COMPARATIVE ASSESSMENT OF DAIRY PRODUCTION IN AMPARA AND BATTICALOA DISTRICTS AFTER RESCUING FROM TERRORISM

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Introduction

Ampara and Batticaloa are two major milk producing districts in the country in Eastern province. From total neat cattle population 59,394 are cross breeds and 196,546 are local breeds. Out of those cross breeds and local breeds, 26,196 and 71,544 are in Batticaloa district while 19,837 and 73,293 are in Ampara districts respectively (Department of Animal Production and Health in the Eastern province, 2010). Total milk production in the Eastern province is 46 million liters per year. But total collection was accounted as half of it (Perera and Jayasuriya, 2008). In the civil war era there is a considerable fluctuation of cattle population and milk production in Ampara and Batticaloa districts (Census and Statistics, 2010). Therefore, the study was carried out to make comparative assessment of development in dairy industry in these two districts after rescuing from terrorism with respect to the milk production, feeding and rearing practices, income, expenditure, veterinary and other facilities.

Methodology

The study was conducted as a survey based research. Data were collected by conducting *face-to-face* interviews administrating a pre–tested questionnaire and formal and informal focus group discussions. Forty five (45) farmers from Ampara and 56 farmers from Batticaloa were selected randomly from the farmer registration list obtained from Department of Animal Production and Heath, Eastern Province. Secondary data were collected from past year annual reports of Department of Animal Production and Heath, Eastern Province.

Discussion and Conclusion

According to the results obtained from the survey, average age of a farmer in Batticaloa and Ampara districts are 38 years and 40 years respectively. Majority of farmers (90%) in these two districts are self owned farmers. Average daily milk production in Ampara district is 20.3L and in Batticaloa is 23.5L. Average daily income of a farmer from the dairy industry in Batticaloa and Ampara districts are Rs. 1332.50 and Rs. 1077.50 respectively. Majority of the farmers in both districts (more than 60%) still practice free range feeding method which is used before the end of the civil war while the others have changed their feeding method to concentrates and roughages. Around 65% of farmers in both districts practice the semi intensive rearing method. Average monthly expenditure for feed, diseases control, electricity, water, labour and traveling to milk collecting centers in Batticaloa district are Rs. 730.00, 1025.00, 130.00, 115.00, 1100.00 and 1197.50 respectively. Estimated costs of same components for Ampara are Rs. 315.00, 1257.50, 13.00, 15.00, 1365.00 and 645.00 respectively. Eighty percent (80%) of the farmers in Batticaloa and 55% of the farmers in Ampara reported unavailability of lands as a major problem after rescuing from terrorism due to rapid settlements. Majority of the farmers (95%) in both districts are satisfied with dairy farming as their livelihood. Ninety five percent (95%) and 85% in Batticaloa and Ampara districts respectively are satisfied with the facilities of getting improved animals to their farm. According to the secondary data available, average daily milk production before terrorism were 14.15L and 12.65L for Batticaloa and Ampara districts respectively. After terrorism it has increased by 56.89% in Batticaloa and 51.38% in Ampara districts. 95% in Batticaloa and 100% in Ampara districts farmers are satisfied with the veterinary development in their area after the terrorism. Figure. 2 shows the farmers' views about the major problems encountered in dairy farming as a percentage after and before terrorism in both district.

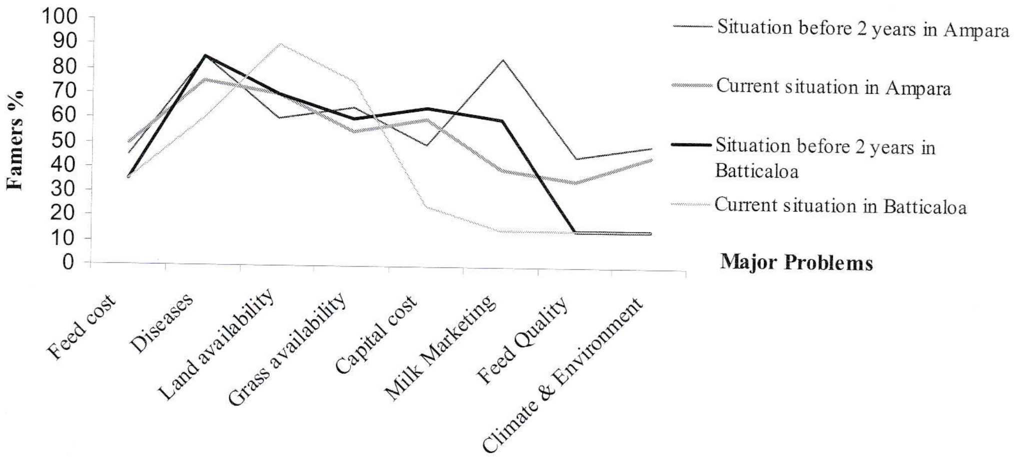

Figure 2: Major problems encountered in dairy farming

The study mainly discovered positive trend of dairy industry with respect to the production, income, veterinary and other facilities after rescuing the terrorism. Further, it is revealed that most of the young people are involved in dairy farming and it shows the enthusiasm of young people towards the industry. Major problem encountered by the farmers is unavailability of the land due to rapid settlements after the terrorism. Other problems reported by the farmers such as capital cost, getting of improved breeds, marketing and infrastructure should be addressed by the government though policy formulation for future betterments of the industry.

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LAX CENTRES FOR PROMONOIDAL CATEGORIES

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Introduction

The centre $Z\mathcal{X}$ of a monoidal category $\mathcal{X}$ is a braided monoidal category. Lax centre becomes lax braided monoidal category. The centre is generally a full subcategory of the lax centre,but sometimes the two coincide. In this paper we identify some cases where the two coincide. Braiding for monoidal categories were introduced in (Joyaland Street, 1993) and its forerunners. The centre of a monoidal category was introduced in (Joyal and Street, 1991). The promonoidal structure on a symmetric closed monoidal category was introduced by (Day, 1970). One reason for being interested in the lax centre of $\mathcal{X}$ is that, if an object X *of* $\mathcal{X}$ is equipped with the structure of monoid in the lax centre of $\mathcal{X}$, then tensoring with X defines a monoidal endofunctor $-\otimes X$ of $\mathcal{X}$. This has applications in cases where the lax centre can be explicitly identified.

Methodology

Let $\mathcal{V}$ be a complete cocomplete symmetric closed monoidal category and $\mathcal{C}$ be a $\mathcal{V}$-enriched category. A *promagmal structure* (defined in (Joyal and Street, 1991)) on $\mathcal{C}$ consists of two $\mathcal{V}$-functors $P: \mathcal{C}^{op} \otimes \mathcal{C}^{op} \otimes \mathcal{C} \rightarrow \mathcal{V}$ and $J: \mathcal{C} \rightarrow \mathcal{V}$, called the *protensor product* and *prounit, A promonoidal structure* on $\mathcal{C}$ is a promagmal structure equipped with the following $\mathcal{V}$–natural isomorphisms:

$$\int^{U} P(U,C;D) \otimes P(A,B;U) \rightarrow \int^{V} P(A,V;D) \otimes P(B,C;V)$$

$$\int^{U} P(U,A;B) \otimes J(U) \rightarrow \mathcal{C}(A,B) \quad \text{and} \quad \int^{V} P(A,V;B) \otimes J(V) \rightarrow \mathcal{C}(A,B)$$

The importance of promonoidal structures on $\mathcal{C}$ lies in their equivalence to closed monoidal structures on the $\mathcal{V}$-functor category $[\mathcal{C},\mathcal{V}]$.

Given a promonoidal structure on $\mathcal{C}$, we can obtain a closed monoidal structure on $[\mathcal{C},\mathcal{V}]$,by defining the tensor product * using the convolution formula

$$(M * N)C = \int^{X,Y} P(X,Y;C) \otimes MX \otimes NY$$

and with the unit J. Conversely, given a closed monoidal structure on $[\mathcal{C},\mathcal{V}]$, we obtain a promonoidal structure on $\mathcal{C}$ by defining

$P(A,B;C) = (\mathcal{C}(A,-) * \mathcal{C}(B,-))C$

and taking the unit as the prounit.

A *lax braiding* for a promonoidal structure on $\mathcal{C}$ is a $\mathcal{V}$–natural family of morphisms $c_{A,B;C} : P(A,B;C) \rightarrow P(B,A;C)$ with some commutative conditions.

A *braiding* is a lax braiding for which each $c_{A,B;C}: P(A,B:C) \rightarrow P(B,A:C)$ is invertible. We can regard the lax braiding as a morphism as a morphism $c_{A,B}: A\otimes B \rightarrow B\otimes A$ satisfying some commutative conditions. Then $c_{A,B;C}: \mathcal{C}(B\otimes A, C) \rightarrow \mathcal{C}(A\otimes B, C)$ is $\mathcal{C}(c_{A,B}, C)$.

Proposition-1:If $\mathcal{C}$ is a right autonomous (that is, each object has a right dual) monoidal category then any lax braiding on $\mathcal{C}$ is necessarily a braiding.

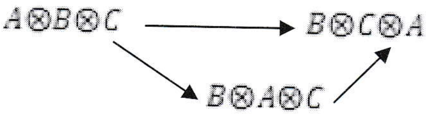
A monoidal functor $F:\mathcal{C} \rightarrow \mathcal{D}$ is equipped with a natural family of morphisms $FA \otimes FB \rightarrow F(A\otimes B)$ and a morphism $I \rightarrow FI$ is called *strong*when these morphisms are invertible.

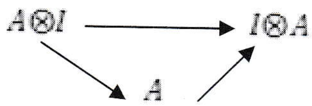
For each promonoidal $\mathcal{V}$-category $\mathcal{C}$ we shall construct a promagmal$\mathcal{V}$-category $Z_l\mathcal{C}$ which is call the *lax centre of* $\mathcal{C}$. The objects of $Z_l\mathcal{C}$ are pairs (A,α) where A is an object of $\mathcal{C}$and α is a $\mathcal{V}$–natural family of morphisms $\alpha_{X;Y}: P(A,X;Y) \rightarrow P(X,A;Y)$ satisfying some commutative diagrams. It is frequently the case that $Z_l\mathcal{C}$ is promonoidal in such a way that $\mathcal{V}$-functor $Z_l\mathcal{C} \rightarrow \mathcal{C}$ is strong promonoidal. For example, if $\mathcal{C}$ is monoidal then $Z_l\mathcal{C}$ is also monoidal and $Z_l\mathcal{C} \rightarrow \mathcal{C}$ is strong monoidal.
The *centre* of $\mathcal{C}$ is the full sub- $\mathcal{V}$-category $Z\mathcal{C}$ of $Z_l\mathcal{C}$ consists of the objects (A,α) for which each $\alpha_{X;Y}: P(A,X;Y) \rightarrow P(X,A;Y)$ is invertible.

Let $\mathcal{C}$ denote a monoidal $\mathcal{V}$ -category. The *lax centre* $Z_l\mathcal{C}$ of $\mathcal{C}$ is the lax centre of $\mathcal{C}$ as a promonoidal category with promonoidal structure defined by

$$JC = \mathcal{C}(I,C) \quad \text{and} \quad P(A,B:C) = \mathcal{C}(B\otimes A, C)$$

The objects of $Z_l\mathcal{C}$ are pairs (A,u) where A is an object of $\mathcal{C}$ and u is a $\mathcal{V}$-natural family of morphisms $u_B: A\otimes B \rightarrow B\otimes A$ such that the following two diagrams commute.





Proposition-2: If (A,u) is an object of the lax centre of a monoidal $\mathcal{V}$-category$\mathcal{C}$andX is an object of $\mathcal{C}$ with right dual X^*then $u_{X^*}: A\otimes X^* \rightarrow X^*\otimes A$ is an invertible for $u_X: A\otimes X \rightarrow X\otimes A$

Theorem-3: Suppose $\mathcal{F}$ is a monoidal $\mathcal{V}$-category. If the full sub- $\mathcal{V}$-category of $\mathcal{F}$ consisting of the objects with right duals is dense in $\mathcal{F}$ then the lax centre of $\mathcal{F}$ is equal to the centre, that is $Z_l\mathcal{F} = Z\mathcal{F}$

Corollary-4: For any finite dimensional Hopf algebra H, the lax centre of the monoidal category **Mod***H of left H-modules is equal to its centre.*

Conclusion

For a monoidal $\mathcal{V}$-category$\mathcal{F}$ which consisting of the objects with right duals is dense in $\mathcal{F}$ then the lax centre of $\mathcal{F}$ is equal to the centre, that is $Z_l\mathcal{F} = Z\mathcal{F}$. Also for any finite dimensional Hopf algebra *H*, the lax centre of the monoidal category **Mod***H* of left *H*-modules is equal to its centre.

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