

Organization of indigenous dairy cattle production system in *Murunkan* veterinary region in *Mannar* district, Sri Lanka

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Abstract

The dairy sector in *Murunkan* veterinary region in *Mannar* district in the northern province, Sri Lanka was adversely affected by the 30-year-long civil war which ended in 2009. The post-war recovering dairy sector in the region produced 2.11 million litres of milk in 2017. However, the lack of updated information constrained the sector's development and identification of development interventions. Hence, this study was designed to review the organization of the dairy production system in the *Murunkan* veterinary region in *Mannar* district. A survey was conducted involving 100 dairy cattle farmers selected from 40 villages in the *Murunkan* veterinary region using a questionnaire. A stratified random sampling technique was used to select the sample dairy cattle farmers. Farmers rear indigenous non-descriptive type cattle in a nomadic system using pastures available on roadsides, reservations, uncultivated rice fields and marginal forest areas. Sources of drinking water for cattle were irrigation canals (76%), ponds (46%), village tanks (35%) and wells (9%). The mean herd size and the mean number of milking cows per farmer was 33 and 14 cows respectively. The average milk yield of a cow was 0.92 L per day and it ranged from one litre to three litres per cow. From daily milk production, 64% of farmers consumed milk at home and the rest of the milk was sold at a rate of Rs 100.00 per one litre of milk on average (Rs 358.51= 1US\$). The diary income of the farmers accordingly ranged from Rs.6,000.00 to Rs 192,000.00 per month. Contraction of feeding grounds during rice cultivation season (six months of the year) is a major challenge faced by farmers. During this season, herds of cattle were restricted to marginal forest areas and milking was not practised by all the farmers as the cows were far away from farm households. Therefore, the intervention of respective government organisations is of utmost importance to facilitate farmers with required grazing grounds, especially during the paddy cultivation season to maintain consistent milk production.

Introduction

The dairy sector in Sri Lanka is led by about 400,000 smallholder cattle and buffalo farmers. Their contribution to local milk production is 75%. The majority of these cattle farms are located in the eastern and northern provinces of Sri Lanka (Vidanarachchi et al. 2019). Earlier days before the war the dairy production system in the northern province of Sri Lanka had its unique characteristics compared to the other areas of the country. The main breed which was the indigenous zebu cattle was mainly reared on communal grazing grounds under an extensive management system with minimum inputs (Jayasuriya 2008). This low input system, however, was disrupted due to the eruption of war and the owners were forced to flee the area or migrate to other areas/countries for safety. After recovering from the 30-year-long civil war, the dairy cattle in the northern province that was in a nomadic system without ownership for a long period is now undertaken by the rural community and managed accordingly. There was a meagre of information available on the effect of the 30-year-old civil war on the dairy production system in this area. Thus, a study was designed to explore the organization of the indigenous dairy production system in the *Murunkan* veterinary region in *Mannar* district in the post-war era. In the *Mannar* district, there are five veterinary zones; *Mannar*, *Murunkan*, *Manthai-west*, *Madhu*, and *Musali*. According to the Department of Animal Production and Health, Sri Lanka, the *Murunkan* veterinary region is the key

area that contributes to milk production in the *Mannar* district. Hence it was selected for this study review.

Methods

Murunkan veterinary region (Latitude of 8° 50' 0" N and Longitude of 80° 2' 0" E) was under war for over thirty years until the past decade and now it is reviving. The agroecological zone was a dry zone low country (DL4) and it is located 18m above sea level (Punniyawardhana 2008). Main land use in the area includes rice and forests. A structured questionnaire survey was conducted with 100 dairy cattle farmers selected from the 40 villages in *Murunkan* Veterinary region. A stratified random sampling technique was used to select the sample of dairy cattle farmers from different villages. The questionnaire consisted of questions that are related to the indigenous dairy cattle production system; demographic information of the farmers, livestock rearing system, herd dynamics, feeding management, milk production, manure production, disease management, access to veterinary services, and farmer knowledge on cattle rearing system in the area.

Results and Discussion

Results show that the majority (96%) of the dairy farmers in the study area had only primary education nevertheless they had over 10 years of experience in cattle rearing. All these farmers were willingly involved in dairy cattle farming. All the farmers included in the survey reared indigenous cattle in a nomadic system with one caretaker per household taking care of the herd. Twenty-two per cent of the farmers hired an additional caretaker when the average herd size exceeds more than 10 cattle per farmer. The mean herd size per farmer was 33 cattle and it varied from 5 cattle to 128 cattle per farmer. On average, there were 14 milking cows per farmer in the herd which also ranged from three to 60 milking cows.

The breed of cattle was an indigenous non-descriptive type as observed by Vidanarachchi et al., (2019) and Dias et al., (2019). The average milk yield of a cow was 0.92 litres per day in this system and it varied from one litre to 3 L per day. In 88% of the farms, the daily milk production per cow was one litre while 8% and 3% of the farms produced 2 L and 3 L per day per cow respectively. Thus, approximately 950 litres of milk were produced daily from this extensive system from which about 90% of the production was sold at an average price of Rs 100.00 (1 USD = Rs 358.51). Depending on the buyer, the price received by the farmers per litre of milk ranged from Rs 80.00 to 120.00. From the daily milk production, 64% of the farmers have at least consumed 1.2 L per day.

The cattle are fed on pastures available in roadsides, reservations, uncultivated paddy fields and marginal forest areas. The available forages for grazing were *Cynodon dactylon*, *Cyperus rotundus*, *Imperata cylindrica*, *Oryza sativa* straw and other wild species such as *Eleusine indica* and forage legumes such as *Gliricidia sepium* (Gliricidia) and *Leucaena leucocephala* (Ipil ipil) were also available in small quantities in the above grazing areas. The majority of the cattle had access to water flows through irrigation canals (76%), ponds (46%), village tanks (35%) and wells (9%). Most of the time water was available throughout the day and one farmer may use more than one of the above sources.

Frequently observed diseases in this system include black quarter (59%), foot and mouth (29%), and bloat and other diseases (12%). However, 63% of the farmers vaccinated their herds against the above diseases. In addition to veterinary care they also depended on traditional medicines such as salt and *Curcuma longa* (turmeric) mixture, *Piper nigrum* (black pepper) and *Brassica nigra* (mustard seeds) mixture, *Cocos nucifera* (coconut or king coconut) water treatment etc to treat the cattle.

Fifty per cent of the farmers collected manure and from them, 59% add manure to the crops and 41% sold manure to other farmers at Rs 100.00 per 30kg bag. One farmer on average sold about 700kg of manure per month, earning an income of about Rs 70,000.00 on average per month.

Farmer income was derived from several sources such as the selling of milk, live cattle, and manure. One farmer earns an average monthly income of Rs 32,649.42 by selling milk and it varied from Rs.6,000.00 to Rs 192,000.00 per month. About 22% of the farmers hired labourers for cattle management. Out of which 47% of the farmers hired daily paid workers at a wage of Rs 1,000.00 per day while another 47% of the farmers hired workers at a monthly wage of Rs 35,000.00.

When inquired about the constraints faced by the farmers, they pointed out that lack of grazing grounds, disease outbreaks, pandemic crisis, low milk production from the milking cows, lack of high-producing breeds, financial difficulties, heat stress during day time, high cost of pharmaceuticals, death of artificially inseminated cows during birth due to the difficulties in parturition, lack of attention on the herd by the hired labourers and poaching as some of the constraints.

In the *Mannar* district, the main paddy cultivation season was the *Maha* season which starts with the rain receives from October to December (Sugirtharan et al., 2016). The harvesting of paddy in the area started from February to March. During this period, grazing on paddy fields was restricted. Hence, farmers were forced to remove cattle from paddy fields. The cattle were restricted to marginal forest lands identified for grazing. Therefore from interviews held with the farmers and *Murunkan* Veterinary Officer, it is certain that milking the cows has become difficult during the paddy cultivation season as the cows are away from the household. Accordingly, during this period milking is not practised. Thus, the reduction of grazing lands during the paddy cultivation season was found to be a challenge in this system. Further, herd monitoring and supervision have become weak and the loss of milking cows, calves and stud bulls due to stealing has also become common during this period.

Conclusions and/or Implications

The indigenous dairy production system in the *Murunkan* veterinary region in *Mannar* district is reviving the post-war era. There is a great potential to enhance milk production, farmers' income and the nutrition of farm families in the *Murunkan* veterinary region. Interventions to overcome a seasonal shortage of pasture are needed. One solution may be to introduce high-yielding grass and fodder varieties into the marginal forest lands. Moreover, gradual upgrading of herd quality is another potential intervention to increase low cow productivity. However, attention should be paid to the breed of stud bull that will be selected. It should be of either Indian or with superior indigenous crosses to avoid the cows having oversize fetuses. In the current economic crisis fulfilling farm families' daily nutritional needs via the consumption of milk at the household level was a positive impact. However, addressing the issues related to lack of grazing grounds and poaching when the animals are in marginal forest areas during the paddy cultivation season is of utmost importance to have a well-established extensive farming organization in the *Murunkan* veterinary region in the *Mannar* district.

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