

**Emergency Market Mapping and Analysis of the Milking Cow Market System
Kilinochchi and Mullaitivu Districts, Northern Province, Sri Lanka
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I. Introduction / Executive Summary

The milk production is a rapidly growing industry in Northern Province Sri Lanka. Since the war ended, many new private sectors and semi-governmental actors have moved into the area to dairies, milk collection networks and processing centers. Milk production has long been a source of food and secondary income in the Vanni, but the arrival of businesses such as Nestle, Milco and others has raised the interest and profile of milk production as an income earning strategy. With this increase in interest has come an increased interest for higher yielding crossbreed cows that can triple the daily milk production of the local cow varieties. This market analysis focuses specifically on the availability and supply of cross-breed milking cows to meet the demand for farmers seeking to both replace their cattle lost during the end of the war and to expand livelihood options through milk production. This study on the milking cow market system will hopefully serve as a useful complement to the forthcoming UNDP market analysis of the milk production market system (That report was not yet made public at the time of this analysis).

Specifically, the milking cow market system analysis will seek to answer three key analytical questions:

1. What is the capacity of external market (still within Sri Lanka) to meet the need of the target population for milking cows?
2. What constraints does the target population face in accessing milking cows?
3. What actions can be taken to improve the target group's access to milking cows?

The following analysis will show that the supply of cross-breed cattle is very low throughout Sri Lanka, and is not sufficient to meet the replacement needs of the total population in order to reach pre-war milk production levels. Government policies seeking milk self-sufficiency at the district level effectively limits the movement of cows across district boundaries, which significantly constrains the market system from meeting the high demand for crossbreed cows. A series of recommendations are provided to expand the milking cow market system capacity so that resettled households can expand their income earning opportunities in dairy.

II. Context and Current situation

More than three decades of armed conflict between the Sri Lanka Armed Forces (SLA) and Liberation Tigers of Tamil Elam (LTTE) led to a steady deterioration of the food security situation along with social and economic infrastructure in Northern Province of Sri Lanka. Kilinochchi and Mullaitivu are two districts in the north that were severely affected in the final phase of the war during January to May 2009. The final war displaced nearly 300,000 people, kept in the transit camps located in 'Menik farm' in the Vavuniya district. In mid-2009, resettlement programs began returning those displaced in the war to their home communities in Kilinochchi and

Mullaitivu, and as of February 2012 around 6,000 IDPs (1800 families) remained in the Menik-farm camps awaiting return to their homes¹.

Returnees have had access to basic relief services in terms of shelter material, food, and water and sanitation facilities, in order to re-start their lives and livelihoods². While basic relief services have helped improve protection and resume the livelihood activities, poverty levels in these areas remain high, and the household-level income generated by returnees is far below the poverty line. Surveys in 2011 found that returnees from Kilinochchi earned a per capita income of only 2,189 per month and around 26% live below half the poverty line³⁴. Expenditure patterns reveal that average households spend nearly 60% of income on food, mainly rice, vegetables and fish, while other expenditures include education, debt repayments, household consumables and transport⁵.

As a result, up to 25% of the population of Killinochchi District are highly food insecure with a similar proportion likely in Mullaitivu District once food distributions cease⁶⁷. Although food is available, prices are high and communities living in the North have low incomes, which lead to very low purchasing power and limited access the available food items. Lack of sufficient production and income sources have resulted in large reductions of household assets (between March 2010 and March 2011, families who reported owning jewelry dropped dramatically from 80% to 5 % in Killinochchi and from 80% to 41% in Mullaitivu⁸) and an increase in indebtedness, reinforcing risks and occurrence of food insecurity.

The population of Kilinochchi and Mullaitivu largely pursue livelihood strategies in three areas – agriculture (including livestock), fishing, and wage labor. The two districts are primarily agricultural areas that cultivate lowland irrigated rice, highland crops such as groundnut and green gram, and vegetables. Ocean and lagoon fishing also provides significant livelihood opportunities for nearly 3,000 households. Lastly, recent food security study estimated that 24% of household income is generated by non-agricultural daily wage labour, representing the third largest livelihood activity.

¹ OCHA Joint Humanitarian and Early Recovery Update, February 2012 – Report #40.

² Detailed account of the relief interventions by the humanitarian actors can be found in the Joint Humanitarian and Early Recovery Update by OCHA, February 2012.

³ Food Security in the Northern, Eastern and North Central Provinces: Food Security Assessment Report, Sri Lanka, April 2011, by Ministry of Economic Development, HARTI and WFP

⁴ The National Poverty line for the period March 2011 is LKR3, 318.

⁵ *ibid*

⁶ *Source: Food Security in Northern, Eastern and North Central Province, WFP, Ministry of Economic Development and Hector Kobbekaduwa Agrarian Research and Training Institute, May 2011*

⁷ The termination of WFP general food distribution six to nine months into the resettlement period results in a reduction in available sustenance of families in Killinochchi and Mullaitivu.

⁸ *Source: Food Security in Northern, Eastern and North Central Province, WFP, Ministry of Economic Development and Hector Kobbekaduwa Agrarian Research and Training Institute, May 2011*

III. Methodology

EMMA (Emergency Market Mapping and Analysis) is a rapid market analysis approach designed to be used in the short-term aftermath of a sudden-onset crisis. It is premised on the rationale that a fuller understanding of the most critical markets in an emergency environment enables key decision makers (donors, NGOs, government policy makers, etc.) to consider a broader range of responses based on market realities. The methodology used for this study adapted the standard EMMA approach to the post-war and resettlement context of Northern Sri Lanka, but nevertheless followed closely the EMMA 10-step process including a focus on key critical market systems and a combined gap, market, and response analysis. Comparison to a baseline market system was not used in this analysis. Due to the duration of the war, and the significant changes in the market environment, reference to a pre-displacement market system is likely not possible or appropriate. Instead, market maps illustrate the market system as it is currently functioning and in certain cases, how it is anticipated to function in the future.

The EMMA team was made up of 17 members from three organizations – Oxfam (lead), Danish Refugee Committee, and NGAGDO – and four external consultants, including two value chain specialists, a financial systems specialist, and one lead facilitator providing overall technical support for market analysis and reporting. Six of the team members were EMMA-trained prior to this assessment. In addition, a four-day training in the EMMA tools was provided for two members of each critical market system prior to the start of fieldwork. The team was divided into five sub-teams, and each sub-team was responsible for analyzing one critical market system.

This assessment took place from 1-18 May, including seven days of desk-based secondary research and EMMA refresher training in Colombo, and 11 days of field work in Kilinochchi and Mullaitivu districts, Northern Province, Sri Lanka. The milking cow market system analysis relied on qualitative and quantitative information from secondary sources as well as primary data collected from 56 households and 24 key informants representing all levels of the market system, using focus group discussions and semi-structured interviews.

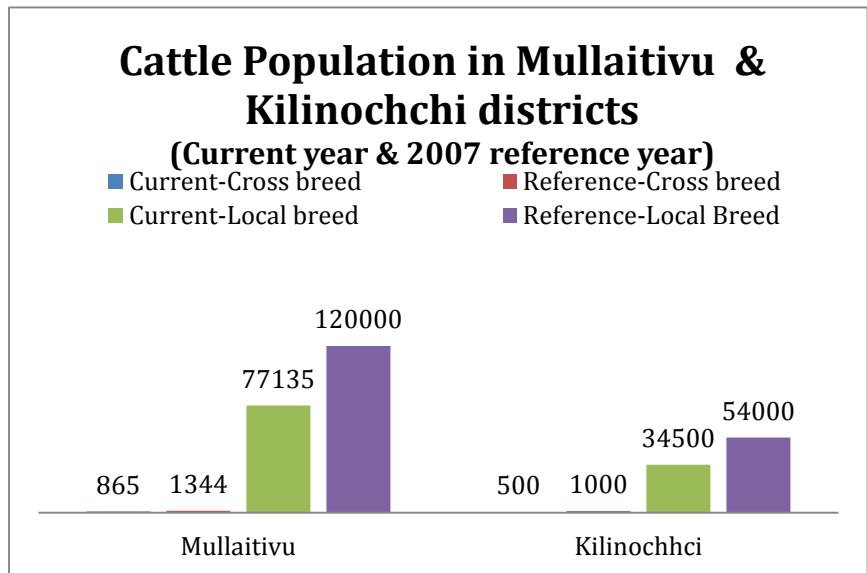
IV. Target population

The target population for this analysis is war-affected and resettled population in Kilinochchi and Mullaitivu districts, Northern Province, Sri Lanka, totaling 230,800 people. There are three main livelihood patterns taking place in these districts, mainly fishing, agriculture, and wage labour. Approximately 20% of this population (over 13,761 farmers) engages in livestock raising as a significant livelihood strategy, and as such, cattle, milking cows in particular, are a major livelihood asset for the population of these districts.

The entire target population was displaced from their homes at the end of the war in 2009, and the majority lost all livelihood assets, including livestock. Cattle were abandoned during displacement and left alone they moved randomly throughout the districts. When the return program started, some farmers were able to re-capture their herds or benefitted from a FAO cattle redistribution program. However, these livestock holdings are still very small relative to pre-displacement herd sizes (see figure 1 below) and many households did not recover any livestock at all. As a result, the target population is relying heavily on the milking cow market system to restock their cattle and to restart livestock-based livelihoods. Additionally, with the end of the war in the north

private companies began collecting milk and demand for milk skyrocketed, making intensive milk production a profitable livelihood activity. As such, resettled farmers are increasingly seeking to replace their lost herds with cross breed varieties that yield more milk. Additionally, the utility of cattle has shifted from the primary importance as draft power to a source of income in the form of milk production and sales.

Figure 1:



Source: Government Animal Production and Health Department Statistics from Kilinochchi and Mullaitivu, 2007 and 2011

The season patterns of the milking cow-based livelihood systems are illustrated in the following seasonal calendar:

Figure 2: SEASONAL CALENDAR, MILKING COW MARKET SYSTEM

Factors	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Price of Milk Cow	HIGH		STABLE						MODERATE				
Trade (supply) Quantity Cows	LOW									HIGH			
Employment for Cattle Management	HIGH		LOW								MODERATE		
Disease Outbreaks						MODERATE				HIGH			
Fodder Availability	HIGH		LOW								MODERATE		
Flooding										HIGH			
Droughts			HIGH										
Capital Investment	HIGH						HIGH						

V. Selection of Critical Market Systems

Five critical markets were selected for this study using a three-step approach during the EMMA refresher training and fieldwork preparation phase prior to the start of data collection. Market selection focused on identifying those market systems that were most critical for ensuring survival, for promoting and protecting livelihoods, and for ensuring income for the target population.

First, a long list of market systems critical was generated for each of the three primary livelihood groups in the two target districts (wage labour, agriculture, and fishing). These lists were then prioritized based on how critical each market is for the food security, livelihood, and income needs of each livelihood group. In total, a long-list of 84 market systems for wage labour, agricultural, and fishing livelihood groups was prioritized into 21 market systems. Those prioritized include: red rice, coconut oil, dhal, bicycles, mamoty (hoe), farm labour, fishing labour, construction labour, cassava, wheat flour, eggplant, corrugated tin sheeting, kitchen utensils, sugar and tea, canned fish, chili, coconut, brinjal, tomato, okra, and transitional shelter materials.

These 21 markets were then ranked according to six criteria to determine which markets were most appropriate for each livelihood group. The criteria used for ranking were:

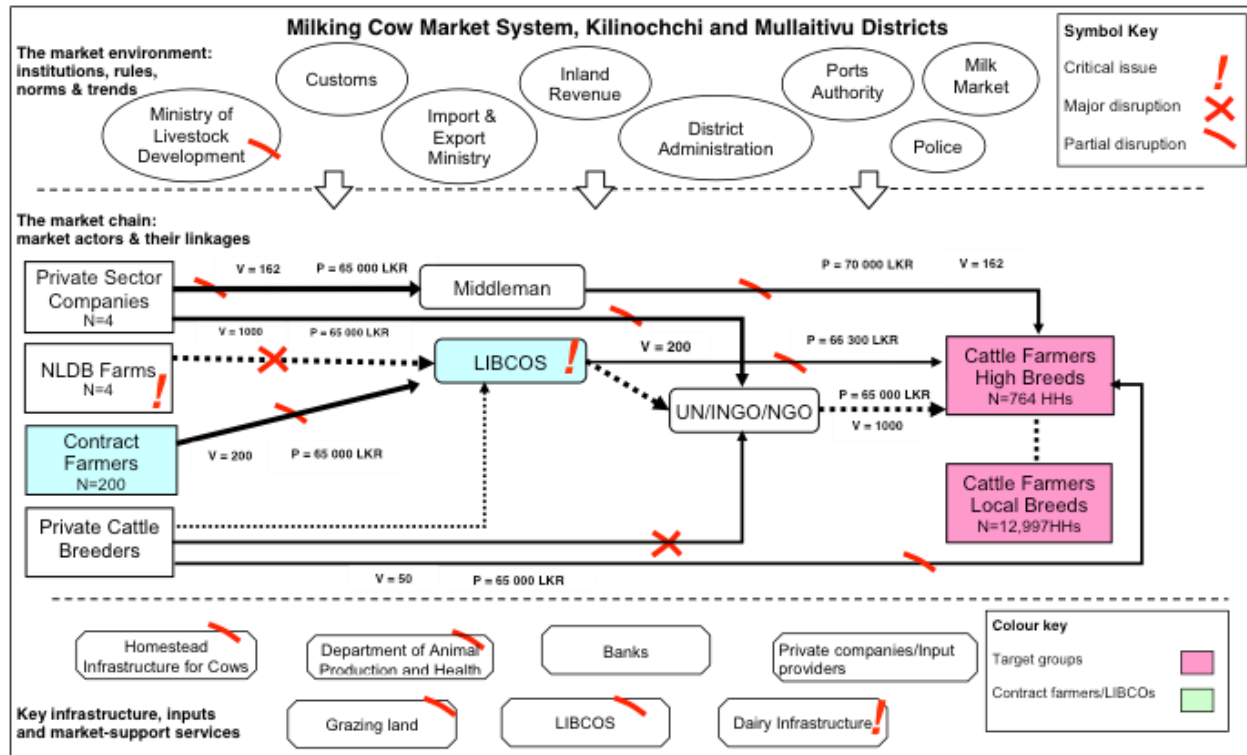
1. The market is related to significant or urgent need
2. The market system is affected by the emergency
3. The market system fits the agency mandate
4. Seasonal factor and timing are appropriate
5. The market system is consistent with government or donor plans
6. Programming options in the market system are likely to be feasible

The high-ranking market systems were then compared across the three livelihood groups and there were several market systems that overlapped, being critical for multiple livelihood groups. The five highest-ranking different market systems were deemed to be the most critical for the target population and selected for this study.

The five critical markets examined by this EMMA team are: 1.) Red Rice – supply market; 2.) Groundnut – income market; 3.) Credit services – supply market; 4.) Masonry labour – income market; 5.) Milking cow – supply market.

VI. The Market system

The milking cow market system is characterized by a series of private and government-supported breeders working through the livestock cooperatives, middlemen, and aid agencies to deliver cows to dairy farmers. This movement of cows is supported by a series of credit providers and extension support services, as well as by laws and regulatory bodies that govern (in effect restrict) the transportation of milking cows between districts. The map below is a visual depiction of the milking cow market system in Kilinochchi and Mullaitivu districts.



The market chain:

- Private sector companies:** There are four private sector companies that breed milking cows across the country, none of which are located in the targeted districts. These companies are located in Anuradhapura, Polanaruwa and Kurunagale districts and supply cross breed milking cows island-wide. These companies both breed their own cows as well as purchase animals from other districts, and contract with farmers to raise the cows until productive age. When cows are ready for sale, the companies sell their cattle through middlemen to farmers. The current price for Jersey-Shakiwal crossbred milking cow is LKR 60,000 to 75,000, including the cost of transport and certification for shipping across district boundaries (LKR 2,500), compared to 30,000-45,000 in 2007. Currently these companies are operating at a very low capacity relative to the demand they are getting for orders. Customer are demanding up to 350 cows per month, but the companies are able to provide a maximum of 70 cows per month, but rarely reach that

level of supply. For the majority of the year, the private sector actors can only supply a small number of cows. Several companies have begun importing cross-breeds cows from Pakistan and India, but the import tax, associated costs of importation, and potential for livestock to not adapt well to Sri Lankan environment mean that imported cows are very expensive and a riskier investment for farmers.

- **NLDB Farms:** The National Livestock Development Board (NLDB) farms are attached with the government. Currently, the NLDB farms are focusing their efforts on increasing milk production in the districts in which they are located, in accordance with the government objectives to promote district-level milk self-sufficiency by 2016. The farms are located in Anuradhapura (1 Farm), Polonnaruwa (1 Farm) and Kurunagale (2 Farms), and as such, these farms are providing cows only to these districts. NLDB supply to Kilinochchi and Mullaitivu is completely disrupted.
- **Contract farmers-LIBCOs:** There are roughly 200 individual contract farmers in the adjacent districts have registered under the LIBCO (Livestock Breeders Cooperative Societies), which is attached with the Cooperatives department. These societies are getting technical support from Department of Animal Production and Health. The LIBCO has an exception from the certification process needed to move livestock from one district to another, and the cooperative uses this exemption to assist farmers to purchase cows from breeders outside the district (mainly from Jaffna) contracted directly with the LIBCO cooperative. They have capacity to provide 200 Milking cows annually. The LIBCOs then provide these cows to individual farmers at the community level. However, since the permit restrictions have gone into effect, LIBCOs have also begun cooperating with aid agencies to supply milking cows to the target population through various agencies. The LIBCO societies were disrupted during the displacement, and in many areas these local-level societies have either not yet been reconstituted or are functioning at a low capacity.
- **Private cattle breeders:** There are a limited number of private cattle breeders in the adjacent districts outside the target area, and there are no cattle breeders in the target area. The private cattle breeders provide cattle directly to the farmers and some time they provide through LIBCOs as well. The identified private cattle breeders are able to provide 50 annually.
- **Government, UN, International NGOs, Local NGOs programs:** During the recovery stage of resettlement agencies are involved in the sector which is identified as lucrative income source for the returnees, and have provided 1000 cross breed milking cows to meet the demand after resettlement. This does include the government-sponsored Dairy Village program recently started in the target areas by the Animal Production and Health department (AP&H) working through LIBCO to provide cattle, inputs and services as a comprehensive packages for 20 cattle farmers at a time in one village. Once the first cycle finished in a year, the next 20 farmers will be selected in the same or neighboring communities with same volume. The composition of the assistance is 50 % grant and 50

% is farmer contribution. The linkages between breeders, LIBCOs, Aid Agencies and the target population is dotted to indicate that this is a new supply channel for milking cows since resettlement began.

- **Middlemen:** The middlemen collects the cross breeds from cattle breeders and private companies outside the target districts and sells them to farmers. Often the middlemen have political connections that have enabled them to obtain transportation permits to move cattle from the outside districts. Many cross breeds are sold through this channel annually, representing a significant source of cross breed cows for dairy farmers.
- **Cattle Farmers:** Cattle farmers are divided into two categories on the market map, those raising cross breeds and those raising only local cattle breeds. The dotted line indicates that an increasing number of farmers are re-stocking with cross breeds and are entering the crossbreed farmer box. Together, the two types of farmers are demanding access to cross breed cows to improve their milk production and livelihood opportunities. Some cattle farmers in Mullaitivu and Kilinochchi are involved in raising crossbreeds for their own use. Because there is such a significant demand for milk, many farmers increase their cow herds by reproducing their own cattle. There are over 13,700 cattle farmers in the two target districts, of which 764 own high-yielding cross breed varieties of cow.

The market Environment

- **Movement limitations** – the most significant constraint on the milking cow market system is the certification process required to move cattle from one district to another. Very recently the Ministry of Livestock Development declared a policy of district-level milk self-sufficiency, and set an objective for the target districts to increase milk production by 60% before 2016. Because cattle populations throughout the north are very low relative to this ambitious target, the government requires a certificate of approval from the district authorities to transport cattle from across district boundaries. Because of the high demand for cows in each district to meet the milk production targets, very few permits for transport are approved.
- **Milk market:** The high demand for raw milk is driving more farmers to engage in milk production and to demand more efficient, higher-yielding cross breed varieties of cows. This milk is being demanded both by the local population for consumption as well as by private and semi-governmental corporations seeking to process milk and sell as value-added products, mainly milk powder. Since the war ended, milk companies, particularly Nestle, MILCO, and Kothmole have entered the northern districts and are purchasing large quantities of milk from local producers. These consumers are currently demanding over 40,000 L of milk per day, of which nearly 70% goes to local consumption. Nestle, MILCO and Kothmole each command about 20%, 7% and 3%, respectively, of the milk produced locally, and each are seeking to increase their market shares (see Figure 3, below). Because of this increasing market demand for raw milk from the target districts, there is vast potential to increase production. Many new farmers are attempting to

enter dairy production, and resettled dairy farmers are attempting to restock their herds lost during the war (see figure 1 for numbers of cattle lost during the war). These efforts have created a large demand for milking cows.

Table 3: Total Milk production per day in Mullaitivu		
Market Actors for Milk	Quantity	Units
Nestle	8,400	Litre
MILCO	3,000	Litre
Kothmale	600	Litre
Local consumption	27,295	Litre
Total Milk production	39,925	Litre

Market Inputs, Infrastructure, and Services

- **Credit facilities:** Several institutions offer farmers loan schemes for expanding their dairy livelihoods. For example, the People Bank has the scheme to provide credit to cattle farmers up to 40,000 LKR while giving 6 months grace period to repay without interest. However, farmers are not rapidly taking up these opportunities, to a small extent because they are not familiar with the scheme, but to a much greater extent because farmers struggle to meet some basic criteria which required to qualify for the loan. In the People Bank example, farmers must demonstrate that they have proper shed for cattle rearing, ample source of water facilities and capacity to manage the cattle. Providing this investment upfront before accessing credit is difficult for many resettled households who are also struggling to house and feed themselves.
- **Infrastructure:** At the household level, many cattle farmers do not have the basic infrastructure such as a cattle shed and sufficient water sources necessary to manage and support high-yielding cattle varieties. Additionally, although the demand for milk is very high and there is significant public and private investment going towards dairy facilities, many areas of the target district are still without the necessary infrastructure for milk collection and processing, including buildings, roads, transport networks, electricity, and cooling facilities.
- **Extension Services:** There is limited number of department staff to provide extension services, with many of the positions remaining unfilled for long periods of time. The

extension services department does not have the facilities or staff to assist the target population with management and rearing of milking cows.

- **Pasture:** Access to pasture land is a persistent problem for many communities in the target districts. There are large portions of land that still needs to be demined in order for cattle farmers to access pasture. Additionally, military installations now occupy many areas that were previously pasture.
- **LIBCOs:** The LIBCO societies serve a dual function in this market system, as both a key component of the market chain (as described above) as well as a support function for dairy farmers and the entire market chain. In addition to supplying cows, the LIBCOs offer a series of services to dairy farmers, connect them to credit opportunities, support expansion of milk collection and processing services, etc. Because of this dual role, the LIBCOs are an element of both the Market Chain as well as the Infrastructure and Support Services components of the market map.

VII. Key findings

Gap Analysis: Milking Cows required by target population

The analysis below quantifies the number of cross breed cows required by the target districts in order reach pre-displacement milk production levels, as measured during a stable reference year (2007). Because total milk production is made up of both cross breed and local varieties of cows which yield different quantities of milk, a comparison of total milk produced is used instead of comparing numbers of each variety. The total milk production gap estimated for the current year (2011) is then converted into the number of cross breed cows necessary to bring the target areas back to 2007 production levels.

In reality, the demand for milk today is much higher than 2007 levels because of the rapid increase in private sector corporations purchasing raw milk from Kilinochchi and Mullaitivu districts, a market factor that was not present during the 2007 reference year. As such, the actual demand for milking cows is likely to be higher than estimated, and recent UNDP analysis of the milk market system suggests that the gap between supply and demand for milk is widening annually⁹. In addition, although this analysis focuses on replacement of milking cows with cross breed varieties which offer improved livelihood options for farmers, it is very likely that a portion of the milking cow gap selected here will be met by increases in local cow herd sizes.

* Milk production estimations are based on government statistics of local and cross breed variety cattle holding in the target districts in 2007 and 2011, average daily milk yield per type of animal (6.3 L/day cross breed, and 2 L/day local variety), and other factors including proportion of cattle that are female, proportion of females producing milk, etc.

⁹ UNDP and CEFE NET Market Analysis of the Dairy Sector: Opportunities and Challenges

Figure 4: Milking cow (Cross breed) requirements for Mullaitivu and Kilinochchi districts^{10*}

District	Reference Year (2007)		Current year		Milk Production Deficit	Required number of Cross breed	Agency distribution / Individual Purchases ¹¹	Cross Breed Cow Gap
	Milking Cow (Local + Cross)	Quantity of Milk /day in Litres	Milking Cow (Local + Cross)	Quantity of Milk /day in Litre				
Kilinochchi District	13,750	28,575	8,750	18,038	10,538	1,673	312	1,361
Mullaitivu District	30,336	62,117	19,498	39,925	22,192	3,541	1,100	2,441
Total	44,086	90,692	28,248	57,963	32,730	5,214	1,412	3,802

This analysis shows that in order to reach pre-displacement levels of milk production, a rather conservative target given the significant rise in sourcing of raw milk from the target districts by large food businesses, over 3,800 high breed cattle are needed. In order to meet the same production using local varieties, three times this number of cows is needed. As a result, there is significant demand in the milking cow market system for cross breed cattle, but the market is also severely constrained and at present cannot meet this demand.

Additionally, the AP&H Department estimates that local production is capable of meeting only 35% of the demand for milk in Kilinochchi and Mullaitivu districts, the majority of that unmet demand being commercial demand for milk. This further illustrates the livelihood opportunities available for households who can access high yielding crossbreed cows.

Market Analysis: Ability of the market system to meet the need for milking cows

As a livelihood input, the milking cow market system cannot meet the need for milking cows for many years to come without external support. Aside from aid agency interventions, the market supplies less than 500 cross breed cattle per year to farmers. With the support of aid agencies and the government Dairy Village program, a further 1,000 livestock were provided to the target population. However, at this rate it will take about three years just to reach 2007 milk production levels assuming all replacement is with cross breeds. If fewer cross breeds are supplied, then it will likely take longer to reach 2007 production levels because more than triple the number of animals would be required to produce the same milk quantities.

Movement restrictions limit supply: The movement restrictions on cattle are one of most significant barriers to the market system supplying more cows. The permit requirements have caused complete disruptions in the supply of milking cows to the target district from NLDB farms, and from private breeders to INGO and UN agencies. The NLDB farms now focus exclusively on breeding cows for the districts in which they operate, and aid agencies have begun to work through LIBCOs to supply cattle, resulting in a new market pathway between the LIBCOs and the aid agencies. Additionally, by limiting where cattle can be sold, the restrictions

¹⁰ Government Animal Production and Health Department Statistics from Kilinochchi and Mullaitivu, 2007 and 2011

¹¹ Individual purchases reported by LIBCOs who facilitate purchases of crossbreed cows from outside the district.

effectively reduce the market opportunities for breeders, and force farmers to pay higher prices because of permit fees. It is very likely that this regulatory uncertainty will de-motivate breeders from increasing their breeding efforts, even despite the high demand they are already facing.

Low LIBCO capacity: Because of the cattle transportation constraints, the LIBCOs have assumed a central role in the market system and are acting as the primary connection between farmers and aid agencies and the different types of milking cow suppliers. Almost all LIBCO societies were disrupted or stopped functioning when communities were displaced, and since resettlement, many are functioning at a low capacity or have simply not yet been reconstituted at the community level. Because of this limited capacity and the increased role they are playing in supplying milking cows, the LIBCOs are under quite a bit of pressure to perform, and risk becoming a bottleneck to the whole market system without further organizational support or a removal of the restrictions on movement.

Long lead times to replenish stock: The partial disruptions between middlemen and other direct suppliers to farmers is the result of low levels of cross breed supply relative to the high need and demand. Currently, suppliers report that they are receiving a very high number of requests for cross breeds that they cannot currently fill. They cannot fill the needs immediately because of the high lead-time required to breed cows and raise to productive age. This process can take two to three years, and given the sudden nature of the increase in demand, it will take breeders several years to increase their capacity to meet the demand.

Demand dampened by lack of capital: Despite the high demand for cross breeds, there are still many farmers who do not have the income or resources to invest in high-yielding milking cows, causing partial disruptions between suppliers (middlemen and private breeders) and farmers. Even though the demand for milk is high and cross breed cows offer a very strong return on investment, these breeds also require greater upfront investment in terms of cow sheds, water sources, and fodder than traditional varieties. Most farmers lost their livestock during displacement and need to purchase cows as well as the basic infrastructure, vet services, and inputs to support them. The majority of recently resettled households do not have the resources to invest in crossbreed cattle, despite the high pay-off potential and the availability of credit schemes to support them in engaging in this livelihood strategy. Lack of capital at the household level and access to these credit opportunities (due to collateral, need to invest in sheds prior to receiving loan, etc.) also restricts the growth potential of this market system.

Minimal impact of dairy infrastructure: Lastly, although the limited development of dairy infrastructure (collection points, processing centers, transportation networks, etc.) would appear to limit milk production and thus demand for milking cows, this influence is fairly small. Aid agencies, government departments and private companies are investing heavily in developing milk collection networks and the processing capacity is gradually increasing. Additionally, despite the infrastructure challenges, demand for milk local consumption is still very high (roughly 70% of all milk produced in target area) and private sector actors (such as Nestle, Milco, Kothmole) are interested in expanding collection from the target districts. So,

although dairy infrastructure does require improvements in order to expand income opportunities for dairy farmers, it has minimal impact on the supply of milking cows.

Impact on farmers: As a result of the milking cow market's weak ability to meet the demand for cows, farmers are unable to take advantage of, or to maximize, milk sales as an income strategy. Roughly 25% of the population in the target districts relied primarily on cattle farming for a livelihood prior to displacement, and a majority of the remaining agricultural households engaged in cattle rearing as a secondary income source. The low supply of cattle for restocking and the high prices (LKR 30,000 higher than in 2007) makes it difficult for farmers to re-stock livestock they lost during displacement, particularly as households are also attempting to meet other essential needs.

Anticipated functioning of the market system: Because of the long lead-times for cows to reach milk-production age, roughly 2 to 3 years, it is not likely that the milking cow market system at the national level will be able to significantly increase supply for the next few years. Even if breeding efforts increase dramatically across the country, it will take several years before these cows enter the market system, however the restrictions on movement of animals will likely dampen any big increases in breeding efforts. On the demand side, demand for milk is anticipated to stay strong for many years as new milk transportation and processing systems come online and corporations increase their purchasing of milk from target districts. Dairy farming will likely remain a viable and productive livelihood strategy for households, but support is needed for households to restock and for the market system to continue the supply of milking cows.

The current capacity of the milking cow market system is roughly 1,400 cows annually provided to farmers in Kilinochchi and Mullaitivu. We cannot expect these levels to continue, especially considering that over 1,000 of the current year supply of cows was delivered by aid agencies. In the future years, the private companies, it could be expected to deliver about 1,000 cattle per year, and the balance come from contact farmers and private cattle breeders in the adjacent districts especially in Jaffna.

Gender Analysis

Women participate throughout the market system starting from cattle breeding up to milk collection, with the exception of transporting and selling cows, which is commonly left to men to handle. While men focus on cattle trading and transporting, the women are often those responsible for cattle rearing, taking out to pasture, collection of fodder, etc. Among the institutional actors in the market system, women are active members in the LIBCOs as both farmers as functionaries within the organization, and there are several women staff members attached to the Department of Animal Protection and Health, ranging from Director to support staff. However, as these institutions continue to recover and grow following the end of the war, it is important to assure and expand female participation and ownership in the governance and management structures of these organizations.

The expansion of crossbreed cows will be a great benefit to women, many of whom directly benefit from the sale of milk. Higher yielding cows offer the potential for greater income generation. Additionally, because crossbreed cows must be kept in confined areas, there is the potential to reduce the work burden on women, who would traditionally care for cattle in the fields and take out to pasture. This confined nature can also create secondary income opportunities out of the work that women normally pursue, such as fodder collection. Confined animals require fodder be brought to them, so there is the potential for women benefit from the collection and sale of.

VIII. Recommendations

The Milking cow system is functioning, but at a very low capacity relative to the demand, with little prospects to increase capacity in the near-term without outside assistance. There are several key actions that humanitarian agencies can do to enable resettled farmers to pursue sustainable livelihood strategies linked with the dairy sector, and to support market actors to improve market functioning that will ultimately benefit the dairy farmers. These actions are summarized in the table below, and described in more detail following the chart.

Recommended Response	Effect on market system and target group	Key risks and assumptions	Timing and feasibility
Advocate for relaxing of permit requirements to transport cattle	<ul style="list-style-type: none"> - Frees up the market system to move cattle supply to areas of highest demand - Could reduce livestock prices 	<ul style="list-style-type: none"> - Government policy can be changed - Breeders can increase supply of milking cows to meet demand 	<p>Immediate</p> <p>Highly feasible</p>
Assist dairy farmers to construct sheds and to access fodder for confined management of cows	<ul style="list-style-type: none"> - Can be accomplished by directly assisting producers or through assistance to LIBCOs - Would strengthen LIBCO as key actor to support the members increasing milk production. - Improves access to credit 	Ample water source availability	<p>Short to medium term approach</p> <p>Highly feasible</p>
Scale up the government's Dairy Village approach to milking cow management	<ul style="list-style-type: none"> - Can be directly supported through government efforts or via NGOs utilizing a similar approach - Improves supply of milking cows and community management of dairies 	<ul style="list-style-type: none"> - Government willing to scale-up or allow NGOs to utilize similar model - Requires supportive extension system and support services for communities 	<p>Medium to long-term approach to restocking milking cows</p> <p>Highly feasible</p>
Provide support and advocacy for importation of milking cows from India/Pakistan	<ul style="list-style-type: none"> - Implementation through private companies, agrarian department or directly by humanitarian agencies. 	<ul style="list-style-type: none"> - No disease out break - Favorable policy on import 	<p>Short-term intervention to improve dairy-related income of farmers.</p>

	<ul style="list-style-type: none"> - Will increase supply of high-yielding varieties. - Will also increase price of milking cow due to import costs, and will require measures to improve farmer purchasing power. 		Medium feasibility
Improve breeding practices through upgrading breeding technology, including adoption of improved artificial insemination practices.	<ul style="list-style-type: none"> - Implementation through support to NLDB farms, LIBCO, or private sector - Provides the technology and systems to meet long-term demand of milk by local population and increasing private sector actors. - Potential to transform dairy into a key industry benefitting smallholders 	<ul style="list-style-type: none"> - Technology transfer from other countries is appropriate for Sri Lanka - May require improved genetic engineering technology - Long timeframe to increase livestock supply 	<p>Long-term approach to increasing supply</p> <p>Medium feasibility</p>

Advocate for relaxation of permit requirements to transport cattle

This intervention is recommended to relax the policy limiting transport of cattle from the adjacent districts. Advocacy efforts should be directed at the Ministry of Livestock Development and local level authorities that approve the permits. This indirect intervention to relax the movement limitations would promote market integration, allowing cows to move from areas of surplus production in the country to areas where demand is high, as in Kilinochchi and Mullaitivu. From the suppliers’ perspective, relaxing the permit requirements will increase the potential number of farmers to whom the suppliers could sell, providing greater motivation to increase breeding efforts. From the farmers’ perspective, being able to purchase cows from other districts and a variety of suppliers will reduce cost, increase the possible volume of trade, and foster competition among producers.

Provision of conditional cash grants to assist dairy farmers to construct sheds and to access fodder for confined management of cows

In order to maximize milk yield from cross breed cow varieties, intensive cattle management practices should be used whereas cows are largely confined, access small pasture areas, and rely heavily on fodder. Many farmers do not have the ability to invest in these assets to improve their milk production capacity.

Support in the form of cash grant – conditional on construction of sheds, fodder production, etc. – can have a doubly positive impact for cattle farmers. Not only would this assistance provide dairy farmers with the necessary household infrastructure for cross breeds, but it also provides assets in the form of sheds, fodder supplies, water sources, etc. that can be leveraged for additional loans. Once infrastructure is in place, farmers can access credit to purchase

cows, re-start dairy-based livelihoods, and rely on the sheds and pasture to protect their investments.

Scale up the government's Dairy Village approach to milking cow management

Aid agencies should influence the government/line ministry to scale up the Dairy Village program to more communities. The Dairy Village model brings a comprehensive package to cattle farmers including cows as well as associated veterinary and extension services. Fostering this network of services in concentrated areas allows service providers, particularly extension and veterinary agents, to focus on a geographical area that is manageable given their resources, yet still benefits all the farmers in that area. Aid agencies can support government efforts to scale up the Dairy Village program or identify complementary activities to support new groups of villages in a manner that increases the numbers of people receiving livestock and services as well as expanding the network of service providers for greater community access.

Provide support and advocacy for importation of milking cows from India/Pakistan

Given the weak supply of milking cows in the Sri Lanka market system and the large-scale demand, aid agencies should consider either directly importing cows from India or Pakistan, or advocating for the government and private companies to take these measures. Such a measure could quickly address the availability of cross breeds, but likely at a high cost and with the possible risk of imported animals not adapting well to the Sri Lanka environment. This indirect intervention would, however, rapidly restock households desiring to produce milk and greatly improve income opportunities for resettled farmers.

Improve breeding practices through upgrading breeding technology, including adoption of improved artificial insemination practices (sex semen).

A long-term recommendation to improve the supply of milking cows is to support the extension service department to upgrade breeding technology. By supporting the extension system to provide technical services in artificial insemination practices to cattle farmers the breeding of livestock can be decentralized to farm level. In the long-term, after livestock populations recover and stabilize, farm-level artificial insemination and production of cross breeds will assure sufficient supply at the necessary volume. New approaches, such as use of sex semen artificial insemination, which can guarantee a female calf, will help to lower the overall livestock population (reducing environmental impact) while at the same time maintaining production levels.

Annex 1: Response Options Framework

The response options framework is an EMMA tool to document the brainstorming process used in identifying the best response recommendations based on the market system. The table below contains the long list of ideas and concepts considered by the market analysis team when thinking through the most appropriate responses for the milking cow market system.

Response Option	Advantages	Disadvantages	Feasibility (High, low, medium and why?) and timing (short, medium, long-term)
Distribution of Cross breed cattle	Immediate impact, For the short term,	Limits integration with markets in	Low!

	Simple distribution program,	target area and neighboring districts	Expect of lack of stocks availability Short term
Upgrading cattle breeds	Unsusceptible breeds to diseases,	Requires intensive cattle management practices,	High! Availability of AI Services Long term intervention
Conditional Cash grant distribution	Pre conditions could be met, i.e. shed for cows, Practicing intensive cattle management,	Limited supply of milking cow in the market, Small scale of intervention	Medium! Unavailability of large number of milking cow in local market,
Re distribution of milking cows	No capital required,	The cattle became stray animal and settled in military bases,	High! Advocacy/Lobby with government to arrange redistribution of cattle to the farmers Short term
Strengthening LIBCOs [Livestock Breeders Cooperative Societies)	Collective action, Legal recognition,	Limits of infrastructure facilities,	High! Emerging trend for institutionalization, Long term
Fodder cutting distribution	Availability of fodder in HH level,	Protection from stray cattle	Medium! Limited access to protected land, Long term,
Linking with credit institution	Pre conditions could be met, i.e. shed for cows, Practicing intensive cattle management,	Risk of over burden	Medium! Lack of credit institution Long term,
Training and Awareness on improved cattle management practices	Skill development, Lateral spread of knowledge,	Limited extension services	Medium! Lack of human recourses in extension services Long term,
Advocacy/lobby with government for pasture land	Increased fodder availability	Productive land contaminated with mines	Medium! Non mechanized process of demining, Long term,

