TECHNICAL EFFICIENCY OF DAIRY FARMING – A REVIEW

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ABSTRACT

Dairy farming can be the best example for the alternative to enhance the socio-economic conditions of many underprivileged societies in the world. It has been shown in many statistics that a high percentage of cattle are being owned by small farmers where their holdings will be limited to three milch cows than the medium farmers (4-6 milch cows) and large farmers (> 7 milch cows). Dairy farming helps to bring a better living for vast majority. So it is necessary to test the technical efficiency of dairy farms. Through various literature reviews this paper finds the existence of technical efficiency in dairy farming and those factors which has been contributed to estimate technical efficiency has been analyzed and also the tool for the estimation of technical efficiency. Reviewing those literatures gives the glimpse about the area of the study.

Keywords: dairy farming, technical efficiency, tools of estimation

1. INTRODUCTION

Dairy development has got unique characteristic, which caters socio-economic-cultural and demographic array. It should not be reviewed as mechanism for the development of the rural economy for the creation of employment opportunities but should be viewed as factor for the rural development. Dairy farming is treated as one of the noblest activity, where it offers a regular and stable income unlike other agricultural and allied activities. The risk is very low compared to other activities. Now many agencies offer different schemes of cattle insurance. It is very important to estimate the technical efficiency of dairy farms.

The estimation of technical efficiency is useful to evaluate the difference between technological progress that makes the production smoothly and the extent to which technology adoption that makes the yield realized to environmental conditions including marketability of milk production and

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farmers respond. It is needed to rank the farmers or its activities by the level of their technical efficiency, the estimation of technical efficiency is possible to measure allocative efficiency with minimum error (Kailsam, 2000). Efficiency measures the outcome of objectives or goals which expected out of an activity in relation to the efforts made. In agriculture, the efforts are related to the use and allocation of the scant resources among the alternative uses with a view to measure the profit. This implies that efficiency measures different tools or mechanism which helps to measure the returns to and overall efficiency of the farming activity, which is of great importance in developing countries where there are many diversified farming activities or integrated farming activities (Saravanam, 2015). The people often get confused with technical efficiency and economic efficiency, former deals with using few inputs as possible to produce same output and latter deals with incurring the lowest cost. The technical efficiency can be find out using the econometric model, which is very useful in way of calculating a decision taken is effective or not. Mathematical model is used for testing whether decision is correct or wrong. Major econometric model used for the estimation of technical efficiency is stochastic production frontier (SPF) and data envelopment analysis (DEA). Reviewing the literature helps to familiarize the area of the study and examining the existing works done in the areas.

1.1 Objectives

This paper attempts to evaluate and analyze the technical efficiency of dairy farming and the factors leading to the efficiency as well as the tools used for the evaluation of technical efficiency through literature review

1.2 Scope of the study

The study on dairy farming has got a greater importance in the rural economy as well as it gives the round the corner income for the farmers than any agricultural and allied activities.

1.3 Limitation of the study

The study considered ten literatures for the purpose. A generalized conclusion not possible, only a glimpse of the technical efficiency can be obtained

2. LITERATURE REVIEW AND THEORY

This sector deals with analyses from ten literature reviews

2.1 What is dairy farming?
It is class of agriculture for a long term production of milk, which is processed (either on the farm or at any dairy plant) for eventual sale of a dairy product (Wikipedia). This can be further focused on producing milk. Dairying is considered as one of the main livelihood of many farmers.

2.1.1 Conceptual framework

Dairy farming in improving the life of rural economy

When there emerges the combination between entrepreneurial culture and the apt resources for daring the results is the employment, but only if the milk is marketed locally or by private dairying the farmers will get income and there by increases their livelihood and reduced poverty.

2.2 Technical efficiency
The measures of efficiency have defined on the assumption that only if the efficient production functions is known (Farrell, 1957). Farrell in his paper defined technical efficiency in another sophisticated way that it is the relation which is given to the set of firms and those sets are measured in a specific way and if there occurs any change in those specifications it will affect the measurement.

2.3 Measuring economic Efficiency

The economic efficiency of a firm can be divided into two ways as technical efficiency and allocative efficiency. Where the former deals with firms’ ability to attain the maximum possible output from a given set of resources and latter which concerns its ability to maximize profit (Farrell, 1957). The levels of application of inputs to the factors which affects the allocative efficiency and the method or way of applying those inputs which affects the technical efficiency. The input-specific measures of allocative efficiency are more useful from policy point of view may be derived from the stochastic production frontier approach (Kaliraja).

2.4 Technical efficiency measures of dairy farms

(Munir and Bravo, 1996) in his paper technical efficiency measures for dairy farms using panel data, shows findings from all the models and tested his area using spearman rank correlation co-efficient used as the time variant technical efficiency model shows a strong association among all the technical efficiency measures. A study conducted by (Sharafat, 2013) indicated that Technical efficiency of milk production was low in the selected area of his study, the reason he stated was in efficient production, and it can be further improved through education training. The reason for the adoption of SPF has got the ability to deal with disturbances occurring in the sample and the incorporation of statistical hypothesis test.

2.5 Technical efficiency and supply chain practices in dairying

(Surrender et al., 2012) the main methodology adopted to estimate the technical efficiency is the stochastic frontier production function. The reason for his adoption of stochastic frontier is due to the reason because it measures the efficiency of farms relative to their own frontier, means the frontier has the disturbance term which is split into two parts, one stated as symmetric which takes all the random effects outside the control area and other side captures all deviations from the frontier curve due to technical efficiency. From his results it was found to be statistically significant at 5% level of significance for the parameter for feed, labour and livestock and statistically insignificant for the capital cost, which is occurred due to the deviations or variations in the variables which took for the consideration. As a conclusion he stated that the farmers who have adopted the modern supply chain practices tend to be
more technical efficiency and also made a note on the possession of crossbreed animals, the expense and education of the farmers affects the technical efficiency.

2.6 Assessing pure technical efficiency

(Vecdi et al., 2010) used the data envelopment analysis for finding the technical efficiency and adopted a two stage sampling process was used, as the sample was stratified by the herd size. The reason stated for the adoption of DEA was the multiple inputs and outputs and gives an insight into type of the area of the study (Fraser et al., 1999). The results from DEA analysis can be used to estimate how the farms level of efficiency can be improved by reducing the given input at the same time maximize the output. He stated the way to improve the dairy production efficiency is by the way of improving the both profits as well as the improvement in contact with internal competitiveness in the dairy sector

2.7 Technical efficiency methods

(Tingly et al., 2005), the paper estimates the technical efficiency in relation with fisheries. His addressed the two important methods of technical efficiency which is known as stochastic production frontier and data envelopment analysis, former is known as econometric stochastic production frontier on the parametric approach and latter is known as linear programming approach on the non parametric approach. DEA can be used as alternatives to SPF technique when there is difficulty in specifying the correctness in SPF model. He also suggested that the technical efficiency is understood using SPF inefficiency model.

2.8 Technical Efficiency among Peasant farmers

The technical efficiency is financially beneficial to farm households who are contributing to the environmental sustainability. The results from the study revealed that there establish a positive association between the productivity and the output diversification (Solis et al., 2009).

2.9 Globalization and technical efficiency

Globalization has got impact on technical efficiency. The stochastic production frontier is used as method of estimation because it shows the maximum likelihood estimation to measure at the same time estimates both the co-efficient of production factors and the co-efficient of effective factors on technical efficiency. The study recommended that the globalization is the major driving factor to reduce the inefficiency because the globalization increases the workers skills, efficiency and proper management and also increases the competitiveness in their production; this will minimizes the risk of technical inefficiency (Rnajbar et al., 2011)
2.10 Technical efficiency application

It is not stated anywhere that technical efficiency can be applied only on the dairy farming area. It has been applied on many parts of the area. A study has been conducted on small scale furniture industry (Alao, 2018) and it was observed in his study that the small scale furniture production which regarding to the particular to his area was marginal. This can also be viewed from different angle as the technical efficiency of ports (Cullinane et al., 2006); his findings were based on stochastic production frontier because it can be statistically proven. The application of technical efficiency in public education estimated by stochastic production function is very common (Kalyan et al., 2001) looks the stochastic specifications as it measures the efficiency assuming half normal distribution, which is the case of folded normal distribution. The paper also suggested that something is said to be technical efficiency if the observed has produced the maximum level of output from a given set of resources used or it uses the minimum resources to produce a given level of output.

3 CONCLUSION

The technical efficiency of dairy is well explained or estimated through stochastic production frontier. According to (Farrarell, 1957) two commonly used procedures for measuring production efficiency was stochastic production frontier and data envelopment analysis. The reason for the adoption is basically useful in determining the efficiency levels and the policy formulation. The variables adopted are mainly inputs (feed, labour, capital) herd size, amount of milk produced, farmers education.

Estimation of technical efficiency is very much needed for a developing country. The reason for adoption of technical efficiency using SPF as it gives more weightage and a structure for sampled area, a structure implied here as a chance effect or can be termed as stochastic relationship between inputs used and output produced, but the DEA approach has got its roots in mathematical program, so the validity and reliability is very difficult to measure.

REFERENCES


