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# Development of Scale to Measure Attitude of Animal Husbandry Personnel towards using ICAR-IVRI Crystoscope

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ABSTRACT

The attitude of animal husbandry personnel toward any animal husbandry technology is an important factor in evaluating the technology and will also aid in the development of future innovative technologies. Based on Likert's summative rating technique of scale development, a scale was constructed in the year 2020 to measure the attitude of animal husbandry personnel toward using the ICAR-IVRI Crystoscope. The scale consisted of final 16 statements, including 8 positive and 8 negative statements. Reliability of the scale was calculated using Cronbach's alpha method which was found to be 0.824 and reflects the high reliability of the measuring instrument. The validity of the scale was tested by expert's judgment. The reliability and validity of the scale indicate its consistency and precision of the results. This scale can be used to measure the attitude of animal husbandry personnel in similar situation beyond the study area with suitable modifications.

## INTRODUCTION

The ICAR- Indian Veterinary Research Institute (IVRI) is India's premier national institute for veterinary research, education and extension. The institute has been credited for developing various innovative livestock technology for the farmers and animal husbandry personnel since its establishment in 1889. '*ICAR-IVRI Crystoscope*' is one such example of cost effective and a simple technological tool for ascertaining the optimum time of breeding the animals and getting maximum conception rate. This instrument is used to visualize the pattern of cervical mucus. It may be a typical pattern, an atypical pattern or no pattern. The typical fern pattern has been observed in fertile oestrus or ovulatory heat, whereas; atypical fern pattern (i.e. very moderate and smaller branches with lesser intensity) indicate that animal is having very low level of fertile oestrus. In case of no fern pattern, (i.e. no branches of fern) there is no chance of conception. For this purpose, a provision of light through the hollow barrel of plastic is made. Posterior end of this barrel has a magnifying glass for viewing the test slides. The instrument is powered by two pencil batteries (1.5 volts each) for providing sufficient light to visualize the test slide. About 62.5 per cent success rate is expected when an animal is allowed to conceive while showing the typical fern pattern. Under on-going insemination practices, mean conception rate is only 34.53 per cent in cows (Thirunavukkarasu and Kathiravan, 2009). Hence the technology developed has profound economic significance.

The ICAR-IVRI Crystoscope technology has been commercialized and has been successfully used by the animal husbandry personnel of Maharashtra. The attitude of animal husbandry personnel towards a certain technology, on the other hand, has a significant impact on the adoption behaviour for that technology. Any animal husbandry technology's success or failure is largely determined by the attitude of its users. By measuring the attitude of animal husbandry personnel towards using ICAR-IVRI Crystoscope, it will provide critical input in evaluating the technology and designing future innovative technologies. To study attitudes towards using Crystoscope technology standardized tools is required. Such a scale would allow benchmarking of animal husbandry personnel's attitudes as well as an examination of the elements that influence attitudes. Furthermore, such a scale would

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be useful for improving the design of breeding technologies in general, designing targeted extension activities to increase uptake of breeding tools and assessing the impact of extension, which in turn will demonstrate to stakeholders the impact of their extension activities. Taking into account all of the aforementioned facts, an attempt was made to develop a scale which measures the attitude of animal husbandry personnel towards ICAR-IVRI Crystoscope.

## METHODOLOGY

An attitude can be defined as "a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour" (Eagly and Chaiken, 1993). In the present study attitude was operationalized as the degree of positive or negative feeling of animal husbandry personnel towards using ICAR-IVRI Crystoscope technology. Likert method of summated rating (1932) was followed with certain modification for construction of attitude scale, as it offers opportunities to select statements based on their discriminating power. In the present study construct was attitude of animal husbandry personnel towards using ICAR-IVRI Crystoscope technology.

Items related to the attitude of the animal husbandry personnel towards using ICAR-IVRI Crystoscope technology were collected and developed based on review of literature, interaction with the experts, as well as the field experience obtained during the pilot research. The statements covered a wide range of areas with respect to Crystoscope technology. Preliminary lists of 61 statements were prepared keeping in view the applicability of statements suited to the area of study. The statements collected were carefully edited by following the 14 informal criteria suggested by Edwards (1957). As a result, 50 statements were chosen from a total of 61 statements. The 50 statements selected were sent to 200 extension experts through e-mail. The experts included were scientists of ICAR institute, extension faculty of veterinary and agricultural universities, Subject Matters Specialists working in KVKs and PhD scholars of extension education discipline in India. The selected judges were requested to critically evaluate items for their relevancy in measuring the attitude of animal husbandry personnel in using crystoscope. The responses were collected on three point continuum (Most Relevant-3, Relevant-2 and Least Relevant-1). The relevancy judgment for selected items with significant ideas were obtained from 50 experts in stipulated time. It is believed that when we have a limited panel size, determining the relevancy, representativeness, clarity, and comprehension of things in order to assure content validity is simple (Wynd et al., 2003). Yadav et al., (2018) approached thirty judges to confirm relevancy of statements in a scale developed to assess people's attitudes toward agriculture biotechnology. The mean score was derived by combining the judges' scores for each statement.

$$\text{Mean relevancy score} = \frac{(\text{Most relevant} \times 3) + (\text{Relevant} \times 2) + (\text{least relevant} \times 2)}{\text{Number of judges}}$$

The mean score was found to be 2.28. All statements having value more than or equal to 2.28 were selected at the first step. The 31 statements which met these criteria were taken for evaluation of 't -value'.

## RESULTS AND DISCUSSION

The 31 items were used to collect the response from the non-sample area of the present study and responses were collected from the 40 animal husbandry personnel of Maharashtra. The responses were taken on 5 point continuum (Strongly Agree-5, Agree-4, Undecided-3, Disagree-2 and Strongly disagree-1) for positive statements. For negative statements, the scoring pattern was reversed. The scores were summed up to get the total score of each statement and each respondent. The scores thus obtained were arranged in the descending order. For item analysis, 25 per cent of the respondents with the highest total score and 25 per cent respondents with the lowest total scores were selected as two separate criterion groups. So, 10 respondents with the highest total score and 10 respondents with the lowest total score from non sampled area were selected. The t-value of each statement was calculated as indication to distinguish between respondents with high and low attitude.

The statements having a t-value (critical ratio) of 2.57 and above were selected for final attitude scale, t-value (critical ratio) of all 31 statements are shown in Table 1. Final attitude scale consists of total 16 items out of which 8 are positive statements and remaining were negative.

Cronbach's alpha method for testing the reliability was employed (Netemeyer et al., 2003). Attitude scale developed was administered to 40 respondents (animal husbandry personnel) from non sampled area to seek response on 5-point continuum ranging from "Strongly agree" to "Strongly disagree". Cronbach alpha was found to be 0.824 and reflects high reliability of the measuring instrument (Field, 2009).

The validity of this scale was established through content validity. Most researchers relied on expert's judgment to determine content validity (Kumar et al., 2016; Priyadarshni et al., 2021; Handage and Chander, 2021). Sasmitha et al., (2021) carried out content validation by subjecting the selected 15 items to judges' opinion. Furthermore, validity usually is a matter of degree rather than an all-or-none property and validation is an never ending process (Nunnally and Bernstein, 1994).

The final scale which would measure the attitude of animal husbandry personnel towards using ICAR-IVRI Crystoscope technology consisted of 16 items. The scale can be administered on a five point continuums viz., strongly agree, agree, undecided, disagree and strongly disagree with a score of 5,4,3,2 and 1, respectively for positive statements and reverse scoring for negative statements. Therefore, the overall possible attitude score of the individual respondent towards using ICAR-IVRI Crystoscope could range from 16-80. The high score of scale will represent the favourable attitude of animal husbandry personnel towards using ICAR-IVRI Crystoscope

## CONCLUSION

The reliability and validity value of the scale show the precision and consistency of the results. The attitude of animal husbandry personnel towards using ICAR-IVRI Crystoscope will also help in designing future innovative animal husbandry technologies. Further, this scale can be used to measure the animal husbandry personnel in similar situation beyond the study area with suitable modifications.

**Table 1.** Selected items to measure the attitude towards using ICAR-IVRI Crystoscope

| S.No. | Items | t-value | Statement Selection Status |
|---|---|---|---|
| 1. | Crystoscope is useful in detection of right time of insemination in all breedable cattle. | 4.58 | Selected |
| 2. | I am satisfied with the results of crystoscope technology. | 0.53 | Rejected |
| 3. | Usage of crystoscope improved overall herd conception rate. | 3.35 | Selected |
| 4. | I have referred crystoscope technology to others for identifying the right time of insemination. | 2.82 | Selected |
| 5. | I perceive that crystoscope is simple to use | 0.68 | Rejected |
| 6. | I feel that using crystoscope has developed competency in our work. | 2.86 | Selected |
| 7. | The farmers are satisfied with crystoscope technology. | 2.39 | Rejected |
| 8. | Crystoscope technology helped in strengthening the trust between farmers and animal husbandry personnel. | 2.93 | Selected |
| 9. | To use crystoscope technology special technical skills and trainings are required.* | 2.94 | Selected |
| 10. | It is not difficult to detect the right time of insemination without the aid of Crystoscope.* | 3.35 | Selected |
| 11. | Crystoscope is not durable technology.* | 1.87 | Rejected |
| 12. | The crystoscope technology requires specialized laboratory setup.* | 3.64 | Selected |
| 13. | Right time of insemination is identified by experience than crystoscope technology.* | 4.16 | Selected |
| 14. | Crystoscope technology is not much useful in low producing non-descript cattle.* | 3.66 | Selected |
| 15. | Crystoscope is heavy in weight and large in size and difficult to carry to the farmer's doorstep.* | 0.96 | Rejected |
| 16. | Crystoscope can be used easily by an uneducated farmer. | 2.14 | Rejected |
| 17. | Crystoscope is socially acceptable among the farmers. | 3.24 | Selected |
| 18. | Crystoscope technology is economically viable. | 1.34 | Rejected |
| 19. | The technology is easy to use at the field level. | 1.66 | Rejected |
| 20. | It is easy to interpret the result from crystoscope and arrive at conclusion | 1.67 | Rejected |
| 21. | It is easy to convince the livestock owners by showing the real time results of crystoscope. | 4.88 | Selected |
| 22. | Crystoscope technology helped in reducing the repeat breeders percentage | 4.20 | Selected |
| 23. | Crystoscope technology can be used in all cattle and buffalo breeds. | 0.97 | Rejected |
| 24. | Use of the crystoscope technology has reduced the economic loss. | 0.88 | Rejected |
| 25. | Use of the crystoscope technology has enhanced the lifetime milk production. | 0.27 | Rejected |
| 26. | Crystoscope can be used in all breedable cattle and buffalo. | 2.21 | Rejected |
| 27. | There are better technologies available at field level to detect the heat.* | 1.80 | Rejected |
| 28. | Balanced ration is a more important issue in dairy animals than heat detection using crystoscope technology.* | 4.58 | Selected |
| 29. | Crystoscope technology can be used only if the oestrous mucus available from the animal.* | 3.75 | Selected |
| 30. | Application of crystoscope technology is limited in animals which are in silent heat.* | 2.33 | Rejected |
| 31. | Use of Crystoscope does not guarantee the conception.* | 3.07 | Selected |

*Shows negative statement

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