FACTORS INFLUENCING THE ADOPTION OF NEW FEEDING TECHNOLOGY BY THE FARMER INTEREST GROUPS (FIGs) OF VELLORE DISTRICT IN TAMIL NADU

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ABSTRACT
The factors influencing the new feeding technology i.e., Dairy Cattle feed computation for Farmer Interest Groups (FIGs) in Vellore District of Tamil Nadu was analysed. The study was conducted among the 150 adopters and 102 non adopters of Farmer Interest Groups belonging to 12 villages from each of the 12 blocks of Vellore district. Binary logistic regression analysis was fitted to study the factors, which influenced the adoption of low cost cattle feed computation technology. The factors influencing adoption rate of the new feeding technology were total dairy income, animal holding and net returns per litre of milk. On the other hand the variables such as age, education, family size, experience in dairy farming and net agricultural income had no significant effect towards the adoption rate. Further, the logit model had correctly predicted the adopters and non adopters by 97 per cent.

Key words: New feeding technology, Adoption, Determinant factors.

INTRODUCTION
Dairy farming plays a vital role in the national economy and socio-economic development of the landless, small and marginal farmers by supplementing family incomes and generating gainful employment. Vellore District of Tamil Nadu contributes a significant quantum of milk supply to Tamil Nadu State. Dairy cows require feed nutrients for maintenance, growth, lactation and reproduction (Orskov, 1998). Good management of cows with superior genetic potential will result in the most efficient response to good nutrition (Krober et al., 1999; Niels et al., 2003). The average daily milk production in this district was 2.09 kgs per indigenous cattle and 6.52 kgs per crossbred cattle in 2007-08. Feed and fodder are the major factors in enhancing farm animal productivity. Balanced feeding alone can bring about 30 per cent increase in milk production. Least cost ration is the standard ration prepared by using a combination of ingredients with the lowest possible cost. The technique employed to calculate least cost and profit maximizing rations is called Linear Programming. In case of formulating livestock rations, minimizing the cost of a ration or maximizing the income above feed cost is essential for profitable dairy farming enterprise.

In view of the above facts a study was carried out to evaluate the factors influencing the adoption of new feeding technology by the Farmer Interest Groups (FIGs) of Vellore District in Tamil Nadu.

MATERIALS AND METHODS
Based on the latest Livestock Census, twelve blocks were selected viz., Sholinghur, Nemili, Pernambut, Katpadi, Thimiri, Jolarpet, Thirupathur, Kaveripakkam, Anaicut, Gudiyattam, Alangayam and Walajah. From each of these blocks, one village was selected by simple random sampling method viz., Kuppireddythangal, Nangamangalam, Palur, Sevoor, Kalavai, Agraharam, Kakanampalayam, Kalapalampattu, Umaiypet, Suraloor, Old Vaniyambadi and Anandhalai. Initially survey was conducted to find out the existing feeding practices in 12 villages. Feed mixing and manufacturing unit was purchased and used in the study. Method
demonstration was carried out in 12 villages of the selected blocks for the computation and preparation of low cost Cattle Feed in 100 kg quantities with the locally available feed ingredients are presented in Table 1.

**Period of the study**
The study period was six months from March 2010 to August 2010.

**Data collection:** Pretested interview schedule was used to collect relevant data from Farmer Interest Groups (FIGs) by personal interview method. The primary data pertaining to the details of adoption, the socio-economic profile of adopters and non adopters and the cost and returns of dairy farming was collected.

**Tools of analysis**
**Binary Logistic Regression Analysis:** Different regression methods (e.g. discriminant analysis, linear probability model, logit and probit) were used to explain a dichotomous dependent variable (Y), where “one” represented adopters of new feeding technology and “zero” represented non adopters of the new feeding technology. A logit model was used to examine factors affecting adoption in the study area because of its simplest mathematical structure. The relationship between dependent and independent variables is non-linear and a logistic function was used to estimate the association between binary, endogenous variable Y and the independent variables (Xs) (Woolridge, 2002). The following mathematical form of the model was used in this study.

\[
\ln \left( \frac{p_i}{(1 - p_i)} \right) = \beta_0 + \sum_{j=1}^{k} \beta_j X_{ij}
\]

where, \(p_i\) is the probability of the \(i^{th}\) farmer being adopting the technology and \(X_{ij}\) is the \(k^{th}\) explanatory variable. The dependent variable \(\ln \left( \frac{p_i}{(1 - p_i)} \right)\), in the equation is the log-odds ratio in favour of adoption of new cattle feed computation technology (Panda, 2009).

**Consideration of model variables:** The definitions of the most important variables expected to influence adoption of new technology is presented as below

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE ((X_i))</td>
<td>Age in number of years</td>
</tr>
<tr>
<td>EDU ((X_j))</td>
<td>Education in number of years</td>
</tr>
<tr>
<td>FSIZE ((X_k))</td>
<td>Family size</td>
</tr>
<tr>
<td>EXD ((X_l))</td>
<td>Experience in Dairy farming</td>
</tr>
<tr>
<td>LANDH ((X_m))</td>
<td>Land holding in acres</td>
</tr>
<tr>
<td>AGRI ((X_n))</td>
<td>Agricultural Income</td>
</tr>
<tr>
<td>DAI ((X_o))</td>
<td>Total Dairy Income</td>
</tr>
<tr>
<td>ANH ((X_p))</td>
<td>Animal Holding</td>
</tr>
<tr>
<td>NR ((X_q))</td>
<td>Net Returns per litre of milk</td>
</tr>
</tbody>
</table>

The following binary logistic regression model was postulated as used by Panda (2009).

\[
\ln \left( \frac{p_i}{(1 - p_i)} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9
\]

Where,

\[
\begin{align*}
& p_i = \text{Probability of Adopters} \\
& (1 - p_i) = \text{Probability of Non-Adopters} \\
& \beta_0 = \text{Constant term} \\
& \beta_i's = \text{Regression coefficients} \\
& X_i = \text{Determinant factors}
\end{align*}
\]

**RESULTS AND DISCUSSION**
The results of the analysis as presented in Table 2 revealed that Chi-square (299.853) which tested the joint significance of the explanatory variable was statistically significant at one per cent level of probability. The estimated model correctly classified 97 per cent of the adopters. The positive signs attached to the estimated coefficients of the variables were dairy income, animal holding and net returns due to adoption of new technology.

High level of statistical significance (\(P<0.01\)) was evident for the variables such as total dairy income and net returns per litre of milk. This indicated that Farmer Interest Groups (FIGs), who adopted the technology made an immense increase in their income by means of increased milk yield. This might be due to full milking potential of the

**TABLE 1:** Recommended dairy cattle compounded feed to farmer Interest Groups (FIGs).

<table>
<thead>
<tr>
<th>Feed ingredients used for Preparation of low cost Cattle Feed</th>
<th>Quantity (in Kgs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>20.00</td>
</tr>
<tr>
<td>Sorghum (Jowar)</td>
<td>10.00</td>
</tr>
<tr>
<td>Cumbu (Bajra)</td>
<td>10.00</td>
</tr>
<tr>
<td>Groundnut Oil Cake (Expeller Variety)</td>
<td>15.00</td>
</tr>
<tr>
<td>Coconut Oil Cake</td>
<td>15.00</td>
</tr>
<tr>
<td>Wheat Bran</td>
<td>13.50</td>
</tr>
<tr>
<td>Rice Bran</td>
<td>13.50</td>
</tr>
<tr>
<td>Mineral Mixture (TANUVAS)</td>
<td>2.00</td>
</tr>
<tr>
<td>Salt</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
</tr>
</tbody>
</table>
animal by balanced feed regimen. Moreover, the net returns per litre of milk was also high for all classes of technology adopted leading to a renewed assurance of livelihood security.

The variable, animal holding showed a statistically significant difference (P<0.05) between adopters and non – adopters towards the adoption of new feeding technology. This explained clearly that the readiness and willingness to adopt new technology was high in FIGs having higher animal holding. Farm size has been shown to have a significant effect on technology adoption behavior in the agricultural sector. The larger farmers are more likely to adopt new technologies due to their greater propensity to adopt technologies and the ability to spread costs of adoption over more units of production, thereby reducing average total cost (Kim, 2005).

In contrast, variables viz., age, education, family size, experience in dairy farming and net agricultural income had no statistical significant effect towards the adoption of new feeding technology.

It can be observed from Table 3 that logit model had correctly predicted the adopters and non adopters of new feeding technology by 97 per cent. Out of 150 adopters, 147 people were correctly identified by this model and among the 102 non adopters, 98 people were correctly predicted by this model.

**CONCLUSION**

The study concluded that the factors influencing adoption rate of the new feeding technology were total dairy income, animal holding and net returns per litre of milk. On the other hand variables such as age, education, family size, experience in dairy farming and net agricultural income had no significant effect towards the adoption rate. Further, the logit model had correctly predicted the adopters and non adopters by 97 per cent.

**ACKNOWLEDGEMENT**

The authors were grateful to the Project Director, Agricultural Technology Management Agency, Vellore for its financial assistance, to our organization Tamil Nadu Veterinary and Animal
Sciences University (TANUVAS), Chennai which has accorded administrative sanction for the conduct of the scheme and to Director of Research, TANUVAS for having extended the required infrastructure and support in the completion of the research project successfully.

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