Internal Ex-Post Evaluation for Technical Cooperation Project

conducted by Sri Lanka Office: November 2017

Country Name	**Small Scale Dairy Farming Improvement through Genetic and Feeding Management Improvement**
Democratic Socialist Republic of Sri Lanka	

I. Project Outline

Background	In Sri Lanka, the local milk production was only 33% (as of 2009) of the domestic demand, and milk and milk products valued at over 30 billion Sri Lankan Rupees (296 million US dollars) was imported in 2009. The Government of Sri Lanka intended to increase milk production since the total import value of milk and milk products was very high, which was 2.1% of Sri Lanka's food import. The government planned to be self-sufficient in milk production by year 2016. Nevertheless, the great majority of dairy farms, especially small scale farms which rear less than 10 cows and account for approximately 90% of the national herds (as of 2009), were facing a number of constraints such as low productivity, poor genetic merit of indigenous cattle and a lack of appropriate techniques due to an inadequate extension scheme for technology transfer.		
Objectives of the Project	Through developing suitable progeny testing method, confirming appropriate Artificial Insemination (AI) techniques related to progeny testing[1] and improving feeding and dairy management of dairy farmers, the project aimed at developing techniques and institutional set-up for small scale dairy farming improvement in the target areas, thereby increasing milk productivity, diffusing AI using the progeny tested bull's semen, and establishing Genetic Improvement scheme. 1. Overall Goal: (1) Feeding and dairy management appropriate for small scale dairy farming is improved and milk productivity is increased in the target areas. (2) Progeny tested bulls are available, and Artificial Insemination (AI) using the progeny tested bull's semen is diffused. (3) The Progeny testing program is sustained in Sri Lanka and Genetic Improvement scheme is established. 2. Project Purpose: The techniques and institutional set-up for small scale dairy farming improvement are developed through breeding and feeding & dairy management improvement in the target areas.		
Activities of the Project	1. Project Site: Kandy, Nuwara Eliya and Matale Districts in Central Province and Kurunegala District in North Western Province 2. Main Activities: (1) Improve data management and pedigree management at selected National Livestock Development Board (NLDB) farms, develop appropriate progeny testing method, and introduce a manual of progeny testing method; (2) Provide trainer's training of improved AI program to staff in AI Center and trainees (veterinary surgeons (VS) and AI technicians), and on-site training of improved AI program to field staff at field veterinary office and NLDB farms; and (3) Develop appropriate feeding and dairy management techniques, demonstrate such techniques to field officers and farmers through establishing model farms, prepare technical manuals for field officers and dairy farmers, and facilitate concerned organizations to implement extension activities to disseminate improved techniques etc. 3. Inputs (to carry out above activities) Japanese Side 1) Experts: 19 persons 2) Trainees Received in Japan: 12 persons 3) Trainees in third country (India): 24 persons 4) Equipment: vehicles, dung spreader, slurry tanker, bulk semen storage tank, liquid nitrogen transport tank, training cow model, milker etc. 5) Local operational expense (including facility improvement at AI Centers) Sri Lankan Side 1. Staff Allocated: 89 persons 2. Project office 3. Local cost		
Project Period	April 2009 – March 2014	Project Cost	(ex-ante) 360 million yen, (actual) 274 million yen
Implementing Agency	Department of Animal Production and Health (DAPH) and National Livestock Development Board (NLDB) of Ministry of Livestock and Rural Community Development (MLRCD)[2]		
Cooperation Agency in Japan	Ministry of Agriculture, Forestry and Fisheries, National Livestock Breeding Center		

II. Result of the Evaluation

< Special Perspectives Considered in the Ex-Post Evaluation >

- Target Year for Indicator 2 of Overall Goal (Progeny tested bull's semen is distributed over the country from AI Center.): All the candidate bulls used in the first and second progeny tests (conducted from 2009 to 2011) were culled because of Bovine Tuberculosis (TB). It is stated in the JICA document that it is possible to distribute progeny tested bulls' semen over the country from AI Center in 2018 onwards. Thus, in this ex-post evaluation, Indicator 2 is evaluated as 'achieved', if it is confirmed that progeny tested bulls' semen is highly likely to be distributed over the country from AI Center in 2018.

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[1] Progeny testing is a method to evaluate genetic capacity of animals on the basis of their daughters' performance. While it is cows that produce milk, capacity of bulls largely influence the improvement of performance of dairy cows. Thus, in progeny testing of dairy cows, capacity of bulls is analyzed on the basis of their daughters' performance (milk yield and milk fat yield etc.) to maintain genetically excellent cows.

[2] In January 2015, MLRCD was abolished and the newly established Ministry of Rural Economy (MORE) took over the works related to livestock development, and DAPH and NLDB have been placed under MORE since then.

1 Relevance

<Consistency with the Development Policy of Sri Lanka at the Time of Ex-Ante Evaluation and Project Completion>

The project was consistent with Sri Lanka's development policy on 'breed improvement' and 'increasing self-sufficiency in domestic milk production' etc. as set forth in the "Ten Year Development Plan (2006-2016)" and "National Livestock Development Policy (2006)" at the time of both ex-ante evaluation and project completion.

<Consistency with the Development Needs of Sri Lanka at the Time of Ex-Ante Evaluation and Project Completion >

At the time of ex-ante evaluation (2008), approximately 95% of poverty group resided in farming and fishing villages and plantation farms, and in order to increase income for the poor and milk productivity to reduce the amount of milk imports, there were needs for breed improvement and improvement of feeding and dairy management techniques. At the time of project completion, MLRCD was implementing "Production System Based Smallholder Dairy Farms Development Program (2010-2015)", in which it aimed to produce 530 million liters of milk annually through providing assistance to small scale livestock farmers (120,000 households) which rear 690,000 cattle in total. Thus, the project was consistent with development needs of the country.

<Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation>

The project was consistent with Japan's ODA policy, as assistance for livestock sector in Sri Lanka corresponds to 'poverty alleviation' in the Country Assistance Program (2004).

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement for the Project Purpose at the time of Project Completion>

The Project Purpose was achieved by the time of project completion. According to the report submitted by Japanese experts (JICA document), more than 80% of relevant officers and more than 90% of dairy farmers understood the concept of progeny testing and were eager for using the method (Indicator 1). According to the same report, more than 80% of dairy farmers applied more than 50% of improved techniques for feeding and dairy management which were introduced by the project (Indicator 2).

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have been mostly maintained since project completion. The progeny testing training module developed under the project has been implemented every year since project completion, particularly in Northern Province, North Central Province, North Western Province and Western Province, in which a total of 299 VSs, Livestock Development Instructors (LDIs) (extension workers) and Private Artificial Insemination Technicians (PAITs) have attended. While formal trainings for progeny test awareness-raising have not been conducted for dairy farmers, extension workers have conducted trainings and knowledge transfer during their routine fieldwork, utilizing materials on progeny testing training module developed under the project. As no survey has been conducted since project completion to check the level of understanding of the concept of progeny test and eagerness to use progeny tested bulls' semen, it is unknown what percentage of field officers and dairy farmers have understood the concept and been eager for using progeny tested bulls' semen since project completion. However, according to the estimate made by the Animal Breeding Division of DAPH through their experience and regular communications with field officers and dairy farmers, all field officers understand the concept of progeny testing and most of them are eager to use progeny tested bulls' semen, while many dairy farmers understand the concept and about half of them are eager to use progeny tested bulls' semen[3] (Indicator 1). Events called 'Farm Day' to disseminate improved techniques for feeding and dairy management to dairy farmers have been conducted every year since project completion, particularly in Central Province, North Central Province and North Western Province, in which a total of 944 dairy farmers, VSs and LDIs have attended. The improved techniques for feeding and dairy management introduced by the project are called '10 things to do before you complain about your cows', and according to Central Provincial DAPH, as of August 2017, 74% on average of model farmers targeted under the project in the province apply the techniques, and according to North Western Provincial DAPH, as of August 2017, 72% on average of model farmers targeted under the project in the province apply the techniques[4] (Indicator 2).

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

The Overall Goal was partially achieved at the time of ex-post evaluation. Data on milk production of dairy farmers in the project-targeted districts before and after project implementation was unavailable. However, according to the Livestock Statistical Bulletin (2013, 2014 and 2015) and the Livestock Statistics 2005-2014, the annual milk production in Central Province (Kandy, Nuwara Eliya and Matale Districts) in 2008 was 39,352,885 liters, which was increased to 112,142,451 liters in 2015 (185% of increase), and that in North Western Province (including Kurunegala District) in 2008 was 24,844,473 liters, which was increased to 56,055,111 liters in 2015 (126% of increase). On the other hand, according to the same statistics, the national milk production in 2008 was 172,442,406 liters, which was increased to 331,197,597 liters in 2015 (92% of increase), and the increase rate is higher in provinces where the project was implemented than the rate in the country as a whole. The improved techniques for feeding and dairy management introduced by the project have contributed to the above increase at least to a certain extent, however, some dairy development projects funded by the government and other donors were also implemented in the same geographical area, which also seems to have contributed to the increase (Indicator 1). Regarding progeny testing, TB infections were identified at NLDB Dayagama farm in 2015 and 2016 and at AI Centre Kundasale in 2016, and Foot and Mouth Disease (FMD) infections were identified at NLDB Andigama farm in 2014, 2016 and 2017, despite the fact that disease prevention measures such as vaccination and screening for diseases introduced under the project have been conducted. As the bulls used for progeny testing were infected with these diseases, the progeny testing cycle has not been completed and progeny-tested bulls' semen has not been

[3] No further detailed information was available.

[4] The breakdown of adoptability (the number of farmers who apply the improved technique out of the total number of model farmers (7 farmers in total in Central Province and 5 farmers in total in North Western Province)) of '10 things to do before you complain about your cows' is: (1) Give your cows what they need (71% in Central Province and 100% in North Western Province), (2) Use cut grass most efficiently (86% in Central Province and 80% in North Western Province), (3) Avoid tethering calves too tight (100% in both provinces), (4) Measure wither height (57% in Central Province and 0% in North Western Province), (5) Make a simple crush (43% in Central Province and 40% in North Western Province), (6) Wash your hands before milking (100% in both provinces), (7) Milk twice a day (86% in Central Province and 80% in North Western Province), (8) Check heat 4 times a day (57% in Central Province and 40% in North Western Province), (9) Check cows before selling and buying (100% in both provinces) and (10) Use a calendar for record keeping (43% in Central Province and 80% in North Western Province).

distributed over the country. DAPH is currently preparing to re-launch the progeny testing program in NLDB Ridiyagama farm, and expecting to complete the progeny testing cycle and produce progeny-tested bulls' semen by 2020 (Indicator 2). The implementation of progeny testing program using the manual (developed under the project) has not been accredited into the National Livestock Development Plan, as a new development plan has not been issued since project completion, due to a delay in a procedure in the Ministry of Rural Economy (MORE). The new policy/plan is expected to be issued in early 2018. On the other hand, the Animal Breeding Division of DAPH is responsible for progeny testing, in which there are six VSs, four LDIs and 40 supporting staff at the time of ex-post evaluation. All technical officers in the division were trained under the project and are ready to be mobilized once the progeny testing program is resumed in a full scale. The number of staff is sufficient, as one to two technical officers to conduct planned mating and another two to three officers for data analysis are required for progeny testing. Budget allocated to the division is also sufficient to conduct progeny testing, as all the necessary infrastructures and systems are already in place and thus a significant amount of budget is not required, and the division has a sufficient amount of budget to resume planned and test mating including fees for transportation, distribution of bulls' semen and staff overtime salary etc.[5] (Indicator 3).

<Other Impacts at the time of Ex-post Evaluation>

No negative impact on natural environment has been observed and no land acquisition and resettlement has been occurred under the project.

<Evaluation Result>

In light of the above, through the project, targets set in indicators for Project Purpose were achieved by the time of project completion, the project effects have been mostly maintained since project completion, and the Overall Goal was partially achieved at the time of ex-post evaluation. Therefore, the effectiveness/impact of the project is fair.

Achievement of Project Purpose and Overall Goal

<table>
<tr><th>Aim</th><th>Indicators</th><th>Results</th></tr>
<tr><td rowspan="2">(Project Purpose)
The techniques and institutional set-up for small scale dairy farming improvement are developed through breeding and feeding & dairy management improvement in the target areas.</td><td>1. 80% of relevant field officers and dairy farmers understand the concept of progeny testing and are eager for using progeny tested bulls' semen.</td><td>Status of the Achievement: achieved (mostly continued)
(Project Completion) More than 80% of relevant officers and more than 90% of dairy farmers understood the concept of progeny testing and were eager for using the method.
(Ex-post Evaluation) According to the estimate made by the Animal Breeding Division of DAPH, all field officers understand the concept of progeny testing and most of them are eager to use progeny tested bulls' semen, while many dairy farmers understand the concept and about half of them are eager to use progeny tested bulls' semen.</td></tr>
<tr><td>2. 80% of dairy farmers in target areas apply more than 50% of improved techniques for feeding and dairy management which are introduced by the project.</td><td>Status of the Achievement: achieved (continued)
(Project Completion) More than 80% of dairy farmers applied more than 50% of improved techniques.
(Ex-post Evaluation) According to Provincial DAPHs, 74% on average of model farmers targeted under the project in Central Province apply the improved techniques, and 72% on average of model farmers targeted under the project in North Western Province apply the improved techniques, as of August 2017.</td></tr>
<tr><td rowspan="2">(Overall Goal)
1. Feeding and dairy management appropriate for small scale dairy farming is improved and milk productivity is increased in the target areas.</td><td>1. Milk production of dairy farmers is increased by 20% in the target areas.</td><td>(Ex-post Evaluation) achieved
The annual milk production in Central Province (Kandy, Nuwara Eliya and Matale Districts) and in North Western Province (including Kurunegala District) has increased by more than 20% after project implementation.
(Unit: liter)
<table>
<tr><th></th><th>Before Project (2008)</th><th>After Project (2015)</th><th>Increase Rate</th></tr>
<tr><td>Central Province</td><td>39,352,885</td><td>112,142,451</td><td>185%</td></tr>
<tr><td>North Western Province</td><td>24,844,473</td><td>56,055,111</td><td>126%</td></tr>
<tr><td>Country as a whole</td><td>172,442,406</td><td>331,197,597</td><td>92%</td></tr>
</table></td></tr>
<tr><td>2. Progeny tested bulls are available, and Artificial Insemination (AI) using the progeny tested bull's semen is diffused.</td><td>2. Progeny tested bull's semen is distributed over the country from AI Center.</td><td>(Ex-post Evaluation) not achieved
The bulls used for progeny testing were infected with TB and FMD, and thus the progeny testing cycle has not been completed and progeny-tested bulls' semen has not been distributed over the country.</td></tr>
<tr><td>3. The Progeny testing program is sustained in Sri Lanka and Genetic Improvement scheme is established.</td><td>3. The implementation of progeny testing program using the Manual is accredited into the National Livestock Development Plan, and budget and staff are continuously allocated.</td><td>(Ex-post Evaluation) partially achieved
The implementation of progeny testing program using the Manual has not been accredited into the National Livestock Development Plan, as a new development plan has not been issued since project completion. However, the Animal Breeding Division of DAPH has sufficient number of staff and budget for progeny testing.</td></tr>
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Source : JICA internal document, questionnaire survey to DAPH, Provincial DAPHs and NLDB, the Livestock Statistical Bulletin, DAPH Annual Report (2013, 2014 and 2015), Livestock Statistics 2005-2014

[5] According to DAPH, the amount of budget allocated to the division was 165 million LKR in 2014, 170 million LKR in 2015 and 106 million LKR in 2016.

3 Efficiency

Both project cost and project period were within the plan (ratio against the plan: 76% and 100%, respectively). Therefore, the efficiency of the project is high.

4 Sustainability

<Policy Aspect>

According to MORE, the new development policy/plan, which is expected to be issued in early 2018, is likely to continuously support the needs of small-scale dairy development. Moreover, this project is consistent with the Food Production National Programme 2016-2018, which identifies dairy, especially fresh milk, as one of the priority products to increase food security of the country, and the Public Investment Programme 2017-2020, which aims at increasing nutritional security through development of livestock sector, especially in dairy production.

<Institutional Aspect>

At the time of ex-post evaluation, the Animal Breeding Division of DAPH is responsible for conducting progeny testing program, and Provincial DAPHs in Central Province and North Western Province are responsible for feeding and dairy management. As stated above, there is a sufficient number of staff in the Animal Breeding Division. There are one Provincial Director (PD), 65 VSs and 67 LDIs in Central Provincial DAPH, and there are one PD, 71 VSs and 131 LDIs in North Western Provincial DAPH. While North Western Provincial DAPH has a sufficient number of staff to continue extension and training works for improved cattle management, Central Provincial DAPH has the minimum required number of staffs, which is not quite sufficient to properly conduct above works. Thus, Provincial DAPHs are training and making use of PAITs to overcome the insufficiency of staffs. There are ten technical staff, 15 field workers and nine supporting staff in AI Center Kundasale, and there are four technical staff, 13 field workers and one supporting staff in AI Center Polonnaruwa, which is sufficient for current activities (production and distribution of bulls' semen and maintenance of the centers including bio-screening system). However, when progeny testing program is implemented in a full scale, a few more staff will be required for milk sample analysis and other data collection and analysis. There are 55 staff in NLDB Ridiyagama farm, 71 staff in NLDB Dayagama farm and 133 staff at NLDB Andigama farm, which is sufficient to manage AI, data collection and cattle herd management etc. properly. While it is stated above that DAPH is currently preparing to re-launch the progeny testing program in NLDB Ridiyagama farm, DAPH and NLDB have not yet agreed on the re-establishment of progeny testing program in the farm, and thus a further institutional arrangement between them needs to be established promptly.

<Technical Aspect>

At the time of ex-post evaluation, most counterparts (C/Ps) of the project still work in DAPH, NLDB and Provincial DAPHs. The follow up assistance for the project was conducted from September to November 2015, and two short term experts (one for progeny testing and the other for data analysis) were dispatched. The progeny testing expert was generally satisfied with the skill level of staff in the Animal Breeding Division. DAPH also hired one qualified officer specialized in data recording and statistical analysis in 2015, following the recommendation from the project, and thus the technical level of the division is sufficient. In both Central Provincial DAPH and North Western Provincial DAPH, all the VSs and LDIs have required academic degrees/diplomas in veterinary or animal science, and many VSs also have postgraduate degrees. All the current officers have sufficient work experience and received trainings under the project and/or other programs, and thus the technical level of these provincial DAPHs is sufficient. The skill level of staff in AI Center Kundasale and Polonnaruwa is also sufficient to produce deep frozen semen to supply for the field AI works and semen has been distributed nation-wide. The progeny testing expert dispatched for the follow up assistance visited the AI Center Kundasale and reported that semen production and distribution were functioning well. On the other hand, NLDB staff have been transferred among their farms in different locations. This staff transfer and discontinuation of the progeny testing program affected some of their skills and their skill level is not sufficient to manage cattle herd properly for progeny testing in NLDB Andigama Farm. However, DAPH and NLDB as a whole retain necessary knowledge and skills, as most of the staff trained during the project remain in these organizations. Therefore, it is expected that the appropriate practice will be resumed once progeny testing program starts again. As stated above, the progeny testing training module developed under the project and 'Farm Day' to disseminate improved techniques for feeding and dairy management to dairy farmers have been conducted every year. Various manuals developed under the project have been well utilized by field officers, and the manual "10 things to do before you complain about your cows" has been reprinted as part of the follow up assistance and is being utilized for dissemination activities. Equipment procured under the project have generally been well utilized and maintained at DAPH, AI Centers and NLDB farms.

<Financial Aspect>

As stated above, the Animal Breeding Division has a sufficient amount of budget to conduct progeny testing. The amount of budget allocated to Central Provincial DAPH is 50 million LKR in 2014, 44 million LKR in 2015 and 152 million LKR in 2016. The amount of budget allocated to North Western Provincial DAPH is 18 million LKR in 2014, 26 million LKR in 2015 and 97 million LKR in 2016 (the budget amount largely increased in 2016, as there were many new provincial projects planned in 2016). As extension and training works for improved cattle management are the primary roles of Provincial DAPHs, budget for these activities is secured as priority. Since both Provincial DAPHs have been able to maintain these activities since project completion, these budget amounts are judged to be sufficient to disseminate the improved cattle management techniques. The amount of budget allocated from the NLDB Headquarter to NLDB Andigama Farm is 17 million LKR in 2014, 20 million LKR in 2015 and 28 million LKR in 2016. The budget amount allocated to NLDB Dayagama Farm is 159 million LKR in 2014, 161 million LKR in 2015 and 142 million LKR in 2016[6]. These amounts are sufficient to manage AI, data collection and cattle herd management for progeny testing, as cows used for progeny testing are selected from the herd that NLDB already owns and manages, and thus a significant amount of budget is not required.

<Evaluation Result>

In light of the above, some problems have been observed in terms of the institutional aspect of the implementing agency. Therefore, the sustainability of the effectiveness through the project is fair.

5 Summary of the Evaluation

Through the project, the Project Purpose of developing techniques and institutional set-up for small scale dairy farming improvement in the target areas was achieved by the time of project completion, the project effects have been mostly maintained since project completion,

[6] The budget amount of NLDB Ridiyagama farm was not available.

and the Overall Goal was partially achieved at the time of ex-post evaluation. As for sustainability, some problems have been observed in terms of the institutional aspect, while policy background and technical and financial aspects are secured.
Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- DAPH and NLDB must conclude an agreement for the use of NLDB Ridiyagama farm to re-launch the progeny testing program, and the Animal Breeding Division of DAPH must conduct planned mating with selected cows to complete one progeny testing cycle. Although trainings are continued and expanded, it will soon be difficult to retain knowledge without actual practice, especially after transfers and retirements of key C/Ps in the future.
- As stated above, as part of the follow up assistance, manuals developed under the project have been reprinted. To disseminate techniques for feeding and dairy management continuously, the budget allocation for printing out the technical manual for field officers and dairy farmers should be secured.

Lessons Learned for JICA:

- Breeding programs, especially progeny testing programs, require many years to complete one cycle and even longer for outcomes/impacts to appear. Such nature makes it difficult to measure impacts within the cycle of JICA's technical cooperation project. In addition, the processes must be restarted once all the target animals were culled due to epidemics. In this project, disease prevention measures were introduced and maintained very well, which should be followed in other projects as a good practice. It should have been better if the project placed target animals in several different farms in different locations, though this would have increased the cost and time required to conduct the program.

Cattle herd in NLDB Dayagama Farm

Laboratory equipment in AI Center Kundasale