

A TEST TO MEASURE THE KNOWLEDGE OF DAIRY FARMERS ON IMPROVED FEED AND FODDER MANAGEMENT PRACTICES

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ABSTRACT

The present study was conducted to develop a knowledge test to measure the extent of the knowledge level of the dairy farmers regarding improved feed and fodder management practices in different agro-climatic zones of Karnataka. This study helps us to find out the knowledge level of different aspects of feeding practices and also different fodder cultivation. Relevant items were gathered that covered different feed and fodder management practices. After consulting with experts on the test items, item analysis, difficulty index, and discrimination index were calculated. All 35 items were administered, for each correct answer, a score of one was awarded, while a score of zero was given for each incorrect response. Items ranging in difficulty index from 25 to 75 and discrimination index values greater than 0.20 were recommended for the knowledge test. Based on their knowledge score, the farmers' total score on all test items was calculated, out of 35 items 19 items were considered for the knowledge test fulfilling both the criteria, and their reliability were calculated using point biserial correlation.

Keywords: feed and fodder management, knowledge, dairy farmers, dairy animals

INTRODUCTION

In India, livestock rearing is a significant source of revenue and employment for the rural population. Draught power, food, and fertilizer are all provided by livestock to farmers (Kapadiya *et al.*, 2022). In terms of size and volume, it makes a significant contribution to the agricultural industry. A chronic scarcity of cattle feeds, along with low-quality fodder, has created a serious bottleneck in the country's dairy industry. More emphasis on feed concentrates feeding increased the cost of milk production in intensive dairy farming. However, it is estimated (Anon., 2017) that by 2025 the requirement of the dry fodder is about 550 million tonnes, green fodder is about 1000 million tonnes and requirement of concentrates is 1000 million tonnes and concentrates requirement is about 105 million tonnes with availability of 433, 600 and 65 million tonnes respectively; this indicates that farmers are facing the deficit of the fodder. To make the dairy industry more profitable, particularly at the grass-roots level, dairy farmers must have the expertise to implement improved dairy management practices where feed and fodder management is most important part of dairy farming.

The past studies highlight the importance of the development and inclusion of knowledge tests to calculate the knowledge level of the farmers as done by Kapadia *et al.* (2022) on the Knowledge level of dairy farmers regarding

scientific dairy husbandry practices, work done by Srinivasa *et al.* (2014) on Construction of Knowledge Test to Measure the Knowledge of Agriculture Officers on IPM, INM and IWM Practices and by Latha *et al.* (2022) on measure the knowledge of input dealers on crop production technologies, Baraiya *et al.* (2022) in their study Assessing knowledge level and analyzing constraints of Organic farmers in Jamnagar district of Gujarat and Bhabhor *et al.* (2020) Knowledge of livestock farmers about various zoonotic diseases. Considering these, the current study focused on developing a standardized knowledge test to assess the knowledge level of dairy farmers regarding improved feed and fodder management practices so that based on their knowledge level further strategies can be developed to make adequate available feed fodder to dairy animals.

OBJECTIVE

To construct and standardize teacher-made knowledge test to measure the extent of knowledge of improved feed and fodder management practices

METHODOLOGY

The details of the construction and standardization of this knowledge test are given below. The procedure followed in developing the knowledge test is as under:

Collection of items

With the assistance of experts, going through different literature and items were gathered from a variety of places a knowledge test was prepared, with multiple items on different matters.

Selection of Items

The first attempt was to create knowledge items that were determined to be acceptable for assessing dairy farmers' knowledge of various feed and fodder management practices. A thorough assessment of relevant literature and discussion with experts were conducted to ensure content validity, and 42 knowledge items were created as a result. A total of 35 items were filtered out after necessary changes were made. The approach proposed by Anastasi (1961), Srinivas *et al.* (2014) and Naveenkumar and Sendilkumar (2015) was used to standardize the selected elements. 48 dairy farmers from non-sampling regions were chosen randomly for the study. The 35 knowledge items were interviewed by the 48 dairy farmers who were chosen at random, and their replies were used to calculate the difficulty index and discrimination index of each item.

Scoring Pattern

The respondents were asked to indicate their answers to each item on the knowledge test, with right responses receiving a score of '1' and wrong responses receiving a score of '0.' The overall knowledge score for each question was computed by adding all of the respondents' scores to the item. The difficulty index and discrimination index were derived as a result of this.

Difficulty Index (P)

The difficulty index determines how complicated a given question is. An item should neither be too simple to be answered by everyone nor should it be too complicated to be answered by none of them. In this study, the item difficulty index P was calculated as the proportion of respondents who answered a question correctly. The formula was used to figure it out.

$$P = \frac{NC}{N}$$

Where,

P = Difficulty index,

NC = Number of respondents who answered correctly

N = Total number of respondents.

Obtained index values of questions range from 0-1 The item is simpler to obtain the higher the value. P

values greater than 0.75 indicate easy things that should not be tested. P scores less than 0.25 suggest that the items are challenging and should be evaluated for possible revisions and changes. For the effective distinction between high and low levels of knowledge, the appropriate difficulty level is 0.50. Items with P values between 0.25 and 0.75 were examined and included in the final knowledge test in this study.

Item Discrimination

The discriminating power of a test item, also known as item discrimination, refers to the extent to which success or failure may be predicted. The presence of an object signifies that it is in the owner's possession. measuring one's abilities (Singh, 2013). It controls the amount to which an object can be modified, and discriminates against the respondents of the skill measured by the item. The discrimination index is calculated using the following formula greatest and lowest percentages of responders' scores were calculated for each item.

$$E^{1/3} = \frac{S_1 - S_3}{N/3}$$

Where E is the discrimination index, S₁ and S₃ are the frequencies of the correct responses of upper and lower limits respectively and N is the total number of respondents. It was determined based on the proportion of the population. of those who answered correctly responses. This number is in the range of -1.00 and +1.00 are the two extremes. The higher the value, the better the item's discriminating power. Negatively discriminatory items are rejected. Following Barman and Kumar (2010), items with a discrimination index greater than 0.20 were chosen for the final knowledge exam. The item difficulty index and discrimination index were calculated using the item analysis approach described in the methodology.

Point biserial correlation (rbis)

The main aim of calculating Point biserial correlation (rbis) was to work the internal consistency of the items i.e., the relationship of the total score to a dichotomized answer to any given item. In a way, the validity power of the item was computed by the correlation of the individual item of the preliminary knowledge test calculated by using the formula suggested by Garret (1969):

$$r_{pb} = \frac{M_p - M_q}{\sigma} \times \sqrt{pq}$$

Where,

r_{pb} = Point biserial correlation

Mp = Mean of the total scores of the respondents who were selected for the final knowledge test.
answered the item correctly.

Mq = Mean of the total scores of the respondents who answered the item incorrectly.

= Standard deviation of entire sample

p = Proportion of respondents giving the correct answer to the item.

q = Proportion of respondents giving an incorrect answer to the item.

Items having point biserial values more than 0.20

were selected for the final knowledge test.

Final Selection of the items

The items, which met all the following conditions were finally selected for the knowledge test:

(1) Items with difficulty level indices ranging from 0.25 to 0.75

(2) Items with discrimination indices above 0.20

(3) Items having a significant point biserial correlation of at least 0.20 were recommended

Table 1 : Difficulty and Discrimination Indices of the Knowledge Items

Sr. No.	Items	Difficulty Index (P) (%)	Discrimination Index	Point biserial correlation
1	Do you know different crops that are used specifically for fodder purposes in your area? If yes mention them.	0.97	0.06	0.12
2	Do you prepare the seed bed for growing fodder?	0.85	0.19	0.15
3	Name of fodder tree that you feed your animals	0.85	0.25	0.20
4	Name the cropping pattern that you are following to grow fodder	0.71	0.31	0.40
5	Do you have an idea of the quantity of mineral mixture required for lactating & pregnant animals per day?	0.69	0.25	0.30
6	Do you know what is balanced feed? Yes/No If yes, what do you mean by it	0.73	0.27	0.28
7	What are the advantages of balanced feed?	0.85	0.25	0.15
8	Are you giving balanced feed?	0.83	0.19	0.15
9	Are you giving a mineral mixture?	0.54	0.13	0.30
10	Do you provide clean drinking water to the animals?	0.71	0.31	0.40
11	Why should an animal be given a balanced ration?	0.67	0.29	0.28
12	Should the balanced ratio contain all the nutrients required by the animal?	0.70	0.31	0.21
13	Should all the available concentrates be added to the animal ration?	0.87	0.19	0.18
14	What are the methods of green fodder preservation?	0.71	0.29	0.23
15	While growing and sowing, should all the fodders be mixed?	0.73	0.29	0.28
16	Why should green fodder be preserved?	0.57	0.23	0.25
17	If we are not preserving the green fodder, what sort of losses do we have to suffer?	0.49	0.23	0.24
18	Is there a necessity of giving additional feed for 7-8 months pregnant animals?	0.61	0.19	0.28
19	Why fodder is grown in a mixture of legumes and non-legume?	0.69	0.23	0.36
20	While growing and sowing, should all the fodders be mixed?	0.91	0.13	0.16
21	What are the advantages of colostrum feeding?	0.87	0.25	0.18
22	Milk/colostrum should be fed 10 percent of its body weight	0.75	0.06	-0.06
23	The new born calf should be allowed to suck its mother	0.77	0.38	0.19

Sr. No	Items	Difficulty Index (P) (%)	Discrimination Index	Point biseral correlation
24	How much concentrate ration should be provided for a growing heifer?	0.85	0.31	0.16
25	How much quantity of green fodder should be provided for a heifer in a day?	0.87	0.06	0.01
26	How much quantity of mineral mixture should be provided for a heifer in a day?	0.61	0.13	0.28
27	How much ration is to be provided to advanced pregnant animals?	0.69	0.31	0.35
28	How many times green/dry fodder should be provided for pregnant animals?	0.72	0.06	0.12
29	Quantity of mineral mixture provided to the milking animals in a day.	0.89	0.19	0.10
30	Which is the best feeding system for dry animals?	0.71	0.13	0.21
31	What is the green fodder scarcity period?	0.87	0.13	-0.01
32	Do you know how to preserve fodder by Silage making?	0.75	0.31	0.28
33	Do you know how to preserve fodder by Hay making Hay making?	0.83	0.19	0.18
34	Do you practice the Enrichment of straw?	0.75	0.38	0.28
35	Do you know about feed combinations to be followed for lactating dairy animal?	0.65	0.25	0.29

The items in the knowledge test were administered to the respondents in the local language and their responses were recorded and calculated in their difficulty index and discriminative index. The results of the knowledge test obtained were as follows in Table 1. Out of 35 items, 19 items were finally selected where items represented both improved feed and fodder management practices where their respective difficulty index ranged from 0.25 to 0.75 and discriminative index greater than 0.20. As a result, 19 of these items were chosen to be included in the final knowledge test following both criteria.

Reliability of the test

Reliability refers to the consistency of scores obtained by the same individuals when re-examined with the same test on different occasions or different sets of equivalent items or under variable examining conditions. In this study, the reliability of the test was assessed by using the “split-half” technique. The final knowledge test containing a total of 19 items was divided into two sets containing odd and even-numbered items. The two test sets were administered to 30 respondents in the non-sampling area. The total score obtained by each respondent in odd and even numbered item sets were calculated separately and Pearson correlation coefficient between the two sets was calculated. The “r” value obtained was 0.626, which is significant at 1% level of probability indicating the knowledge test had a high level of internal consistency & was sufficiently reliable.

Validity of the test

Knowledge test developed on improved feed and fodder was subjected to content and construct validity. The construct validity of the test items was tested by the method of point biserial correlation (rpbis). The items having point biserial values more than 0.20 indicated the validity of the test. According to Anastasi (1961), content validity involves essentially the systematic examination of test content to determine whether it covers a representative sample of the behaviour domain to be measured. All items of the test of improved feed and fodder management practices were collected from various sources as discussed earlier. It was assumed that the score obtained by administering the knowledge test of this study measures what was intended to measure.

RESULTS AND DISCUSSION

Dairy farming is wholly dependent on the type of feed and fodder fed to dairy animals and also on how much quantity is fed. Knowledge is a person’s cognitive behaviour. The result of the learning process is the corpus of knowledge. Once information is obtained, it alters a person’s thought process, which results in more attitude changes and aids farmers in making thoughtful decisions. It is necessary before any agricultural invention is adopted. With this perspective, Teacher made test was constructed to test knowledge of dairy farmers regarding feed and fodder management practices. The item difficulty index and discrimination index were

calculated using the item analysis approach described in the methodology. The items in the knowledge test were administered to the respondents in the local language and their responses were recorded and calculated in their difficulty index and discriminative index. The results of the knowledge test obtained were as follows in Table 2. Out of 35 items, 19 items were finally selected where items represented both improved feed and fodder management practices.

Table 2 : Final developed knowledge test items

Sr. No.	Items	Difficulty Index (P) (%)	Discrimination Index	Point biserial correlation
1	Name the cropping pattern that you are following to grow fodder	0.71	0.31	0.40
2	Do you have an idea of the quantity of mineral mixture required for lactating & pregnant animals per day	0.69	0.25	0.30
3	Do you know what is balanced feed? Yes/No If yes, what do you mean by it	0.73	0.27	0.28
4	Are you giving a mineral mixture?	0.54	0.13	0.30
5	Do you provide clean drinking water to the animals?	0.71	0.31	0.40
6	Why should an animal be given a balanced ration?	0.67	0.29	0.28
7	Should the balanced ratio contain all the nutrients required by the animal?	0.70	0.31	0.21
8	What are the methods of green fodder preservation?	0.71	0.29	0.23
9	While growing and sowing, should all the fodders be mixed?	0.73	0.29	0.28
10	Why should green fodder be preserved?	0.57	0.23	0.25
11	If we are not preserving the green fodder, what sort of losses do we have to suffer?	0.49	0.23	0.24
12	Is there a necessity of giving additional feed for 7-8 months pregnant animals?	0.61	0.19	0.28
13	Why fodder is grown in a mixture of legumes and non-legume?	0.69	0.23	0.36
14	How much quantity of mineral mixture should be provided for a heifer in a day?	0.61	0.13	0.28
15	How much ration is to be provided to advanced pregnant animals?	0.69	0.31	0.35
16	Which is the best feeding system for dry animals?	0.71	0.13	0.21
17	Do you know how to preserve fodder by Silage making?	0.75	0.31	0.28
18	Do you practice the Enrichment of straw?	0.75	0.38	0.28
19	Do you know about feed combinations to be followed for lactating dairy animal	0.65	0.25	0.29

CONCLUSION

Timely feeding of dairy animals and round-the-year fodder availability is the most important part of dairy farming. The knowledge of feed and fodder management of dairy farmers can be assessed by using this finalized test. Based on the knowledge level of the dairy farmers' the department of agriculture and the line department can take appropriate measures to create further awareness programs, and other extension activities can be organized. The standardized knowledge test can be used by future research scholars with due modification to assess the knowledge level of dairy farmers in different regions.

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CONFLICT OF INTEREST

The authors of the paper declare no conflict of interest

REFERENCES

- Anastasi, A. (1961). *Psychological Testing*. The Macmillan Company. New York and Simons Pvt. Ltd., Bombay.329
- Anonymous (2017). Standing committee on agriculture, GOI, Ministry of Agriculture & farmers welfare, Dept. of Ani. Hus. Dairying & Fisheries, Lok Sabha secretariat, New Delhi.
- Baraiya. K. P., Lakhani. S. H., & Baraiya. A. K. (2022).

- Assessing knowledge level and analysing constraints of organic farmers in Jamnagar district of Gujarat. *Gujarat Journal of Extension Education*, 22(2), 58-66.
- Barman, U. & Kumar, B. (2010). A test to measure knowledge of extension personnel on farmers' group dynamics. *Indian Research Journal of Extension Education* 10 (3), 119-123.
- Bhabhor, N., Vyas, H. U., & Patel, N.R (2020) Knowledge of live stock farmers about various zoonotic diseases. *Gujarat Journal of Extension Education*, 31(1), 92-94.
- Garret, H. E., & Woodworth, R. S. (1969). Statistics in psychology and education. Vakils, Feffer
- Kapadiya, P. S., Chaudhari, P. N., & Parmar, V. S. (2022). Knowledge level of dairy farmers regarding scientific dairy husbandry practices. *Gujarat Journal of Extension Education*, 33(1), 89-94.
- Latha, M. C., Kadian, K. S., & Patil, N. D., (2022). A test to measure the knowledge of input dealers on crop production technologies. *Gujarat Journal of Extension Education*, 33(1), 155-162.
- Naveenkumar, G. & Sendilkumar, R. (2015). Item analysis methodology to measure the knowledge of farmers on eco-friendly farm technologies in rice cultivation. *Journal of Krishi Vigyan*.4(1); 56-59.
- Singh, A. K. (2013). *Tests, measurements, and research methods in behavioral sciences*. 5th edn. Bharati Bhawan. New Delhi.
- Srinivasa, A., Sudharani, V. & Archana, P. (2014). Construction of Knowledge test to measure the knowledge of agricultural officers on IPM, INM, and IWM practices. *Global Journal for Research Analysis*. 3(1); 98-102.

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