



# UNITED STATES DEPARTMENT OF AGRICULTURE SRI LANKA MARKET ORIENTED DAIRY (MOD) PROJECT

## Final Evaluation Report - **FINAL**

*Submission Date: September 30, 2024*

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# UNITED STATES DEPARTMENT OF AGRICULTURE SRI LANKA MARKET ORIENTED DAIRY (MOD) PROJECT

## FINAL EVALUATION REPORT

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## ACRONYMS

AI	Artificial Insemination
DAPH	Department of Animal Production and Health
EDR	Evaluation Design Report
FFPr	Food for Progress
FGD	Focus Group Discussion
GDP	Global Dairy Platform
GoSL	Government of Sri Lanka
IESC	Improving Economies for Stronger Communities
IP	Implementing Partner
JAA	J.E. Austin Associates
KII	Key Informant Interview
LKR	Sri Lankan Rupee
LOP	Life of Project
MEL	Measurement, Evaluation and Learning
MOD	Market Oriented Dairy
MOU	Memorandum of Understanding
M&E	Monitoring and Evaluation
PMP	Performance Management Plan
RF	Results Framework
SEAF	Small Enterprise Assistance Fund
SOW	Scope of Work
THI	Temperature Humidity Index
TMR	Total Mixed Rations
ToC	Theory of Change
TL	Team Lead
UF	University of Florida
USDA	United States Department of Agriculture
USG	United States Government

## EXECUTIVE SUMMARY

Improving Economies for Stronger Communities (IESC) commissioned a final performance evaluation of the United States Department of Agriculture (USDA) Food for Progress (FFPr) Sri Lanka Market Oriented Dairy (MOD) Project to measure the influence and effectiveness of project interventions, uncover design and implementation challenges, learn which programmatic areas are positioned for further improvement, and to draw lessons to inform future programming of other USDA projects in Sri Lanka, specifically, and in the dairy sector, generally. The evaluation is guided in this process by the six evaluation questions detailed in the evaluation scope of work (SOW).

The final evaluation focused on the MOD Project performance with respect to expected results and objectives as outlined in the Project's SOW; program design and management; the prospect of long-term sustainability; and practical recommendations for future programming. The evaluation findings underscore if planned project activities achieved their objectives and expected outcomes.

## EVALUATION METHODOLOGY

The evaluation utilized a mixed methods approach appropriate for a final performance evaluation, anchored by an extensive quantitative survey, analyzed in conjunction with data gleaned from the midline evaluation and semi-annual surveys, and supported through informal discussions with beneficiaries and field observations to triangulate findings. This approach allows USDA, IESC, and other MOD stakeholders to understand the effectiveness of the Project's programming while contributing to the knowledge base used to inform decision-making at USDA. The evaluation design enables USDA to test the key hypotheses underlying the overarching results framework's theory of change (ToC). This design provided for inquiries into the evaluation of processes and the achievement of the project's targets and objectives.

The final evaluation methodology required adjustment from the originally proposed Evaluation Design Report approach. Poor project database design, field challenges and limitations required a departure from the expected sampling approach vis-à-vis the imposition of inconsistent field requirements by the MOD field team (i.e. the influence of processors to any sampling strategy): (1) a "grey" line in definitional relationships between "different" farmer groups which was not clear at evaluation design which reduced the suitability in conducting comparative analysis between groups, (2) an MOD Project database which was not well suited for sampling and evaluation purposes, and (3) general issues related to proximity between various higher level stakeholders, government staff strikes and lack of availability.

Despite these broader challenges, the MOD Final Evaluation team conducted a total of 629 unique quantitative surveys across the six evaluation provinces. Given the MOD Project's intervention approach, surveys were focused on beneficiary farmers collecting more than 20 liters of milk daily at entry into the MOD Project. Surveys, informal interviews and field observations were conducted across 11 districts reflecting a diverse range of agro-ecological zones.

## FINDINGS AND CONCLUSIONS

The MOD Project Final Evaluation addressed six evaluation questions, each delving into the various objectives and activities of project implementation. As a project intended to address Sri



Lanka's dairy sector development through a market oriented approach, the MOD Project delivered mixed results. The Project returned successful results related to the core issue related to "increase[ing] agriculture productivity in the dairy value chain through improving the availability of inputs for dairy farmers in a way that can be sustained beyond donor support." However, the Project struggled to gain traction on core issue 2 "increase trade of dairy products by improving food safety and quality at the local level and targeting interventions aimed at market-oriented farmers seeking to grow their businesses." There are substantial lessons to be learned, as the MOD experience varied across different agro-ecological zones, providing for useful comparative analysis between zones in complement to the overall analysis approach. A synopsis of findings and conclusions include:

***Core Issue 1: Increase agriculture productivity in the dairy value chain through improving the availability of inputs for dairy farmers in a way that can be sustained beyond donor support***

*Farmer satisfaction in the improvement to milk production:* Farmers generally recognized the opportunity to expand their dairy enterprise under the MOD Project. Total milk production for beneficiary farmers improved over the course of the later five years of MOD Project implementation, having reported an average of 30.4 liters of total daily production in 2019, increasing to 37.6 liters in 2024.

*Evidence of improved management practices:* Survey results indicate that farmers improved their knowledge of improved management practices such as feed, water access and other management practices, with farmers reporting positive results from applying these new practices and technologies.

- Over 50 percent of farmers in intermediate and wet zones applied 7 or more practices, while over half of farmers in the dry zone applied 6 or more practices. Some practices proved more universal than others - such as year-round nutritious feed, 24/7 access to water and herd composition, while other practices were found to be more significant in one zone versus others, such as silage and TMR, weaning, management of effluents.
- Fodder cultivation under MOD intervention experienced uneven results, whose experience was likely influenced by the various external shocks farmers faced such as the fertilizer and financial crisis and the Coronavirus 19 pandemic. Farmers in dry and intermediate zones failed to sustain any real change to fodder cultivation, while wet zone farmers were most influenced by the shocks in 2020 but recovered substantially to net a positive increase in the percentage of farmers cultivating some form of fodder.
- While fodder cultivation provided mixed results, survey data provided strong evidence of significant change in how farmers utilize silage on their dairy farms. In 2020, the midline evaluation found that only 16.8 percent of farmers utilized silage on their farms. By 2024, that percentage has increased to 46.6 percent.

*Access to high-quality veterinary supplies and services, including artificial insemination:* Market demand for veterinary services, either for disease prevention or AI, remains high and unmet. An overwhelming majority of farmers purchase veterinary medication, with deworming medication the most frequently purchased (93 percent) followed by supplements (36 percent), antibiotics (31 percent), additives (24 percent) and vaccines (16 percent). Private agri-input dealers accounted



for near two thirds of the sales market, where 63 percent of farmers buy drugs from private dealers compared to 30 percent from a government clinic.

***Core Issue 2: Increase trade of dairy products by improving food safety and quality at the local level and targeting interventions aimed at market-oriented farmers seeking to grow their businesses.***

*Dissatisfaction with the undervaluation of the quality of milk farmers produce, compounded with significant inequality in milk prices across districts and zones:* Market price is a key driver in determining production volumes. Surveyed farmers shared dissatisfaction with the undervaluation of the quality of milk produced. The Project advocated enhanced production practices to improve the quality of milk; however, the fat quality and purity of milk was rarely, if ever, appraised at the selling point. The lack of applying quality standards and testing penalizes quality-orientated producers and risks productivity gains.

### ***Design and Implementation Findings***

A final evaluation provides an opportunity to review the foundational assumptions made at inception and test the hypothesis underpinning the entire project. The following results are intended to contribute to a learning environment where the integration of strategic objectives over the course of a dynamic, seven-year period and the sustainability of the intended results are considered in addition to project performance.

*Achieving Strategic Objectives:* The MOD Project's TOC clearly details a market oriented approach which addresses both supply and demand side aspects. While the initial, five-year contract period was marked by limitations to fully engage all relevant stakeholders in the dairy sector, the extension years likely did not capitalize on expanding the implementation approaches to fully achieve the project objectives.

*Project performance indicators as the measure of performance success:* The MOD Project successfully achieved the majority of the project targets. In total, the Project achieved or overachieved their stated targets for twenty (20) of their twenty-three (23) indicators, with only three (3) indicators failing to achieve the end of project (LOP) targets; however, the M&E system was designed solely for indicator reporting, was not integrated with strategic objectives and activities, which did not serve the Project's learning and adaptation needs.

*Scalability of MOD's intensive mentorship approach:* The Project's substantial investment in time and resources to provide a "high touch" approach to improving and applying best practices and technologies was clearly effective. With this enhanced capacity, farmers were better positioned to capitalize on improvements to input suppliers and fodder cultivators in the supply chain and better understood the financial investments needed to grow their dairy enterprises. This "high touch" approach required that the MOD Project prioritize those dairy farmers who were already well-positioned to grow into dairy entrepreneurs, i.e. over 20 liter and progressive dairy farmers; however, these farmers do not reflect the average Sri Lankan dairy farmer. MOD's "high touch" engagement with farmers is beyond feasibility for DAPH to duplicate given the ratio of extension officers to farmers and similarly would be constrained at the processor level. This raises concerns as to the scalability of these activities under the MOD Project approach to develop smaller scale farmers into dairy entrepreneurs.

## RECOMMENDATIONS FOR FUTURE PROGRAMMING

The MOD Project leaves behind a significantly different domestic dairy landscape compared to the conditions faced at inception. The following recommendations are intended to prompt discussion and consideration for future programming efforts in the Sri Lankan dairy sector.

### *Project Design and Implementation:*

- *Dairy quality:* Achieving improvement to dairy quality is not beyond the scope of feasibility within the Sri Lankan dairy sector. A renewed programmatic approach which revisits the barriers to milk quality, and corresponding milk quality pricing, will ensure sustainability of improved dairy production practices.
- *Agro-ecological zones:* The absence of agro-ecological and culturally appropriate improved technologies reduced the effectiveness of the Project's overall programming. Future programming would benefit in providing greater attention in designing to the unique challenges farmers face in their respective zones and within culturally appropriate norms.
- *Value chain actors:* Future programming will not be similarly constrained by the commencement limitations for the MOD Project, and considerable consideration should be given to any project relationships with dairy processors. Far too many districts continue to experience uncompetitive pricing practices by dairy processors, which undermines the market oriented approach.
- *Technology and tracking:* The Project developed an application for extension services, improved market access and ration formulation. Such digital applications could expand to include record keeping of farm activities. Poor record keeping is common in Sri Lanka and results in any number of limitations, including failures in feed, herd management and AI.
- *Scaling:* Despite reaching the contract target of 35,000 direct beneficiaries, the MOD Project's implementation approach resulted in a contraction of deeply engaged farmers (>20L) benefiting from the full scale of project activities. A refreshed design would better serve a wider range of farmers by considering how to scale the application of key project activities, such as the 10 Best Practices, to smaller scale (<20L) farmers in the future.

### *Milk Marketing:*

- Establishing fair and transparent pricing mechanisms that accurately reflect the quality of milk is needed if the project intends to promote the quality and safety of milk produced.
- Developing more robust quality assurance programs that certify and promote high-quality milk at the milk collecting points.
- Strengthening the collective bargaining power of farmers through existing producer organizations, a more robust AIDA, or developing a national level farmers group, would improve Sri Lankan dairy farmers' capacity to advocate for issues important to their dairy enterprises.
- A national-level policy may be required on the pricing of milk, dependent on both quality and quantity, in the event that barriers to a competitive market for dairy are too constrained.

*Value Addition within the Dairy Value Chain:* Promotion of value additions of dairy products can reduce the wastage of milk due to poor storage and transport facilities farmers encounter in Sri Lanka. The MOD Project could have done more to develop small scale dairy processing of value added dairy products, which would have enhanced the opportunities for dairy farmers to expand their dairy enterprises and improve incomes. A proportion of surveyed farmers indicated interest in developing their dairy enterprises further, providing a suitable pilot cohort for future programming.

*Improved practices and technologies:* Future programming would benefit from practices tailored to the specific conditions associated with each agro-ecological zone. Key practices which would most benefit from zone specific programming include:

- Dairy herd management - herd improvements with the use of a well-coordinated breeding program are required in the dry and intermediate zones. Fewer herd improvements were predominant in the dry zone compared to other zones. Considering the contribution to the national milk production in Sri Lanka, herd improvement in the dry and intermediate zones can benefit largely to improve milk production in the country. This can include improved AI facilities and the use of sex semen. Further, the use of suitable tropical breeds for breeding or selection can help better establish herd productivity in dry zones rather than using temperate breeds for breeding given the natural environmental conditions are suitable for such breeds.
- Cow feed, fodder and silage - Areas with a higher potential in dry and intermediate zones with adequate land for growing fodder should continue to be identified and farmers in those areas should be encouraged to grow fodder as a business. Ongoing policy implementations related to growing fodder as a crop can facilitate this in the future as irrigated water can be used for this purpose.
  - Development of farmer tools to measure dry matter yield and quality can be developed for respective fodder crops to ensure farmers harvest crops at the best time and quality for feeding cattle.
  - If the expectation is to establish island-wide fodder growers, irrespective of the agro-ecological limitations, implementing activities need to prioritize locally bound limitations in the future.
- Access to veterinary medicine and AI: Limitations persist with inadequate access to high-quality veterinary supplies and services, including artificial insemination (AI). The Project encouraged the development of support service ventures, including private partners, to provide such services. Prevailing conditions in Sri Lanka in relation to AI facilities, however, may have hindered the expectations of the Project. Suggestions for future programming includes:
  - Encourage the implementation of government policies and subsidies to support the availability and affordability of veterinary services and supplies.
  - Promote or utilize existing cooperative and association models where farmers can collectively access veterinary services and share the costs.

*Youth Engagement:* The demographics of dairy farming in Sri Lanka is changing; evaluators noted a significantly strong representation of youth in the dairy industry. The lack of a youth engagement strategy resulted in a missed opportunity under the MOD intervention. Multiple discussions highlighted young farmers interest in investing in the dairy sector, not only as farmers or growers but as service providers. A more extensive approach to engaging youth should be identified as potential contributors to dairy sector development, as this population signaled willing to invest in dairy as a business.

## INTRODUCTION

On September 2017, United States Department of Agriculture (USDA) Food for Progress (FFPr) awarded the five-year Sri Lanka Market Oriented Dairy (MOD) Project and further received a two-year extension<sup>1</sup> to culminate in a seven-year FFPr project. The Project is implemented through a consortium of partners led by International Executive Service Corps<sup>2</sup> (IESC), and includes the University of Florida (UF), Sarvodaya,<sup>3</sup> Global Dairy Platform (GDP), and the Small Enterprise Assistance Fund (SEAF).<sup>4</sup> The MOD Project is valued at a total of \$27.6 million allocated across four key funding streams:

- \$15,765,518 to commodity funding for project service delivery;
- \$2.08 million to commodity Credit Corporation for project startup phase;
- \$251,801 to IESC cost-share in the form of technical services;
- \$7.2 million to freight allocation for transport of commodity.

IESC has engaged JE Austin Associates (JAA) to conduct an independent final performance evaluation of the MOD Project. USDA and IESC intend to conduct this final evaluation of the MOD Project to measure the successes achieved, identify any challenges or constraints to achieving the targeted results, and provide recommendations for more effective and efficient implementation.

## BACKGROUND

Dairy is the most critical livestock sub-sector in Sri Lanka. This is due to the growing domestic demand for fresh milk and dairy products, combined with the sector's potential to drive growth in the rural economy. Today, just over 30 percent of Sri Lanka fresh milk demand is met through domestic production.

In the face of these dairy shortages, the MOD Project addressed two overarching goals: (1) to increase agriculture productivity in the dairy value chain through improving the availability of inputs for dairy farmers in a way that can be sustained beyond donor support and (2) to increase trade of dairy products by improving food safety and quality at the local level and targeting interventions aimed at market-oriented farmers seeking to grow their businesses.

The Project relies on six mutually reinforcing activity areas to reinforce the dairy sector and improve the availability of quality inputs and services to dairy farmers, introduce best practices in dairy farm operations and management, and improve quality standards and hygienic best practices at all levels of dairy farming and dairy collection and transport:

1. Capacity Building: Agricultural Extension Agents/Services
2. Inputs: Develop Agrodealers and/or Input Suppliers
3. Financial Services: Leverage Public and/or Private Investment
4. Market Access: Facilitate Buyer-Seller Relationships
5. Training: Sanitary and Phytosanitary Standards<sup>5</sup>
6. Capacity Building: Trade Associations

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<sup>1</sup> The MOD Activity is contracted through September 31, 2024.

<sup>2</sup> Since the initial launch of the MOD Project, IESC has changed its name to Improving Economies for Stronger Communities.

<sup>3</sup> Sarvodaya's engagement ended in 2022.

<sup>4</sup> SEAF's engagement ended in 2021.

<sup>5</sup> Activity 5 was discontinued as a standalone activity in 2022, with the relevant training having been shifted to Activity 1.

Ultimately, the MOD Project arrived at the following theory of change (ToC) to guide the design of the change pathways resulting in the expected results of the Project. It states as follows:

*If* interventions are targeted toward market-oriented dairy farmers to increase investment in, access to, availability of, and knowledge of the proper use of dairy inputs and to improve quality and safety; and, also, if consumers' awareness of the importance of quality fresh dairy products is increased, **then** the productivity of dairy farming will improve, and the formal trade of milk and milk products will increase.

## EVALUATION PURPOSE AND SCOPE

The primary purpose of this final evaluation is to assess the performance of the MOD Project, identify the progress made to date, the challenges encountered, the areas of implementation successes and sustainability, the areas of weakness or capacity gaps that will allow for reflection and learning, and measures to be taken by USDA to improve future FFP programming. The evaluation will provide feedback, lessons learned, good practices and recommendations, if any, for improvements to the Project's implementation strategy to strengthen future USDA programming.

### EVALUATION OBJECTIVES

The final evaluation focuses on the MOD Project performance with respect to expected results and objectives as outlined in the Project's Scope of Work (SOW); program design and management; the prospect of long-term sustainability; and practical recommendations for future programming. The evaluation findings determine if planned activities achieved their objectives and expected outcomes. In a general sense, the objectives of the final evaluation are three-fold:

- To analyze if the MOD Project achieved the objectives as stated in the contract and associated work plans as of January 1, 2024;
- To evaluate major constraints and enablers to achieving the Project objectives; and
- To provide recommendations for more effective and efficient implementation approaches and management practices to enhance and inform future USDA programming.

## EVALUATION QUESTIONS

The MOD Project Final Evaluation SOW details the following list of evaluation questions:

1. To what extent did the MOD project design address the core issues of target beneficiaries? How were existing relevant USDA and U.S. government activities leveraged?
2. To what extent did MOD achieve the specific targets and results established? Which activity or combination of activities proved to be the most effective approach to achieve the project's higher-level results, namely:
  - a) Farmer capacity building on training in best practices, mentoring and monitoring visits through extensions staff
  - b) Facilitation of financial services for investments and provision of inputs through cost shared initiative,
  - c) Capacity building of the extensions arms of private sector and DAPH

- d) Strengthening supply chains such as input suppliers and fodder cultivators, introduction of new technology etc.
- 3. To what extent did the level of project resources lead to the achievement of results? Could the same results be achieved with fewer resources?
- 4. What is the likelihood that the project benefits will endure over time after MOD ends? To what extent has MOD developed local ownership and the capacity of both government and private sector partners to continue the changes introduced by MOD?
- 5. What are the immediate-, medium-, and long-term effects, intended and unintended, positive and negative, of the project after nearly 7 years of implementation?
- 6. What was the overall impact of COVID-19 restrictions/protocols, and the current economic crisis on project results?



## EVALUATION METHODOLOGY

The MOD Project final evaluation relied heavily on a quantitative research approach appropriate for a final performance evaluation, combining survey research with descriptive research while also relying on available midline evaluation data, annual “wave” survey data and qualitative interviews to triangulate findings. This design allows USDA, MOD, and its stakeholders to understand the effectiveness of MOD programming and identifies programmatic areas which would benefit from further reinforcement in the future. This design provides for inquiries into the evaluation of processes and the achievement of the project’s targets and objectives. The MOD Evaluation Matrix, documented in Annex B, provides a linear representation of the linkages between the evaluation questions, question objectives, data collection strategy, data sources, and potential data analysis methods.

### SCOPE AND COVERAGE

The MOD Project Final Evaluation was carried out in a total of eleven districts across six provinces and captured the experiences of the Project’s farmers in the targeted areas. The evaluation approach was designed with an extensive and detailed quantitative questionnaire (Annex D), composed of 167 variables, specifically intended to address the Project’s learning objectives. The surveys were independently administered to a randomized selection of 629 respondents across the eleven targeted districts: Anuradhapura, Ampara, Badulla, Jaffna, Kurunegala, Matale, Mullaitivu, Nuwara Eliya, Polonnaruwa, Puttalam, and Trincomalee.<sup>6</sup>

### Agro-Ecological Zones

The MOD Project was implemented in areas of Sri Lanka that fall under different agro-ecological zones: the dry zone, intermediate zone, and wet zone (Figure 1). The agro-ecological zones possess unique dairy farming characteristics. There are variations of available cattle breeds, cattle farming practices, availability of resources such as land and water, distribution of rainfall and temperature amongst these areas creating different challenges and opportunities for dairy farming. These zone distinctions became increasingly evident during evaluation field work. The following discussion outlines the differences between the agro-ecological zones.

Figure 1: Agro-ecological zones in Sri Lanka



Sri Lanka’s agro-ecological zones are largely influenced by the two monsoon seasons: the Maha season, associated with the northeast monsoon, and the Yala season, linked to the southwest monsoon. Temperature differences within agro-climatic zones are primarily driven by altitude, with the south-central mountain regions (wet zone) experiencing significantly cooler conditions, and

<sup>6</sup> The final evaluation methodology required adjustment from the originally proposed Evaluation Design Report approach. Field challenges and limitations required the departure from the expected sampling approach vis-à-vis the imposition of inconsistent field requirements by the MOD field team (i.e. the influence of processors to any sampling strategy), a “grey” line in definitional relationships between “different” farmer groups which reduced the suitability in conducting comparative analysis between groups, an MOD Project database which was well not suited for evaluation purposes, general issues of proximity between various higher level stakeholders, government staff strikes and lack of availability to list a few. Despite these broader challenges, the evaluation effort was able to exceed the statistically relevant target sample size while maintaining randomization and proportional distribution to arrive at 629 total surveys conducted.



the dry zone experiencing a hot and intermediate blend of hot and cooler temperatures. The magnitude of heat stress in dairy cattle can be assessed using the temperature humidity index (THI); THI can be used as a basis for the categorization of geographical regions of a country based on suitability for different cattle breeds. MOD Project interventions were applied across districts in all three zones.

### A. The Dry Zone

The dry zone receives an average of less than 1,750 mm of rainfall annually, considerably less rainfall than the wet zone. The lower precipitation levels result in an arid landscape of sparse vegetation, where resilient crops such as millet, pulses, and certain varieties of rice are cultivated, alongside drought-tolerant trees like palmyra palms and cashew. Sri Lanka's dry zone is characterized by its generally flat to gently undulating landscape, with occasional low hills and rocky outcrops. The terrain transitions from the more fertile central areas to drier peripheral regions, influencing the cultivation of drought-resistant crops. Irrigation systems, such as tanks and canals, which have been developed over centuries, are vital to sustain agriculture and ensure water availability in this zone.<sup>7</sup> This zone covers approximately 60 percent of the total land in Sri Lanka and spans the northern, eastern, and southeastern parts of the island. It is the top producing agricultural zone in Sri Lanka.<sup>8</sup>

Dry spells affect fodder availability and water resources in the dry zone; however, certain areas gain water access through irrigation schemes. Indigenous and crossbred cattle, particularly those with Indian lineage (Table 1), are more prevalent in the dry zone as they are better suited to harsh conditions. Pure European breeds that prefer low THI are less common due to their need for more intensive management and cooler climates. Milk production tends to be lower because of inadequate nutrition, water stress and general breed characteristics, with significant seasonal fluctuations leading to reduced yields during dry periods. Livestock often rely on natural pastures in this region, which can become scarce during dry seasons. The MOD Final Evaluation conducted survey work in the following districts located in the dry zone: Anuradhapura, Ampara, Jaffna, Mullaitivu, Polonnaruwa, Puttalam, and Trincomalee.

*Table 1: Availability of cattle breeds, percentage by agro-ecological zones<sup>9</sup>*

Agro-Ecological Zone	Pure breed (%)	Cross-bred (%)	Local breed (%) (non-descript)
Dry	2 - 3 (majority Indian breeds)	20 - 30 (majority Indian crosses)	67 - 78
Intermediate	5 - 10 (majority Indian breeds)	33 - 60 (majority Indian crosses)	30 - 65
Wet	5 - 10 (majority European breeds)	35 - 70 (majority European crosses)	20 - 60

### B. The Intermediate Zone

The intermediate zone of Sri Lanka, situated between the wet and dry zones, is marked by its transitional climate and diverse agricultural practices. This region, lying approximately between

<sup>7</sup> Bebermeier, W., Abeywardana, N., Susarina, M., & Schütt, B. (2023). Domestication of water: Management of water resources in the dry zone of Sri Lanka as living cultural heritage. *Wiley Interdisciplinary Reviews: Water*, 10(4), e1642.

<sup>8</sup> Somasundaram, D.; Zhang, F.; Ediriweera, S.; Wang, S.; Li, J.; Zhang, B. Spatial and Temporal Changes in Surface Water Area of Sri Lanka over a 30-Year Period. *Remote Sens.* 2020, 12, 3701. <https://doi.org/10.3390/rs12223701>

<sup>9</sup> Allen, Jack and Na-Chiangmai, Ancharlie. 2002. Development Strategies for Genetic Evaluation for Beef Production in Developing Countries. *ACIAR Proceedings*, 108, 180 pp.

the high-rainfall areas of the southwest and the arid expanses of the north and east, experiences moderate rainfall, typically ranging from 1,750 to 2,500 millimeters annually.<sup>10</sup> The intermediate zone spans approximately 20 percent of Sri Lanka's total land area and has seen an increasing trend of precipitation in recent years.<sup>11</sup> The climate here is characterized by a blend of both wet and dry season influences, resulting in a relatively balanced environment conducive to a wide variety of crops. The landscape is characterized by rolling hills, moderate slopes, and undulating terrain, with elevations that range from lowland areas to foothills leading up to the Central Highlands. This transitional region includes a mix of fertile river valleys and higher ground that influences local rainfall patterns.

The intermediate zone experiences a blend of wet and dry conditions depending on their specific location. Fodder availability is moderate and varies with the seasons. Crossbreeds are prevalent, offering a balance between resilience to changing weather and enhanced milk production. In drier intermediate zones, Indian breeds are more common, while European crosses are found in wetter areas. Milk production is moderate, with some seasonal variation based on the specific climate of the zone. The MOD Final Evaluation conducted survey work in the following districts located in the intermediate zone: Badulla, Kurunegala, and Matale.

### C. The Wet Zone

The wet zone is characterized by its high annual rainfall, lush tropical evergreen forests, and rich biodiversity.<sup>12</sup> The wet zone accounts for about 20 percent of Sri Lanka's total land area and includes the southwestern part of the island and the central highlands. Stretching across the southwestern part of the island, this zone receives an abundance of precipitation, ranging from 2,500 to 5,000 millimeters annually, heavily influenced by the southwest monsoon. Sri Lanka's wet zone features a rugged landscape dominated by the Central Highlands, including steep slopes and rolling hills. A network of rivers and streams flows through the area, enhancing its fertility.

The wet zone benefits from high rainfall and humidity, creating a more favorable environment for dairy farming. Natural fodder is plentiful and consistent throughout the year. Both pure breeds, especially European varieties, and crossbreeds are common, as the climate supports higher-yielding breeds with appropriate management. While indigenous breeds are present, they are less dominant compared to crossbreeds. Milk production is higher here due to better feeding conditions and a more reliable water supply. The MOD Final Evaluation conducted survey work in the following districts located in the wet zone: Nuwara Eliya.

Table 2 below details the distribution of final evaluation districts across the corresponding agro-ecological zones. The final evaluation's analysis provides for these disaggregates by agro-ecological zones to better reflect the agricultural variations found across different districts and provide for a more comprehensive understanding of the data.

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<sup>10</sup> "World Bank Climate Change Knowledge Portal." Climateknowledgeportal.worldbank.org, climateknowledgeportal.worldbank.org/country/sri-lanka/climate-data-historical.

<sup>11</sup> Somasundaram, D.; Zhang, F.; Ediriweera, S.; Wang, S.; Li, J.; Zhang, B. Spatial and Temporal Changes in Surface Water Area of Sri Lanka over a 30-Year Period. *Remote Sens.* 2020, 12, 3701. <https://doi.org/10.3390/rs12223701>

<sup>12</sup> Sri Lanka - Plant and animal life. (n.d.). Encyclopedia Britannica. <https://www.britannica.com/place/Sri-Lanka/Plant-and-animal-life>

Table 2: Evaluation Surveyed Districts by Agro-Ecological Zones

	DRY	INTERMEDIATE	WET
	Ampara	Badulla	Nuwara Eliya
	Anuradhapura	Kurunegala	
	Jaffna	Matale	
	Mullativu		
	Polonnaruwa		
	Puttalam		
	Trincomalee		
Total Surveys	252	285	92

### Survey Sampling MOD Farmers

Driving the development of a market-orientated dairy sector, the Project focused on dairy farmers with a demonstrated capacity for commercial dairy production. Farmers collecting more than 20 liters of milk daily (>20L) served to distinguish commercially motivated dairy producers from those farmers engaged in household dairy farming. The commercially motivated farmers, those producing >20L and/ or deemed “progressive” farmers, represent a total population of 4,327 farmers who benefited from direct MOD training and mentoring support over the course of the Project.<sup>13</sup>

These farmers served as the anchor within the Project, with the greatest amount of time and intensity under MOD interventions. For this reason, the evaluation survey effort focused on MOD-trained and mentored farmers. A robust sampling approach was drawn to ensure a statistically appropriate sample size at 95 percent confidence and 2 percent variance, applying a two stage proportionately random sample.

### DATA COLLECTION

The MOD Project Final Evaluation was conducted by four expert consultants and twelve enumerators covering both Sinhala and Tamil speakers, with operational support provided by the MOD Project and a local logistics consultant. The Evaluation Team Lead designed and supervised the field data collection effort, with multiple quality control measures implemented throughout the data collection process.

Prior to the commencement of field data collection activities, the evaluation expert team held a workshop to ensure continued technical understanding and interviewing guidelines to maintain strict quality-control, ethics, and confidentiality procedures. All enumerators received a multi-day training on the survey instruments and benefitted from one day’s inclusion of the MOD Project staff to answer technical questions related to dairy production and the MOD Project. All workshop and training activities were conducted over a 5-day period in Colombo, Sri Lanka, including a half-day session revising data collection instruments with MOD Project representatives. The workshop consisted of harmonizing the various technical lenses needed to evaluate the MOD Project, questionnaire explanations and guidance, and engagement approaches for various locations and beneficiary types.

<sup>13</sup> The Project focused on dairy farmers with a demonstrated capacity for commercial dairy production. Farmers collecting more than 20 liters of milk daily (>20L) served to distinguish commercially motivated dairy producers from those farmers engaged in household dairy farming. These >20L farmers serve as the anchor within the Project, with the greatest amount of time and intensity under MOD intervention. The commercially motivated farmers represent 4,327 farmers who benefited from direct MOD training and mentoring support over the course of the Project.

The main evaluation fieldwork required approximately four weeks to complete, from June 27 to July 24, 2024. The evaluation team split into two groups to ensure adequate time for assessing each evaluation question and its underlying objectives within each district. To maintain harmonization of data collection activities, the expert consultants maintained regular communication throughout the data collection period. The following table provides the detailed data collection schedule.

*Table 3: Final Evaluation Data Schedule*

Activity	Start Date	End Date
Evaluation Team Harmonization Workshop	June 21	June 22
Enumerator Training	June 24	June 25
Data Collection, by province		
Central	July 15	July 24
Eastern	July 12	July 17
North Central	July 8	July 12
North Western	June 27	July 5
Northern	July 9	July 11
Uva	July 17	July 19
Data Synthesis & Analysis	July 25	August 20

### **Data Collection Instruments**

The Final Evaluation relied on an extensive quantitative survey instrument (Annex D), providing for inquiry into various activities and outcomes. The questionnaire's aim was to gain information on the variety of experiences and issues faced by commercially motivated farmers and to document successes and changes in beneficiary behavior. The questionnaire included 167 variables with components on individual and enterprise demographic information, agri-input access and utilization, fodder cultivation and application, artificial insemination (AI), milk marketing, extension and education services, and overall confidence on the future of dairy farming.

The MOD Final Evaluation conducted a total of 629 unique interviews across the eleven evaluation districts. Table 2, below, details the distribution of unique surveys concluded during the data collection effort.

*Table 4: Final Evaluation Survey Data, dates and completed surveys*

Province / District	Dates	Total Surveys
<b>Central</b>		
Matale	July 15 - 16	57
Nuwara Eliya	July 22 - 24	92
<b>Eastern</b>		
Ampara	July 17	19
Trincomalee	July 12 - 13	27
<b>North Central</b>		
Anuradhapura	July 8 - 10	86
Polonnaruwa	July 11 - 12	52
<b>North Western</b>		
Kurunegala	June 27 – July 4	140
Puttalam	July 5	18
<b>Northern</b>		

Jaffna	July 9	20
Mullativu	July 10 - 11	30
Uva		
Badulla	July 17 - 19	88
Total		629

### Supplemental Data

The MOD Project's Monitoring and Evaluation activities provided the evaluators with supplemental data for analysis and contribution in this final evaluation. Two additional sources of quantitative data have been applied for analysis where appropriate:

- Project Midline Evaluation Data**  
 The MOD Project's Midline Evaluation provided select quantitative data for Project implementation in 2019 and 2020. The final evaluation survey duplicated select midline survey questions, where feasible, to ensure continuity with the midline data specifically for multi-year analytical purposes.
- Project Annual "Wave" Survey Data**  
 In order to meet USDA's performance reporting requirements, the MOD Project conducted semi-annual surveys for indicator data collection. Despite being termed "semi-annual," these survey efforts resulted in one annual pilot, with a second, larger survey in the same reporting year which served as the primary annual data collection.<sup>14</sup> For accuracy, the Final Evaluation has excluded the pilot rounds of "wave" survey data, whose n-values did not reflect an appropriate sample size. In total, five "waves" of data were available for inclusion in the analysis period.

### Challenges and Mitigating Actions

Conducting any evaluation is subject to challenges, both across different evaluation objectives and logistical realities. The MOD evaluation was anchored in international best practices for performance evaluations using a mixed methods approach. The usefulness of evaluation information may not be obvious to all stakeholders, while others may have concerns as to how this collected information may be used. Logistics and coordination can also be challenging given the extensive list of stakeholders and broad geographic scope of this evaluation. The following details the challenges and corresponding measures implemented to overcome them:

**Continuity of data.** Ideally, a final evaluation would measure and analyze recorded changes to project indicators across the entire project period of performance. The MOD Project did conduct both baseline and midline evaluations; however, the baseline effort only returned three (3) measured indicators, significantly limiting the usefulness of the baseline data. Where feasible, the evaluation aggregated all available longitudinal data, primarily focusing on the midline evaluation data. Supplemental data, gleaned from other MOD Project studies or third party sources such as official GoSL ministerial data was utilized to further draw data-driven findings.

**Inadequate M&E system design for evaluation purposes.** The MOD Project's M&E data management system was specifically designed to track and report on the Project's contractually

<sup>14</sup> Given that reported data is Congressionally mandated once annually, this semi-annual approach was an acceptable approach to the semi-annual reporting requirements. Annually reported data was consistent with appropriately sized samples.



required indicators. This indicator-focused design limited the capacity of the database to be manipulated for evaluation sampling purposes, as well as more sophisticated project learning. To ensure an appropriate, two stage sampling approach, the MOD Project staff supported the addition of necessary evaluation specific fields to the entirety of the database of 20+ liter producers.

***Sample selection challenges.*** Limitations in the Project's M&E data management system were compounded by a "grey" line in definitional relationship between "different" farmer groups (i.e. farmer/ processor relations.) The relationship between processors and farmers, as impressed upon the evaluation team by the Project, required significant flexibility to maintain proportionality in the sample. Farmer/ processor status was not tracked by the Project, requiring each sample cohort to be re-verified after first-round selection in each locality. To maintain the sampling parameters, adjustments were made prior to arrival in the locality; however, the fluidity in these relationships, compounded with the disproportionate consideration for processors, reduced the suitability in conducting comparative analysis between processor groups.

***Distance and proximity of various stakeholders.*** The geographic range of the Project presented a challenge in reaching higher level stakeholders within each evaluation locality. The project's focus at the dairy-producer level resulted in a reduction in the capacity of the evaluators to conduct face-to-face interviews with silage/feed producers, independent veterinary service providers, and other input suppliers, specifically. Where feasible, phone interviews were conducted; however, the evaluators noted that the low number of potential respondents would have resulted in limited, unbiased reporting.

This report reflects chapters mapped against the evaluation questions which serve as the main structure for outlining the evaluation findings. Each evaluation question chapter provides a synthesis of multiple quantitative sources and qualitative findings, field observations, notes, considerations, and lessons learned for improvement or engagement, as relevant to that question.

## EVALUATION QUESTION I

***To what extent did the MOD Project design address the core issues of target beneficiaries? How were existing relevant USDA and U.S. government activities leveraged?***

The MOD Project is anchored to a theory of change (TOC) that integrates a variety of market-oriented expectations in Sri Lanka's dairy sector. The TOC addresses both supply and demand side components with the objective of developing a dynamic dairy market, whereby increased dairy production is a function of improved supply side mechanisms such as farmer capacity for the uptake of agri-inputs and enhanced market demand through consumer awareness. The MOD TOC states that:

***If*** interventions are targeted toward market-oriented dairy farmers to increase investment in, access to, availability of, and knowledge of the proper use of dairy inputs and to improve quality and safety; and, also, if consumers' awareness of the importance of quality fresh dairy products is increased, ***then*** the productivity of dairy farming will improve, and the formal trade of milk and milk products will increase.

In order to arrive at the MOD TOC, IESC proposed that the MOD Project would address two core issues facing Sri Lankan dairy farmers:<sup>15</sup>

- Increase agriculture productivity in the dairy value chain through improving the availability of inputs for dairy farmers in a way that can be sustained beyond donor support
- Increase trade of dairy products by improving food safety and quality at the local level and targeting interventions aimed at market-oriented farmers seeking to grow their businesses

***Core Issue: Increase agriculture productivity in the dairy value chain through improving the availability of inputs for dairy farmers in a way that can be sustained beyond donor support***

Increasing agricultural production is a key metric needed to move a farmer from subsistence farmer to an agribusiness entrepreneur. Utilizing MOD farmer reported midline and endline evaluation survey data, the following Table 5 and Figure 2 illustrate the changes to milk production experienced by MOD beneficiary farmers between production midline years 2019 and 2020 and endline years 2023 and 2024.<sup>16</sup>

Table 5: Average daily milk production, in liters

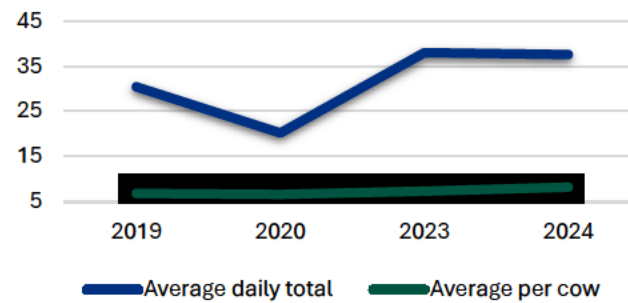
	2019	2020	2023	2024
Daily volume, total	30.4	20.2	38.0	37.6
Daily volume, per cow	6.8	6.6	7.3	8.2
N-value	182	182	386	399

<sup>15</sup> IESC Evaluation Plan, 2018

<sup>16</sup> No baseline data for individual targeted beneficiary farmer data is available. All years with available data are provided.



Figure 2: MOD farmer milk production, liters per year

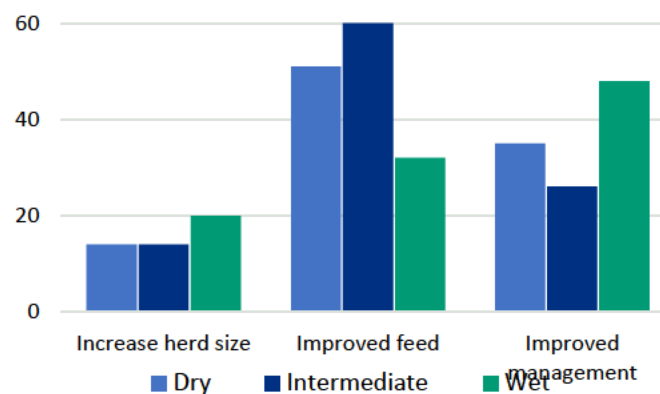


Total milk production for beneficiary farmers improved over the course of the last five years of MOD project implementation, having reported an increase from 30.4 liters in 2019 to 37.6 liters in 2024. The trajectory of improvement is not linear, as the impacts of the global Coronavirus pandemic and the respective economic crisis led farmers to sell their cattle and likely severely influenced a substantial reduction in milk production in 2020. Milk production volumes stabilized in the final two years of implementation, with milk production by MOD farmers reporting no significant change from 2023 to 2024. Overall, farmers reported improvement in their milk production in comparison to previous years. These positive changes in milk production may have been due to the cumulative effect of changes that occurred to various on-farm practices over the entire project period.

Of specific interest is the variability in the volume of milk production per cow, where the trend line does not mirror that of the total volume of production (see Figure 2). MOD farmers reported 6.8 liters per cow in 2019, underwent a 3 percent reduction in 2020 to 6.6 liters, and then increased by 21 percent to 8.2 liters per cow in 2024. This steady improvement in individual cow production likely corresponds with various MOD interventions, including both improved management and improved feeding interventions.

Surveyed farmers provided insight into their perception of factors influencing the improvement in milk production (Figure 3). Each zone held significantly different interpretations of which MOD best practices most influenced production: wet zone farmers garnered the most impact from improved management practices (48 percent) while intermediate and dry zone farmers required improved feed to increase milk production, 60 and 51 percent respectively.

Figure 3: Primary reason for increased milk production, percentage by zone



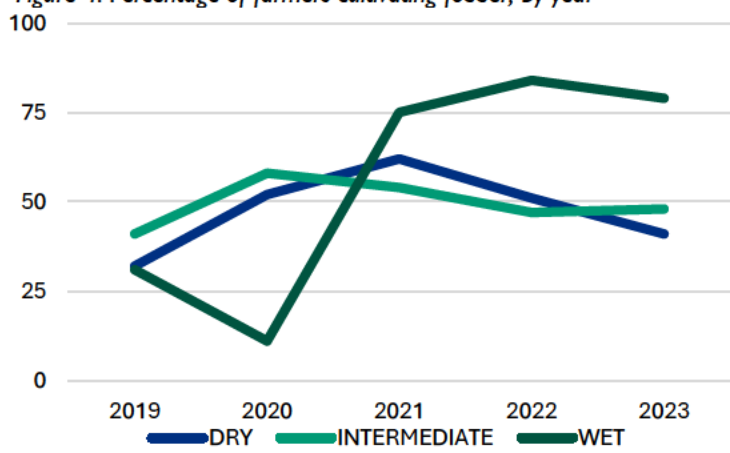
The Project encouraged farmers to apply appropriate herd rationalization, whereby the focus is placed on increasing herd productivity and removing unproductive livestock from the herd. Table 6 below details the changes to herd composition. In 2020, MOD farmers maintained an average herd of 16 cattle, with only 3.7 milking cows. By 2024, farmers had reduced the average herd size to 14.4 cattle, increased the average number of milking cows to 4.6 and reduced redundant dry cows by a third from 3.4 to 2.3 cows.<sup>17</sup> The total herd, milking cows and calves on MOD supported farms reported minimal change from 2023 to 2024, further reflecting that any change in milk production is due to improved feeding and management.

*Table 6: Average number of cattle per herd*

	2020	2023	2024
Total Number	16.0	14.5	14.4
# Milking	3.7	5.2	4.6
# Dry	3.4	2.1	2.3
# Heifers	2.6	2.5	2.7
# Calves	5.7	3.5	3.6
# Breeding bulls	0.7	0.5	0.4
N-value	185	629	629

The most significant variable to influence milk production is feed, where fodder and silage are integral components of a dairy cow diet. To better assess the influence of the Project on fodder cultivation, Figure 4 illustrates the percentage of farmers cultivating fodder.<sup>18</sup> Fodder cultivation under MOD interventions produced an uneven record, likely heavily influenced by the various external shocks farmers faced such as the fertilizer and financial crisis and the Coronavirus 19 pandemic. Farmers in dry and intermediate zones failed to sustain any real change in fodder cultivation, while wet zone farmers were most influenced by the shocks in 2020 but recovered substantially to net a positive increase in the percentage of farmers cultivating some form of fodder.

*Figure 4: Percentage of farmers cultivating fodder, by year*



While the Project's influence on fodder cultivation is uneven, the data clearly finds strong evidence of significant change in how farmers utilize silage on their dairy farms. In 2020, the Midline

<sup>17</sup> A more detailed discussion on herd size and breed composition, specifically as it relates to agro-ecological zones and the milking of mixed breed and/or beef cattle, is provided in the evaluation's response to Evaluation Question 2.

<sup>18</sup> Multiyear data extracted from Waves 2, 4, 6, 8, and 10 of the MOD Semi-Annual Wave Survey

Evaluation found that only 16.8 percent of farmers utilized silage on their farms. By 2024, that percentage has increased to 46.6 percent (Table 7).

*Table 7: Percentage usage of silage for feed*

	Midline	Endline
Feeding silage	16.8%	46.6%
N-value	185	629

Capacity development of dairy farmers into dairy entrepreneurs is a main objective under the MOD Project and serves as a key strategy for sustainability. The development of farmer action plans intended to build dairy enterprises which better utilized available resources at each level of farm activity, provided the necessary skills for farmers to think of dairy as a business. Dairy farmers' understanding on how to better control inputs to maximize the output of the dairy operation is critical for farmers accustomed to a subsistence farming approach to develop further into a dairy business. Action plan development provided the foundation from which farmers would develop their dairy farms as businesses and increase their overall milk production.

Table 8 details the responses MOD farmers provided to the final evaluation in relation to their experience with the farmer action plans. The development of individual farmer action plans provided each farm with a strategy for planning the best use of the resources available at the farm level; understanding how to manage resources such as feed and water efficiently is critical for the sustainable devolvement of a dairy farm. 98 percent of all farmers surveyed reported that the action plans assisted in the improvement of on-farm productivity and recommended that other farmers also use action plans in their dairy operations.

*Table 8: Dairy Enterprise Development through MOD supported Farmer Action Plans*

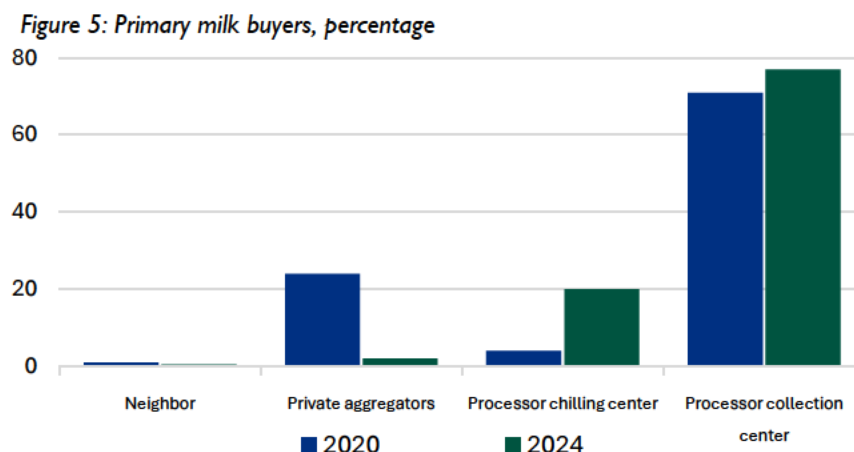
	DRY	INTERMEDIATE	WET	TOTAL
<i>Percentage of MOD farmers with a MOD farmer action plan</i>				
	83	87	93	86
N-value	252	285	92	629
<i>How farmers rated the development process of their farmer action plans</i>				
Very good	58	58	49	56
Good	34	28	42	33
Average	7	7	8	7
Fair	1	1	1	1
Poor	1	5	0	3
<i>Percentage of farmer action plans that effectively helped to improve farmers' dairy enterprises</i>				
	99	98	96	98
<i>Percentage of farmers who recommend other dairy farmers develop their own farmer action plans</i>				
	99	99	98	99
N-value	210	247	86	543

Both the baseline and midline evaluations recommended focusing significant attention to large scale dairies to grow the volume of milk production in Sri Lanka. These recommendations highlight the distinction in applying a market systems development approach to livelihoods versus a sector development approach. The Project's market orientated approach was intended to address the shortage of dairy production, but with the intention to develop smallholder farmers into dairy enterprises.

***Core Issue 2: Increase trade of dairy products by improving food safety and quality at the local level and targeting interventions aimed at market-oriented farmers seeking to grow their businesses***

The second core issue addresses the market sales challenges dairy farmers face in targeted areas. In Sri Lanka, farmers are closely connected with their buyers and buyers tend to safeguard their producers through various incentives. This producer/buyer relationship trend can hinder the development of a dynamic dairy market where producers can seek alternative buyers and benefit from more competitive prices for their milk.

MOD implementation predominantly worked within and looked to expand the existing dairy processor structures, rather than facilitate any serious expansion of alternative sales channels for producers. This was likely a necessary tradeoff in the face of the initial operating environment MOD implemented in, irrespective of the impact on market competition. This tradeoff, which re-enforced the buying power enjoyed by processors, likely contributed to improvements in their supply chain operations, as illustrated in the following chart.



Comparison between the midline and endline evaluation data details an interesting development in the sales channels for MOD farmers (Figure 5). Chilling centers associated with dairy processors accounted for 20 percent of the primary buyers in 2024, a substantial increase from the 4 percent reported in 2020. The Project's training and encouragement of dairy processors resulted in the expansion of chilling centers into MOD supported communities which reduced the reliance on private aggregators. This development likely contributed to improvements in hygiene metrics by reducing the time between milking and chilling.<sup>19</sup> Processor collection centers only incrementally increased their percentage share as key sales channels for MOD farmers, having accounted for over 70 percent of the buyers across both periods. This expansion of chilling centers suggests that processors recognized that production volumes were increasing in targeted communities and would increase their profitability. This increase to potential profits justified the development of chilling centers over the expansion of their existing collection strategies. The increase in chilling centers directly influenced the role private aggregators had in the dairy market, essentially rendering aggregators obsolete in targeted communities.

A dynamic market with improved sales channels should ultimately improve prices for dairy producers. While a direct comparison between midline and endline values is not appropriate given the significant macro-economic shocks Sri Lanka experienced between the two evaluation

<sup>19</sup> Unfortunately, the MOD Midline Evaluation lacked suitably comparable price data to conduct sales analysis between the two periods.

periods, a review of the data does provide useful considerations on the influence of MOD interventions on prices.

*Table 9: Average dairy prices in LKR, by year*

	2019	2020	2023	2024
Price per liter	66	72	151	168
Percentage difference		9.1		11.3
National CPI Inflation <sup>20</sup>	N/A	4.1	18.8	3.0

The average price per liter in 2019 and 2020 was reported by beneficiary farmers during the midline evaluation as 66 and 72 Sri Lankan rupees (LKR), respectively. The corresponding percentage difference in milk prices amounts to 9.1 percent. Farmers during the endline evaluation achieved significantly higher average milk prices in 2023 and 2024 at 151 and 168 LKR, respectively. The year-on-year percentage difference amounts to an 11.3 percent increase; however, given the high rates of national consumer price index core inflation in the previous year, the most recent average milk prices appear to reflect a negative real price change, a concern that was shared by farmers during informal discussions and reflected in the survey data.

Table 10 below provides the most significant factors which influenced high milk prices for MOD supported farmers. During the midline evaluation period, feed in the form of fodder, silage or TMR accounted for the majority of justification to improved milk prices, while by the 2024 endline farmers reported macro-economic conditions facing the country were driving higher milk prices. This variation between periods is consistent with the substantial price variations detailed in table 10 and further highlights the various challenges and opportunities dairy farmers face when selling their milk.

*Table 10: Factors which most influenced higher milk price, percentage*

	2020	2024 <sup>21</sup>
Provided higher quality fodder	41	19
Provided silage	12	2
Provided concentrated feed (TMR)	35	3
Changing Processors	-	6
Changes to the macro-economic conditions in LKA	-	67
Nothing	31	-
Other	28	5
N-value	148	593

In light of the variable milk prices, MOD supported farmers frequently shared dissatisfaction with the undervaluation of the quality of milk produced. The Project advocated enhanced production practices to improve the quality of milk; however, the fat quality and purity of milk is rarely, if ever, appraised at the selling point. Chilling station managers interviewed by the evaluators verified that their operations did not provide milk quality tests. The lack of quality standards and testing penalizes quality-orientated producers and benefits processors who are able to increase their profit margins through the value addition of improved quality milk to the value chain. The quality

<sup>20</sup> Central Bank of Sri Lanka, National Consumer Price Index Core Inflation (NCPI), Year 2021 = 100, 15August2024

<https://www.cbsl.gov.lk/en/measures-of-consumer-price-inflation>

<sup>21</sup> 2024 Evaluation survey questionnaire only permitted respondents to choose the most significant factor (only one) that resulted in higher prices received for their milk.



issue for milk in the market persists because there is little to no application of certification or regulation by processors, nor adequate oversight by the national authorities. Furthermore, no feedback mechanism exists from consumer awareness about quality of fresh milk – only that consumers prefer fresh milk over reconstituted, imported powder milk.

*Improvement in milk quality is a persistent challenge for the dairy industry. Processors have not made the investments needed in improving the milk quality chain. The milk collection system is still woefully under-invested by the processing industry.<sup>22</sup>*

At present, the Sri Lankan dairy industry does not apply milk quality standards consistently, and dairy processors have low rejection rates of producers' milk due to the supply shortage of fresh milk (Table 11). Rejection rates have historically been negligible, as documented in the MOD Baseline and Midline Evaluations. Rejection of low-quality milk was argued as a non-issue in 2018 and remains a relative non-issue for processors in 2024 as demonstrated by the lack of milk-quality pricing. This indifference to milk quality in the market leads to farmers being dissatisfied with the undervaluation of their milk, which has consequences for farmer behavior. The absence of milk quality pricing reduces the motivation to maintain or improve milk quality, decreases investment in dairy farming to maintain milk quality, with possible overall decline in milk production resulting in poor herd health conditions.

*Table 11: Milk rejection rate in past 12 months, percentage*

	Midline	Endline
Milk rejection rate	12.4%	4.9%
<i>N-value</i>	185	629

While unmeasured by any project specific quantitative metrics, the evaluators observed many of the milk quality recommendations set out in the baseline and midline occurring in the field. Farmers trained in best practices upgraded to stainless steel containers, hand washing stations were visible, and processors were seen sending out collection trucks to reduce the milk transport time. Milk quality has likely improved on aggregate for MOD farmers, but these farmers have not necessarily benefitted financially from these advancements

<sup>22</sup> Sullivan, G. *Midterm Evaluation of the Market-Oriented Dairy Project Report*; May 2020, page 54.

## EVALUATION QUESTION 2

***To what extent did MOD achieve the specific targets and results established? Which activity or combination of activities proved to be the most effective approach to achieve the project's higher-level results, namely:***

- a) Farmer capacity building on training in best practices, mentoring and monitoring visits through extensions staff***
- b) Facilitation of financial services for investments and provision of inputs through cost shared initiative,***
- c) Capacity building of the extensions arms of private sector and DAPH***
- d) Strengthening supply chain such as inputs suppliers and fodder cultivators, introduction of new technology, etc.***

The MOD Project sought to increase productivity and associated formal trade in milk and milk products in Sri Lanka through the delivery of training and mentorship, coordination with various value chain actors, enhanced access to agri-inputs and capacity building of processors and government stakeholders. The Project sought to reinforce the dairy sector and improve the availability of quality inputs and services to dairy farmers, introduce best practices in dairy farm operations and management, and improve quality standards and hygienic best practices at all levels of dairy farming and dairy collection and transport. The Project was expected to deliver on the two project objectives through six mutually reinforcing activity areas:

1. Capacity Building: Agricultural Extension Agents/Services
2. Inputs: Develop Agrodealers and/or Input Suppliers
3. Financial Services: Leverage Public and/or Private Investment
4. Market Access: Facilitate Buyer-Seller Relationships
5. Training: Sanitary and Phytosanitary Standards<sup>23</sup>
6. Capacity Building: Trade Associations

The following discussion outlines the results of the MOD Project's Key Performance Indicators, triangulated against findings from the independent interviews and discussions which were held in the field. Where applicable, the discussion integrates performance metrics anchored to performance indicators, comparative analysis between midline and endline evaluation data, longitudinal analysis of detailed MOD endline survey data, and qualitative inputs gleaned from field discussions and observations.<sup>24</sup>

The MOD Project's performance is tracked against twenty-three indicators<sup>25</sup> selected to measure USDA Food for Progress's results framework: thirteen outcome indicators (eight standard and five custom) and ten output indicators (eight standard and two custom). Disaggregation by sex and age is completed for relevant indicators. Additional indicators required disaggregation per status as new or continuing, type of storage capacity – dry, cold, refurbished or new, and management practice/ technique, when applicable. At the time of evaluation, the Project achieved or overachieved its stated targets for twenty (20) of its twenty-three (23) indicators, with only three

<sup>23</sup> Activity 5 was discontinued as a standalone activity in 2022, when the relevant training shifted to Activity 1.

<sup>24</sup> For ease of reference, tables are color coded based on data type: blue colored tables contain final evaluation survey data, while green colored tables contain PITT data.

<sup>25</sup> The MOD Project's initial approved Monitoring and Evaluation Plan in 2017 documented 22 indicators, with no performance indicator reference sheets. Two additional indicators were contractually added in October 2022; however, there is inconsistent reporting of these two additional indicators across the three semi-annual reports. It is outside the scope of the evaluation to fully harmonize the MOD M&E reporting system. The Project provided the evaluators with a 23 indicator PITT, which has been applied to this report.



(3) indicators failing to achieve the expected indicator targets.<sup>26</sup> The complete MOD Performance Indicator Tracking Table (PITT) is provided in Annex C.<sup>27</sup>

Triangulation of the PITT reported data is conducted against the Final Performance Evaluation's MOD beneficiary farmer survey data. Survey findings are provided as aggregate totals, and generally disaggregated by agro-ecological zone. The application of the agro-ecological zone disaggregates provides additional granularity with which to better understand the influence MOD interventions have within heterogeneous variation between the zones.

### ***Farmer capacity building on training in best practices, mentoring and monitoring visits through extension staff***

Capacity development of farmers into dairy entrepreneurs was a central theme of MOD's implementation. In order for farmers to move from home production to dairy enterprise, dairy farmers need to develop their capacity to better control inputs to maximize the output of the dairy operation. The Project's training helped entrepreneurs move beyond traditional farming practices to a more business-oriented approach.

MOD Project Activities 1 and 5 focused on building farmer capacity to increase and improve milk production. Table 12 details the output level, F-standard indicators associated with this higher-level result statement. The Project reached over 35,000 total individuals directly benefiting from USDA-funded interventions, exceeding the contractual target by 17 percent. Of those individuals, 15,684 went on to receive short-term agricultural productivity or food security training as a result of USDA assistance, exceeding the target by 37 percent. If it is assumed that each of these farmers operates only one farm, this farmer population represents nearly 6 per cent of the registered dairy cattle farms in Sri Lanka in 2023.<sup>28</sup> The Project successfully reached and exceeded their targeted number of both male and female beneficiaries.

*Table 12: Capacity building output indicators*

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	LOP Target	Target Achieved
<i>Number of individuals benefiting directly from USDA-funded interventions (Standard #17)</i>									
Total Individuals	199	4,110	12,221	25,099	27,198	35,002	35,002	29,973	117%
Male	154	3,083	9,166	18,824	20,399	26,252	26,252	25,477	103%
Female	45	1,027	3,055	6,275	6,799	8,751	8,751	4,496	195%
New	199	3,911	8,701	14,222	5,613	12,156	12,156	7,000	174%
Continuing	0	199	3,520	10,877	21,585	22,846	22,846	N/A	N/A
<i>Number of individuals who have received short-term agricultural sector productivity or food security training as a result of USDA assistance (Standard #16)</i>									
Total Individuals	80	2,304	4,453	4,969	7,950	14,701	15,684	11,492	137%
Male	50	1,738	3,340	3,727	5,963	11,026	11,763	9,768	120%
Female	30	566	1,113	1,242	1,987	3,675	3,921	1,724	227%
New	80	2,304	2,241	695	3,542	6,822	15,684	11,492	137%

<sup>26</sup> Target achieved figures reflect available data at the time of evaluation. At time of this evaluation submission, the MOD Project had not completed their final reporting data collection. It is expected that indicator achievements in the evaluation report may not reflect the final reported PITT values at the closeout of the MOD Project due to a later date of submission for final project reporting.

<sup>27</sup> The PITT provides a detailed breakout of annual targets and achievements, with LOP aggregates provided as a simple percentage difference between target and actual achieved figures for all indicators. It is beyond the scope of the evaluation to conduct an in-depth data quality assessment of the reported figures; however, the evaluators did note that no comprehensive methodology was available for the annual survey data used to derive the majority of Foreign Assistance Standard Indicators. The evaluators take the reported data as accurate for final report analytical purposes.

<sup>28</sup> Annual livestock statistical bulletin 2023, DAPH

Continuing	0	0	2,212	4,274	4,408	7,879	18,773	N/A	N/A
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MOD beneficiary farmers were trained on dairy nutrition, fodder cultivation, silage production, livestock health and vaccinations, heat detection, management during pregnancy, calf management, synchronization, and other animal husbandry management practices to improve milk productivity by MOD staff with support from trained extension officers. The extent to which training output led to outcomes is captured in the indicator values associated with the MOD capacity building outcome indicators (Table 12). MOD farmers were expected to apply their capacity building to both farm management and new technology(s) on the farm, with a focus on the MOD advocated “10 Best Practices” in dairy farming. In both cases, the Project exceeded the target, with 14,791 individuals (147 percent of target) applying improved farm management practices and 16,953 individuals (133 percent of target) having applied new techniques or technologies.

Table 13 below highlights final evaluation survey responses to the farmer experience of MOD capacity building. Entering the final year of the Project, farmers reported continued new training from MOD staff, on average 92 percent. The Project appears to have been continuing to expand the activity reach in the wet zone, with 27 percent of farmers reporting dairy management training in the last year. The MOD implementation model provided training at the initial engagement with farmers, but the intensity of intervention focused on mentorship between MOD staff and farmers. On average, an MOD farmer received 3 visits in the past year to their farm, with wet zone farmers benefiting from one additional annual visit (4.1).

*Table 13: Capacity building of MOD supported farmers*

	DRY	INTERMEDIATE	WET	TOTAL
<i>Farmers receiving training on dairy management in the last year, percentage</i>				
	89	92	97	92
<i>Average number of MOD trainings &amp; mentorship visits in the last year</i>				
Number of visits	2.9 (3.5)	2.9 (2.1)	4.1 (3.6)	3.1 (3.0)
<i>Percentage rating on quality of information received from the MOD project</i>				
Very good	69	69	78	70
Good	29	27	21	27
Average	1	4	1	2
Fair	1	1	0	1
Poor	0	0	0	0
<i>Percentage rating on quality of mentorship from the MOD project</i>				
Very good	70	77	88	76
Good	27	20	11	21
Average	2	3	1	2
Fair	1	0	0	1
Poor	0	0	0	0
N value	252	285	92	629

MOD supported farmers reported satisfaction with both the quality of information and the quality of mentorship provided by the Project. Farmers shared that the information provided by the Project was generally appropriate and relevant to developing their dairy enterprises, while the on-farm mentorship encouraged them to apply the information and practices being shared. Less than 3 percent of farmers reported dissatisfaction with regards to the technical training and mentorship from the Project; however, it is worth noting that the evaluation surveys focused on the restricted

beneficiary sample size of >20-liter farmers. Wet zone farmers were significantly more satisfied than dry and intermediate zone farmers, reinforcing other reported data in this report highlighting the need for culturally and agro-zone appropriate variations to best practices.

*Table 14: Capacity building outcome indicators*

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	LOP Target	Target Achieved
<i>Number of individuals who have applied improved farm management practices (i.e. governance, administration, or financial management) as a result of USDA assistance (Standard #3)</i>									
Total Individuals	0	1,038	2,741	3,383	3,865	3,764	14,791	10,088	147%
Male	0	779	2,056	2,537	2,899	2,823	11,094	7,891	141%
Female	0	259	685	846	966	941	3,697	2,197	168%
<i>Number of individuals who have applied new techniques or technologies as a result of USDA assistance (Standard #2)</i>									
Total Individuals	0	1,233	4,253	7,782	12,093	16,602	16,953	12,775	133%
Male	0	922	3,190	5,837	9,070	12,452	12,715	10,859	117%
Female	0	311	1,063	1,945	3,023	4,150	4,238	1,916	221%
New	0	1,233	3,069	3,756	4,386	4,509	16,953	12,775	133%
<i>Number of private enterprises, producer organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) that applied improved techniques and technologies as result of USDA assistance (Standard #7)</i>									
Total	0	25	51	0	10	6	92	86	107%
New	0	25	51	0	10	6	92	86	107%
Continuing	0	0	25	76	66	74	241	N/A	N/A
Continuing	0	0	1,184	4,026	7,707	12,093	25,010	N/A	N/A

The final evaluation survey inquired more deeply as to the scale of application and perceived value of each of the 10 Best Practices (Table 15). Nearly all survey respondents applied at least one new practice to their dairy enterprise, irrespective of their agro-ecological zone, suggesting that farmers found at least one of the best practices applicable to their production area. Over 50 percent of farmers in intermediate and wet zones applied 7 or more practices, while over half of farmers in the dry zone applied 6 or more practices. Some practices proved more universal than others - such as year-round nutritious feed, 24/7 access to water, and herd composition, while other practices were found to be more significant in one zone versus others, such as silage and TMR, weaning, and management of effluents.

Clustering farmers by agro-ecological zone provides meaningful insights to indicators which demonstrate zone-bound potential and limitations. Variation across zones also highlights the universal relevance and suitability of all 10 practices; only 44 percent of farmers practiced weaning in the dry zone compared to 69 percent in the wet zone. Cultural conditions influence the acceptability of certain practices. When asked about weaning, one farmer stated, "it would be a sin to remove a calf from his mother so young!" Dry and intermediate zone farmers had a higher propensity for applying feed related practices, as these zones must contend with more challenging fodder conditions. Despite a strong focus by MOD staff to encourage herd rationalization and improved herd composition practices, less than half of MOD farmers (45 percent) across all zones were prepared to sell off unproductive cattle, with most highlighting non-dairy enterprise reasons for selling off cattle.

Table 15: MOD's 10 Best Practices Application

	DRY	INTERMEDIATE	WET	TOTAL
<i>Percentage of farmers adopting any new practices in their dairy enterprise</i>				
	98	99	97	98
<i>Percentage of farmers applying each best practice</i>				
Year-round nutritious feed	92	93	89	92
Silage - cultivate or buy	48	41	36	43
TMR	61	70	58	65
24/7 water access	87	88	95	88
Separate calf within 6 hours of birth	28	35	74	38
Weaning (weeks 8-12)	44	56	69	53
AI @ 15 months, Calf @ 24 months	55	51	74	56
Herd composition	43	47	44	45
Annual calving	65	66	64	65
Manage effluents	61	60	49	59
<i>Single most important practice to improving milk production, by percentage</i>				
Year-round nutritious feed	51	54	36	50
Silage - cultivate or buy	2	2	1	2
TMR	8	12	3	9
24/7 water access	35	27	46	33
Separate calf within 6 hours of birth	1	0	3	1
Weaning (weeks 8-12)	0	1	3	0
AI @ 15 months, Calf @ 24 months	0	1	3	1
Herd composition	0	0	3	1
Annual calving	2	4	3	3
Manage effluents	0	0	0	0
N-value	252	285	92	629

MOD supported farmers universally highlighted the importance of year-round nutritious feed and 24/7 access to drinking water as the two most significant practices they applied which resulted in improved production. The decomposition of these best practices by zone yields an interesting finding: variation between zones illustrates that year-round feed was found to be most significant to farmers in dry and intermediate zones, and 24/7 access to water was most significant to farmers in the wet zone.

### ***Facilitation of financial services for investments and provision of inputs through cost shared initiative***

Activity 3 interventions address the opportunities and limitations the dairy value chain actors, processors, farmers, input suppliers, face in accessing financial services. The Project applied adaptive approaches as macro-economic financial conditions changed throughout the seven years of implementation. The interventions aligned to one of two approaches:

- Individual financing through formal bank lending or cost share grants
- Public private partnerships to leverage investment

### ***Individual financing for investment and provision of inputs***

Table 16 introduces the three finance indicators under the MOD Project, built from two output indicators, (1) number of individuals receiving financial services and (2) number of loans

disbursed. The expected outcome of these two outputs is to increase the value of money invested in dairy enterprises and measured by the value of loans provided.

Table 16: Finance Indicators

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	LOP Target	Target Achieved
<i>Number of individuals receiving financial services as a result of USDA assistance (Standard #4)</i>									
Total Individuals	0	1,312	2,039	1,022	1,017	780	6,170	4,524	136%
Male	0	1,076	1,509	819	700	500	4,604	3,571	129%
Female	0	236	530	203	317	280	1,566	953	164%
<i>Number of loans disbursed as a result of USDA assistance (Standard #5)</i>									
	0	55	661	1,252	1,104	979	4,051	2,183	186%
<i>Value of loans provided as a result of USDA assistance (USD) (Standard #6)</i>									
Total Individuals	0	256,667	1,259,218	2,024,745	929,717	866,250	5,336,597	3,940,500	135%
Male	0	192,500	944,414	1,518,559	697,288	649,688	4,002,449	3,349,425	120%
Female	0	64,167	314,804	506,186	232,429	216,562	1,334,148	591,075	226%
Joint	0	0	0	0	0	0	0	0	N/A

The MOD Project exceeded the targets on all performance metrics associated with access to finance. 6,170 individuals were found to be receiving financial services, including 1,566 women. Of these individuals, 4,051 received a loan distribution (86 percent above target) amounting to US\$5,336,597 total lent. The average loan value is relatively similar, regardless of the recipient's gender, suggesting women and men are receiving comparable loan amounts despite women accounting for only 1 in 4 individuals accessing financial services through MOD.

Endline survey data provides a detailed assessment of how MOD farmers are engaging in financial management and investing in their dairy enterprises (Table 17). Two thirds of all farmers are associated with a producer group or cooperative (POs), with dry zone farmers having the strongest linkages to POs at 70 percent. Dairy enterprise activity is strong enough that 81 percent of all farmers save an average of 22 percent of their income, with minimal variation between zones. Wet zone farmers have the lowest percentage of saving activity yet invest the highest value in their dairy farm; wet zone farmers reported an average of US\$1,939 in investments in the past year compared to the sample average of US\$1,564 for all farmers.

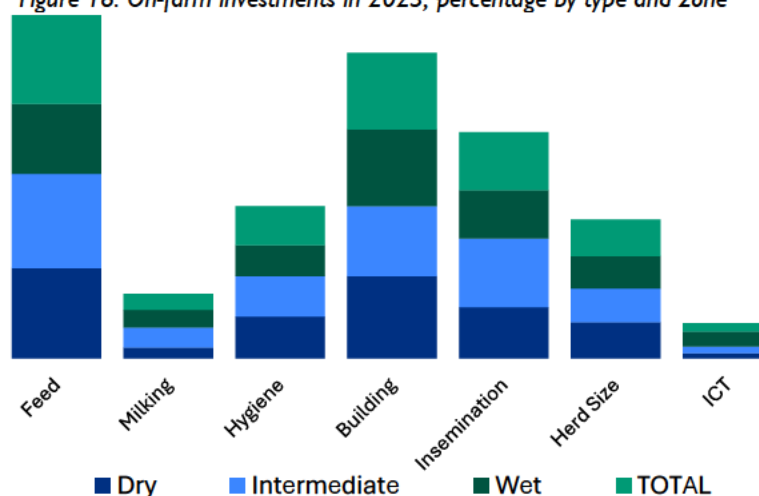
Table 17: Finance Behavior

	DRY	INTERMEDIATE	WET	TOTAL
<i>Percentage of farmers reporting membership in a producer group or cooperative</i>				
	70	65	59	66
<i>Percentage of farmers saving a portion of the dairy business income</i>				
	82	81	78	81
N value	252	285	92	629
<i>Average percentage of income saved as a result of the dairy business</i>				
	22	24	18	22
<i>Average value of on-farm investment in the last year</i>				
LKR	505,084	400,777	581,544	469,167
	(1,656,004)	(611,797)	(1,123,968)	(1,205,924)
USD <sup>29</sup>	1,684	1,336	1,939	1,564
	(5,520)	(2,039)	(3,747)	(4,020)

<sup>29</sup> LKR to USD conversion tabulated at 300 to 1.

MOD supported farmers invested heavily in the expansion and upkeep of their dairy enterprises in 2023 and 2024. Figure 18 illustrates the percentage distribution of investments in feed (fodder, silage and TMR); milking, hygiene, and insemination practices; building; cattle stock; and information and communication technology (ICT) across agro-ecological zones and aggregated for all MOD farmers. Consistent with other data supporting the importance of improved feeding practices, farmers invested most heavily in feed for their cows, with 70 percent of intermediate zone farmers, 67 percent of dry zone farmers and 52 percent of wet zone farmers investing in feed. In addition to feed, the majority of farmers invested in building infrastructure in the past year. 51 percent of intermediate zone farmers invested in improving insemination, compared against 38 and 36 percent of farmers in dry and wet zones, respectively. Approximately 1 in 4 farmers invested in increasing their herd size, while wet and intermediate zone farmers made incrementally higher investment in hygiene practices, 31 and 30 percent, respectively. In total, investment in milking (12 percent) and ICT (6 percent) remains low for all MOD farmers.

Figure 18: On-farm investments in 2023, percentage by type and zone



### Leveraging public-private partnerships for investment

Dairy processors serve at the confluence of the dairy value chain and formed the foundation for implementation at the inception of the MOD Project. They serve as buyers and intermediaries of inputs, investors in links throughout the value chain, through incentive<sup>30</sup> facilitation to maintain farmer relationships and loyalty. As the dominant private sector stakeholder in the Sri Lankan dairy value chain, the expansion of public-private partnerships (PPP) is critical for the sustainability of the Project's stated objectives.

<sup>30</sup> Farmers shared various incentive opportunities by dairy processors, with significant variability based on the length of relationship, volume of production, and other conditions. In a broad sense, incentives served as subsidies by dairy processors and most frequently were applied to discounted feed/inputs, veterinary services and financing opportunities.



Table 19: Public-private partnership indicators

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	LOP Target	Target Achieved
<i>Number of public-private partnerships formed as a result of USDA assistance (Standard #8)</i>									
Total	9	11	13	3	6	4	46	36	128%
<i>Value of new public and private sector investment leveraged as a result of USDA assistance (USD) (Standard #9)</i>									
Total	0	1,257,827	6,721,864	8,071,806	7,013,407	6,638,681	29,703,585	24,440,000	122%
Public	0	0	0	0	39,209	31,784	70,993	40,000	178%
Private	0	1,257,827	6,721,864	8,071,806	6,974,198	6,606,897	29,632,592	24,400,000	121%

Table 19 provides the two performance indicators related to PPP under the MOD Project. In total, the Project facilitated 46 public-private partnerships, exceeding the target by 28 percent. Nearly US\$30 million dollars was leveraged as a result of USDA assistance, with the private sector accounting for the vast majority of that investment. The private sector leveraged US\$29,632,592 while the public sector leveraged US\$70,993, exceeding the individual investment leveraged targets by 21 and 78 percent, respectively.

### **Capacity building of the extensions arms of private sector and DAPH**

Providing market-oriented training to agricultural extension officers is crucial for the effective delivery of relevant animal husbandry services. The initial years of MOD implementation focused on private sector individuals to expand and enhance the delivery of dairy value chain skills to beneficiary farmers. DAPH, as the primary government agency responsible for providing animal husbandry extension services including technical assistance, training, and resources to dairy farmers in Sri Lanka, expanded the scale of MOD extension's reach. Extension officers from DAPH joined the MOD Project to deliver training to MOD farmers in 2021.

*[MOD Project Training] was a good venture for us to get trained ourselves. More importantly, it was an extended opportunity for us to deliver a quality extension service to the farmers to improve milk production – DAPH Agriculture Extension Officer*

Table 20 below details the 2,535 public and private extension agents who benefited from training on best practices for animal health and productivity from 2018 to 2024, exceeding the target by 28 percent. Field discussions with DAPH extension officers revealed that partnering with the MOD Project was a great opportunity for them to better connect with farmers and assist in improving milk production.

Table 20: Agriculture extension indicator

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	LOP Target	Target Achieved
<i>Number of public and private extension agents' skills enhanced to provide recommendations on best practices for animal health and productivity</i>									
Total Individuals	89	586	659	190	444	567	2,535	1,987	128%
Male	78	495	528	138	330	367	1,936	1,627	119%
Female	11	91	131	52	114	200	599	360	166%



***Strengthening supply chain such as input suppliers and fodder cultivators, introduction of new technology etc.***

MOD interventions adopted throughout the project period to improve milk production include improved fodder cultivation, silage production, livestock health and vaccinations, heat detection, management during pregnancy, calf management, synchronization and other animal husbandry management practices. Under the MOD Project's Activity 2, strengthening supply chains for agri-inputs and introducing new products and technologies within the dairy supply chain can be collectively broken out into three main technical areas:

- Inputs for fodder cultivation
- Inputs for veterinary medicine
- Availability of artificial insemination services

The Project endeavored to reinforce and expand access to and quality to all three components, with mixed results.

***Inputs for fodder cultivation and improved feed***

Farmers received training on best practices in fodder cultivation and silage production by the MOD Project. Given the role feed plays in increasing milk production, extensive and repeated training and mentorship is needed to reinforce the importance of fodder and silage as integral components of a dairy cow diet. Adjusting the nutrition of the herd such as improving feed quality or balancing rations (TMR) can have immediate effects on milk production and is often noticeable within a single lactation cycle (6 to 12 months). Consistency in the availability of high-quality forage, silage, and concentrate feed ensures cows have the necessary nutrients for optimal production.

Improved fodder crops typically contain higher levels of essential nutrients and, therefore, can enhance the health and productivity of dairy cattle. High-quality fodder boosts digestive efficiency and overall metabolism in dairy animals, resulting in increased milk production. Additionally, these improved fodder varieties are often more digestible, allowing animals to extract more energy from the same amount of feed, which is vital for maximizing milk yield.

All respondent farmers in the evaluation study engaged in fodder cultivation or procurement (Table 21). 83 percent of surveyed farmers cultivated their own fodder, with relative consistency across all agro-ecological zones. In the wet zone, which benefits from significant rainfall, 16 percent of farmers reported freely collecting fodder from within the area. On average, 6 percent of farmers purchased fodder in the past year, with dry zone farmers reporting slightly above average at 8 percent. MOD supported farmers understand the need for fodder; nearly all farmers reported providing fodder for over 11 months per year. Dry and intermediate zone farmers had wider standard deviations, reflecting the zone-specific practice of feeding crop residuals at the end of the harvest period.

Development of input suppliers such as fodder, silage and other inputs as well as the trend of farmers producing silage and crop cultivation can ensure supply to the dairy industry. In addition to supporting on-farm cultivation of fodder and silage production, MOD developed 10 small-scale silage entrepreneurs and 125 commercial fodder cultivators in the targeted areas. These supplemental enterprises further increased the availability of feed for MOD supported farmers.

With an average reported herd size of 14 heads, farmers provided an average of 87,073 kgs of fodder last year, or 7,256 kgs per month. This average distorts the variation observed at the zone level, where dry zone farmers provided only 71,333 kgs of fodder last year compared with wet

zone farmers who provided 112,911 kgs of fodder last year. The wet zone has more favorable climatic conditions for fodder cultivation despite the limited land availability. Adequate water availability mainly facilitates the year-round fodder production in the wet zone. Further, there is a need for farmers to cultivate fodder as much as possible to feed their cattle due to less availability of communal grazing lands in the wet zone. In contrast, intermediate and dry zone farmers may have adequate lands to cultivate fodder, but water availability can limit fodder production. Additionally, the evaluators noted that the risk of elephant raids to fodder lands mainly impacts the dry zone and partially the intermediate zone, which may have affected less development of fodder cultivation in comparison to the wet zone where human-wildlife conflict does not exist.

*Table 21: Fodder crop cultivation and utilization*

	DRY	INTERMEDIATE	WET	TOTAL
<i>Primary source of fodder</i>				
Grow/produce	81	86	78	83
Collect from area	10	6	16	9
Purchase – neighbor	2	0	1	1
Purchase – input supplier	6	4	6	5
Other	2	3	0	2
<i>Average number of months providing fodder in the past 12 month</i>				
	11.22 (2.28)	11.10 (2.47)	11.88 (0.72)	11.24 (2.23)
<i>Average volume of fodder, kgs the past 12 months</i>				
	71,333 (84417)	92,932 (120095)	112,911 (82531)	87,073 (103012)
N value	229	268	86	583
<i>Average volume of silage, kgs the past 12 months</i>				
	13,674 (18869)	18,417 (31500)	8,698 (18308)	14,934 (18308)
N value	125	124	44	293
<i>Rating fodder cultivation as a result of MOD support, percentage</i>				
Excellent to above average	76	75	71	74
Average to poor	25	25	30	24
N value	252	285	92	629

In dry and intermediate zones, silage amounted to 20 percent of the fodder volumes, 13,674 and 18,417 kgs respectively, and by significantly fewer farmers. Proportionally less silage was utilized in the wet zone, an average of 8,698 kgs. This is likely due to the unfavorable climate conditions for silage production throughout the year in the wet zone. Silage production requires dry weather conditions at the time of wilting; therefore, such operations are difficult to follow in the wet zone resulting in lower silage production. Further, if adequate fodder can be grown in the wet zone to feed the cattle, there is no need for farmers to produce silage. The use of silage in ration formulation is not common in the majority of the farms in Sri Lanka, therefore, silage interventions can be novel for farmers. Nonetheless, the Project positively impacted the silage utilization by farmers. Three out of four farmers reported high satisfaction with the quality of their fodder cultivation as a result of MOD support.

### ***Inputs for veterinary medicine***

The availability of inputs, including veterinary drugs, is crucial for optimizing dairy production. By the completion of the Project, nearly all the farmers, all but 3 surveyed, purchased veterinary

drugs to treat their cattle from various input suppliers. The overwhelming veterinary medication purchased most frequently by farmers is deworming medication, with 93 percent of farmers making a purchase in the last year, followed by supplements (36 percent), antibiotics (31 percent), additives (24 percent) and vaccines (16 percent). Private agri-input dealers accounted for near two thirds of the sales market, with 63 percent of farmers buying drugs from private dealers compared to 30 percent from a government clinic.

Table 22: Veterinary Medicine

	DRY	INTERMEDIATE	WET	TOTAL
<i>Percentage of farmers who purchased any veterinary medicine in the past year</i>				
	99	100	100	100
<i>Most frequently visited veterinary medicine provider, by percentage</i>				
Private Dealer	58	64	74	63
Open Market	2	4	1	3
Government Facility	37	27	25	31
Other	3	5	0	3
<i>Most frequently purchased veterinary medicines, by percentage</i>				
Antibiotics	33	37	7	31
Deworming	93	95	90	93
Vaccines	16	14	20	16
Additives	20	28	20	24
Supplements	38	26	64	36
<i>Ease of accessing veterinary medicine, by percentage</i>				
Easy	57	69	34	59
Normal	20	15	25	18
Difficult	23	15	41	22
<i>Percentage of farmers reporting improved access to higher quality veterinary medicines as a result of MOD</i>				
	92	91	88	91
N-value	252	285	92	629

According to the farmer's experience accessing veterinary medicine, 59 percent of farmers (n=371) found easy access while 22 percent of farmers (n=139) had difficulties in accessing veterinary medicines. Approximately, 19 percent (n=116) of farmers found normal access to veterinary drugs. Overall, the majority of farmers (91 percent, n= 572) reported that their access to higher-quality veterinary medicines improved since their engagement with MOD. In summary, these indicate that the MOD project has positively impacted the development of input suppliers related to veterinary drugs for dairy operations. It is a trend in Sri Lanka that input suppliers, not only for drugs but also for other inputs for dairy operations, are emerging and continuing to develop. MOD implementation on introducing private input suppliers is a trending effect that will positively affect the dairy sector in Sri Lanka. Further, increased awareness and practice of farmers to develop their farming as a business will attract more input suppliers in the future supporting the dairy sector.

*[We] prefer buying veterinary drugs from private dealers as they were introduced by the MOD staff, and it has been convenient for us to access them whenever needed - Beneficiary Farmer, Intermediate Zone*

These findings from the endline survey provide insight into the influence improved access to quality agri-input suppliers can have in the Sri Lankan dairy sector. In total, the MOD Project

assisted in establishing 92 new dairy input retail operations, exceeding the target by 18 percent (Table 23).

Table 23: Dairy input retailers

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	LOP Target	Target Achieved
<i>Number of dairy input retail operations established</i>									
Total	0	19	50	7	10	6	92	78	118%

### Availability of artificial insemination services

Artificial Insemination (AI) is an important practice in strengthening a dairy enterprise and improving milk production. AI can improve and accelerate genetic progress, potentially yielding results within 2 to 3 years, as it allows for the introduction of superior genetics more quickly, removes all risks involved with keeping a breeding bull on the premise, and reduces the risk of transmitting diseases. The MOD Project struggled to reach the intended target of 5,000 successful AI delivered (Table 24), reflecting the broader challenges Sri Lanka's dairy sector faces with the application of AI.

Table 24: Artificial Insemination indicator

	FY18	FY19	FY20	FY21	FY22	FY23	FY24	LOP Target	Target Achieved
<i>Number of successful Artificial Inseminations delivered</i>									
Total	N/A	N/A	N/A	N/A	0	3,966	3,966	5,000	79%

The overall use of AI remains relatively the same across the available years of evaluation data, with 84 percent of MOD farmers having obtained AI services in 2020 compared with 88 percent in 2024 (Table 25). This is consistent with the relatively poor performance in MOD's AI performance indicator; however, the market for AI has clearly been influenced. In 2020, most MOD farmers, 90 percent, relied on government veterinary surgeons for their AI needs. By 2024, that percentage dropped to 77 percent, with almost 1 in 4 farmers relying on private providers for their AI needs.

Table 25: Artificial Insemination, midline versus endline

	2020	2024
<i>Percentage of farmers who obtained AI services in the past year</i>		
	84	88
<i>Current AI provider, percentage</i>		
Government	90	77
Private	5	23
N-value	158	593

Improving AI services can significantly enhance milk production in dairy operations. By implementing various strategies, dairy farms can enhance the effectiveness of their AI programs, leading to improved fertility rates, better genetics, and ultimately, increased milk production. At the end of project implementation, 88 percent of farmers obtained AI services and farmers in wet

and intermediate zones were found to use AI more often than dry zone farmers (Table 26). On average, fewer dry zone farmers obtained AI services (81 percent), fewer times (6.0) on fewer cows (4.2) despite having larger herds than either intermediate or wet zone farmers. Despite the under-utilization of AI in the dry zone, AI provision yielded comparably successful pregnancies in the intermediate and wet zones. Wet zone farmers demonstrated the highest propensity for AI, with nearly all wet zone farmers (98 percent) obtaining AI in the previous year. Over 90 percent of the time all or half of impregnated cows returned successful pregnancies after AI. These indicators appeared to be lower in the dry zone, likely owing to the heat stress conditions that cows experience during AI. Moreover, most of the cows in the wet zone are high-yielding temperate breeds while tropical breeds, which produce comparatively lower volumes of milk, are dominant in the dry zone. Cow breeds found in the wet zone evidently perform better with AI under the current conditions.

Table 26: Artificial insemination demographics

	DRY	INTERMEDIATE	WET	TOTAL
<i>Percentage of farmers who obtained AI services in the past year</i>				
	81	92	98	88
<i>Average number of times AI was applied to the herd in the past year</i>				
	6.0	8	7	7
	(5.0)	(6.4)	(5.3)	(5.8)
<i>Average number of cows AI was applied to in the past year</i>				
	4.2	4.7	4.3	4.5
	(2.5)	(3.0)	(2.4)	(2.8)
<i>Percentage of successful pregnancies as a result of AI</i>				
All	52	49	68	53
More than half	29	32	24	30
Less than half	12	13	7	12
None	8	5	1	5
N-value	205	261	90	556

The MOD Project worked jointly with government and private AI service providers to improve overall access to AI, influencing how farmers access and apply AI in targeted communities. Table 27 below details these dynamics. Nearly nine out of ten farmers sought out AI services for their herd breeding, with 77 percent of MOD farmers obtaining AI services from government veterinary surgeons and the remaining 23 percent from private AI providers. Farmers reported a 53 percent AI success rate (i.e. over half of AI applications resulted in pregnancy) irrespective of private or government AI service provision. Given many environmental stresses, feeding and animal effects leading to the different success of the pregnancy, the above indicates the overall AI farmers received is satisfactory with further necessary improvement. MOD farmers on average pay 880 SLR per visit to AI and have to wait an average of 4.5 hours. Nearly, 85 percent of the farmers claimed the price for AI has increased since last year, probably owing to the existing financial crisis in Sri Lanka.

Farmers in 2024 are more likely to hire private sector providers than previously under the MOD Project. Private AI providers in dry and intermediate zones consistently charged more for their services, 1,086 and 895 LKR respectively, but provided significantly more expedient arrival times than the government service providers. In both dry and intermediate zones, hiring a private AI provider consistently reduced the average wait time by as much as 26 percent. Government and private provision of AI was generally comparable in regard to the number of visits needed to achieve a successful pregnancy; however, in the dry zones government veterinary surgeons

yielded successful pregnancies with fewer visits. The wet zone demonstrated the most significant change in the AI market, with near parity between government and public AI service provision, 51 and 49 percent respectively. Prices between the two providers are comparable, yet the government's responsiveness is nearly 40 percent slower. Unlike the dry and intermediate zones, farmers in the wet zone experienced comparable rounds needed to reach a successful pregnancy, irrespective of the provider. This combination of accessibility, responsiveness and efficiency has created an improved and more competitive private sector for AI services in the wet zone.

*Table 27: Artificial insemination application*

	DRY	INTERMEDIATE	WET	TOTAL
<i>Average cost for each individual round of AI, in LKR</i>				
Total	950 (394)	866 (220)	784 (276)	884 (308)
Government	904 (355)	863 (209)	820 (177)	873 (268)
Private	1086 (468)	895 (298)	746 (350)	922 (418)
<i>How has the price of AI services changed since the first AI application</i>				
Price is higher	86	89	74	86
Price is lower	3	0	17	4
Price is the same	11	11	9	11
<i>Current AI provider, percentage</i>				
Government	75	89	51	77
Private	25	11	49	23
<i>Average response time of AI provider, hours</i>				
Total	4.3 (6.0)	4.6 (6.3)	4.3 (3.9)	4.4 (5.9)
Government	4.6 (6.7)	4.8 (6.6)	5.0 (4.5)	4.7 (6.4)
Private	3.4 (3.2)	3.5 (3.0)	3.6 (3.3)	3.5 (3.1)
<i>Average number of visits before successful pregnancy</i>				
Total	1.8 (1.6)	2.1 (1.6)	1.8 (0.8)	1.9 (1.5)
Government	1.7 (1.3)	2.1 (1.6)	1.9 (0.9)	1.9 (1.5)
Private	2.1 (2.4)	2.2 (1.1)	1.8 (0.7)	2.0 (1.7)
N-value	252	285	92	629

### **Overall Activity Effectiveness**

Quantitative data, detailed here and in Evaluation Question 1, confirms the Project's success in reaching their performance metrics and influencing developments in the Sri Lankan dairy sector over the past seven years. These metrics alone, however, do not consider aspects of the Project design which may or may not have been effective in achieving the project goal of increased productivity and associated formal trade in milk and milk products in Sri Lanka.

The Project's substantial investment in time and resources to provide a "high touch" approach to improving and applying best practices and technologies was clearly effective. Farmers' capacity building on training in best practices, mentoring and monitoring visits through extensions staff drove changes in farmer behavior resulting in improvements to quality and quantity of milk



production. With this enhanced capacity, farmers were better positioned to capitalize on improvements to input suppliers and fodder cultivators in the supply chain and better understood the financial investments needed to grow their dairy enterprises. This “high touch” approach, however, required that the MOD Project prioritize those dairy farmers who were already well-positioned to grow into dairy entrepreneurs, i.e. >20L or progressive dairy farmers who did not reflect the average Sri Lankan dairy farmer. This raises concerns as to the scalability of these activities under the MOD Project approach.

The intention behind building capacity of the extension arms of private sector and DAPH to address scalability will have limited effectiveness. At present, DAPH remains the dominant extension service provider across all agro-ecological zones. The sheer number of dairy farmers in the sector, coupled with the number of available DAPH extension officers, will never arrive at the effectiveness of the Project’s intervention approach. The private sector’s extension remains far too small to meet the substantial demand for extension.

## EVALUATION QUESTION 3

***To what extent did the level of project resources lead to the achievement of results?  
Could the same results be achieved with fewer resources?***

The MOD Project is valued at a total of \$27.6 million allocated across four key funding streams:

- \$15,765,518 to commodity funding for project service delivery;
- \$2.08 million to commodity Credit Corporation for project startup phase;
- \$251,801 to IESC cost-share in the form of technical services;
- \$7.2 million to freight allocation for transport of commodity.

As of August 1, 2024, the Project is expected to have spent \$17.7 million on program implementation for three of the four key funding streams, excluding freight allocation. Project service delivery alone accounted for approximately 60 percent of the total budget.

The Project successfully met or exceeded the vast majority of their performance indicator targets. In total, the MOD Project reached 35,002 total direct beneficiaries, 4,327 of whom produced at least 20 liters of milk at entry into the Project and were selected for extended mentorship and other resources. The final evaluation survey findings are based on the results of these 4,327 farmers and not the entire universe of reported beneficiaries; however, these farmers represent the strongest farming candidates for transforming into dairy enterprises. These farmers do not reflect the average Sri Lankan dairy farmer.

The challenges at inception resulted in the MOD Project ultimately shifting much of the project implementation to milk production and supply, rather than a seven-year investment in a market oriented implementation approach. Novel milk production approaches require significant promotion and support, and the Project invested heavily in providing ample support to ensure uptake of the 10 Best Practices. This investment is evident, with more than half of all surveyed farmers applying 7 or more Best Practices at the end of the project. The level of project resources is strongly responsible for this level of achievement, and it is highly unlikely that the same result would have been attained with fewer resources.

The Project's implementation was very labor intensive by design and required substantial investment in each commercially motivated farmer. The quandary exists in the scaling of these production practices, not necessarily in the achievement of the same results with fewer resources. This is evident in the relatively low proportional share of >20L or progressive farmers to total beneficiary farmers. Processors are inherently competitive, thus are poorly placed to act as scaling agents. Their incentives are not fully aligned with dairy farmers. DAPH extension services will struggle to provide comparable resources, it will be a challenge for extension agents to invest their time as heavily as the MOD Project staff did. It is unlikely DAPH could mirror the level of success evidenced by the MOD Project in a comparative period of time.<sup>31</sup>

The lack of achievements related to market demand and corresponding prices for milk quality reflects broader systemic challenges during the implementation period. Additional resources were unlikely to return stronger results; rather, a stronger willingness by the Project to challenge the industry status quo was necessary.

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<sup>31</sup> This statement is made assuming ceteris paribus, all things held equal. As Question 5 details, the dairy sector in Sri Lanka may benefit from macro-level changes the MOD Project contributed to, which would change the parameters of this assumption.

## EVALUATION QUESTION 4

***What is the likelihood that the project benefits will endure over time after MOD ends? To what extent has MOD developed local ownership and the capacity of both government and private sector partners to continue the changes introduced by MOD?***

The two core issues central to the MOD Project are increasing milk production and improving milk quality. Over the course of seven years, market-oriented interventions were developed to enhance the skills and capacities of various dairy value chain actors, building local ownership of the processes and practices, with the intention of strengthening the value chain. The following section discusses the evidence gathered detailing the likelihood that the project benefits will endure after the MOD Project ends.

### MILK PRODUCTION

***Sustainability of project benefits through increased capacity of both government and private sector partners***

#### Dairy Enterprises

The Project's commercially motivated farmers clearly benefitted from the project. They report improvements to production and operations; however, total average milk production in MOD farms did not significantly change between 2023 to 2024, despite a steady increase in the amount of daily milk production per cow. Farmers are producing comparable total volume, but with fewer cows. Increased per-cow production is a good indication of project benefit owing to the improved management practices adopted by MOD farmers. Despite this stagnation, over 90 percent of farmers reported improvements to their dairy operations, with various dairy operation outcomes strengthened (Table 28) as a result of the Project's interventions.

Table 28: Dairy operations, percentage by zone

	DRY	INTERMEDIATE	WET	TOTAL
<i>Farmers with improved dairy operations in the past 12 months, percentage</i>				
	90	93	83	90
<i>Dairy operation outcomes improved, percentage</i>				
Milk production	78	90	74	83
Shorter cycle for cows to rebreed	48	41	51	45
Lower death rate	19	21	13	19
Quality of milk increased	73	74	89	76
Produce more milk from the same number of cows	69	71	87	72
Increase revenues from milk sales	76	70	58	71
<i>Main barrier in improving dairy operations, percentage</i>				
Lack of feed	5	6	0	4
Lack of water	5	0	0	2
Persistent diseases	27	24	63	36
Poor market prices	5	0	0	2
Other	59	71	38	56
N value	22	17	16	55
<i>Percentage of farmers reporting improvements met their expectations for achieving significant progress towards your goal for the dairy enterprise</i>				
	98	97	93	97

Farmers adapted best practices in milk production, storage, and quality control, elevating the productivity of the dairy enterprise while ensuring the production of high-quality milk consistently and sustainably. 83 percent of farmers reported improvement to their milk production, with 76 percent reporting the quality of milk improved. Nearly half of surveyed farmers benefitted from shorter breeding cycles reflecting how quickly the cows come back to breeding due to improved body conditions owing to proper feeding, and two thirds saw an improvement in their per-cow production volumes. Adopting those best practices in dairy farms can ensure the gradual development of dairying, ensuring sustainability. Unfortunately, few farmers benefitted from any price premiums on the improvements to milk quality, irrespective of quantity.

Certain practices such as the year-round supply of feed and *adlibitum* supply of water every day were adopted by the majority of the farmers, as few now report these as main barriers to improvement. Disease management remains a significant challenge, especially in the wet zone. “Other barriers” accounted for a large share of farmers’ concern and are likely related to herd size.

These improvements to both the quantity and quality of production are heavily influenced by the improvement gains attributed to improvements in feed. Figure 6 below illustrates the percentages of cattle feed MOD farmers provided to their cows this past year. Reflecting similar trendlines discussed in Question 2, forage crops remained the dominant feed in all zones, while dry and intermediate farmers were more likely to supplement their feed programs with silage. Of particular interest in this graph is the marked increase in crop residuals as a component of the feeding program between the 2023 and 2024 seasons. In all zones, a substantially higher percentage of farmers fed their cows with crop residuals in 2024 than in 2023. If this development proves to be a broader trend, there is a risk that farmers will reduce their reliance on other fodder and risk the impacts that have been gained in milk production. The main residues used in Sri Lanka are rice straw, corn stover and sugar cane tops, and occasionally other crop residues depending on the availability at farm levels. Extensive use of crop residues can bring disadvantages as it can substitute the major nutrients intake, however, crop residues with proper treatments can be used to provide the required fiber for the optimal function of the rumen eventually elevating the overall capacity of the rumen to better utilize nutrients.

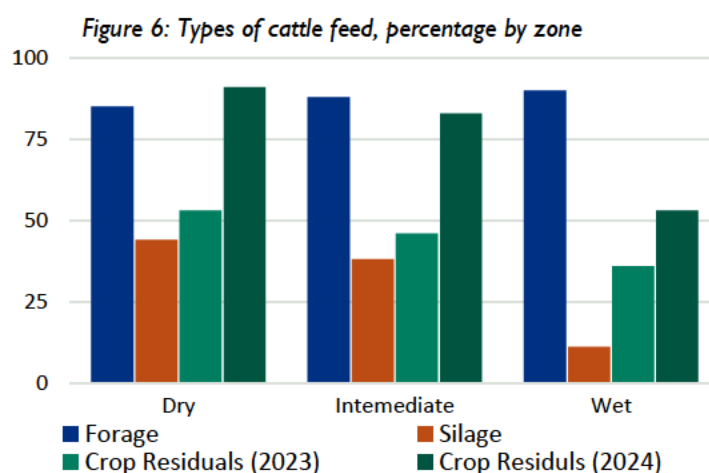
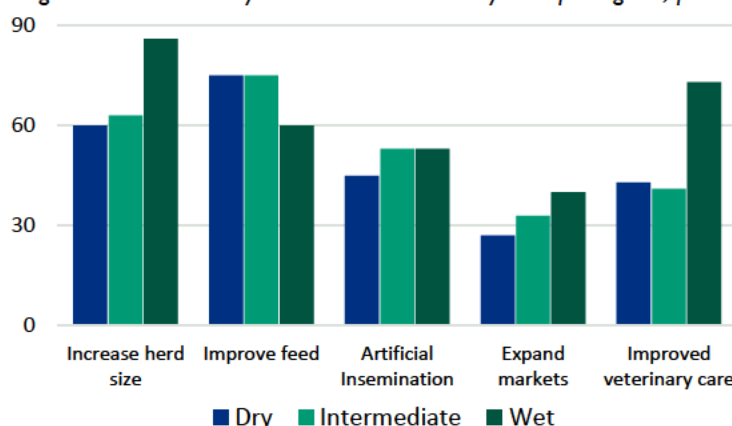


Figure 7 details the activities that are required by farmers for the future development of their dairy enterprises. Further improvements to herd size, feeding and AI are seen mainly as the future activities needed to achieve the dairy enterprise goals. It is clear that while significant headway

has been made in developing dairy entrepreneurs, future growth remains precarious without sustained focus on feed and herd composition, both in terms of herd size and herd health.

Figure 7: Future activity needed to achieve dairy enterprise goals, percentage

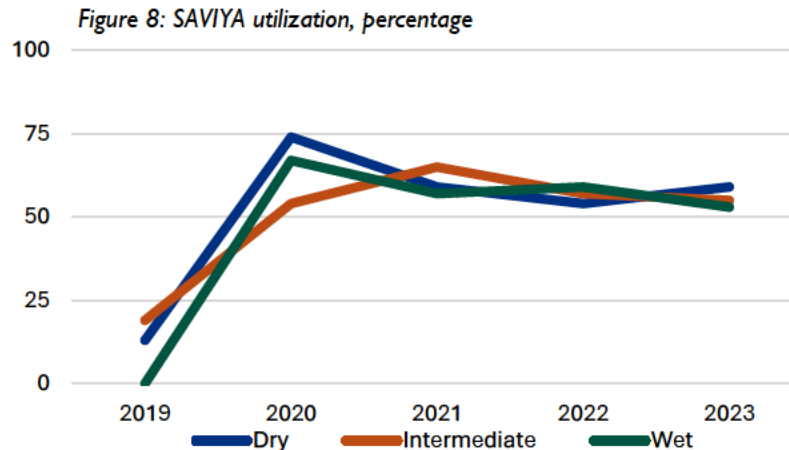


### Government and private extension

Training extension officers is crucial for sustaining the effective delivery of animal husbandry services. DAPH is the primary government agency responsible for providing animal husbandry extension services including technical assistance, training, and resources to farmers in Sri Lanka. In the final two years of implementation, DAPH extension officers partnered with the Project to deliver training beyond MOD's beneficiary farmers. Field discussions with DAPH extension officers revealed that joining the Project provided a great opportunity for them to better connect with their farmers while assisting to improve their milk production. Private extension was generally linked directly with processors. As previous data shows, the role of the private sector in delivering extension services is increasing, filling a gap in DAPH's ability to meet the demand for such services. The Project's training of private and government officers in various aspects of dairy management ensures that they have the necessary skills, knowledge, and strategies to maintain and enhance the sustainability of a dairy project, from production to market.

Mobile extension services, including the Project's SAVIYA platform, connect farmers and extension officers in delivering timely and relevant advice to farmers on best dairy practices, planning and decision-making to improve income and productivity. Mobile extension can be a viable and sustainable intervention for farmers with improved access to smart technologies. Figure 8 details the synthesis of 5 years of the Project's wave survey, whereby approximately one in four (24 percent) farmers had some level of awareness of the SAVIYA platform. Of those farmers, over half (55 percent) used the application to access extension services, with peak uptake in 2020. The platform has since arrived at the point of homeostasis, where around half of MOD's farmers utilize the platform at least once in the previous year. In total, nearly all surveyed farmers (96 percent) reported the platform provided useful information to address issues in their dairy operations. From a sustainability point of view, such applications can help farmers continuously, even after the project ends to reach out for necessary advice for their dairy farming. However, limitations such as access to mobile devices and internet facilities and the novelty of using mobile applications by the farmers can determine the potential benefits and sustainable use of mobile extension services.





If managed properly, rolling out extension services through mobile applications can increase accessibility and deliver extension services to a wider audience while reducing the need for physical infrastructure, travel, and in-person training, lowering the overall cost of delivering services for dairy farmers in Sri Lanka. Mobile applications such as SAVIYA can be used to deliver timely information, alerts, and updates, which is crucial in the dairy sector, while also collecting data on farm user behavior, preferences, and challenges, which can be analyzed to improve services in the future. Moreover, the effectiveness of extension services can be monitored in real-time, allowing for quick adjustments and targeted interventions for dairy farmers. Careful consideration of accessibility to smartphones and reliable internet is required, especially for populations who traditionally may have greater challenges accessing and using digital technologies. The engagement of youth in dairy operations will be an added advantage in the use of these applications in the future.

#### *Medium and large-scale farms*

Due to the prevailing limitations of AI services in the country, formalized breeding programs for medium and large-scale farms did not reach its full expectations. The Project's broader intervention to train and introduce private AI service providers to the dairy sector mostly targeted smaller dairy enterprises. The expectation remains that improved capacity of AI service providers will eventually strengthen AI services across all size dairy enterprises as private sector providers will increase and stabilize the supply of AI services in the country. Large dairy operations received introduction and training of independent herd policies such as herd breeding policy, herd culling policy and Mastitis control, with the support from the University of Florida, but limitations to overall AI quality and availability would significantly influence AI results for all dairy enterprises.

#### *Trade Associations*

The All Island Dairy Association (AIDA) was established in Sri Lanka to create an organized trade body to facilitate deliberations on matters of relevance to the dairy sector. The Project's technical support in drafting policy provided a conducive environment for sustaining project benefits. The Project's support set initiatives to develop a National Dairy Association to integrate into existing local, regional, or national policies and strategies. The Project provided technical assistance to AIDA in the drafting of policy recommendations to recognize 'fodder as a crop.' Previously, cultivating fodder was not recognized as a crop and farmers faced difficulties in receiving necessary inputs such as water and land. This policy is awaiting approval from the cabinet to be implemented island wide. Together with the Ministry of Agriculture, the Project has supported drafting the country's first-ever dairy policy enforcing regulations related to dairy farming needed



for the sustainability of the dairy industry. Further, the formation and technical assistance to the Large Dairy Farm Association (LDFA) is aligned with MOD's intention to support trade associations.

### ***Sustainability of project benefits through local ownership***

The MOD Project began at a time when the domestic dairy industry in Sri Lanka was nascent, and the course of the dairy industry was unclear. Dairy processors were distrustful, small scale dairy farmers were plentiful but not motivated, and the GoSL showed little interest in working with a project intended to address domestic dairy needs. The MOD Project was in effect a proof of concept, that investment in both time and resources could yield results in the local dairy value chain.

The past seven years of MOD programming have clearly influenced the Sri Lankan dairy sector. Farmers consistently shared their improvements to milk production, largely driven by improved feeding programs and dairy enterprise management. Dairy processors invested in their supply chains, improving and expanding their cold storage capabilities and increasing milk collections. A budding private sector for agricultural extension services is developing. The GoSL has embraced dairy as a development sector. The MOD Project successfully proved the merit in pursuing a market-oriented approach to expanding the Sri Lankan dairy industry.

The dairy sector continues to face supply shortages of milk; however, there is optimism among MOD supported farmers that their experience with the MOD Project has prepared them for their future with their dairy enterprise (Table 29). Looking out over the next production year, on average 53 percent of farmers are very optimistic about the improvements they expect to see with their dairy enterprises, while 1 in 3 wet zone farmers have reservations about the next year. However, when the timeline for dairy business improvements is expanded to 5 years, over 80 percent of all surveyed farmers reported the highest level of optimism with very little variation across zones.

*Table 29: Dairy operations, percentage by zone*

	DRY	INTERMEDIATE	WET	TOTAL
<i>Percentage of farmers with adequate knowledge and skills to sustain the improvements in their dairy enterprise</i>				
Yes	100	98	100	99
<i>Farmer optimism for dairy business improvement this year, percentage</i>				
Very optimistic	51	59	37	53
Optimistic	31	21	34	27
Indifferent to not optimistic	18	20	29	20
<i>Farmer optimism for dairy business improvement in the next 5 years, percentage</i>				
Very optimistic	82	83	80	82
Optimistic	16	13	11	14
Indifferent to not optimistic	2	5	9	4
<i>N value</i>	252	285	92	629

This long view likely reflects the knowledge that many of the advocated best practices take time to yield returns. Herd composition remains a challenge, with the average commercially motivated farmer keeping 15 cows in their herds, with 5 milking cows. As farmers appeared not to follow synchronized breeding in their farms, as is typical in most of the dairy farms in Sri Lanka, milk production is seasonal and limited by the lack of clear breeding strategies. AI can accelerate genetic progress and allow for the introduction of superior genetics more quickly and effectively, but any potential yields resulting from AI require 2 to 3 years. These animal-specific variations in

milk production, the stage of milk production, and young cows in a herd, require time to adjust. A significant improvement in milk production in a short period cannot be expected.

While it is likely that MOD's commercially motivated farmers will continue to maintain and grow their dairy enterprises, the labor-intensive approach to implementing the MOD Project resulted in a "thinning of the herd" of potential beneficiary dairy enterprises. The MOD Project's reliance on dairy processors to coordinate farmers for entry into the Project resulted in the strongest farmers gaining access to the Project's interventions, rather than developing a sustainable pipeline of new dairy enterprises. It is unclear how the Project's sustainability plans would absorb a wider cohort of smaller, lesser producing dairy farmers.

The National 100-Liter Farm Development Initiative is seen as the long-term sustainability plan for continuing project outcomes. It is a clear indication of the GoSL's commitment and strategy to meet national fresh milk requirements for commercial processing. Well performing farmers have been selected from the Project's beneficiary list of farmers and connected with APNH and DAPH. While an important step in building excitement and interest from government stakeholders, there is little clarity on if and how the Initiative would absorb any of the other 94 percent of dairy farmers in Sri Lanka not engaged with the MOD Project.

The MOD Project contributed to strengthening AIDA as the importance of building the capacity of the dairy trade association is crucial in developing the dairy industry in Sri Lanka. AIDA serves as a central forum for building consensus amongst key stakeholders in the dairy industry and is comprised of individuals, farmers, milk collectors, manufacturers, processors, importers and service providers. This collective effort addresses a long-felt need in Sri Lanka to develop a thriving, sustainable and self-sufficient dairy industry while providing value for all stakeholders. At the time of evaluation, AIDA's contribution to advocacy in the dairy sector reflected much of the priorities of the higher level, dairy value chain actors. A central theme among dairy farmers is concern over dairy prices, and the high variability, and lack of transparency, in prices and lack of price premiums for quality milk. To provide value for all stakeholders, it is important to provide adequate opportunities for farmers representation, otherwise, their voices and demands are left unheard, reducing motivation to build their dairy enterprises.

The MOD Project's commercially motivated farmers have demonstrated the capacity to continue implementing their chosen best practices; however, challenges still remain. The growing number of private sector and government extension officers may not be enough to fill the void left by the closure of the MOD Project. On average, 85 percent of farmers rely on government extension services as the first choice for any technical concerns, and while DAPH has benefitted from MOD's technical trainings, it is not in the realm of feasibility for DAPH extension to apply the same heavy investment in time per farmer as the Project supported. DAPH extension remains limited by the number of available staff per district and corresponding resources. Many of the private sector extension services are attached to dairy processors, which reduces access for farmers not associated with a given processor.

The Project's implementation approach did not provide for a farmer-specific channel through which farmers could advocate to have their needs met. As previously detailed, farmers are closely connected with their buyers and processors look to safeguard their producers. The dairy processor-centric implementation approach hinders the development of a dynamic dairy market where producers can seek alternative formal markets, increase competition and improve prices for farmers. Any sustainability strategy needs to consider a farmer forward mechanism through which farmers could lobby and advocate for their needs, irrespective of their association with

industry processors. The establishment or reinforcement of farmers' groups or cooperatives to improve the degree of community ownership and involvement in the project would have enhanced sustainability, just as the creation of AIDA did for dairy processors. According to the final evaluation, 66 percent of farmers reported membership in a producer group or cooperative. These cooperative groups or producer groups could have been reinforced with supplemental capacity building by the MOD Project to help farmers raise their concerns related to trading their milk.

## **MILK QUALITY**

The MOD Project intended to train farmers on best practices in milk quality, conduct quality and safety campaigns for consumers, and promote quality-based payments for milk producers in order to improve milk quality within the domestic dairy market; however, the dynamics of the dairy sector in Sri Lanka paralyzed any meaningful movement on influencing milk quality in the dairy value chain. Documented in the midline evaluation report, the midline evaluators stated:

*The baseline report found that the rejection rate by processors was low and not an indicator that would signal an improvement in quality of milk. The recommendation was for the industry to agree on a standardized test for quality and that processors test producers' milk. This recommendation did not meet with industry approval, and MOD staff chose to modify the indicator to be based on producers receiving higher prices for their milk because of improved FAT and SNF of the milk from better feeding.*

*The problem is that the industry needs to move to international milk standards, but the way the [performance] indicator reads, it does not achieve this purpose. This is confounded partly because the GoSL raised the price for producers' milk based on the formula for FAT and SNF. With better feed rations, producers will receive a better price for their milk, because of increased FAT and SNF but not necessarily due to improvements in quality of the milk due to lower bacteria and somatic cell counts.<sup>32</sup>*

In practice, the final evaluation found scant evidence that MOD beneficiary farmers received a price premium based on their milk fat percentages, and no interviewed farmers or chilling center staff reported testing milk for bacteria or somatic cells. Informal discussions with various stakeholder found that dairy industry dynamics were such that motivating change in measuring milk quality was a futile exercise. This reality was reinforced by the dissolution and integration of Activity 5: Training in Sanitary and Phytosanitary Standards into Activity 1 in the contract extension years.

## **Sustainability of project benefits**

MOD's >20L and progressive farmers have benefitted from and understand the value of producing high quality milk. The majority of the Project's >20L and progressive farmers are investing in at least half of the prescribed MOD best practices. These farmers visually assess the improvement in the quality of milk produced on their farms; however, the improvement to milk quality is likely tenuous given feedback and comments made by surveyed farmers. Dairy operations are an around-the-clock operation. Unlike beef farming, dairy enterprises must conduct daily operations to sustain their milk production. It is both time and resource intensive. The price farmers receive should reflect the additional costs associated with the quality of production.

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<sup>32</sup> Sullivan, G. *Midterm Evaluation of the Market-Oriented Dairy Project Report*; May 2020, Page 22.

*Why should I continue these expensive practices when my neighbor adulterates his milk with water and gets the same price? – MOD Farmer, Dry Zone*

Dairy processors' early and sustained contribution in facilitating the implementation of the MOD Project resulted in dairy processors likely influencing the priorities for the Sri Lankan dairy sector, potentially at the expense of dairy farmers. Dairy processors stand to benefit from the lack of quality-based payment, as the financial gain from the enhanced quality is profited to the processor and not the dairy farmer. Dairy processors are not benevolent actors in the dairy value chain; the lack of movement on dairy quality on price over seven years of implementation threatens the sustainability of small dairy farmers' investment in continuing to apply the best dairy practices on their farms to keep milk quality standards.

### ***Sustainability through local ownership***

Given the lack of measurable results related to dairy quality, there is little project activity to sustain beyond the gains made to milk production. This challenge, however, does provide an opportunity for future programming. Dairy farmers, processors and government stakeholders all have a vested interest in improving the dairy sector. The next steps in doing so will require developing further the difficult conversations needed for actionable implementation of international dairy quality standards and regulations.

*I am informed that the DAPH has agreed to take over the project activities once the MOD Project is over and to continue training, monitoring and evaluation – DAPH Veterinary Officer*

The Project's secured support from DAPH to harmonize the MOD training curriculum and activities, including monitoring activities, intends to support farmers to improve their production targets. These production targets should include both quantity and quality. Effective monitoring and evaluation systems can track progress, identify challenges, and provide data to support ongoing adjustments and improvements, contributing to the sustainability of benefits. Institutional support is crucial for the long-term viability of project benefits. Data garnered in the monitoring process should be used to motivate dairy processors to facilitate a quality-based price for milk.

## EVALUATION QUESTION 5

***What are the immediate-, medium-, and long-term effects, intended and unintended, positive and negative, of the project after nearly 7 years of implementation?***

With nearly seven years of project implementation, and a substantial amount of corresponding data, a review of the various effects of overall MOD Project implementation contributes to the knowledge base for all stakeholders in the Sri Lankan dairy sector. For the purposes of this discussion, immediate-term effects are those found to occur during the course of the MOD Project implementation period through to the next year; medium-term effects are considered those likely to reach fruition in the next two to five years; while long-term effects are sustained developments expected to achieve actualization after five years.

### ***Immediate effects***

#### ***Application of various improved dairy farm practices***

The Project trained over 16,500 farmers on the aforementioned best practices in dairy production, having provided substantial mentorship support to 4,327 farmers. Assuming that each of these farmers operates only one farm, the total MOD beneficiary farmer population represented nearly 6 per cent of the registered dairy cattle farms in Sri Lanka in 2023.<sup>33</sup> The training and mentorship activities encouraged the application of various improvements to dairy farm practices, which coupled with improvements to fodder cultivation and input suppliers, resulted in a steady and potentially sustainable increases to the volume of per-cow dairy production. Ultimately, it should be expected that the application of all 10 Best Practices would stretch across the immediate and medium-term periods. Genetic enhancements tend to take the longest, whereas adjustments in nutrition, management, and environment can lead to quicker results.

#### ***Importance of improved feed and 24/7 water access***

Adjusting herd nutrition by improving feed quality or balancing rations (TMR) can have immediate effects on milk production and is often noticeable within a single lactation cycle or 6 to 12 months. Consistent availability of high-quality forage, silage, and concentrated feed ensures cows have the necessary nutrients for optimal production and adequate access to clean water is essential for milk production. A year-round supply of feed and *ad libitum* supply of water 24/7 on beneficiary farms is followed by the majority of farmers as best management practices introduced by the Project. Consistently, farmers reported that their feeding programs improved since their first engagement with the Project. Farmers claimed that average milk production had increased mainly due to improved feeding and management, and less due to improved herd size. This enhanced capacity at the farm level yielded immediate effects which positively influenced the core objectives of dairy farmers.

#### ***Influence of improved production on savings and investment***

The cascading effect of improved production, and thus income, has immediate influence on the MOD Project's farmers' savings and investment decision making. With 81 percent of surveyed farmers saving a portion of their dairy income, and then 61 percent investing back into their dairy enterprise, it is clear that farmers hold a degree of confidence in the viability of their dairy enterprise. In the short term, farmers have signaled that they remain cautiously optimistic about the growth of their dairy farms over the next year but hold higher confidence over a five-year horizon. A contributing factor for this longer-term view is directly linked to the immediate effect of saving and investment.

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<sup>33</sup> Department of Animal Production and Health, *Annual Livestock Statistical Bulletin*, 2023.

### *Industry Investment in Chilling Stations*

Of the various investments made at the industry level, chilling stations have likely had the most influence on overall dairy quality and quantity. By increasing the number of chilling stations, the dairy industry has expanded the number of farmers who can provide a higher quality milk product directly to the processor. The increase in chilling stations has also reduced farmers' reliance on aggregators, reducing the costs associated with selling their milk.

### **Medium-term effects**

#### *Changes at the National Level*

Policies, institutions and support services provide a setting in which dairy enterprises move from household consumption to small scale, commercial production. The medium-term effects are strongly influenced by the Project activities intended to improve the enabling environment for agribusiness and corresponding industry-level changes. The sustainability of any on-farm dairy production requires industry conditions to maintain dairy enterprise motivation and further uptake of best practices.

Deliberate and strategic interventions on the part of government can play an important role in fostering the development of dairy enterprises and the enhancement of the dairy value chain. While the signing of MOUs with the GoSL would take the better part of the first five years, the groundwork put in by the MOD Project has elevated the dairy sector to a viable sector for economic development and poverty reduction. Conditional on further stability within the GoSL and DAPH, it should be expected that medium-term effects would result in a rebalancing of dairy specific agricultural policies.

The Project's support to drafting regulatory changes in fodder crop designation, which influenced farmers' ability to access water for fodder production, is a significant accomplishment whose full-scale influence on the dairy sector will only become evident in the medium term, conditional on other aspects of the enabling environment continuing to improve. Previously, cultivating fodder as a crop was not recognized, and farmers faced difficulties in receiving necessary inputs such as water and land. If this policy is implemented, farmers will be able to use irrigated water and their lands to cultivate fodder. This policy is waiting to receive approval from the cabinet to be implemented island wide.

#### *Milk Market Prices and Dairy Processors*

Rooted in the inception period challenges, dairy processors hold a usually powerful role within the Sri Lankan dairy value chain, and even more so in the MOD Project. Dairy processors were central to the development and implementation of the Project, so much so that the final evaluation methodology was unusually impacted by the importance of maintaining processor – rather than farmer – relations. Dairy processors provided the MOD Project with linkages and accessibility to their farmers at inception, a necessity in 2018. This influence on the Project implementation also likely contributed to the lack of movement on the Project's mandate to address dairy quality, as dairy processors financially benefit from the absence of a milk-quality price in the market. The evaluators observed repeated instances where farmers had limited options in regard to which dairy processor they associate with. In the most uncompetitive areas, dairy processors benefitted from monopolistic pricing. Few districts were observed to have multiple, competitive market



channels for farmers to sell to, and even if they did, the “incentivization”<sup>34</sup> programs provided by dairy processors all but ensured farmer loyalty.

Previous evaluation question sections detailed the challenges associated with further developing the dairy industry in Sri Lanka into a dynamic and competitive market. The evaluators would be remiss if not to highlight the potential risk dairy processors currently pose to farm-level progress made by the MOD Project, and the Sri Lankan dairy industry as a whole. Price distortions are evident in the final evaluation survey data. Farmers reported price ranges between 125 to 220 LKR per liter in 2024, and 70 to 190 per liter in 2023. The vast majority of farmers attribute the increase in prices in the past year to exogenous macro-economic pressures, i.e. national inflation issues. These price distortions lead to a mispricing of financial contracts relative to their fundamental value, hindering the potential for scaling the Project’s production enhancements to smaller, less “market oriented” farmers. The following two figures illustrate MOD farmers reported average sales price of milk and the average daily volume of production in 2024.

Figure 9: Average price per liter of milk, LKR in 2024, by district

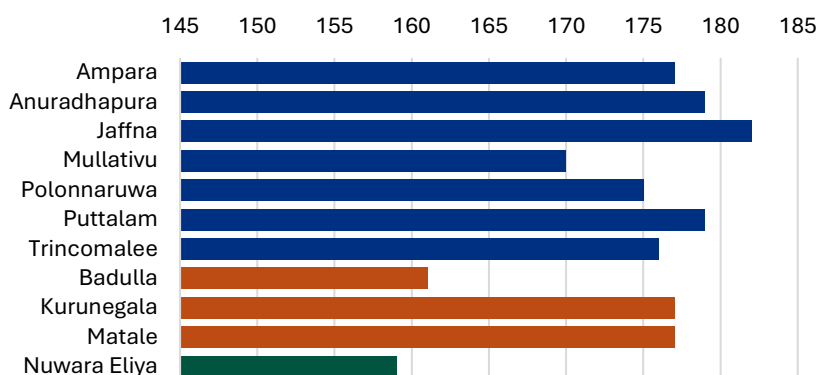
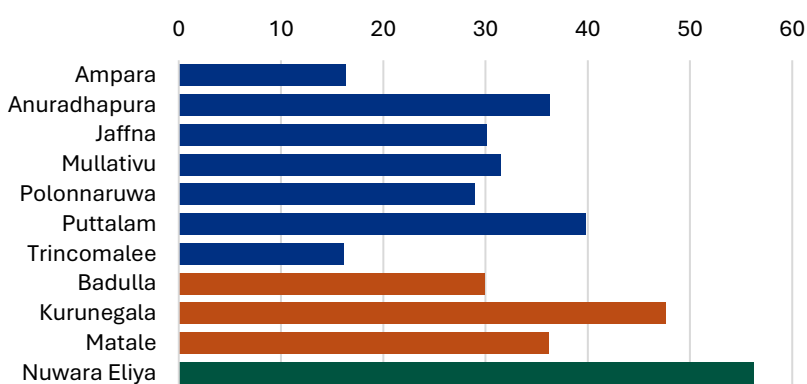


Figure 10: Average daily volume of milk per farm, liters in 2024, by district



In a dynamic market, prices should equilibrate at a point where milk supply equals milk demand. The MOD Project design is predicated on the reality that domestic dairy production is a substantial fraction of domestic dairy demand; however, the above figures detail a relatively distorted market. Intermediate zone farmers in Kurunegala benefitted from proportionately higher prices, on

<sup>34</sup> MOD Project staff and beneficiary farmers detailed incentives schemes provided by dairy processors. These schemes varied and could include subsidized feed rations, improved access to processor associated veterinarians, and other farm services.

average, while exhibiting proportionately stronger daily milk production. Moving one district over in the same agro-ecological zone, the price offered to farmers in Badulla is 16 rupees per liter less than in Kurunegala, amounting to a 10 percent price reduction. Wet zone farmers in Nuwara Eliya generate the highest average level of milk production in the sample but receive the lowest average price per liter. Dry zone districts exhibited less price variation, despite substantial production variation across districts. There is no strong correlation between production volumes and prices, with the added complexity that few farmers received milk-quality pricing. These distortions are, in part, an unintended consequence of the MOD Project implementation, whose heavy reliance on dairy processors likely reduced the capacity of the Project to implement broader macro-level changes to the industry in the later years of implementation.

#### *Medium-term best practices on milk production*

While some improvements in milk production can be observed on a farm within months, dairy farms undertaking a comprehensive management improvement plan - including genetics, nutrition, health, and environment - generally require two to five years to see significant and sustained improvements in milk production. Younger cows (heifers) generally produce less milk than mature cows and cow milk production typically peaks a few weeks after calving and gradually declines as the lactation period progresses. On average, Project farmers have 15 cows per herd, of which 5 are milking cows. As MOD farmers appeared to not follow any synchronized breeding in their farms, delays in improving herd composition are likely. Extreme temperatures, whether too hot or too cold, can stress cattle and reduce milk production. Improving herd health through better disease prevention and treatment strategies can show results within a year, as healthier cows generally produce more milk. Enhancements in housing can improve milk production within six months to a year, as cows adapt to better living conditions and experience reduced stress. The exact timeline depends on the initial conditions and the scale of changes implemented. Due to the aforementioned variability observed in herd composition and dairy farm management, a significant increase in milk production in MOD farms within a year would not have been evident in the final evaluation; however, farmers' knowledge of best practices and their continued application of these practices is likely to provide demonstrated effects in the medium-term.

#### *Applying universal best practices, rather than crafting zone specific best practices*

The MOD Project's implementation of best practices treated the Sri Lankan dairy sector as a monolith, applying the same 10 Best Practices across all beneficiaries regardless of locality. Given the substantial investment in each commercially motivated farmer, such a blanket approach fell short in providing zone appropriate and specific information to farmers. The unintended consequence of this inefficiency was farmers applied practices they deemed appropriate for their zone based on imperfect, or novel, information. For example, the production and use of silage under the Project was successful under certain conditions, and woefully under-utilized in others. Much of the variation is a function of agro-ecological zones. Farmers in the wet zone produce less silage in comparison to other zones. This is due to the unfavorable climate conditions for silage production throughout the year in the wet zone. Silage production requires dry weather conditions at the time of wilting; therefore, such operations are difficult to follow in the wet zone resulting in lower silage production. Further, if adequate fodder can be grown in the wet zone to feed the cattle, there is no need for farmers to produce silage. The use of silage in ration formulation is not common in the majority of the farms in Sri Lanka, therefore, such interventions can be novel for farmers. Given the substantial investment required to improve production through the application of best practices, there is likely a missed opportunity to apply agro-ecological zone-specific practices for medium and longer-term effects.

## *Long-term effects*

The MOD Project implemented across a seven-year period during which Sri Lankan dairy farmers faced a variety of shocks, from fertilizer policy changes to the financial crisis and a global pandemic. Forecasting long-term effects, in light of potential economic and political risks, is likely implausible on any concrete measures; however, the MOD Project has created a foundation for future dairy sector programming.

### *Market-Oriented Dairy as proof of concept*

The MOD Project served as a proof of concept that USDA foreign assistance could be a trusted partner in developing agriculture in Sri Lanka and that the dairy sector can contribute to Sri Lanka's national development strategies. Previous dairy sector international assistance focused on medium and large-scale dairy operations, importing dairy breeds that required higher levels of management capability than these operations could deliver. By focusing on small scale farmers, the MOD Project effectively expanded the discussion within the dairy sector to include small scale farmers, shifting the perception of the entire industry.

### *Recognition of dairy as development and the shift in policy*

Policy support can provide a conducive environment for sustaining project benefits. The MOD Project set initiatives to develop a National Dairy Association to integrate their intentions into existing local, regional, or national policies and strategies. Technical assistance was provided to the All Island Dairy Association (AIDA) in the drafting of policy recommendations to recognize 'fodder as a crop'. Together with the Ministry of Agriculture, the Project supported drafting the country's first-ever dairy policy through public/private dialogue. Further, the formation and technical assistance to the Large Dairy Farm Association (LDFA) is aligned with the MOD's intention to support trade associations.

### *Headwinds of entrenched interests*

The MOD Project commenced at a time of substantial implementation uncertainty. The dairy sector had well-established actors in a sector impregnated with distrust. GoSL stakeholders had little enthusiasm for a project in the dairy sector. Compromises were made in order to facilitate activity. Seven years on, substantial progress has been made in certain areas, but the realities of industry entrenched interests remain. Enforcing regulations related to dairy farming and continued movement towards a dynamic and open market are needed for the sustainability of the dairy industry, and stagnating in the current status quo risks many of the gains made over the course of the Project period.

## EVALUATION QUESTION 6

### ***What was the overall impact of COVID-19 restrictions/protocols, and the current economic crisis on project results?***

The MOD Project navigated a number of systematic shocks in Sri Lanka, from political to economic instability through to the Coronavirus-19 (COVID-19) pandemic. The data discussed throughout this report, specifically in Question 1, clearly documents the impact of these exogenous shocks on the dairy sector in 2019 and 2020.<sup>35</sup> The impact of these shocks is visible in the data in regard to both production and prices.

The impact of the 2019/2020 shocks on overall production had an immediate, but not lasting, impact on the commercially motivated farmers, where many reported a return to pre-pandemic production values within two years. It is likely that these farmers were able to rebound with greater expediency as a result of MOD Project interventions. From the available data, it is apparent that there was no long term, sustained losses to milk production for the majority of these farmers.

The more recent economic crisis, which has heavily impacted prices and inflation, appears to currently hold greater concern for farmers. Farmers reported greater optimism for their dairy enterprises over a five year horizon, compared against a shorter one year horizon. This may reflect the time realities associated with the application of select best practices, which require 2-5 years to properly influence production. Conversely, this sentiment may also reflect unease regarding the current economic situation and upcoming national elections. The stronger long-term confidence is likely indicative of farmers' confidence in the improved skills and technologies the MOD Project has imparted, and through this knowledge farmers are better able to navigate the unpredictability of exogenous shocks on their dairy enterprises.

While there was a clear reduction in project results during the 2019/2020 seasons, there is little to no evidence of significant or lasting impacts on results documented in this final evaluation due to COVID-19 or other systemic shock in Sri Lanka during the performance period.

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<sup>35</sup> Due to likely time and reporting lag in the data, 2020 data held the most evident depressed reporting of data.

## RECOMMENDATIONS FOR FUTURE PROGRAMMING

The MOD Project sought to target market-oriented dairy farmers to increase investment in, access to, availability of, and knowledge of the proper use of dairy inputs and to improve quality and safety and increased consumers' awareness of the importance of quality fresh dairy products to increase milk production in Sri Lanka. The Project was implemented in 15 districts across 6 provinces in Sri Lanka, covering dry, intermediate and wet agro-ecological zones of dairy production. The overall performance of the MOD project returned improvements to the quantity of milk production, and the following recommendations provide guidance for further discussion among relevant stakeholders:

### *Project Design Considerations*

Any future USDA dairy programming will be built on a foundation which did not exist at the commencement of the MOD Project; chiefly, the GoSL and other high-level stakeholders have grown to appreciate the value of developing the dairy sector. Key themes to consider include:

- *Dairy quality:* Achieving improvement to dairy quality is not beyond the scope of feasibility within the Sri Lankan dairy sector. A renewed programmatic approach which revisits the barriers to milk quality, and corresponding milk quality pricing, will ensure sustainability of improved dairy production practices.
- *Agro-ecological zones:* The absence of agro-ecological and culturally appropriate improved technologies reduced the effectiveness of the Project's overall programming. Future programming would benefit from providing greater attention to consideration of the unique challenges farmers face in their respective zones and within culturally appropriate norms.
- *Value chain actors:* Future programming will not be similarly constrained by the commencement limitations faced by the MOD Project, and considerable consideration should be given to programming relationships with large dairy processors. Far too many districts continue to reflect monopolistic practices by dairy processors, which undermines any market oriented approach.
- *Technology and tracking:* The Project developed an application for extension services, improved market access and ration formulation. Such digital applications could expand to include record keeping of farm activities. Poor record keeping is common in Sri Lanka and results in any number of limitations, including failures in feed, herd management and AI.
- *Scaling:* Despite reaching the contract target of 35,000 direct beneficiaries, the MOD Project's implementation approach resulted in a contraction of deeply engaged (>20 liter) farmers benefiting from the full scale of project activities. A refreshed design would be better served by considering how to scale the application of key project activities, such as the 10 Best Practices, to all sized farmers at the commencement of any future programming.

### *Milk Marketing*

Despite production-level improvements to milk quality, ***farmers do not have their milk quality appraised at the selling point.*** The consequence of farmer dissatisfaction with the undervaluation of the quality of milk they produce jeopardizes improvements to their on-farm practices with reduced motivation to maintain or improve milk quality, decreased investment in dairy farming to maintain milk quality, and possible decline in overall milk production due to leading poor health conditions. To address the remaining issues to milk marketing:

- Establishing fair and transparent pricing mechanisms that accurately reflect the quality of milk regardless of the intended use of milk if the project intends to promote the quality and safety of milk produced.
- Further, farmers can be provided with better access to more dynamic markets where they can sell their milk at a price dependent on quantity and quality.
- Simultaneously, quality assurance programs are required that certify and promote high-quality milk at milk collecting points.

A **high degree of price variation** was noted throughout the evaluation areas and zones, reflecting some degree of inequality in the price of milk regardless of quality. Processors were observed to hold monopolist or oligarchic power in multiple districts during the evaluation, with farmers gaining little bargaining power to demand higher prices.

- Strengthening the collective bargaining power of farmers through existing producer organizations, a more robust AIDA, or developing a national level farmers group, would improve Sri Lankan dairy farmers' capacity to advocate for issues important to their dairy enterprises, including milk prices.
- A national-level policy may be required on milk pricing, dependent on both quality and quantity, in the event that barriers to a competitive market for dairy are too constrained.

### **Value Addition within the Dairy Value Chain**

Promotion of value additions of dairy products can **reduce the wastage of milk due to poor storage and transport facilities farmers encounter in Sri Lanka**. MOD has worked with processing companies to ensure frequent collection of milk from farmers. Meanwhile, certain farmers indicated interest in value addition investment. Such interest promoting value additions to fresh milk is likely to increase local development of dairy-related enterprises in the long run.

### **Milk Production & Inputs**

The MOD Project significantly contributed to the promotion of best practices by dairy farmers. While detailed discussion is provided in Question 1 and 2, the following themes are highlighted for specific review in future programming.

#### **Dairy herd management**

Herd improvements with a well-coordinated breeding program are required in the dry and intermediate zones. Fewer herd improvements were predominant in the dry zone compared to other zones. Considering the contribution to the national milk production in Sri Lanka, **herd improvement in the dry and intermediate zones can largely benefit improved milk production in the country**. This can include improved AI facilities and the use of sexed semen. Further, the use of suitable tropical breeds for breeding or selection can help better establish herd productivity in dry zones rather than using temperate breeds for breeding given the natural environmental conditions are suitable for such breeds.

Repeated breeding in cattle can be largely due to poor nutrition and environmental stresses pre and post-AI mainly in dry and intermediate zones. Despite implementation activities intended to address cow stress, further **improvements are necessary in controlling the heat stress of animals in the dry zone**. Suitable housing for respective zones should be identified to control the heat stress and to achieve success in breeding.



Mainly in dry and intermediate zones, farmers use communal lands for grazing their cattle. Existing implementation strategies identified in Sri Lanka can be harmonized to further **develop these communal lands as grazing grounds for cattle.**

### ***Cow feed, fodder and silage***

Fodder production by farmers is constrained by the availability of land, water and elephant raids, where farmers reported being discouraged for having wasted resources in an effort to develop fodder production enterprises. Building on the design suggestions for agro-ecological specific programming, the following suggestions for fodder producers are provided:

- ***Areas with a higher potential in dry and intermediate zones with adequate land for growing fodder can be identified and farmers in those areas can be encouraged to grow fodder as a business.*** This could also be recognized as an opportunity to develop sustainable fodder suppliers. Ongoing policy implementations related to growing fodder as a crop can facilitate this in the future as irrigated water can be used for this purpose.
- Development of ***farmer tools to measure dry matter yield and quality*** can be developed for respective fodder crops to ensure farmers harvest crops at the best time and quality for feeding cattle.
- If the expectation is to establish island-wide fodder growers, irrespective of the agro-ecological limitations, ***implementing activities need to prioritize locally bound limitations in the future.***

Silage production requires a relatively drier environment when the silage is being made. Therefore, the production of silage in the wet zone can be challenging. Suggestions for future programming includes:

- Areas with a higher potential for making silage can be identified and farmers in those areas can be encouraged to make silage as a business. This could be also identified as an opportunity to develop sustainable silage producers. Again, farmers with adequate land, water supply and less burden from elephant raids can be identified and developed as silage producers.

### ***Access to veterinary medicine and AI***

Limitations persist with inadequate and timely access to high-quality veterinary supplies and services, including AI provision. The Project encouraged the development of support service ventures, including private partners, to provide such services. While the Project did create new entrants into the market, the increase was negligible against the scale of demand. Prevailing conditions in Sri Lanka in relation to AI facilities, in particular, hindered farmer demand for professional AI services. Suggestions for future programming include:

- Encourage the implementation of government policies and subsidies to support the availability and affordability of veterinary services and supplies.
- Promote or utilize existing cooperative and association models where farmers can collectively access veterinary services and share the costs.

### ***Youth engagement***

Dairy farming in Sri Lanka is changing and evaluators noted a significantly stronger representation of youth in the dairy sector. The Project lacked a comprehensive youth engagement strategy which resulted in a missed opportunity to expand employment. Multiple discussions highlighted

young farmers' interest in investing in the dairy sector, not only as farmers but as service providers. These younger farmers and entrepreneurs signaled a willingness to invest in building their skills and enterprises as they see the growth of dairy production as a long-term investment approach. A more extensive approach to engaging youth should be identified as potential contributors to dairy sector development, as this population signaled their willingness to invest in dairy as a business.

## ANNEX A: REFERENCES

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## ANNEX B: EVALUATION OBJECTIVES AND SCOPE OF WORK

The purpose of the MOD Final Evaluation is to impartially assess whether the project achieved the expected results as outlined in the results framework. The scope of the evaluation will include MOD's project design, implementation, management, and replicability; assessing both intended and unintended impacts as well as lessons learned and recommendations for USDA, dairy sector stakeholders such as the Department of Agriculture and Health (DAFH), processor companies, and other potential actors of similar ongoing or future interventions. In addition, the Final Evaluation scope will cover the follow up actions from the midterm evaluation's findings and recommendations and how effectively those recommendations were built into the post-mid-term phase of the project.

The contractor will conduct the MOD Final Evaluation in compliance with USDA's monitoring and evaluation (M&E) policy and the approved MOD Evaluation Plan. The evaluation will examine both administrative and programmatic aspects of MOD related to data capture, measurement, and intervention impact. The analysis of progress against indicator targets will define areas of shortfalls and areas of success that may highlight opportunities for IESC and USDA to design future successful interventions leading to greater impact.

Independence of the evaluation function from project implementation and management is a core principle of USDA evaluation. Independence helps to ensure both credible and objective evaluations. USDA-supported evaluations should be conducted by people who are not involved in the implementation and management of the project, and the evaluation process must be free from political influence and organizational pressure. For this external evaluation, all of the contractor's evaluation team members will provide a signed statement attesting to a lack of conflict of interest or disclosing any real or potential conflicts of interest.

Monitoring and evaluation activities should appropriately balance the desired creation of evidence with the protection of human subjects, including safeguarding the dignity, rights, safety, and privacy of participants. The Contractor is responsible for applying ethical principles in all stages of the evaluations, and for raising and clarifying ethical matters with stakeholders during the evaluations.

The successful offer must demonstrate its ability to the following:

- Undertake a comprehensive approach to evaluating project performance and impact, including proposing key evaluation questions that aim to assess the growth of the dairy industry in Sri Lanka. Propose, design, and manage data collection methodologies and approach to data analysis; and
- Highlight learning as a key focus for the project and demonstrate how MOD will build evidence to help answer at least two key learning questions from the FFPr Learning Agenda2, which may include but not limited to the questions below. The final list and number must be determined by IESC with input from USDA in advance of each evaluation.
  - How can market-driven public/private partnerships help ensure long-term sustainability of programs?
  - What interventions are effective in reducing risk to encourage adoption of innovative methods, practices, technologies and climate-smart agriculture?

The contractor's evaluation team will include various positions, all of which will have a detailed scope of work. The positions and relevant qualifications for each are described below under Section 10, Qualifications and Eligibility Requirements.

## EVALUATION AUDIENCE AND KEY STAKEHOLDERS

The audience and key stakeholders for the MOD Final Evaluation include:

- USDA
- MOD beneficiaries: a group of dairy farmers, commercial fodder cultivators, input suppliers, etc.
- IESC MOD program and administrative staff internally
- Project steering committee, which is comprised of project staff as well as representatives of the livestock division of Ministry of Agriculture and the Department of Animal Production and Health.
- MOD partners: private sector milk processing companies, inputs suppliers and dairy sector associations, such as the All Island Dairy Association, etc.

The MOD Final Evaluation report will be made publicly available. IESC and the offeror will ensure public copies of the evaluation reports are free of personally identifiable information (PII) and proprietary information.

Additionally, final versions of the evaluation reports will also be made accessible to persons with disabilities.

## METHODOLOGY

The evaluation will employ a variety of qualitative and quantitative methods including desk research, quantitative surveys, individual beneficiary surveys, focus group discussions with and direct observation of target beneficiaries, and key informant interviews with government officials and relevant public/private stakeholders, including IESC MOD staff and USDA representatives. IESC will confirm details around survey design, interview questions, and sampling in conjunction with the contractor well before the field data collection begins.

Following desk research, the evaluation is expected to take place with one-on-one interactions with the beneficiaries and other target audiences through a participatory approach. In unavoidable circumstances, subject to prior approval by IESC, virtual data collection methods including phone calls or video conference interviews, surveys conducted by emails, and online surveys using various platforms can be adapted. The final data collection methods will be discussed and confirmed with the selected contractor in the workplan deliverable.

The MOD Final Evaluation will not attempt to confirm attribution of impact but, rather, verify contributions and plausible links between changes occurring in the target audience and MOD activities. The MOD Final Evaluation must also determine whether recommendations from the MOD Midterm Evaluation were incorporated into the project and if not, identify the reasons why.

As in the MOD Mid-Term Evaluation, the evaluation contractor will assess the situation at that time and include any COVID-19 considerations in its data collection methodology as needed. The details around survey design, interview questions, and sampling will be confirmed in conjunction with the evaluation contractor. MOD does not anticipate conducting an experimental

or quasi-experimental impact evaluation for it will be logistically unreasonable to find and maintain control or comparison groups due to the reach of the project throughout the dairy value chain across most of the regions of Sri Lanka.

The MOD Final Evaluation will answer the following questions related to the standard evaluation criteria of relevance, effectiveness, efficiency, sustainability, and impact. A final list of questions will be developed in consultation with IESC and USDA staff prior to the commencement of the evaluation field work, similar to the following:

- **Relevance:** To what extent did the MOD project design address the core issues of target beneficiaries? How were existing relevant USDA and U.S. government activities leveraged?
- **Effectiveness:** To what extent did MOD achieve the specific targets and results established? Which activity or combination of activities proved to be the most effective approach to achieve the project's higher-level results, namely, farmer capacity building on training in best practices, mentoring and monitoring visits through extensions staff, facilitation of financial services for investments and provision of inputs through cost shared initiative, capacity building of the extensions arms of private sector and DAPH, strengthening supply chain such as inputs suppliers and fodder cultivators, introduction of new technology etc. In addition, activities carried out at a policy making and implementation level, capacity building at large farms, introduction of climate smart agriculture model etc. should be evaluated in terms effectiveness
- **Efficiency:** To what extent did the level of project resources lead to the achievement of results? Could the same results be achieved with fewer resources?
- **Sustainability:** What is the likelihood that the project benefits will endure over time after MOD ends? To what extent has MOD developed local ownership and the capacity of both government and private sector partners to continue the changes introduced by MOD?
- **Impact:** What are the immediate-, medium-, and long-term effects, intended and unintended, positive and negative, of the project after nearly 7 years of implementation?
- **Other:** What was the overall impact of COVID-19 restrictions/protocols, and the current economic crisis on project results?

In addition, the contractor is expected to explore following areas and report on the following during the evaluation:

- To what extent were the recommendations from the midterm evaluation implemented?
- What were the most significant constraints and/or difficulties encountered while implementing the project and, where appropriate, how did IESC overcome them?
- What is the perspective of beneficiaries with regards to the services provided under the Food for Progress project?
- What are lessons learned from this project? What implications for future Food for Progress activities can be extracted from those lessons learned?
- What specific future needs can be prioritized for future projects? Of activities in the current Food for Progress project, which areas would benefit from additional support in the future?
- A brief evaluation of the quality of MOD data reported to USDA against the criteria of validity, reliability, integrity, precision and timeliness.



## STATEMENT OF WORK

The contractor will conduct the MOD Final Evaluation in compliance with USDA's monitoring and evaluation (M&E) policy and the approved MOD Evaluation Plan. The evaluation will examine both administrative and programmatic aspects of MOD related to data capture, measurement, and intervention impact. The analysis of progress against indicator targets will define areas of shortfalls and areas of success that may highlight opportunities for IESC and USDA to design future successful interventions leading to greater impact.

The scope of the evaluation will include MOD's project design, implementation, management, and replicability; assessing both intended and unintended impacts as well as lessons learned and recommendations for USDA, dairy sector stakeholders such as the Department of Agriculture and Health (DAPH), processor companies, and other potential actors of similar ongoing or future interventions. In addition, the Final Evaluation scope will cover the follow up actions from the midterm evaluation's findings and recommendations and how effectively those recommendations were built into the post-mid-term phase of the project

## ANNEX C: EVALUATION TEAM COMPOSITION

### EVALUATION TEAM COMPOSITION

JE Austin Associates has assembled a team of experts with significant working experience with agribusiness, livestock and dairy in Sri Lanka to conduct this evaluation. The evaluation team will be led by Katrina Makuch (Team Lead) assisted by Jay Ekanayake, Ph.D. (Livestock Specialist), Kylie Grow (MEL Expert & Field manager), Hemaluxcika Salamon (Agronomy Associate) and Suganya Yogeswaran (Logistics).

### TECHNICAL EVALUATION TEAM

**Katrina Makuch, Team Lead:** Ms. Makuch has led multiple evaluations for various USG clients and other donors across sub-Saharan Africa, with over 17 years of overseas experience leading monitoring and evaluation (M&E) activities including strategic planning, performance and adaptive management, baseline development, midterm, and final evaluations. She has extensive experience with quantitative methodologies, including randomized control trials and quasi-experimental design, with a focus on providing rigorous, empirical evaluation approaches for data-driven results analysis. She has conducted substantial field work, including primary data collection for over a dozen evaluations across Africa and Asia.

Her previous evaluations have included both performance and impact evaluations. In 2022, Ms. Makuch served as Team Lead and provided technical guidance and oversight for the design and implementation of the USAID/West Africa Partnership for Agricultural Research, Education and Development (PAIRED) Activity Final Evaluation under the USDA, which focused on regional seed systems development, specifically targeting 6 countries in West Africa. Following the successful approval of the final evaluation report, Ms. Makuch returned to USAID/WA to support a 4-day, collaborative, in-person codesign event for 95 stakeholders from 6 West African countries, having guided the development of 12 bilingual engagement sessions covering a range of Feed the Future market systems development priority topics to inform the design and development of USAID/West Africa's follow on Activity. Ms. Makuch holds a Master of Science, with honors, in Applied Economics and Finance from the University of California, Santa Cruz.

**Jay Ekanayake, Ph.D., Livestock Specialist:** Dr. Ekanayake is a livestock expert with more than ten years of experience working in academic and applied research relevant to animal nutrition and production in Sri Lanka, New Zealand, and the United States. He is a Senior Lecturer in the Department of Animal Science at the University of Peradeniya, and a Visiting Lecturer at the Aquinas College of Higher Studies where he supervises research on animal nutrition and agrostology. His areas of expertise include animal genetics, silage production, feed supplements in Sri Lankan dairy farming systems, and climate smart agriculture. He holds a Doctor of Philosophy in Animal Science from the College of Veterinary, Animal, and Biomedical Sciences at New Zealand's Massey University. In addition, he earned a Master of Science degree in Cereal and Food Science from North Dakota State University in the United States. During his graduate studies, Dr. Ekanayake served as a Research Scientist on animal nutrition for the United States Department of Agriculture. He is fluent in Sinhalese and English.

**Kylie Grow, MEL Expert and Field Manager:** Ms. Kylie Grow is a Senior Technical Manager at J.E. Austin Associates with six years of professional experience, three years of technical experience in evaluations and economic growth research, and a master's level education in development economics. Ms. Grow is trained in statistically rigorous methods for evaluating and implementing international development programs and has experience leading data collection in the field. She has trained and supervised local research teams in mixed-methods data collection in three countries, designed and electronically programmed quantitative surveys, conducted key informant interviews, and analyzed and synthesized quantitative and qualitative data for projects

funded by the U.S. government and private clients. She holds a master's in international development policy from Georgetown University.

**Hemaluxcika Salamon, Agronomy Associate:** Ms. Salamon is a graduating candidate of the Bachelor of Science in Agriculture program at the University of Sri Lanka. She has academic training in climate smart agriculture, dairy, and dairy value chains. She has two years of data collection and analysis experience.

## ANNEX D: CONFLICT OF INTEREST

### CONFLICT OF INTEREST CERTIFICATION

#### Recipient Information:

Name: Katrina Makuch

Position: Evaluation Team Lead

Duty Location: Sri Lanka

Contact Number: +1 (831) 901-1495

I hereby certify that neither I, my spouse, nor any dependent child, serves as an officer, director, committee member, or employee of any business entity with whom my individual work assignment or program area does business.

I certify that neither I, my spouse, nor any dependent child, has stock, conducts business, or has other direct or indirect financial interest or liability, in any business entity with whom my individual work assignment or program area does business.

I certify that I do not know of any other matters, including family or personal relationships, as defined by §2635.502(b)(1), of the “**Standards of Ethical Conduct for Employees of the Executive Branch**,” which might give rise to an apparent or possible conflict of interest involving my present employment. I certify that I do not perform any outside employment or activity that conflicts with my official duties.

I am aware of the prohibitions regarding gift acceptance from any business entity with whom my individual work assignment or program area does business, and I certify that I have not violated those prohibitions.

I understand my responsibility to immediately report any known or possible conflict of interest situations to my supervisor or Agency ethics advisor.

**I CERTIFY THAT THIS STATEMENT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF**

Signature: 

Date: 15 March 2024

**If you cannot certify or give an affirmative response to any of the statements above, contact your supervisor or Agency Ethics Advisor before signing this certification.**

## CONFLICT OF INTEREST CERTIFICATION

### Recipient Information:

Name: Dr. Ekanayake, W.E.M.L.J.

Position: Livestock Consultant

Duty Location: Sri Lanka

Contact Number: +94773129941

I hereby certify that neither I, my spouse, nor any dependent child, serves as an officer, director, committee member, or employee of any business entity with whom my individual work assignment or program area does business.

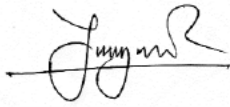
I certify that neither I, my spouse, nor any dependent child, has stock, conducts business, or has other direct or indirect financial interest or liability, in any business entity with whom my individual work assignment or program area does business.

I certify that I do not know of any other matters, including family or personal relationships, as defined by §2635.502(b)(1), of the “**Standards of Ethical Conduct for Employees of the Executive Branch**,” which might give rise to an apparent or possible conflict of interest involving my present employment. I certify that I do not perform any outside employment or activity that conflicts with my official duties.

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I understand my responsibility to immediately report any known or possible conflict of interest situations to my supervisor or Agency ethics advisor.

**I CERTIFY THAT THIS STATEMENT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF**

Signature:  \_\_\_\_\_

Date: May 18, 2024

**If you cannot certify or give an affirmative response to any of the statements above, contact your supervisor or Agency Ethics Advisor before signing this certification.**

## CONFLICT OF INTEREST CERTIFICATION

### Recipient Information:

Name: Kylie Grow

Position: MEL Specialist/ Field Manager

Duty Location: Sri Lanka

Contact Number: N/A

I hereby certify that neither I, my spouse, nor any dependent child, serves as an officer, director, committee member, or employee of any business entity with whom my individual work assignment or program area does business.

I certify that neither I, my spouse, nor any dependent child, has stock, conducts business, or has other direct or indirect financial interest or liability, in any business entity with whom my individual work assignment or program area does business.

I certify that I do not know of any other matters, including family or personal relationships, as defined by §2635.502(b)(1), of the “**Standards of Ethical Conduct for Employees of the Executive Branch**,” which might give rise to an apparent or possible conflict of interest involving my present employment. I certify that I do not perform any outside employment or activity that conflicts with my official duties.

I am aware of the prohibitions regarding gift acceptance from any business entity with whom my individual work assignment or program area does business, and I certify that I have not violated those prohibitions.

I understand my responsibility to immediately report any known or possible conflict of interest situations to my supervisor or Agency ethics advisor.

**I CERTIFY THAT THIS STATEMENT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF**

Signature:  \_\_\_\_\_

Date: 3/1/2024 \_\_\_\_\_

**If you cannot certify or give an affirmative response to any of the statements above, contact your supervisor or Agency Ethics Advisor before signing this certification.**



## CONFLICT OF INTEREST CERTIFICATION

### Recipient Information:

Name: Salamon Hemaluxcika

Position: Agronomy Associate

Duty Location: Sri Lanka

Contact Number: +94768426128

I hereby certify that neither I, my spouse, nor any dependent child, serves as an officer, director, committee member, or employee of any business entity with whom my individual work assignment or program area does business.

I certify that neither I, my spouse, nor any dependent child, has stock, conducts business, or has other direct or indirect financial interest or liability, in any business entity with whom my individual work assignment or program area does business.

I certify that I do not know of any other matters, including family or personal relationships, as defined by §2635.502(b)(1), of the “**Standards of Ethical Conduct for Employees of the Executive Branch**,” which might give rise to an apparent or possible conflict of interest involving my present employment. I certify that I do not perform any outside employment or activity that conflicts with my official duties.

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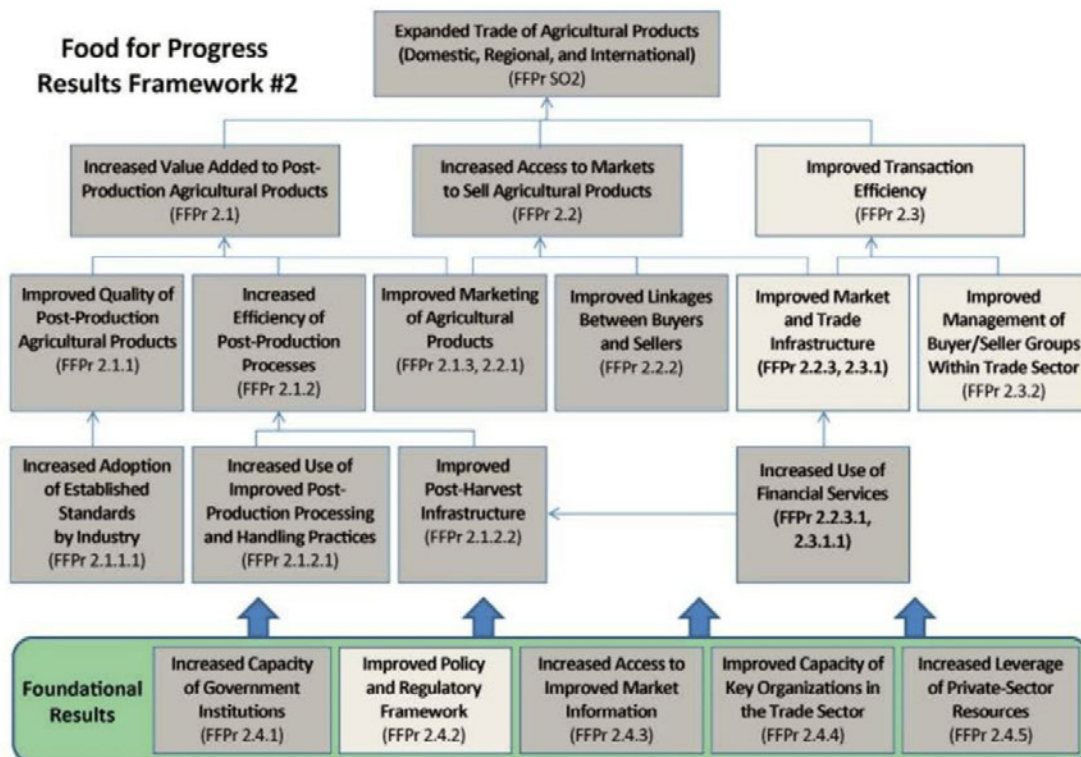
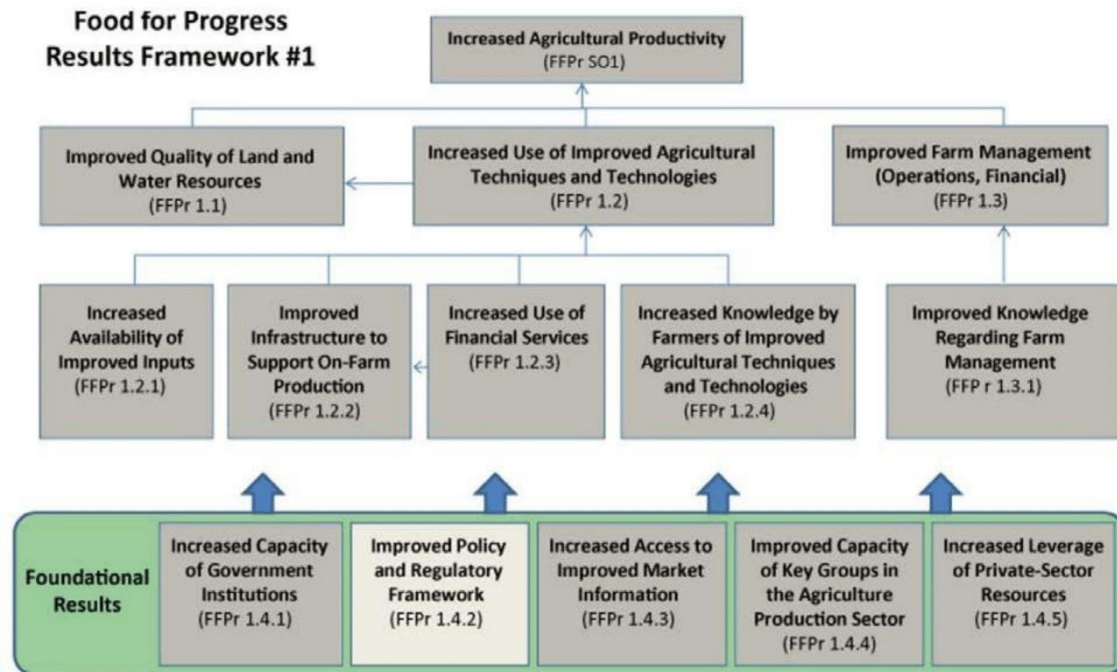
**I CERTIFY THAT THIS STATEMENT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF**

Signature: 

Date: June 3rd, 2024

**If you cannot certify or give an affirmative response to any of the statements above, contact your supervisor or Agency Ethics Advisor before signing this certification.**

## ANNEX E: RESULTS FRAMEWORK



## ANNEX F: PERFORMANCE INDICATOR TRACKING TABLE

Result	Performance Indicator	Standard or Custom	Disaggregation	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Cumulative to Date	Life of Project Target	Difference
FFPr SO1 FFPr 1.1, FFPr 1.2	Number of hectares of land under improved techniques or technologies as a result of USDA assistance	Standard #1	Total	0	0	706	3,968	5,763	4,648	4,440	19,525	14,139	38%
			New	0	0	706	1,993	1,237	1,255	624	5,815	4,938	18%
			Continuing	0	0	0	1,975	4,526	3,393	3,816	13,710	N/A	N/A
FFPr SO1/S O2	Number of individuals benefiting directly from USDA-funded interventions	Standard #17	Total	0	199	4,110	12,221	25,099	27,198	35,002	35,002	29,973	17%
			Male	0	154	3,083	9,166	18,824	20,399	26,252	26,252	25,477	3%
			Female	0	45	1,027	3,055	6,275	6,799	8,751	8,751	4,496	95%
			New	0	199	3,911	8,701	14,222	5,613	12,156	12,156	7,000	74%
			Continuing	0	0	199	3,520	10,877	21,585	22,846	22,846	N/A	
FFPr SO1/S O2	Number of individuals benefiting indirectly from USDA-funded interventions	Standard #18	Total	0	576	12,330	36,663	75,297	81,594	105,006	105,006	89,919	17%
FFPr SO1 FFPr 1.3	Number of individuals who have applied improved farm management practices (i.e. governance, administration, or financial management) as a result of USDA assistance	Standard #3	Total	0	0	1,038	2,741	3,383	3,865	3,764	14,791	10,088	47%
			Male	0	0	779	2,056	2,537	2,899	2,823	11,094	7,891	41%
			Female	0	0	259	685	846	966	941	3,697	2,197	68%
FFPr SO1 FFPr 1.1, FFPr 1.2	Number of individuals who have applied new techniques or technologies as a result of USDA assistance	Standard #2	Total	0	0	1,233	4,253	7,782	12,093	16,602	16,953	12,775	33%
			Male	0	0	922	3,190	5,837	9,070	12,452	12,715	10,859	17%
			Female	0	0	311	1,063	1,945	3,023	4,150	4,238	1,916	121%
			New	0	0	1,233	3,069	3,756	4,386	4,509	16,953	12,775	33%
			Continuing	0	0	0	1,184	4,026	7,707	12,093	25,010	N/A	
	Number of individuals who have received short-	Standard #16	Total	0	80	2,304	4,453	4,969	7,950	14,701	15,684	11,492.0	36%

FFPr SO1/S O2	term agricultural sector productivity or food security training as a result of USDA assistance		Male	0	50	1,738	3,340	3,727	5,963	11,026	11,763	9,768.2	20%
			Female	0	30	566	1,113	1,242	1,987	3,675	3,921	1,723.8	127%
			New	0	80	2,304	2,241	695	3,542	6,822	15,684	11,492. 0	36%
			Continuing	0	0	0	2,212	4,274	4,408	7,879	18,773	N/A	N/A
FFPr SO1/S O2	Value of sales by project beneficiaries (USD)	Standard #13	Total	\$15,42 7,539	\$15,42 7,539	\$17,78 6,887	\$37,919 ,245	\$49,53 2,860	\$40,412 ,195	\$68,83 4,870	\$63,834 ,870	\$ 41,371, 196	54%
FFPr SO1/S O2	Volume of commodities (MT) sold by project beneficiaries	Standard #14	Total	38,525	38,525	41,543	69,119	78,247	85,116	135,44 8	135,448	102,429	32%
FFPr SO1/S O2 FFPr 1.2.3, FFPr 2.2.3.1 , FFPr 2.3.1.1	Number of individuals receiving financial services as a result of USDA assistance	Standard #4	Total	0	0	1,312	2,039	1,022	1,017	780	6,170	4,524	36%
			Male	0	0	1,076	1,509	819	700	500	4,604	3,571	29%
			Female	0	0	236	530	203	317	280	1,566	953	64%
FFPr SO1/S O2	Number of jobs attributed to USDA assistance	Standard #15	Total	0	0	20	102	286	280	332	1,020	507	101%
			Male	0	0	15	77	215	210	250	767	399	92%
			Female	0	0	5	25	71	70	82	253	108	134%
FFPr SO1/S O2 FFPr 1.2.3, FFPr 2.2.3.1 , FFPr 2.3.1.1	Number of loans disbursed as a result of USDA assistance	Standard #5	Total	0	0	55	661	1,252	1,104	979	4,051	2,183	86%
FFPr SO1/S O2 FFPr 1.4.5,	Number of public-private partnerships formed as a result of USDA assistance	Standard #8	Total	0	9	11	13	3	6	4	46	36	28%

FFPr 2.4.5													
FFPr SO2 FFPr 2.1.2.2	Total increase in installed storage capacity (dry or cold storage) as a result of USDA assistance	Standard #11	Total	0	0	58	281	387	426	848	2,000	915	119%
			Dry	0	0	44	242	387	426	811	1,910	794	141%
			Cold	0	0	14	39	0	33	37	123	121	2%
			Refurbished	0	0	7	163	163	62	231	626	317	98%
			New	0	0	51	118	224	364	590	1,347	598	125%
FFPr SO1/S O2 FFPr 1.2.3, FFPr 2.2.3.1 , FFPr 2.3.1.1	Value of loans provided as a result of USDA assistance (USD)+	Standard #6	Total	\$0	\$0	\$256,667	\$1,259,218	\$2,024,745	\$929,717	\$866,250	\$5,336,597.00	\$3,940,500	35%
			Male	\$0	\$0	\$192,500	\$944,414	\$1,518,559	\$697,288	\$649,688	\$4,002,449.00	\$3,349,425	19%
			Female	\$0	\$0	\$64,167	\$314,804	\$506,186	\$232,429	\$216,562	\$1,334,148.00	\$591,075	126%
			Joint	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0.00	\$0	
FFPr SO1/S O2 FFPr 1.4.4, FFPr 2.4.4	Number of private enterprises, producers organizations, water users associations, women's groups, trade and business associations, and community-based organizations (CBOs) that applied improved techniques and technologies as result of USDA assistance	Standard #7	Total	0	0	25	51	0	10	6	92	86	7%
			New	0	0	25	51	0	10	6	92	86	7%
			Continuing	0	0	0	25	76	66	74	241	N/A	N/A
FFPr SO2 FFPr 2.2	Value of new public and private sector investment leveraged as a result of USDA assistance (USD)	Standard #9	Total	\$0	\$0	\$1,257,827	\$6,721,864	\$8,071,806	\$7,013,407	\$6,638,681	\$29,703,584.89	\$24,440,000	22%
			Public	\$0	\$0	\$0	\$0	\$0	\$39,209	\$31,784	\$70,993.00	\$40,000	77%
			Private	\$0	\$0	\$1,257,827	\$6,721,864	\$8,071,806	\$6,974,198	\$6,606,897	\$29,632,591.89	\$24,400,000	

FFPr 1.4.4, 1.2.4, 2.4.4, 2.1.1.1	Number of public and private extension agent's skills enhanced to provide recommendations on best practices for animal health and productivity	Custom	Total	0	89	586	659	190	444	567	2,535	1,987	28%
			Male	0	78	495	528	138	330	367	1,936	1,627	19%
			Female	0	11	91	131	52	114	200	599	360	66%
FFPr 1.2.1, 1.2.4	Number of dairy input retail operations established	Custom	Total	0	0	19	50	7	10	6	92	78	18%
FFPr 1.2.1, 1.2.5	Number of successful Artificial Inseminations delivered	Custom	Total	N/A	N/A	N/A	N/A	N/A	0	3966	3,966	5,000	-21%
FFPr 2.2.2	Number of registered users of the program-initiated mobile extension SMS messages	Custom	Total	0	0	140	7,750	20,890	21,418	23,494	23,494	26,414	-11%
	Number of registered users of the program-initiated MOD-Trade	Custom	Total	N/A	N/A	N/A	N/A	N/A	1052	2,033	2,033	3,000	-32%
	Percent of beneficiary farmers earning higher prices than before start of project interventions, due to improved milk quality	Custom	Total	0	0%	19%	49%	55%	55%	59%	5900%	80%	N/A
FFPr 2.4.4, 2.4.1	Number of paying members of all island dairy association	Custom	Total	0	0	23	21	21	22	24	24	20	20%



## ANNEX G: EVALUATION QUESTION MATRIX

Evaluation Question	Question Objective	Data Collection Strategy	Data Source	Potential Data Analysis Method
<b>Relevance</b>				
1. To what extent did the MOD project design address the core issues of target beneficiaries? How were existing relevant USDA and U.S. government activities leveraged?	<p>i. Ascertain the extent to the MOD team has used the Activity to forge strategic and operational partnerships among key partners and stakeholders working to achieve desired results.</p> <p>ii. To what extent were the recommendations from the midterm evaluation implemented?</p>	<p>Document review</p> <p>Endline survey</p> <p>Midline survey</p>	<p>MOD Project reports; supplemental activity reports</p> <p>MOD staff; MOD local partners and stakeholders</p> <p>MOD Project M&amp;E data</p>	Content and Comparative Analysis
<b>Effectiveness</b>				
<p>2. To what extent did MOD achieve the specific targets and results established?</p> <p>Which activity or combination of activities proved to be the most effective approach to achieve the project's higher-level results, namely:</p> <p>(a) Farmer capacity building on training in best practices, mentoring and monitoring visits through extensions staff</p> <p>(b) facilitation of financial services for investments and provision of inputs through cost shared initiative,</p> <p>(c) capacity building of the extensions arms of private sector and DAPH</p> <p>(d) strengthening supply chain such as inputs suppliers and fodder cultivators, introduction of new technology etc.</p>	<p>iii. Determine how successfully the MOD Activity has met its planned targets and how all reported indicators validate MOD's role in achieving the results.</p> <p>iv. Identify internal and external factors that have affected the implementation of the Activity.</p> <p>v. Assess the extent to which the assumptions outlined by MOD and USAID are appropriate and have been addressed.</p> <p>vi. Document the depth of MOD's success in scaling producer access to markets which facilitates the uptake of improved technologies and practices.</p> <p>vii. What specific future needs can be prioritized for future projects? Of activities in the current Food for Progress project, which areas would benefit from additional support in the future?</p>	<p>Document review</p> <p>Endline survey</p> <p>Informal interviews</p> <p>Direct observations</p>	<p>MOD Project reports; supplemental activity reports</p> <p>MOD staff; MOD local partners and stakeholders</p> <p>MOD Project M&amp;E data</p> <p>Evaluation team field notes from each district to substantiate evidence of improved dairy production</p>	Content, Comparative, Organizational and Descriptive Analysis
<b>Efficiency</b>				
3. To what extent did the level of project resources lead to the achievement of results? Could the same results be achieved with fewer resources?	viii. What were the most significant constraints and/or difficulties encountered while implementing the project and, where appropriate, how did IESC overcome them?	<p>Document review</p> <p>Endline survey</p> <p>Direct observations</p>	<p>MOD staff; MOD local partners</p> <p>MOD staff; MOD local partners and stakeholders</p>	Content, Comparative, and Organizational Analysis

Sustainability				
4. What is the likelihood that the project benefits will endure over time after MOD ends? To what extent has MOD developed local ownership and the capacity of both government and private sector partners to continue the changes introduced by MOD?	ix. Determine the extent to which the Project's local capacity development initiatives managed to develop and strengthen the capacity of the key stakeholders and assess the sustainability of the approach.  x. What is the perspective of beneficiaries with regards to the services provided under the Food for Progress project?	Document review  Endline survey  Informal interviews  Direct observations	MOD staff; MOD local partners  MOD Project M&E data  Evaluation team field notes from each district to substantiate evidence of improved dairy production	Content Analysis
Impact				
5. What are the immediate-, medium-, and long-term effects, intended and unintended, positive and negative, of the project after nearly 7 years of implementation?	xi. What are lessons learned from this project? What implications for future Food for Progress activities can be extracted from those lessons learned?	Document review  Midline survey  Endline survey  Informal interviews  Direct observations	MOD Project reports; supplemental activity reports  MOD Project M&E data  MOD staff; MOD local partners	Content, Comparative, Descriptive, and Organizational Analysis    Impact measurements against baseline & midline values
Other				
6. What was the overall impact of COVID-19 restrictions/protocols, and the current economic crisis on project results?		Document review  Endline survey	MOD Project reports; supplemental activity reports	Content and Descriptive Analysis

## ANNEX H: MOD FARMER QUESTIONNAIRE

Hello. My name is ..... and I am working with an American independent research firm, in support of the United States Department of Agriculture (USDA). You have been selected to participate in our study of the Market Orientated Project (MOD). We are conducting a survey and would appreciate your participation. We want to learn about your personal experience with the MOD Project and your dairy enterprise. This information will help the USDA and MOD Project to better understanding the impact of various project training and mentorship in improving your dairy enterprise and increasing the quantity and quality of dairy production in Sri Lanka. Whatever information you provide will be kept strictly confidential and will not be shown to other persons. Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. You can also choose to stop participating at any point in the survey. However, we hope that you will participate in this survey since your views are important. There is no compensation for participating in the survey. If at any time during this survey you have any questions about our study, please feel free to ask to speak with our manager.

The interview will last between 30-45 minutes. Would you be willing to participate in the survey? Do you agree? Yes ☐ No ☐

1	Enumerator:	5	Farmer Name:	
2	Date:	6	Farmer Contact number:	
3	District:	7	Farmer NIC #:	
4	Chilling Station:	8		

### A. Demographic Data

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Age of respondent  <i>Age on NIC card</i>	Respondent Gender	Gender of the household head	How many members live in your household?  <i>Total number</i>	Education background of household head	Do you plant crops?	If A6 = yes, which food crops?  <i>Multiple selections possible</i>	How many years have you been engaged in the dairy business in this location?	In what year did you begin working with the MOD Project?	Do you plant forage crops for livestock?
	[1] M [2] F	[1] M [2] F	<hr/> # Adults (18 and over)  <hr/> # Children (under 18)	[1] None [2] Some primary [3] Primary completed [4] Secondary (some – higher) [5] Graduate	[1] Yes [0] No	[a] Maize [b] Sorghum [c] Millet [d] Rice [e] beans [f] Vegetables (non-leafy greens) [g] Vegetables (leafy greens) [h] Fruit [95] Other			[1] Yes [0] No

A. Demographic Data (continued)									
A11	A12	A13	A14	A15	A16	A17			
Do you grow forage trees for dairy cattle?	Do you make silage for your livestock?	Do you purchase crop and forage seeds from the input supplier?	Do you have any livestock besides dairy cattle?	If A14 = yes, which ones?  <i>Multiple selections possible</i>	What source does your household primarily receive income from?	Today, do you consider your dairy enterprise an important contributor to household income?			
[1] Yes [0] No	[1] Yes [0] No	[1] Yes [0] No	[1] Yes [0] No	[a] Cattle [b] Sheep and goats [c] Poultry [d] Pigs [e] Buffalo [95] Other	[1] Livestock [2] Crops cultivation [3] Formal employment [4] Charcoal burning/ firewood sales [5] Remittances from outside village [95] Other	[1] Yes [0] No			

B. Dairy Enterprise – Demographics									
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Are you a member of a producer group or cooperative?	Do you save a portion of your income from the dairy business?	If B2 = yes, in the past 12 months, what percentage of your income did you save from the dairy business?	Do you deposit your savings in a financial institution?	What is your current number of dairy cattle today?	What was the number of dairy cattle this time last year?	What is your average daily milk production?	Has your milk production increased over the last year?	If B8 = yes, what was the primary reason?	What was your average daily milk production at this time last year?
				Total # _____ Milking _____ Dry _____ Heifers _____ Calves _____ Breeding bull _____	Total # _____ Milking _____ Dry _____ Heifers _____ Calves _____ Breeding bull _____				
[1] Yes [0] No	[1] Yes [0] No [99] I don't know		[1] Yes [0] No			[ ] liter  [ ] kilogram	[1] Yes [0] No	[1] Increase herd size [2] Improved feed [3] Improved management	[ ] liter  [ ] kilogram

				C. Dairy Enterprise – Inputs Used/Purchased – Vet Meds				
B11	B12	B13	B14	C1	C2	C3	C4	C5
How many of your family members are engaged in your dairy enterprise on a regular basis?	Who in your family is engaged in your dairy enterprise on a daily basis?  <i>Multiple selections possible</i>	Since you first began working with MOD, how would you describe the number of dairy cows in your herd?	Since your first began working with MOD, how would you describe the average milking volume of your dairy herd?	Do you purchase veterinary medicine?	If C2= yes, from whom do you purchase your drugs – medicine?	What are the most common drugs/ medicine you buy?  <i>Select maximum 2 options</i>	How would you describe your experience accessing veterinary medicine?	Has your access to higher quality veterinary medicines improved since your engagement with MOD?
# Male	[a] Myself [b] My spouse [c] My son(s) [d] My daughter(s) [e] Other family members	[1] Increased [2] Decreased [3] Stayed the same [99] I don't know	[1] Increased [2] Decreased [3] Stayed the same [99] I don't know	[1] Yes [0] No	[1] Private dealer [2] Open market [3] Government clinic [95] Other	[a] Antibiotics [b] Deworming [c] Vaccines [d] Additives [e] Supplements	[1] Easy [2] Normal [3] Difficult [4] I do not use a veterinarian	[1] Yes [0] No
# Female								

D. Dairy Enterprise – Inputs Used/Purchased – Fodder							
D1	D2	D3	D4	D5	D6	D7	
Do you currently use any crop residuals to feed your cattle?	Prior to engaging with MOD, did you use any crop residuals to feed your cattle?	What is the primary source of your fodder or silage concentrate feed for your dairy cattle?  <i>Choose only one</i>	In the past year, how many months did you provide fodder to your dairy cows?	In the past 12 months, how much fodder did you provide for your cows?	In the past 12 months, how much silage did you provide for your cows?	Since your first began working with MOD, how would you rate your fodder cultivation?	
[1] Yes [0] No	[1] Yes [0] No	[1] Grow/produce [2] Collect from area [3] Purchase from neighbor [4] Purchase from input supplier [95] Other		Total in kgs	Total in kgs	On a scale of 1 to 5, where 1 is no change to fodder cultivation practices and 5 being a very substantial increase in fodder cultivation	



E. Dairy Enterprise – Artificial Insemination								
E1	E2	E3	E4	E9	E5	E6	E7	E8
In the last 12 months have you obtained services for artificial insemination?  <i>If E1 = 1, continue If E1 = 0, go to F section</i>	If E1 = 1, how many instances?	If E1 = 1, how many cows?	How many instances resulted in successful pregnancies?	On average, how many visits did the inseminator make to have a successful pregnancy? Give the number	How much did you pay for the most recent AI session?	How has the price per AI session changed since you first obtained AI services?	Was the inseminator a government or private inseminator?	How much time did it take for the inseminator to arrive at your dairy enterprise?
[1] Yes [0] No			[1] All [2] More than half [3] Less than half [4] None		LKR	[1] Price is now higher [2] Price is now lower [3] Price is the same	[1] Government [2] Private	Time in hours

F. Dairy Enterprise – Milk Marketing								
F1	F2	F3	F4	F5	F6	F7	F8	F9
Who is your primary buyer of your milk?  <i>Choose only one</i>	If F1 = 3/4, which processor do you currently sell your milk to?	In the past 12 months, has your milk been rejected by your primary buyer for quality?	If F3 = yes, how many times was your delivery rejected?	If F3 = yes, since you began working with MOD, have you seen a reduction in the number of rejections?	What is the current price you receive for your milk?	What was the price paid for your milk last year at this time?	If F7<F6, what action that you adopted last year led to higher price for your milk?  <i>Choose only one</i>	Do you feel you have improved marketing opportunities for your dairy enterprise today?
[1] Neighbor [2] Private trader [3] Collection center of a processor [4] Chilling center of a processor	[1] Cargills [2] Chello [3] Lanka Dairy [4] Milco [5] Nestle [6] Pelwatta [7] Richi [8] Wonrich [95] Other	[1] Yes [0] No		[1] Yes [0] No	[ ] liter  [ ] kilogram	[ ] liter  [ ] kilogram	[1] Provided higher quality fodder [2] Provided silage [3] Provided concentrated feed [4] Changes Processor [5] Macro-economic conditions [95] Other	[1] Yes [0] No



G. Dairy Enterprise – Extension and Education Services							
G1	G2	G3	G4	G6	G8	G9	G10
Who do you prefer to contact when you have a problem with your dairy cows today?  <i>Give preference by the producer.</i>	This time last year, who would you contact when you had a problem with your dairy cows?	Have you received any training on dairy management in the last year?	How many MOD trainings & mentorship visits did you attend in the past 12 months?	How do you rate the information received from the MOD project?	How would you rate the quality of mentorship from the MOD project?	Did you develop a farmer action plan with the MOD project?	How would you rate the development of your farmer action plan?
[1] Private vet doctor [2] Gov vet doctor [3] Local vet clinic [4] Retail input dealer [5] Neighbor [95] Other	[1] MOD Staff [2] Private vet doctor [3] Gov vet doctor [4] Local vet clinic [5] Retail input dealer [6] Neighbor [95] Other	[1] Yes [0] No		[1] Poor [2] Fair [3] Average [4] Good [5] Very good	[1] Poor [2] Fair [3] Average [4] Good [5] Very good	[1] Yes [0] No	[1] Poor [2] Fair [3] Average [4] Good [5] Very good

G. Dairy Enterprise – Extension and Education Services (continued)							
G11	G12	G13	G14	G15	G16	G18	G19
Do you feel that the farmer action plan effectively helped to improve your dairy enterprise?	Would you recommend other dairy farmers develop their own farmer action plans?	Did you make investments in your dairy operation in the last 12 months?	What investments did you make? List.	Give a value for the investments?	In the past 12 months, did you adopt any new practices in your dairy enterprise?	What were the best practices that you adopted?  <i>Select all that apply</i>	Which was the most important practice to improving your dairy enterprise?  <i>Choose only one</i>
[1] Yes [0] No	[1] Yes [0] No	[1] Yes [0] No	[a] Feed [b] Milking [c] Hygiene [d] Building [e] Insemination [f] Cattle stock [g] ICT	LKR	[1] Yes [0] No	[a] Year round nutritious feed [b] Silage - cultivate or buy [c] TMR [d] 27/7 water access [e] Separate calf within 6 hours of birth [f] Weaning (weeks 8-12) [g] AI @ 15 months, Calf @ 24 months [h] Herd composition [i] Annual calving [j] Manage effluents	[1] Year round nutritious feed [2] Silage - cultivate or buy [3] TMR [4] 27/7 water access [5] Separate calf within 6 hours of birth [6] Weaning (weeks 8-12) [7] AI @ 15 months, Calf @ 24 months [8] Herd composition [9] Annual calving [10] Manage effluents

## J. Evaluation of Outcomes

J1	J2	J3	J4	J5	J6	J7	J8	J9
Did your dairy operation improve in the past 12 months?	If J1 = no, what is the main problem why your dairy operation did not improve?	If J1 = yes, how has the dairy operation improved?	Did the improvements result in meeting your expectations for achieving significant progress towards your goal for the dairy enterprise?	Which specific interventions/activities by MOD resulted in you making significant progress towards your goal for the dairy enterprise?  <i>Choose only one</i>	Do you believe you have adequate knowledge and skills to sustain the improvements in your dairy enterprise?	What other activities do you need to meet the goals for your dairy enterprise?  <i>Select all that apply</i>	On a scale of 1 to 5, how optimistic are you that your dairy business will improve this year?	On a scale of 1 to 5, how optimistic are you that your dairy business will improve in the next 5 year?
[1] Yes [0] No [3] No change	[1] Lack of feed [2] Lack of water [3] Persistent diseases [4] Poor market prices [5] Other	[a] Milk production [b] Shorter cycle for cows to rebreed [c] Lower death rate [d] Quality of milk increased [e] Produce more milk from the same number of cows [f] Increase revenues from milk sales [95] Other	[1] Yes [0] No	[1] Trainings [2] On farm discussions [3] Mentoring sessions [4] Preparations of action plans [5] Preparations of business plans [95] Other	[1] Yes [0] No	[a] Increase herd size [b] Improve feed [c] AI [d] Expand market [e] Improved veterinary care [95] Other	1-5, 5 being high rating	1-5, 5 being high rating

## ANNEX I: SURVEY DATA TABLES

At the request of the USDA in Sri Lanka, the following tables are provided in advance of the evaluation report to better support the Department's learning objectives and to assist in informing their future program planning.

The tables document the synthesized data generated from the USDA FFP Market Oriented Dairy Project's Final Performance Evaluation MOD farmer survey. These data values are drawn directly from data collected as part of the performance evaluation field data collection strategy and reflect the responses of 629 MOD supported farmers<sup>36</sup>, only.

The tables are disaggregated into sections which are associated with a thematic areas under evaluation. Each section documents the respondent data to the detailed questions on the table. Data interpretation follows two approaches:

- 1) Percentage responses, i.e. 61 percent of respondents reported increasing their milk production in the past year. Percentages are reported as whole integers.
- 2) Average value responses, i.e. respondents reported an average of 3.1 MOD training or mentorship visits in the past year. Average values are reported to one decimal place, with the standard deviation documented below in parenthesis.

Please note the table below details the evaluation districts by agro-ecological zones. The evaluators have elected to disaggregate by agro-ecological zones to better reflect the agricultural variations found across different districts and provide for a more comprehensive understanding of the data.

Evaluation Surveyed Districts by Agro-Ecological Zones			
	DRY	INTERMEDIATE	WET
	Ampara	Badulla	Nuwara Eliya
	Anuradhapura	Kurunegala	
	Jaffna	Matale	
	Mullativu		
	Polonnaruwa		
	Puttalam		
	Trincomalee		
N-value	252	285	92

The following tables serve solely as a repository for the synthesized farmer survey data. Any and all data analysis will be fully presented in the final evaluation report.

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<sup>36</sup> MOD Project Farmers are those collecting more than 20 liters of milk daily (>20L), a metric which served to distinguish commercially motivated dairy producers from those farmers engaged in household dairy farming. The commercially motivated farmers represent a total of 4,327 farmers benefited from direct MOD training and mentoring support over the course of the Project.

Table 30: Dairy Production

	DRY	INTERMEDIATE	WET	TOTAL
What is your current number of dairy cattle in your herd today?				
Total Number	16.1 (11.4)	14.5 (8.8)	9.3 (5.2)	14.4 (9.8)
# Milking	4.8 (3.6)	4.6 (2.7)	4.2 (2.3)	4.6 (3.1)
# Dry	2.5 (2.9)	2.6 (2.8)	1.1 (1.4)	2.3 (2.7)
# Heifers	3.0 (2.5)	2.9 (2.3)	1.7 (1.3)	2.7 (2.3)
# Calves	4.4 (3.7)	3.4 (2.7)	2.0 (1.7)	3.6 (3.1)
# Breeding bulls	0.45 (0.8)	0.38 (0.7)	0.24 (0.6)	0.39 (0.7)
What was the number of dairy cattle in your herd this time last year?				
Total Number	16.5 (11.3)	14.4 (8.9)	9.6 (5.5)	14.5 (9.8)
# Milking	5.6 (3.9)	5.1 (3.0)	4.7 (2.7)	5.2 (3.4)
# Dry	2.4 (2.7)	2.2 (2.4)	1.0 (1.3)	2.1 (2.4)
# Heifers	2.8 (2.6)	2.7 (2.2)	1.3 (1.3)	2.5 (2.3)
# Calves	4.3 (3.6)	3.2 (2.7)	2.3 (1.9)	3.5 (3.1)
# Breeding bulls	0.54 (0.8)	0.46 (0.7)	0.15 (0.5)	0.45 (0.8)
Since you first began working with MOD, how would you describe the number of dairy cows in your herd?				
Increased	79%	75%	85%	78%
Decreased	12%	10%	12%	11%
Stayed the same	10%	15%	3%	11%
What is your average daily milk production today?				
Liter	27.1 (21.3)	35.3 (28.6)	56.2 (37.8)	37.6 (21.3)
<i>N value</i>	127	167	92	386
Kg	33.6 (24.5)	46.6 (27.7)	0	39.9 (26.9)
<i>N value</i>	125	118	0	243
What was your average daily milk production at this time last year?				
Liter	29.7 (19.9)	35.6 (33.8)	54.6 (33.2)	38.0 (31.2)
<i>N values</i>	131	176	92	399
Kg	33.9 (22.5)	41.5 (25.1)	0	37.5 (22.0)
<i>N values</i>	121	109	0	230
Has your milk production increased over the last year?				
Yes	58%	61%	65%	61%
No	42%	39%	35%	39%
What is the primary reason for the increase in production?				
Increase herd size	14%	14%	20%	15%
Improved feed	51%	60%	32%	52%
Improved management	35%	26%	48%	33%
<i>N value</i>	147	177	60	384
Since your first began working with MOD, how would you describe the average milking volume of your dairy herd?				
Increased	91%	90%	89%	90%
Decreased	6%	7%	11%	7%
Stayed the same	3%	4%	0%	3%
Total Series <i>N value</i>	252	285	92	629

**Table 31: MOD Targeted Dairy Production Best Practices\***

	DRY	INTERMEDIATE	WET	TOTAL
<b>Did you adopt any new practices in your dairy enterprise?</b>				
Yes	98	99	97	98
No	2	1	3	2
<b>What were the best practices that you adopted?</b>				
Year round nutritious feed	92	93	89	92
Silage - cultivate or buy	48	41	36	43
TMR	61	70	58	65
27/7 water access	87	88	95	88
Separate calf within 6 hours of birth	28	35	74	38
Weaning (weeks 8-12)	44	56	69	53
AI @ 15 months, Calf @ 24 months	55	51	74	56
Herd composition	43	47	44	45
Annual calving	65	66	64	65
Manage effluents	61	60	49	59
<b>Which was the most important practice to improving your dairy enterprise?</b>				
Year round nutritious feed	51	54	36	50
Silage - cultivate or buy	2	2	1	2
TMR	8	12	3	9
27/7 water access	35	27	46	33
Separate calf within 6 hours of birth	1	0	3	1
Weaning (weeks 8-12)	0	1	3	0
AI @ 15 months, Calf @ 24 months	0	1	3	1
Herd composition	0	0	3	1
Annual calving	2	4	3	3
Manage effluents	0	0	0	0
<i>N value</i>	252	285	92	629

\* All values provided as percentages

**Table 32: Veterinary Medicine\***

	DRY	INTERMEDIATE	WET	TOTAL
Have you previously purchased any veterinary medicine?				
Yes	99	100	100	100
No	1	0	0	0
From whom do you most frequently purchase your veterinary medicines?				
Private Dealer	58	64	74	63
Open Market	2	4	1	3
Government Facility	37	27	25	31
Other	3	5	0	3
What are the most common medicines you purchase?				
Antibiotics	33	37	7	31
Deworming	93	95	90	93
Vaccines	16	14	20	16
Additives	20	28	20	24
Supplements	38	26	64	36
How would you describe your experience accessing veterinary medicine today?				
Easy	57	69	34	59
Normal	20	15	25	18
Difficult	23	15	41	22
Don't use	1	1	0	1
Has access to higher quality veterinary medicines improved since your engagement with MOD?				
Yes	92	91	88	91
No	8	9	11	9
<i>N value</i>	252	285	92	629

\* All values provided as percentages



**Table 33: Artificial Insemination**

	DRY	INTERMEDIATE	WET	TOTAL
In the last 12 months have you obtained AI services?				
Yes	81%	92%	98%	88%
No	19%	8%	2%	12%
<i>N value</i>	252	285	92	629
How many rounds of AI have you applied to your herd?				
Average	6.0 (5.0)	8 (6.4)	7 (5.3)	7 (5.8)
On how many cows have you applied AI?				
Average	4.2 (2.5)	4.7 (3.0)	4.3 (2.4)	4.5 (2.8)
How many rounds resulted in successful pregnancies?				
All	52%	49%	68%	53%
More than half	29%	32%	24%	30%
Less than half	12%	13%	7%	12%
None	8%	5%	1%	5%
What is the average price for each round of AI?				
LKR	950 (394)	866 (220)	784 (276)	884 (308)
How has the price of insemination services changed since you first began using such services?				
Price is higher	86%	89%	74%	86%
Price is lower	3%	0%	17%	4%
Price is the same	11%	11%	9%	11%
What type of inseminator do you rely on?				
Government	75%	89%	51%	77%
Private Sector	25%	11%	49%	23%
On average, how many hours were required for the inseminator to arrive at your farm from initial contact?				
Hours	4.3 (6.0)	4.6 (6.3)	4.3 (3.9)	4.4 (5.9)
On average, how many inseminator visits were needed to result in a successful pregnancy?				
Number of visits	1.8 (1.6)	2.1 (1.6)	1.8 (0.8)	1.9 (1.5)
<i>N value</i>	205	261	90	556

**Table 34: Herd and Dairy Enterprise Management**

	DRY	INTERMEDIATE	WET	TOTAL
Who do you primarily rely on to assist with problems related to your herd?				
Private vet	7	11	14	10
Government vet	87	86	77	85
Local vet clinic	2	1	1	1
Retail input dealer	1	1	2	1
Neighbor	0	0	0	0
In the previous year, who do you primarily rely on for problems with your herd?				
MOD staff	2	3	2	2
Private vet	8	9	17	10
Government vet	84	84	76	83
Local vet clinic	2	0	0	1
Retail input dealer	0	1	2	1
Neighbor	0	1	0	0
Have you received any training on dairy management in the last year?				
Yes	11	8	3	8
No	89	92	97	92
How many MOD trainings & mentorship visits did you attend in the last year?				
Number of visits	2.9 (3.5)	2.9 (2.1)	4.1 (3.6)	3.1 (3.0)
Did you develop a farmer action plan with the MOD project?				
Yes	83	87	93	86
No	17	13	7	14
How would you rate the development of your farmer action plan?				
Very good	58	58	49	56
Good	34	28	42	33
Average	7	7	8	7
Fair	1	1	1	1
Poor	1	5	0	3
Do you feel that the farmer action plan effectively helped to improve your dairy enterprise?				
Yes	99	98	96	98
No	1	2	4	2
Would you recommend other dairy farmers develop their own farmer action plans?				
Yes	99	99	98	99
No	1	1	2	1
N value	252	285	92	629
How do you rate the information received from the MOD project?				
Very good	69	69	78	70
Good	29	27	21	27
Average	1	4	1	2
Fair	1	1	0	1
Poor	0	0	0	0
How would you rate the quality of mentorship from the MOD project?				
Very good	70	77	88	76
Good	27	20	11	21
Average	2	3	1	2
Fair	1	0	0	1
Poor	0	0	0	0
N value	252	285	92	629

**Table 35: Dairy Enterprise Operations\***

	DRY	INTERMEDIATE	WET	TOTAL
Did your dairy operation improve in the past 12 months?				
Yes	90	93	83	90
No	8	6	17	9
No change	1	1	0	1
How has the dairy operation improved?				
Milk production	78	90	74	83
Shorter cycle for cows to rebreed	48	41	51	45
Lower death rate	19	21	13	19
Quality of milk increased	73	74	89	76
Produce more milk from the same number of cows	69	71	87	72
Increase revenues from milk sales	76	70	58	71
If not, what is the main problem why your dairy operation did not improve?				
Lack of feed	5	6	0	4
Lack of water	5	0	0	2
Persistent diseases	27	24	63	36
Poor market prices	5	0	0	2
Other	59	71	38	56
<i>N value*</i>	22	17	16	55
Did the improvements result in meeting your expectations for achieving significant progress towards your goal for the dairy enterprise?				
Yes	98	97	93	97
No	2	3	7	3
Which specific interventions/activities by MOD resulted in you making significant progress towards your goal for the dairy enterprise?				
Trainings	68	64	67	66
On farm discussions	9	9	12	10
Mentoring sessions	18	20	20	19
Preparations of action plans	3	4	1	3
Preparations of business plans	1	2	0	1
Do you believe you have adequate knowledge and skills to sustain the improvements in your dairy enterprise?				
Yes	100	98	100	99
No	0	2	0	1
What other activities do you need to meet the goals for your dairy enterprise?				
a) Increase herd size	60	63	86	65
[b] Improve feed	75	75	60	73
[c] AI	45	53	53	50
[d] Expand market	27	33	40	32
[e] Improved veterinary care	43	41	73	46
On a scale of 1 to 5 (5 being the highest), how optimistic are you that your dairy business will improve this year?				
5	51	59	37	53
4	31	21	34	27
3	16	18	23	18
2	1	2	5	2
1	1	0	1	0
On a scale of 1 to 5 (5 being the highest), how optimistic are you that your dairy business will improve in the next 5 year?				
5	82	83	80	82
4	16	13	11	14
3	1	4	9	3
2	0	0	0	0
1	1	1	0	1
<i>N value</i>	252	285	92	629

**Table 36: Dairy Enterprise Marketing and Sales**

	DRY	INTERMEDIATE	WET	TOTAL
<b>Who is your primary buyer of your milk?</b>				
Neighbor	1	0	0	0
Private trader	1	3	3	2
Collection center of a processor	80	76	71	77
Chilling center of a processor	0	20	26	20
<b>Which processor do you currently sell your milk to?</b>				
Cargills	17	27	40	25
Chello	10	2	3	6
Lanka Dairy	1	10	0	5
Milco	17	7	9	11
Nestle	13	5	0	7
Pelwatta	21	12	27	18
Richi	0	9	0	4
Wonrich	5	4	0	4
Other	16	25	19	21
<b>In the past 12 months, has your milk been rejected by your primary buyer for quality?</b>				
Yes	8	5	4	5
No	92	95	96	95
<b>If your milk has previously been rejected, how many times was your delivery rejected?</b>				
Number of rejections	1.1 (0.9)	1.0 (2.0)	2.2 (0.9)	1.1 (1.7)
<i>N value</i>	7	13	11	31
<b>What is the current price you receive for your milk?</b>				
Liter	176 (9)	168 (15)	159 (11)	168 (14)
<i>N value</i>	124	150	91	365
Kilogram	178 (6)	178 (7)	140 (0)	178 (7)
<i>N value</i>	127	135	0	262
<b>What was the price paid for your milk last year at this time?</b>				
Liter	156 (17)	154 (17)	140 (16)	151 (18)
<i>N-value</i>	124	150	91	365
Kilogram	159 (16)	161 (14)	130 (0)	160 (15)
<i>N-value</i>	128	135	1	264
<b>If F7&lt;F6, what action that you adopted last year led to higher price for your milk?</b>				
Provided higher quality fodder	16	17	30	19
Provided silage	1	1	3	2
Provided concentrated feed	1	3	3	3
Changes Processor	4	7	6	6
Macro-economic conditions	74	67	45	67
Other	3	4	13	5
<b>Do you feel you have improved marketing opportunities for your dairy enterprise today?</b>				
Yes	99	98	100	99
No	1	2	0	1
<i>N value</i>	252	285	92	629

**Table 37: Dairy Enterprise Saving & Investment**

	DRY	INTERMEDIATE	WET	TOTAL
Are you a member of a producer group or cooperative?				
Yes	70	65	59	66
No	30	35	41	34
Do you save a portion of your income from the dairy business?				
Yes	82	81	78	81
No	18	19	22	19
In the past 12 months, what percentage of your income did you save from the dairy business?				
Average percentage	22	24	18	22
<i>N value</i>	206	232	72	510
Do you deposit your savings in a financial institution?				
Yes	83	80	78	81
No	17	20	22	19
Did you make investments in your dairy operation in the last 12 months?				
Yes	58	61	65	61
No	42	39	35	39
What investments did you make?				
Feed	67	70	52	66
Milking	8	15	13	12
Hygiene	31	30	23	29
Building	61	52	57	57
Insemination	38	51	36	43
Cattle stock	27	25	24	27
ICT	4	5	11	6
How much was the value of these investment(s)?				
LKR	505,084	400,777	581,544	469,167
	(1,656,004)	(611,797)	(1,123,968)	(1,205,924)
USD	1,684	1,336	1,939	1,564
(300 to 1)	(5,520)	(2,039)	(3,747)	(4,020)
<i>N value</i>	252	285	92	629