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RESEARCH ARTICLE

Construction of Knowledge Test to Measure the Knowledge of Farmers about Existing Opportunities of Rearing Buffaloes as Fattening Animal

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ABSTRACT

The study aimed to construct a knowledge test to measure the knowledge of farmers about existing opportunities of rearing buffaloes as fattening animals. A total of 46 items were initially constructed to promote thinking rather than root memorization and differentiate the well-informed dairy farmers from the less informed ones. Then, the scores from sample respondents were subjected to item analysis, comprising of item difficulty index and item discrimination index. The final scale consisted of 15 items with a difficulty index ranging from 30-80 and a discrimination index ranging from 0.30 to 0.55. The reliability of the knowledge test developed was tested by split half and test-retest method. The coefficient of correlation values in split half and test-retest methods were 0.70 and 0.64, respectively, which were found to be significant at 1 percent level. It was found that the knowledge test constructed was highly stable, reliable and dependable for measurement.

***Key words**: Knowledge; Farmers; Fattening Animals; Item Analysis; etc.*

Despite having 58 per cent (109.85 million, 20th Livestock Census, 2019) of the world's buffalo population and contributing about 30 percent of total meat production in the country, India has yet to exploit the opportunities in the meat sector fully. To tap this potential of the meat sector in India, entrepreneurship development among rural farmers about fattening buffaloes for meat production is the need of the hour. To explore opportunities in this sector, it is essential to know farmers' knowledge about existing opportunities for rearing buffaloes as fattening animals. A reliable and valid knowledge test is required for this purpose. *Bloom. et al. (1995)* defined knowledge as those behaviors and test situations which emphasizes remembering by the recall of ideas, material or phenomenon. In the present study, the term knowledge was conceptualized as the understood information about existing opportunities of rearing buffaloes as fattening animals. In this context, the study was undertaken to construct a knowledge test to measure the knowledge of farmers.

METHODOLOGY

The procedure followed by *Devarani and Bandhyopadhyay (2014), Chatterjee et al. (2020), Marbaniang et al. (2021),* and *Bharti and Sagar (2022)* for the construction of the knowledge test was adopted with little modifications for this study.

The steps followed in the construction of the knowledge test are as follows:

Item collection: The content of the knowledge test comprises questions, also called items. These items were collected from various sources, such as literature, field extension personnel, subject matter specialists and the researcher's own experience. The questions were developed to test farmers' knowledge about existing opportunities of rearing buffaloes as fattening animals.

Initial selection of items: The selection of items was done based on the following criteria:

i) It should encourage thinking rather than rote memorization, and

ii) It should differentiate between the well informed dairy farmers and the poorly informed ones and should have a certain difficulty value.

The procedure followed in the selection of the test items was on the lines used by *Lindquist (1951),*

Moulik (1965) and Dhargupta (2008). Based on these two criteria, 46 items were initially constructed in a dichotomous and multiple choice formats.

Preliminary administration of test: The items were checked and modified based on pre-testing and administered to 60 randomly selected dairy farmers for item analysis. Each of the 60 respondents was given a score 1 for the correct answer or 0 for an incorrect answer. The total number of correct answers given by a farmer out of 46 items was the knowledge score secured by him/ her. After calculating the scores obtained from 60 dairy farmers, the scores were arranged in descending order. These 60 farmers were then divided into six equal groups (G1, G2, G3, G4, G5 and G6) each having ten farmers. Based on the total score obtained by each respondent, they were arranged in descending order. Four extreme groups i.e. two with high and two with low scores were taken into account for the computation of item difficulty and item discrimination indices.

Item analysis: Guilford (1954) pointed out that an item analysis of a test usually provides two kinds of information. It gives an index of item difficulty and item discrimination for each item. The item difficulty indicates how difficult an item is, whereas, the index of item discrimination tells us how well the item measures or discriminates in agreement with the rest of the scale or how well it foresees some external criterion.

Item difficulty index (P): The difficulty index of an item was described as the proportions of farmers giving correct answers to that particular item. This was calculated by the formula given below,

$$Pi = \frac{ni}{Ni} \times 100$$

where,

Pi = Difficulty index in the percentage of i^{th} item

ni = Number of farmers giving correct answers to i^{th} item

Ni = It is total number of respondents to whom the i^{th} item was administered

Item discrimination index ($E^{1/3}$): The discrimination index was derived by calculating the *Phi-co-efficient* as formulated by Perry and Michael (1951). However, Mehta (1958) in using the $E^{1/3}$ method to find out item discrimination highlighted that this method was analogous to *Phi-co-efficient*, and therefore, can be conveniently substituted with the *Phi-co-efficient*. The method proposed by Mehta (1958) was used for the study. The formula used for calculating an item discrimination index is given below:

$$E^{1/3} = \frac{(S1 + S2) - (S5 + S6)}{N/3}$$

Where,

S1, S2, S5 and S6 were frequencies of the correct answers in G1, G2, G5 and G6 groups, respectively and

N=Total number of dairy farmers in the sample of the item analysis.

Selection of items for the test: Item difficulty and item discrimination index were the two criteria considered for selection of items in the final format of the knowledge test. In the present study, items with difficulty index between 30 to 80 and the discrimination index between 0.30 to 0.55 were included in the final knowledge test. Item difficulty index and item discrimination index of all the 46 items were calculated (Table 1) and fifteen items which fulfilled both the criteria were selected for the final format of the knowledge test (Table 2).

Scoring method: The summing up of scores for correct replies over all the items of a particular respondent indicated his level of knowledge about existing opportunities of rearing buffaloes as fattening animals. The range of scores was, therefore, from 0 to 15.

Reliability: The reliability testing of the knowledge test developed was done by split-half method and test-retest method.

Split-half method: All the 15 items of the knowledge test were first arranged randomly and then divided into two sets of 8 and 7 items. These two sets having fifteen items were administered to 50 respondents separately. The coefficient of correlation between two sets of scores was computed and the 'r' value of 0.70 was found to be significant at 1 percent level of significance. The reliability coefficient, thus obtained, indicated that the 'internal consistency' of the knowledge test developed for the study was quite high.

Test-retest method: The knowledge test with 15 items was administered to 30 dairy farmers, twice at an interval of 15 days. The co-efficient of correlation value was 0.64 which was found to be significant at 1 percent level. Hence, the knowledge test developed was highly stable and dependable for measurement.

Content validity of knowledge Test: In the final selection of items, care was taken to include items covering the entire universe of relevant behavioural aspects of the respondents with respect to knowledge about existing opportunities of rearing buffaloes as fattening animals. Items were collected through various sources

Table 1. Knowledge items with difficulty index and the discrimination index

Knowledge items	Difficulty index (P)	Discrimination index ($E^{1/3}$)
Name the city which has organized/mechanized abattoirs in the state for slaughtering buffaloes? a) Mumbai/Aurangabad b) Any other c) No idea	60.00	0.40
Which country has the largest buffalo population in the world? a) India b) China	72.50	0.05
Do you know by putting additional weight on male calves prior to slaughter can fetch good price? a) I know b) I don't know	45.00	0.30
Which country is number one in exporting beef in the world? a) India b) China	72.50	0.05
Rearing buffalo calves for fattening will generate additional income. a) True b) False	27.50	0.25
Have you heard about the pink/red revolution? a) Yes b) No	77.50	0.05
What is the age at which the young male buffaloes are slaughtered? a) Less than 12 months b) 12-24 months c) 24-30 months d) More than 30 months	47.50	0.35
Do you know there is a huge demand for Indian buffalo meat abroad? a) I know b) I don't know	65.00	0.30
Do you know the mortality rate in male Buffalo calves can be reduced by rearing them scientifically? a) I know b) I don't know	72.50	0.25
Do you think buffalo calves rearing for meat will raise the standard of living of small and marginal farmers in the long run? a) Yes b) No	17.50	0.15
Do you know buffalo meat has low cholesterol and fat than beef? a) I know b) I don't know	62.50	0.05
Do you know millions of male buffalo calves are culled annually? a) Yes b) No	40.00	0.30
Do you know buffaloes have a unique ability to convert coarse feeds, straws and crop residues into protein rich lean meat? a) I know b) I don't know	65.00	0.30
What is the average dressing percentage of buffalo on moderate ration? a) 50-54 b) 55-59 c) 60-64 d) 65-69	80.00	0.10
Buffaloes have a higher degree of resistance and tolerance than cattle against many diseases. a) True b) False	60.00	0.10
Do you know quality meat production and quality leather production are interlinked? a) I know b) I don't know	67.50	0.05
Do you think there is scope for buffalo rearing under 'Contractual Farming as Backward Integration' to the modern abattoirs for meat production? a) Yes b) No	55.00	0.50
Which of the following animal is known as 'black gold'? a) Buffalo b) Cattle	80.00	0.10
Do you know the castration of male calves helps in rapid fattening? a) Yes, I know b) I don't know	75.00	0.20
To get faster weight gain calves need high protein/energy rich ration? a) Agree b) Disagree	17.50	0.15
Do you know the government scheme 'salvaging and rearing of male buffalo calves' for meat production? a) Yes b) No	75.00	0.30
Meat can be a main source of income than milk from buffaloes. a) Agree b) Disagree	87.50	0.05
What is the average weight when the young male buffaloes are slaughtered? a) Less than 250 Kg b) 250-300 Kg b) 300-350 Kg d) More than 350 Kg	30.00	0.10
Do you know buffalo meat production has an opportunity for export? a) Yes b) No	15.00	0.10
It is uneconomical to dispose male buffalo calves. a) True b) False	55.00	0.00
Do you know there are huge employment opportunities in the meat sector, viz. trade of live animals, hides, bones, casings, horns and hooves, etc? a) I know b) I don't know	67.50	0.45
Buffalo meat has 2-3 fold cost advantage over mutton and chevon. a) True b) False	85.00	0.10
The utility of buffalo meat in meat processing is on increase because of higher content of lean meat and less fat. a) Agree b) Disagree	32.50	0.05
Do you know APEDA encourages buffalo meat export? a) Yes b) No	17.50	0.25
Do you know Indian buffalo meat has large export potential because it is free from BSE (Bovine Spongiform Encephalopathy), Rinderpest and Contagious Bovine Pleuropneumonia? a) Yes b) No	20.00	0.30

Do you know buffalo meat is tender, tasty and healthy red meat, which can be a substitute for beef? a) Yes b) No	80.00	0.20
Rearing male buffalo calves for meat production is remunerative activity. a) Agree b) Disagree	75.00	0.10
Buffalo skin has huge demand in the leather industry. a) Yes, I know b) I don't know	12.50	0.05
Do you think buffalo meat production can diversify agro-enterprises? a) Yes b) No	57.50	0.35
Family labour especially farm women can be effectively utilized in rearing male buffalo calves for fattening. a) Agree b) Disagree	52.50	0.45
Do you know buffaloes gain weight faster than cattle? a) Yes, I know b) I don't know	75.00	0.30
Ban on beef is an opportunity to enhance buffalo meat production. a) Agree b) Disagree	67.50	-0.05
Buffalo carcass has a higher proportion of muscle and a lower ratio of bone and fat than cattle carcass. a) Agree b) Disagree	15.00	0.30
Do you know sanitary and phytosanitary (SPS) measures adopted by the exporting units as they are required? a) Yes b) No	12.50	0.15
Do you know about management practices of rearing buffaloes for meat production? a) Yes b) No	80.00	0.30
Buffalo meat is the cheapest source of protein to the weaker section of the society. a) True b) False	55.00	0.20
Do you know stress free and safe transport of animals is important for quality meat production? a) Yes b) No	72.50	0.05
Government of India's Meat Export Policy facilitates meat production and export from male buffalo calves. a) I know b) I don't know	65.00	0.10
Do you think market information and farm/ market infrastructures are lacking about the fattening of buffaloes? a) Yes b) No	50.00	0.40
Rearing buffalo calves for meat production will increase employment opportunities and ensure better livelihood to farmers, thereby reduce poverty. a) Agree b) Disagree	77.50	0.35
Buffalo meat and leather product export has the potential to improve India's foreign exchange earnings. a) Agree b) Disagree	77.50	0.25

as discussed earlier and include materials from literature, expert's opinions, findings of past work and discussions with extension workers, including specialists. Hence, it was assumed that the scores obtained by administrating this test – measured knowledge of the respondents as intended.

CONCLUSION

The standard test developed to measure the knowledge level of farmers about existing opportunities to rear buffaloes as fattening animals will be helpful for extension workers in the assessment and formulation of need-based planning for the socio-economic development of farmers. It will also be beneficial for the researchers to find out the number of items related to measuring the knowledge level of the farmers. The knowledge test constructed was highly stable, reliable and dependable for measuring the knowledge level of the dairy farmers. It can be used beyond the study area by making suitable modifications.

REFERENCES

Bharti, R. and Sagar, M.P. 2022. Construction and Standardization of Knowledge Test for Broiler Farmers Regarding Scientific Broiler Farming Practices. *Indian Res. J. Ext. Edu.* **22** (4) : 89-93

Bloom, B.; Englehart, M.F.; Hill, W. and Krathwohl, D. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain.

Chatterjee, D.; Jha, S.K. and Maiti, S. (2020). Development of knowledge test regarding method of preparation of traditional dairy products. *Indian Res. J. Ext. Edu.* **20** (2&3) : 17-21 .

Devarani, L. and Bandhyopadhyay, A.K. (2014). Development of gender-disaggregated knowledge test for measuring knowledge level of farmers in improved rice cultivation. *Indian Res. J. Ext. Edu.* **14** (1) : 30-35.

Dhargupta, A. 2008. Study on health status of selected tribal communities in West Bengal. Thesis, Ph.D. University of Calcutta, Kolkata, West Bengal.

Guilford, J. P. 1954. Psychometric Methods. Mc Graw Hill, New York.

Lindquist, E. F. 1951. Educational Measurement. American Council on Education, Washington, D.C.

Marbaniang, E.K., Chauhan, J.K., Devarani, L., Singh, R.J., Singh R. and Hemochandra. L., 2021. Knowledge Test Scale to Measure the Knowledge Level of the Village Councillors about MGNREGA in Meghalaya. *Indian Res. J. Ext. Edu*. **21** (4) : 56-62

Table 2. Scale to measure knowledge level of farmers about existing opportunities of rearing buffaloes as a fattening animal

Name the city which has organized/mechanized abattoirs in the state for slaughtering buffaloes? a) Mumbai/Aurangabad (1) b) Any other (1) c) No idea (0)
Do you know by putting additional weight on male calves prior to slaughter can fetch good price? a) I know (1) b) I don't know (0)
What is the age at which the young male buffaloes are slaughtered? a) Less than 12 months (0) b) 12-24 months (1) c) 24-30 months (0) d) More than 30 months (0)
Do you know there is a huge demand for Indian buffalo meat abroad? a) I know (1) b) I don't know (0)
Do you know millions of male buffalo calves are culled annually? a) Yes (1) b) No (0)
Do you know buffaloes have a unique ability to convert coarse feeds, straws and crop residues into protein rich lean meat? a) I know (1) b) I don't know (0)
Do you think there is scope for buffalo rearing under 'Contractual Farming as Backward Integration' to the modern abattoirs for meat production? a) Yes (1) b) No (0)
Do you know the government scheme 'salvaging and rearing of male buffalo calves' for meat production? a) Yes (1) b) No (0)
Do you know there are huge employment opportunities in the meat sector, viz. trade of live animals, hides, bones, casings, horns and hooves, etc? a) I know (1) b) I don't know (0)
Do you think buffalo meat production can diversify agro-enterprises? a) Yes (1) b) No (0)
Family labour especially farm women can be effectively utilized in rearing male buffalo calves for fattening. a) Agree (1) b) Disagree (0)
Do you know buffaloes gain weight faster than cattle? a) Yes, I know (1) b) I don't know (0)
Do you know about management practices of rearing buffaloes for meat production? a) Yes (1) b) No (0)
Do you think market information and farm/ market infrastructures are lacking about the fattening of buffaloes? a) Yes (1) b) No (0)
Rearing buffalo calves for meat production will increase employment opportunities and ensure better livelihood to farmers, thereby reduce poverty. a) Agree (1) b) Disagree (0)

Scoring: Correct answer (1) and Incorrect answer (0)

Mehta, P. 1958. A study of communication of agricultural information and the extent of distortion occurring from district to village level workers in selected I.A.D.P. districts. Thesis, Ph.D. Uni of Udaypur, Rajasthan.

Moulik, T. K. 1965. A study of the predictive values of some factors of adoption of nitrogenous fertilizers and the influence of source of information on adoption behavior. Thesis, Ph.D. ICAR-Indian Agricultural Research Institute, New Delhi.

Perry, N. C. and Michael, W. B. 1951. The estimation of a Phi-Coefficient for an entire criterion group from a Phi-Coefficient calculated from the use of extreme Tails of a normal distribution of criterion scores. Educational Psychology Measurement, **11**: 629-639

Twentieth Livestock Census, 2019. Key Results (Provisional), Ministry of Fisheries, Animal Husbandry and Dairying, Department of Animal Husbandry and Dairying, Krishi Bhawan, New Delhi. Retrieved on January 23, 2020, from http://dadf.gov.in/sites/default/filess/

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