

Summary of Terminal Evaluation Results

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| 1. Outline of the Project | |
| Country: Democratic Socialist Republic of Sri Lanka | Project title: Project on Small Scale Dairy Farming Improvement through Genetic and Feeding Management Improvement in Sri Lanka |
| Issue/Sector: Agriculture | Cooperation scheme: Technical Cooperation Project |
| Division in Charge: JICA Sri Lanka Office | Total Cost: 250 million Japanese Yen (at the time of the evaluation) |
| Period of Cooperation | (R/D): April 2009– March 2013 (5 years) |
| | Partner Country's Implementing Organization: Department of Animal Production and Health (DAPH) Ministry of Livestock and Rural Community Development (MLRCD) |
| | Supporting Organization in Japan: Ministry of Agriculture, Forestry and Fisheries, National Livestock Breeding Center |
| Related Cooperation: | |
| 1-1. Background of the Project | |
| <p>In Sri Lanka, the local milk production was only 33% (2009) of the domestic demand, and milk and milk products valued at over Rs. 30 billion (US \$296 million) has been imported in 2009. The Government of Sri Lanka intends to increase milk production since the total import value of milk and milk products is very high which is 2.1% of Sri Lanka's food import. The Government of Sri Lanka has 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 (Department of Census and Statistics, 2009), are 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. With this background, Ministry of Livestock and Rural Community Development (MLRCD) and JICA launched "Project on Small Scale Dairy Farming Improvement through Genetic and Feeding Management Improvement in Sri Lanka" in April 2009.</p> | |
| 1-2. Project Overview | |
| (1) Overall Goal | |
| <ol style="list-style-type: none"> 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 | |
| <p>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.</p> | |

(3) Outputs

Output 1: Suitable progeny testing method is developed in Sri Lanka.

Output 2: Appropriate AI techniques related to Progeny testing are confirmed.

Output 3: Feeding and dairy management of dairy farmers are improved.

(4) Inputs (As of September 2013)

1. Japanese side: Total 250 million Yen

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| Long-term Experts: | 4 long-term experts (121.00 M/M) |
| Short-term Experts: | 14 short-term experts (33.93 M/M) |
| Trainees received: | 34 persons (10 persons for Japan, 24 persons for India) |
| Provision of Equipment: | Equivalent to 43,976,550Yen |
| Local Operational Expenses: | Equivalent to 50,192,986 Yen |

2. Sri Lankan side:

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| Counterpart Personnel: | Total of 88 CPs were assigned by MLRCD, DAPH, NLDB, Provincial DAPHs (Central Province, North Western Province), VSOs, Model Farmers |
| Provision of Space: | Project office at DAPH |
| Local Cost Sharing: | Equivalent to 9,476,398 Yen |

2. Evaluation Team

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|---------------------------------|--|--------------------|--|
| Member of Evaluation Team | Team Leader | Mr. Hiroyuki ABE | Senior Representative, JICA Sri Lanka Office |
| | Evaluation Planning | Ms. Makiko ASAOKA | Representative, JICA Sri Lanka Office |
| | Progeny Testing | Mr. Tatsuya NAKANO | Deputy Director, Miyazaki Station, National Livestock Breeding Center |
| | Evaluation Analysis | Ms. Hiroyo ONOZATO | Consultant, VSOC Co., Ltd. |
| Schedule of survey | 21 st October – 8 th November 2013 | | Type of Evaluation: Terminal Evaluation |

3. Result of Evaluation

3-1. Project Performance

(1) Outputs

Output 1 is expected to be achieved by the time of the Project completion. Manuals for progeny testing method have been compiled and utilized by the respective C/Ps. Practical version of the progeny testing manual will be produced by November 2013 (Indicator 1-1). Regarding the institutional set-up for progeny testing, relevant C/Ps in DAPH and NLDB farms have repeatedly practiced the progeny testing procedure, and therefore the technical set-up has been strengthened. Although the creation of a new cadre within DAPH, which was one of the recommendations by the Mid-term review team, has not been achieved, DAPH has assigned two more officials who have experiences in computer programming (Indicator 1-2).

Output 2 has been fully achieved by the time of the Study. Motility of frozen semen at CAIS, Kundasale has

been maintained at 60.6% in average, which is more than the targetted rate of 50%. Facilities at both CAIS, Kundasale and Polonnaruwa AI centers have been improved through the Project. Quality of the semen processed at CAIS, Kundasale has been improved by the installation of necessary equipment as well as gaining operational skills. Moreover, the importance of the progeny tested semen is being taught at training programmes implemented at Polonnaruwa AI center.

Output 3 has been achieved by the time of the Study. Regarding the trainings and demonstrations for field officers, the technical package consisting of 10 techniques was developed associated with development of the manuals. Field officers from VSOs participated in Experts' visits to the model farms and gained skills and knowledge of the improved techniques from the Experts (Indicator 3-1). Regarding the training and demonstrations for model farmers, DAPH and Provincial DAPHs carried out the training and demonstrations by utilizing prepared technical manuals (Indicator 3-2). For development and practice of the mass extension methodology, the Project has developed and implemented the 'Farm Day' for 39 times at the 19 model farms. Through the coordination by DAPH and Provincial DAPH, 'Farm Day' has also been organized for field officers and farmers beyond selected veterinary ranges (Indicator 3-3).

(2) Project Purpose

The Project Purpose has been fully achieved at the time of the Study.

As for the Indicator 1 "80% of relevant field officers and dairy farmers understand the concept of progeny testing and are eager for using progeny tested bulls' semen", more than 90% of relevant field officers and dairy farmers understood the concept of progeny testing and expressed their eagerness for using progeny tested bulls' semen (Indicator 1). As for Indicator 2 "80% of dairy farmers in the target areas apply more than 50% of improved techniques for feeding and dairy management which are introduced by the Project", more than 90% of dairy farmers in the target areas apply more than 50% of the technical package (Indicator 2). Therefore, the achievement levels of both indicators are much higher than the targetted rates.

Regarding the improvement of breeding, although the goal of the Project is to develop the method of the progeny testing, because of the nature of the progeny testing requiring the strictly controlled management of herd and data recording, it is essential to structure the management framework specifically for the progeny testing for securing the sustainability. Regarding the feeding and dairy management, the technical package with its manuals and tools have contributed on improving growth and health condition of the cows at the model farmers as well as some of the satellite farmers participated in the 'Farm Day' events. However, as VSOs have limitations in outreaching to farmers due to lack of resources, necessary arrangements shall be done to continue mass extension activities utilizing the methods developed and introduced by the Project.

(3) Responses to the recommendations by the Mid-term review

In response to the recommendations at the Mid-term review team in September 2011, the following actions (1) to (7) have been undertaken.

1) Strengthening management structure for progeny testing at the DAPH headquarters

DAPH has assigned two young officials who have some experience of computer programming. They

have been working on generating information from data gathered through the milk recording related to progeny testing herds. However, the creation of a new cadre has not been realized within DAPH at the time of the Study.

2) Awareness raising on progeny testing through AI training courses

The importance of progeny tested semen is being taught to the trainees at Polonnaruwa AI Center by the C/P.

3) Development of a methodology for disseminating the improved techniques to dairy farmers.

The Project has informed all Provincial DAPH Directors about the availabilities of facilities to training farmers using the model farms and Provincial DAPH Directors have already agreed with the Project to demonstrate series of 'Farm Day' events for technical officials outside the model farm areas. During the Study, with technical guidance by DAPH, North Western Provincial DAPH organized the 'Farm Day' event in Katupotha in Kurunegala district.

4) Risk management of stud bulls

A Short-term Expert had instructed the officers at the CAIS on bio-security measures. Manuals for risk analysis and risk control for diseases were produced. Renovation of CAIS, Kundasale was carried out in 2012 to improve internal roads, constructed a vehicle bath and a biological pit. Additional renovation such as constructing a wash room and fence to prevent introduction of diseases from outside is now going on and will be completed within the Project period.

Furthermore, Government of Sri Lanka has reinforced quarantine facilities at port of entries to the country. DAPH officials have raised their awareness on risk management. DAPH has determined to conduct TB test regularly. At the same time, C/Ps in CAIS, Kundasale has prepared guidelines to control unauthorized moments in the laboratory area, where semen is being processed and is planning to extend this practice to the bull area in CAIS, Kundasale once, the construction of the wash room and fence is completed.

5) Effective use of liquid nitrogen (LN₂) at CAIS, Kundasale

The Project introduced two numbers of 1,000L LN₂ distribution tanks to CAIS, Kundasale in March 2012. A Short-term Expert checked the whole distribution process and found the wastage had been reduced. It is confirmed that LN₂ had been used effectively with LN₂ tanks including those introduced by the Project.

6) Advance semen stock of the candidate bulls at the CAIS, Kundasale

A Short-term Expert checked the process of producing deep frozen semen and found no technical problem in the process and confirmed that the collection of semen from bulls had been carried out two days per week. Thus, CAIS, Kundasale is making maximum use of the bulls to produce enough semen stock for progeny testing.

7) Improvement of animal health conditions and forage supply at Andigama Farm

A dung spreader was introduced and utilized in Andigama Farm for better manure disposing and has also contributed to the improvement of hygiene conditions. A Short-term Expert made proposal for improvement of management system to enhance the growth of calves and heifers at Andigama farm. Farm officers have been carrying out this proposed feeding plan. In response to the proposal, renovation

for animal sheds at the farm has also been undertaken by NLDB.

As the result of the survey on supply and demand situation of forage in Andigama farm, it was identified that production level is slightly insufficient. Thus, the Short-term Expert demonstrated how to produce compact hay bales using the devised hay box and advised for producing 10 acres of CO3 grassland. As a result, trained Andigama farm officers are now being able to produce hay bales, though the quality of hay still needs to be improved. Andigama farm has also newly established CO3 field to produce 10 acres of CO3 grassland in addition to 50 acres of grassland (2 acres of CO3, 48 acres of *Brachiaria ruziziensis*) development by the Project.

3-2. Evaluation Results

(1) Relevance

Relevance of the Project is high. The objectives and activities of the Project are in line with policies and strategy of the Government of Sri Lanka and the Government of Japan, Project design, selection of the target groups, and Japanese technical expertise. The Project is coherent with the policy priorities of the Government of Sri Lanka as expressed in Ten Year Development Plan (2006-2016) and National Livestock Development Policy, which show the plan to be self-sufficient in milk production by year 2016. Two factors are related with improvement of milk production, namely, genetics and environment. The Project has been working on both the improvement of breeding and feeding management. Therefore, it is consistent with the aims of the small scale farmers which is to improve the milk productivity of cows.

(2) Effectiveness

Effectiveness of the Project is high. The Project Purpose is to develop the techniques and institutional set-up for small scale dairy farming improvement through breeding and feeding & dairy management improvement in the target areas and its indicators have been highly achieved associated with development of suitable progeny testing method (Output 1), practice of appropriate AI techniques related to progeny testing (Output 2) and improvement of dairy farmers in feeding and dairy management (Output 3).

(3) Efficiency

Efficiency of the Project is relatively high. Though the Project period was limited, especially for progeny testing which normally requires seven-years period, all three Outputs with various expertise and target areas have been produced as planned. Dispatch of the Japanese experts, procurement of inputs, disbursement of the local expenses, as well as C/Ps training in Japan and India have been conducted timely. DAPH has assigned C/P personnel with specialized techniques to cover all types of activities. NLDB, Provincial DAPHs, and VSOs have assigned C/P personnel to implement the Project activities of their parts. As a result, DAPH and Experts have been able to effectively conduct the Project in different sites.

There have been external factors that stopped progeny testing procedure in 2012. Effects of Bovine Tuberculosis (TB) threatened the important assumptions such as 1. No major livestock epidemics or severe climate changes occur and 2. Partnership between the NLDB and the Project maintained, and hindered the implementation of the progeny test activities in 2012.

(4) Impacts

The impact of the Project is relatively high and there are noticeable positive impacts. It is assumable to say that the indicators of the Overall Goal will be achieved within three to five years after the completion of the Project. Continuation of the Project effects will depend on how far DAPH can collaborate with other C/P organizations and carry on the Project activities.

- Regarding Indicator 1 “Milk production of dairy farmers is increased by 20% in the target areas”, farmers who have participated ‘Farm Day’ improved feeding management by applying the improved technical package. Around half of the model farmers were recognized to have been increased the milk production.
- Regarding Indicator 2 “Progeny tested bull's semen is distributed over the country from AI Center”, as long as DAPH and NLDB continue carrying on the progeny testing which the Project is now rebuilding, it is expected that progeny tested bulls will be available after five years. Accordingly, AI using the semen of proven sires will be available at CAIS, Kundasale.
- Regarding Indicator 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”, through the introduction of the progeny testing in Sri Lanka, significance of the progeny testing has been recognized by C/Ps. DAPH and NLDB farms have strengthened knowledge and skills of the progeny testing process including selection of the stud bulls and planned mating cows, milk analysis, feeding management, weighing, record keeping, fodder production and AI techniques. While structuring the management framework specifically for the progeny testing is the precondition, it is expected that the progeny testing program will be established in Sri Lanka.
- From environmental aspect, hygiene conditions have been improved by the utilization of dung spreader in NLDB farm, bio-digester at the model farms, as well as renovation of AI centers. From the cultural aspect, trainees feel more comfortable with practical training utilizing the cow model introduced by the Project, without restraining the actual animal. From the gender aspect, the Project has been carried out with participations of female farmers as the model farmer as well as female VSs and LDIs. Their training opportunities increased through participations in ‘Farm Day’ events.

(5) Sustainability

Sustainability of the Project is relatively high.

<Policy aspect>

- Dairy sector development through supporting dairy farmers especially for small scale farmers remains to be an important development agenda for Sri Lanka as shown in various policies and strategies. It has been set as the policy goal to achieve self-sufficiency of milk production.

<Institutional & Financial aspect>

- Although new cadre within DAPH has not been established yet, DAPH has recognized its necessity as well as the necessity of strengthening the collaboration with NLDB, which is the station for the progeny testing.
- NLDB has been improving management of the farms including installment of new internet connections. However, it is still essential for NLDB to assign the persons in charge of the progeny testing because

progeny testing requires accurate process and recording. There have been some concern about securing budget for feeding expenses at the NLDB Andigama farm, however, C/Ps recognize its importance and has intension to secure budget.

- Provincial DAPHs have the strong ownership towards utilizing the model farms, improved technical package and ‘Farm Day’ and are eager to continue extension activities within and beyond the target areas. Provincial DAPHs have also been trying to increase the number of LDIs in response to the issues of limitations at VSOs in outreaching to farmers due to lack of resources.

<Technical aspect>

- The progeny testing concept and procedure have been acquired by DAPH and NLDB C/Ps. DAPH still recognizes the needs of further technical assistance by Japanese experts on monitoring of progeny testing especially genetic evaluation. As for feeding and dairy management, technical package has been acquired by the participated VSOs and model farmers. They are confident about their own techniques strengthened by the Project and are willing to continue disseminating these techniques to other satellite farmers. It has been pointed out that reproductive technology at the field level has to be improved further by training VSOs.

3-3. Factors promoting better sustainability and impact

(1) Factor concerning to Planning

- The Project design

The Project is aiming to increase productivity of small scale dairy farming through developing technical and institutional set-ups of the breeding and feeding management and therefore it is comprehensive.

- Effects of C/P training in Japan

C/P Training in Japan enhanced knowledge and techniques of DAPH C/Ps in progeny testing. C/Ps fully utilized newly gained knowledge and skills to their work including production of manuals, conducting lectures, applying in feeding and dairy management and planning for management framework for bio-security.

(2) Factors concerning to the Implementation Process

- Process and method of technical transfer

Awareness raising programmes for progeny testing, the improved technical package, model farm establishment and ‘Farm Day’ events have directly contributed on the technical transfer to the field officers as well as farmers. Especially, “10 things to do before you complain about your cows” is highly adopted by the participating farmers in ‘Farm Day’ because of low costs for practicing.

- Utilization of imported cattle through the Australian loan project and milking record collected through the FAO project

Even though the progeny testing has faced external hindering factors associated with TB and late puberty of the cows, availability of newly imported cows from Australia as well as milking data from the FAO project

for genetic evaluation has resumed the progeny testing procedure.

- Sense of the ownership among C/Ps towards progeny testing

C/Ps have recognized high significance of progeny testing for improvement of the genetic abilities of the stud bulls in Sri Lanka. Strong ownership of DAPH and NLDB is illustrated by the fact that they managed resuming the progeny testing even after the progeny testing bulls were culled due to TB.

3-4. Factors inhibiting better sustainability and impact

(1) Factors concerning to Planning

- There has been no hindering factor related to the planning.

(2) Factors concerning to the Implementation Process

- Influence of TB on implementation of the progeny testing

The progeny testing process has been stopped in 2012 because of culling of the progeny tested bulls in CAIS, Kundasale and the daughters of the progeny tested bulls in Dayagama farm to prevent further expansion of TB. After continuous discussion among C/Ps with the Experts, the progeny testing has been restarted with an alternative plan in 2013.

- Late puberty of the progeny tested cows

NLDB Andigama farm has been working on improvement of feeding and herd management in order to accelerate growth and puberty of animals in the farm.

3-5. Conclusion

The Project has successfully been implemented so far although there were several external factors occurred on the way and is expected to achieve its outputs by the end of the technical cooperation period. Regarding the breeding, as the Project aims for the development of suitable progeny testing method in Sri Lanka, the purpose of this component is expected to be fully achieved by the end of the Project period. However, in order to implement the actual progeny testing sustainably, institutional set-ups for progeny testing, necessary budget for enough feed in NLDB farms and strengthening the coordination between DAPH and NLDB is indispensable. Regarding the feeding and dairy management, as the targeted model farmers have already shown the effectiveness for the feeding and dairy management by applying the improved technical package and the dissemination of the developed package by 'Farm Day' in and beyond the target veterinary ranges has been implemented, the purpose of this component has been achieved already. Now the provincial DAPH and VSO officers are expected to take initiative for continuing these activities.

3-6. Recommendations

(1) Establishment of action plan for progeny testing and clarification of roles of the relevant C/Ps

In order to promote the progeny testing in Sri Lanka, clarification of the necessary roles of DAPH and NLDB is required. Also, it is essential for DAPH to establish the action plan and show clear picture of how to implement the progeny testing as well as coordination mechanism.

(2) Close communication between DAPH and NLDB

It is required for DAPH, which look after the overall progeny testing plan and NLDB, which actually conduct progeny testing to have a close communication. The Study Team suggest that it might have been able to avoid introducing a new milking parlor under the Australian loan project to NLDB Dayagama farm where JICA-granted milking parlor had already existed, if the information sharing had been kept among DAPH and NLDB and the better donor coordination had been done. Thus, the Study Team recommends for having better communication among progeny testing related parties.

(3) Strengthening the NLDB farm management for progeny testing

NLDB Dayagama farm, which is one of the important station farms for progeny testing, has imported cattle in 2013 under the Australian loan project. Consequently, this farm has been in a busy situation looking after both the loan project and the Project, which aims for different purposes. Therefore, it is necessary for the NLDB Dayagama farm to strengthen management system by assigning full-time personnel for the record keeping of the progeny testing related cattle.

(4) Continuous prevention measures against epidemics

CAIS is the sole sire station in Sri Lanka and risk management of stud bulls is crucial. Continuous prevention measures against epidemics shall be conducted to protect the Sri Lankan cattle from spreading the diseases and to sustain the result of the progeny testing.

(5) Continuous utilization of the technical package by Provincial DAPHs

The national and provincial projects targeting to the small scale dairy farmers have high consistency with the Project Output 3 activities. Therefore, it is recommended for Provincial DAPH to incorporate the improved technical package within the existing/new project plans. Furthermore, in order to maintain sustainability, necessary arrangements shall be done by Provincial DAPH to strengthen the resources attached to VS offices for delivering extension services.

(6) Mass extension activities with collaboration with other development partners

In the field of feeding and dairy management, other donors have deployed similar activities within the country. Therefore, it is effective to distribute the Project deliverables relating to Output 3 to such donors through DAPH and JICA office so that the utilization of the improved techniques can be promoted and that the 'Farm Day' can be conducted in the target area of the other donors.

3-7. Lessons Learned

(1) Although this project was conducted only by one long-term expert specialized in livestock techniques, this expert had to look after both the breeding and the feeding and dairy management improvement including wide dissemination. As the covered area for the technology transfer/ the number of the counterpart personnel/ the physical distance to move within the target area were huge, thus the burden of the expert was very high. It is necessary to consider, when formulating a similar project including the dissemination of the outputs, for the scope of work that can be accommodated by one expert.

- (2) The Project has faced two unexpected external factors, namely, TB disease and the imported cattle introduction to the NLDB farms. Accordingly, the Project had to correspond to several difficulties such as cull of the Project's progeny testing related cattle and transfer of the progeny testing cattle. Nevertheless, the Project could overcome such difficulties and is expected to highly achieve its outputs through having series of discussions among the experts and relevant C/Ps resulting to take appropriate correspondence. It can be said that the importance of progeny testing was well understood among all the related C/Ps through the activities of the experts at the early stage before the occurrence of the important assumption, thus led the C/Ps to show strong intension to continue the process of progeny testing. As infectious disease such as TB cannot be prevented completely and is difficult to predict, whenever these important assumption has occurred in the similar projects, it is expected to respond flexibly and sometimes necessary to make changes of the project activities through having good communication among the Japanese side and the counterpart side.
- (3) As progeny testing, which is one of the methods of genetic improvement of dairy cattle, is an advanced improvement system, it requires various conditions, including the cattle feeding and management and the pedigree registration in the target country. In addition, good coordination among related institutions is essential for progeny testing implementation. Whenever formulating a breeding project similar in the future, it is advised that a full survey on the management system for the improvement of the dairy sector in the target country should be conducted before the project implementation.

