A study on determinants of sustainable dairy farming in Karnataka

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ABSTRACT

Study aimed at assessing the factors affecting sustainable dairy farming in Karnataka state, India. Since two districts namely Hassan and Mysuru have highest number of crossbred cattle population in the state. These two districts were selected for the study. Study identified seven variables that affected sustainable dairy farming index. Those variables were ratio of crossbred cows and buffaloes to local cow, milk productivity of milch animals of household, marketed surplus of households, per animal area under fodder crops, proportion of expenses on concentrates to total feed expenses, proportion of curative veterinary expenses to total veterinary expenses and education level of households. Variable that affected significantly were milk productivity, marketed surplus of household, per animal area under fodder crops, proportion of curative veterinary expenses to total veterinary expenses and education level. Focussing on these factors would help in improving sustainable dairy farming in the study area. Current study would be helpful to policy makers while framing policies regarding augmenting farmers income through holistic dairy development.

KEYWORDS

Dairy, Milch Animals, Milk Productivity

Livestock production is important sector that acts as a major source of income, employment to farming community in India. Livestock provides draught power, food and fertilizer to farmers. Its contribution to agriculture sector is remarkable in size and volume (Kumar, S. S., Rjvir, S., Mishra, U. K., Mishra, D. J., 2012). Chronic shortage of feeds for cattle along with poor quality of fodder had become major bottleneck in dairy farming in the country. In intensive dairy production more emphasis given to feed concentrates feeding also escalated the cost of milk production. Seasonal variation in feed availability is also adding factor for increased cost of milk production. Since cattle rearing is providing assured monthly income, majority of small and marginal farmers are into livestock rearing. A farmer not coming forward to adopt rational feeding practices is also one of the factors that led to increased methane emission.

With ever growing human population there is a need to meet the demands of milk and milk products supply. This can be met by either increasing the bovine head numbers or increasing productivity of bovines. In current context resources required for producing dairy products are inadequate. Essential requirements for improvising dairy sector are availability of pasture land, concentrates, and fodder crops and so on. Now increasing productivity of milch animals is a viable option. This addresses the social, economic and environmental issues pertaining to dairy sector.

Materials and Methods

Data Collection

Multistage random sampling method was employed to select dairy farmers. At first level two districts namely Hassan and Mysuru having highest...
crossbred population was selected. At second stage block falling under selected districts falling under same agro climatic zone i.e. southern transition zone was selected. Eight villages were selected from all blocks. To selected sample farmers standard methodology (Chand, P., 2008) was employed. Hence 191 dairy farmers were selected for the study.

**Tools of Analysis**

Multiple regression analysis was carried out to assess the factors affecting the sustainability of dairy farming. The computed Composite Sustainable Dairy Farming Index (CSDFI) was regressed on explanatory variables. A list of these variables is as follows:

\[
\text{CSDFI} = f (X_1, X_2, X_3, X_4, X_5, X_6, X_7)
\]

Where,

- \(X_1\) = Ratio of crossbred cows and buffaloes to local cow (No.)
- \(X_2\) = Milk productivity of milch animals of household (lit.)
- \(X_3\) = Marketed surplus of household (%)
- \(X_4\) = Per animal area under fodder crops (ha)
- \(X_5\) = Proportion of expenses on concentrates to total feed expenses (%)
- \(X_6\) = Proportion of curative veterinary expenses to total veterinary expenses (%)
- \(X_7\) = Education of household (Years)

Following variables were selected based on following justification:

**Ratio of Crossbred Cows and Buffaloes to Local Cow**

In current scenario rearing of cattle is done mostly for milk purpose. Hence composition of milch animals to draught animals would act as best proxy to check the sustainability of dairying in economic sense. In addition to this cross bred and Buffalo yields higher milk than indigenous breeds. Higher the number of crossbred cow and buffalo in proportion to local cow in the herd, more will be economically sustainable.

**Milk Productivity of Household**

It was taken as a proxy for the quality of dairy animals reared by the farmer. Better profitability can be achieved with higher milk productivity at household level. On other hand, low milk productivity results in less profitability.

**Marketed Surplus of Household**

Commercialization of dairy farms is backed up by higher marketed surplus at household level.

Surplus output can be associated with greater specialization of farms and higher disposable income. Further, commercialization leads to the separation of households’ production decisions from their consumption decisions. This in turn leads to food diversity and security and ends up with higher sustainability in dairying.

**Area under Fodder Crops per Animal (Ha)**

This variable captures the year round availability of green fodder from farm owned resources. More area under fodder crops ensures ample fodder resources and increases the productivity of animals. It is expected to have positive association with sustainability.

**Proportion of Expenses on Concentrates to Total Feed Expenses**

Among three types of feed, viz., dry fodder, green fodder and concentrates, higher use of concentrates leads to better productivity efficiency of animals. Hence, it is expected to have positive influence on sustainability.

**Proportion of Curative Veterinary Expenses to Total Veterinary Expenses**

Veterinary expenses include both curative and preventive medical expenses. Lesser curative expenses indicate animals are in better health and imply that better sustainability can be achieved. Preventive health procedures in veterinary medicine involve parasite control, neutering and annual vaccination and health checkups. This combination of good preventative health protocol can help to maximize the potential life span and quality of animal lives and thereby improve the sustainability. Therefore, it is expected that higher the ratio of curative expenses to total veterinary expenses, higher will be the sustainability.

**Education**

Profitability of dairy enterprise and improved dairying practices depend on the knowledge gained through education. If people are well educated, their probability of using appropriate modes of production and marketing is more. Hence, it is expected that education of sample respondents have positive influence on sustainable dairy farming. For this factor, average education score of households above the age of 14 was considered.
Results and Discussion

Regression results indicated that about 75 per cent of variation in sustainable dairy farming was explained by all explanatory variables included in the model. Milk productivity significantly affected sustainability. If milk productivity increases milk production increases, in turn income increases. Substantially, less number of animals are required to meet financial requirements of households and lesser will be the enteric methane emission. This contributes towards better economic, social and ecological sustainability dimensions.

Table 1. Factors affecting sustainable dairy farming

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.896</td>
<td>3.112</td>
<td>1.252</td>
</tr>
<tr>
<td>Ratio of crossbred cows and buffaloes to local cow (No.)</td>
<td>-2.197</td>
<td>1.540</td>
<td>-1.426</td>
</tr>
<tr>
<td>Milk productivity of household (lit.)</td>
<td>0.079***</td>
<td>0.039</td>
<td>2.025</td>
</tr>
<tr>
<td>Marketed surplus of household (%)</td>
<td>0.676**</td>
<td>0.030</td>
<td>2.223</td>
</tr>
<tr>
<td>Per animal area under fodder crops (ha)</td>
<td>3.056**</td>
<td>1.399</td>
<td>2.185</td>
</tr>
<tr>
<td>Proportion of expenses on concentrates to total feed expenses (%)</td>
<td>0.050*</td>
<td>0.029</td>
<td>1.702</td>
</tr>
<tr>
<td>Proportion of curative veterinary expenses to total veterinary expenses (%)</td>
<td>0.016</td>
<td>0.029</td>
<td>0.543</td>
</tr>
<tr>
<td>Education (Years)</td>
<td>0.416***</td>
<td>0.120</td>
<td>3.475</td>
</tr>
<tr>
<td>R-square</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of observations</td>
<td>191</td>
<td></td>
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</tbody>
</table>

Note: ***, ** and *= significant at 1%, 5% and 10% probability level

Marketed surplus also affected sustainability of dairy farming. Marketed surplus means actual quantity of milk sold to market after meeting household needs. More the per cent denotes that farmers gain more income. Clearly results reveal that as marketed surplus increased, sustainability of dairy farming was more. Finally there was positive significant relationship between sustainable dairy farming and market surplus. Per animal area under fodder crop significantly influenced sustainability of dairy farming. This indicated that as fodder area increased, farmers fed better quality of fodder with adequate quantity. This in turn made farmers not to go in search of fodder. Since farmers need not purchase fodder, they feed well to animals. Proportion of expenses on concentrates to total feed expenses also expressed positive relationship with sustainable dairying and statistically significant. More the concentrates increased the digestibility of inputs given to cow and buffalo. Education also significantly influenced sustainable dairy farming. Higher education led farmers to keep abreast with new technologies. Above results are in line with other two results (Chand, P., 2008, Nazir, H., Kharwal, S., Bardhan, D., Tripathi, S. C., Kumar, A., 2017).

Summary and Conclusion

Overall study indicated that as milk productivity increased sustainable dairy farming tend to improve further. Marked surplus led to increase income level of dairy farmers. More area under fodder by households assured increased availability of dry fodder, it increase milk production. Supply of concentrates also enhances the productivity of milk. As education of dairying households increased farmers used better technologies that improved sustainability in dairy farming. Eventually providing inputs required for milk production at subsidized rates, strengthening institutional set up via policy instruments improve dairy sector in India.

References


