental process and interpretation of sensory information. It involves physical signals and psychological factors such as attitude, past experience, social and cultural background influence perception. People interpret sensory perception in different ways depending on previous experiences, selective processes, mental sets and cognitive styles. In this study perception is operationalized as the process of recognizing and interpreting sensory stimuli by the livestock owners towards wildlife. Understanding the process of human perception is crucial to understanding human behaviour. For the development of perception scale summated rating method suggested by [23,24] was followed and the steps given as follow:

Collection of statements: The initial point to construct the perception scale to collect the statements related to the livestock owners perception towards wildlife conflict. A care was taken to include positive and negative (60:40) statements related to livestock owners wildlife conflict in the list. A tentative list of 42 statements was prepared from available literature, consultation with experts in the field of wildlife conservation, forest officers, wildlife inspector and progressive

farmers.

Editing of statements:

By following [1] editing of statements was done as per the 14 informal criteria and finally 28 statements were retained after editing and considered for judge's response.

Feedback to raw statements:

On the basis of five point continuums viz., Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree retained 28 statements were sent through Google forms, post, e-mail and also handed over personally to the total of 50 judges. These judges were experts in the field of extension education, wildlife conservation, forest officers, wildlife inspector and progressive farmers. The judges were requested to indicate their response by marking in appropriate continuum for each statement. After a short duration of time, 44 judges returned the same set of statements after duly recording their judgments. Finally, out of returned 44 judges' response, 12 responses were found imperfect and inappropriate for item analysis.

Analysis of item:

The judges were requested to indicate their agreement or disagreement for each statement with five point continuums that is Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree which was scored as 5, 4, 3, 2, and 1, respectively for positive statements and reverse direction were followed for negative statements. By summing up the response score for each statement, the individual score was calculated.

Calculation of 't' values:

Based upon the calculated individual scores, the judges were organized in a descending order. The highest twenty five percent of aggregate statement value with highest score and lowest twenty five percent of aggregate statement value with lowest score were considered to evaluate the individual statements. Thus, out of 32 judges to whom the statements were administered for the item analysis, 8 judges with top individual scores and 8 judges with bottom scores were used as criteria to evaluate the individual statements.

Table-1 A list of 28 statements with their respective 't' values.

S.N	Statement	t-value
1*	Crop raiding, livestock depredations, killing of pet animals, household items destroyed by wildlife are the reasons for Livestock Owners- Wildlife Conflict	5.13
2*	Wild animals destroyed standing crops in the fields	0.55
3*	Carnivore animals are threat to livestock and people near National Park	1.93
4*	Carnivore attacking livestock is an acceptable risk in livestock farming	0.28
5*	Primates (monkey, langur, etc.) are threat to human and livestock	0.29
6	The protection of wild animal is important for ecological balance	1.94
7	National park is important for livelihood of nearby farming community	0.17
8	Awareness should be created among farming community regarding wildlife protection act/ rules & regulation	0.65
9*	Farmers are afraid of diseases spread by wild animals in the vicinity of National park	0.50
10*	In the vicinity of National park farmers fear to work in their field during odd hours due to wild animal.	2.22
11	There may be chance of spreading zoonotic diseases due to Wild animals	2.36
12*	Establishment of National Parks is a threat for farming community	-0.26
13	Game wildlife species (herbivores) are more important than non-game wildlife (carnivores)	-0.06
14	Wildlife have as much right to exist on protected areas land as we have	1.94
15*	Restriction of farming in the vicinity of the National park can reduce Livestock Owners- Wildlife Conflict	2.30
16*	Restriction of entry of farming community in the National park can reduce Livestock Owners- Wildlife Conflict	0.75
17	The relationship between the official of forest department and farming community is cordial	0.07

18*	Population located within close proximity of National Park is the most terrible/ affected with Livestock Owners- Wildlife Conflict	0.39
19	Livestock owners felt more risk from wildlife than non-livestock owners	2.13
20	Livestock predation, crop raiding should be solved by co-ordination among local, state or central authorities	0.54
21	Current laws are sufficient to protect wildlife and fauna of the National Park	2.21
22*	Do you think that the number of attacks by carnivores have increases these day	0.39
23	The presence of more wildlife in National Park is a sign of a better biodiversity	0.66
24	National Park is the source for fodder to livestock	0.28
25	Fuel woods from National Park is important source of energy for local communities	1.85
26	Promotion of Livestock insurance scheme may reduce the Livestock Owners- Wildlife conflict	1.90
27	Rearing Guard animal by the livestock owners reduce the Livestock Owners- Wildlife conflict	0.89
28	Proper Fencing around the National Park may reduce the Livestock Owners- Wildlife conflict	1.79
* = Indicate Negative Statement		

The critical ratio, that is the 't' value which is a measure of the extent to which a given statement differentiates between the high and low groups of the respondents for each statement was calculated by using the formula given by [1].

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\sum_{i=1}^n (X_H - \bar{X}_H)^2 + \sum_{i=1}^n (X_L - \bar{X}_L)^2}{n(n-1)}}$$

Where,

$$\sum (X_H - \bar{X}_H)^2 = \sum X_H^2 - \frac{(\sum X_H)^2}{n}$$

$$\sum (X_L - \bar{X}_L)^2 = \sum X_L^2 - \frac{(\sum X_L)^2}{n}$$

\bar{X}_H = The mean score on a given statement for the high group;

\bar{X}_L = The mean score on a given statement for the low group;

$\sum X_H^2$ = Sum of squares of the individual score on a given statement for high group

$\sum X_L^2$ = Sum of squares of the individual score on a given statement for low group

$\sum X_H$ = Summation of scores on given statement for high group

$\sum X_L$ = Summation of scores on given statement for low group

n = Number of subject in low and high group

t = The extent to which a given statement differentiate between the high and low group.

\sum = Summation

Example:

Sample Statement: Crop raiding, livestock depredations, killing of pet animals, household items destroyed by wildlife are the reasons for Livestock Owners- Wildlife Conflict. The calculation of 't' value for measuring the extent to which a given statement differentiates between the high and low groups of the respondents.

$$\bar{X}_H = \frac{31}{8} = 3.87 \quad \bar{X}_L = \frac{13}{8} = 1.62$$

$$\sum (X_H - \bar{X}_H)^2 = \sum X_H^2 - \frac{(\sum X_H)^2}{n}$$

$$\sum (X_L - \bar{X}_L)^2 = \sum X_L^2 - \frac{(\sum X_L)^2}{n}$$

$$\sum (X_H - \bar{X}_H)^2 = 129 - \frac{(31)^2}{8} \quad \sum (X_L - \bar{X}_L)^2 = 23 - \frac{(13)^2}{8}$$

$$=8.87 \quad =1.87$$

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\sum_{i=1}^n (X_H - \bar{X}_H)^2 + \sum_{i=1}^n (X_L - \bar{X}_L)^2}{n(n-1)}}$$

$$= \frac{3.87 - 1.62}{\sqrt{\frac{8.87 + 1.87}{8(8-1)}}}$$

$$t=5.13$$

The calculation of 't' for evaluating the difference in the mean response to perception statement by a high group and a low group

Response Categories	High group					Low group				
	X	X ²	f	fX	fX ²	X	X ²	f	fX	fX ²
Strongly Agree	5	25	3	15	75	5	25	0	0	0
Agree	4	16	2	8	12	4	16	0	0	0
Undecided	3	9	2	6	6	3	9	0	0	0
Disagree	2	4	1	2	2	2	4	5	10	20
Strongly Disagree	1	1	0	0	0	1	1	3	3	4
Sums	55	8	31	129	129	55	8	13	23	23
		ΣX_H	ΣX_H^2				ΣX_L	ΣX_L^2		

Where, X = Score assigned to the response category; f = Frequency

The 't' value is a measure of the extent to which a given statement differentiates between the high and low groups. As a crude and approximate rule of thumb, we may regard any 't' value equal to or greater than 1.75 as indicating that the average response of high and low groups to a statement differs significantly. Thus, 12 (8 positive and 4 negative) statements for measuring the livestock owners' perception towards wildlife with significant 't' values were retained in the final scale [Table-2].

Table-2 A list of selected statements for final scale construction with their respective 't' values

S.N	Statements	t-value
1*	Crop raiding, livestock depredation, killing of pet animals, household items destroyed by wildlife are the reasons for Livestock Owners- Wildlife Conflict	5.13
2*	Carnivore animals are threat to livestock and people near National Park	1.93
3	The protection of wild animal is important for ecological balance	1.94
4*	In the vicinity of National park farmers fear to work in their field during odd hours due to wild animal.	2.22
5	There may be chance of spreading zoonotic diseases due to Wild animals	2.36
6	Wildlife have as much right to exist on protected areas land as we have	1.94
7*	Restriction of farming in the vicinity of the National park can reduce Livestock Owners- Wildlife Conflict	2.30
8	Livestock owners felt more risk from wildlife than non-livestock owners	2.13
9	Current laws are sufficient to protect wildlife and fauna of the National Park	2.21
10	Fuel woods from National Park is important source of energy for local communities	1.85
11	Promotion of Livestock insurance scheme may reduce the Livestock Owners- Wildlife conflict	1.90
12	Proper Fencing around the National Park may reduce the Livestock Owners- Wildlife conflict	1.79

*= Indicate Negative Statement

Standardization of the scale: For standardization of the scale validity and reliability was ascertained by following split half method and content validity

respectively.

Reliability of the scale: Reliability of scale is the degree to give consistently the same results when it applied to the similar sample. The final set of the 12 statements which represent the livestock owners' perception towards wildlife, was administered on five point continuums to a fresh group of 20 livestock owners in the vicinity of protected area (10% of actual sample size for the study) from non-sample area and which was not included in the definite sample size. Developed perception scale was pre-tested for its reliability by using the split half method. One half (one set) contains the odd numbered statements (1, 3,.....,11) and the other half (other set) contains the even numbered statements (2, 4,.....,12). The total individual score of each livestock owners was calculated by summing up the responses given by two halves statements for livestock owners. The value of correlation coefficient (r_{hh}) scores of two halves was 0.71. The positive and significant correlation between the two sets of scores indicated that the scale was reliable. The formula given by [24,25] was used for calculation of reliability coefficient as follows;

$$r_{SB} = \frac{2r_{hh}}{1 + r_{hh}}$$

Where,

r_{SB}= Reliability coefficient of the whole scale

r_{hh} = Reliability coefficient of the half-scale, found experimentally i. e. 0.71

$$r_{SB} = \frac{2 * 0.71}{1 + 0.71}$$

$$= \frac{1.42}{1.71}$$

r = 0.83

Where, The reliability coefficient of whole scale was 0.83 which found significant and positive indicated that the scale was fulfilling the criteria of reliability.

Validation of the scale: It is the characteristics that confirm the obtained test score as valid, if and only it measure what it supposed to measure. The content validity of the scale was verified by experts' judgment and it is representative or sampling adequacy of the content. The content of the perception scale was comprehensively covered through literature scan and experts opinion. The statements which have at least 80% judges' agreement were retained and this indicated validity of the scale content.

Administration of the scale:

The final scale consisting of 12 [Table-3] statements can be administered to the livestock owners' perception towards wildlife on a five continuums viz., Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D) and Strongly Disagree (SDA) with a score of 5,4,3,2 and 1, respectively for positive statements and opposite scoring pattern for negative statements. The complete possible highest and lowest score ranges from 60 to 12. The highest value will indicate that livestock owners have high level of perception towards wildlife.

Conclusion

In social science the scale is a useful instrument in data collection; reliability and validity of the scale are two important characteristics, which indicate the consistency of the results. Perception scale for livestock owners' towards wildlife conflict is invaluable asset for researchers as well as policy makers for framing the programmes and projects which seek to reduce wildlife conflict and vulnerabilities of farmers. As the scale contains both positive and negative statements so overall it is suitable to assess the view regarding livestock owners' towards wildlife conflict. This scale can be used further beyond the study area with suitable modifications and evaluation of reliability and validity of it.

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Table-3 Standardized scale to measure the livestock owners' perception towards wildlife.

S.N.	Statement	SA	A	UD	D	SDA
1*	Crop raiding, livestock depredation, killing of pet animals, household items destroyed by wildlife are the reasons for Livestock Owners- Wildlife Conflict					
2*	Carnivore animals are threat to livestock and people near National Park					
3	The protection of wild animal is important for ecological balance					
4*	In the vicinity of National park farmers fear to work in their field during odd hours due to wild animal.					
5	There may be chance of spreading zoonotic diseases due to Wild animals					
6	Wildlife have as much right to exist on protected areas land as we have					
7*	Restriction of farming in the vicinity of the National park can reduce Livestock Owners- Wildlife Conflict					
8	Livestock owners felt more risk from wildlife than non-livestock owners					
9	Current laws are sufficient to protect wildlife and fauna of the National Park					
10	Fuel woods from National Park is important source of energy for local communities					
11	Promotion of Livestock insurance scheme may reduce the Livestock Owners- Wildlife conflict					
12	Proper Fencing around the National Park may reduce the Livestock Owners- Wildlife conflict					
*Negative Statement, SA- Strongly Agree; A- Agree; UD- Undecided; D- Disagree; SDA- Strongly Disagree						

Conflict of Interest: None declared**References**

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