Internal Ex-Post Evaluation for Technical Cooperation Project

conducted by Bhutan Office: June, 2023

Country Name	Strengthening Farm Mechanization Project Phase 2
Kingdom of Bhutan	

I. Project Outline

Background	The Royal Government of Bhutan (RoGB) had promoted farm mechanization and Agriculture Machinery Centre (AMC) under Ministry of Agriculture and Forests (MoAF) had been facilitating the supply of farm machinery as well as back-up service delivery after sales. AMC's capacity was enhanced through the JICA's technical cooperation "Strengthening Farm Mechanization Project" (2008-2011), which was the 1st phase of this project. However, there were still issues to be addressed, such as development of national certification standards for farm machinery. Improvement of hiring services of farm machinery was also necessary to disseminate the benefits of farm mechanization to poor farmers who could not afford to purchase agricultural machinery on their own. In addition, MoAF had a plan to promote farm mechanization in the southern region in the country, where the land is relatively flat, especially in Sarpang District in parallel with development of irrigation facilities.		
Objectives of the Project	Through (i) introducing objective basis for farm machinery selection, (ii) enhancing awareness of farm machinery safety and quality, (iii) improving machine performances[1] in the sites, and (iv) proposing improved service provision model of farm machinery, the project aims to have farmers have access to appropriate farm machinery in the sites, thereby contributing to having farmers have better access to appropriate farm machinery in Bhutan. 1. Overall Goal: Farmers have better access to appropriate farm machinery in Bhutan. 2. Project Purpose: Farmers have better access to appropriate farm machinery in the sites.		
Activities of the Project	1. Project site: Paro and Sarpang Districts. 2. Main activities: Draft test codes and standards for submission to Bhutan Standards Bureau (BSB), technical advice to the BSB technical committee activities for certification of farm machinery standards, application of the developed test codes and standards, awareness activities on the developed standards, analysis on the needs of machinery improvement for rice production in Sarpang and prioritization of the needs, improvement of the machine performance to meet the prioritized needs, verification of improved field performance of machinery; development of hiring service (HS) models of farm machinery, and test of hiring service provision modes in a pilot area. 3. Inputs (to carry out above activities) Japanese Side 1) Experts: (long-term) 4 persons, (short-term) 16 persons 2) Trainees received: 12 persons 3) Equipment: Measuring equipment, sample equipment, fabrication machines and special service tools. 4) Local cost Bhutanese Side 1) Staff allocated: 65 persons 2) Land, building and facilities: Project Office at AMC and office space at Farm Machinery Corporation Limited (FMCL), etc. 3) Local cost		
Project Period	(ex-ante) August 2014-July 2017 (actual) August 2014 – August 2018	Project Cost	(ex-ante) 313 million yen, (actual) 251 million yen
Implementing Agency	Agriculture Machinery Centre (AMC), Department of Agriculture, Ministry of Agriculture and Forests (MoAF) Farm Machinery Corporation Limited (FMCL)[2], Ministry of Finance		
Cooperation Agency in Japan	-		

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

- According to the conclusion of Japanese experts and AMC during the project implementation, the Project Purpose Indicator 1 ("At least 4 types of farm machines with certificate of AMC are distributed") was recognized to have been achieved once "a certificate of AMC, which could be defined as a test result sheet, had been issued for 4 types of farm machines", and this conclusion was applied in organizing information and judging the achievement status of Indicator 1 in the Completion Report (CR) of the project. This ex-post evaluation followed this conclusion of the Japanese experts and AMC, respecting the perspective of the CR. In this connection, distribution status at the time of project completion was not considered in making evaluation judgment on achievement status of the Project Purpose Indicator1; however, distribution status at the time of ex-post evaluation was checked to confirm the effects of the Project Purpose Indicator 1.
- The CR recommended to use the 3 new Overall Goal indicators instead of the existing indicator set in the logical framework to confirm the achievement status of the Overall Goal separately for AMC and FMCL along with the Project Purpose and based on the AMC's 12th five-year plan (FYP) (July 2018-June 2023: Bhutanese Fiscal Year (BFY) 2018/19-2022/23) and the FMCL's tentative future plan for the 12th FYP period[3]. The logical framework, however, was not modified. In this ex-post evaluation, the existing indicator was used according to the logical framework. In addition, respecting the

[1] Description based on the latest logical framework dated December 23, 2016. Initially, improvement of "operating patterns" was also included. In the Minutes of the Meeting signed on the above date, although there was no reference to the change of the output, improvement of "operating patterns" was deleted from the activities to focus on performance test. It is considered that the intent was, in effect, to delete "operating pattern" from the output as well. So, the description of the logical framework was used.

[2] AMC was separated into to 2 organizations i.e., AMC and FMCL, a state own enterprise newly established in August 2016, which carried out all the commercial activity earlier done by AMC. Inclusion of FMCL into the Implementing Agency was approved at the 2nd Joint Coordination Committee (JCC) meeting in August 2016.

[3] Through the field survey, FMCL confirmed that the period of the tentative future plan coincided with that of the 12th FYP.

perspective of the CR, the 3 indicators recommended by the CR were used as Supplementary Information (SI): "12 numbers of quality and safe farm machineries and spare parts are ensured by the end of BFY2022/23" (SI-1); "12 numbers of appropriate technologies for farm machineries are developed and disseminated through research & development (R&D) activities by the end of BFY2022/23 (SI-2)"; and "(a) 68,400[4] acres is covered by HSs by the end of BFY2020/21 and (b) 122,000 acres by BFY2022/23 respectively as accumulated yearly acreage[5] in the whole country from BFY2018/19" (SI-3)[6]. In the case of SI-3, the target figures stated in the CR were the tentative targets of the FMCL's unofficial tentative plan, so that the progress against the finalized targets of the FMCL's official plan was also checked (i.e., 58,469 acres by BFY2020/21 and 109,469 acres by BFY2022/23). In making the judgement, more weight was placed on the finalized targets as they are the official targets of FMCL.

1 Relevance/Coherence

[Relevance]

<Consistency with the Development Policy of Bhutan at the Time of Ex-Ante Evaluation >

The project was consistent with the development policy of Bhutan at the time of ex-ante evaluation. The 11th five-year plan (FYP) (July 2013-June 2018), the national plan of Bhutan, stated that labor shortage including increasing feminization of the agricultural labor force was becoming one of the leading constraints in agriculture production and set forth enhancing agriculture productivity by farm mechanization.

<Consistency with the Development Needs of Bhutan at the Time of Ex-Ante Evaluation >

The project was consistent with the development needs of Bhutan for strengthening farm mechanization at the time of ex-ante evaluation as stated in "Background" above.

<Appropriateness of Project Design/Approach>

The project design/approach was appropriate. No problem attributed to the project design/approach was confirmed.

<Evaluation Result>

In light of the above, the relevance of the project is ③[7].

[Coherence]

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

The project was consistent with the Japan's ODA policy to Bhutan at the time of ex-ante evaluation[8], which included assistance to modernization of agriculture and development of agriculture infrastructure under one of the priority areas of agriculture and rural development.

<Collaboration/Coordination with other JICA's interventions>

The collaboration/coordination between this project and JICA's "The Project for the Rehabilitation of Taklai Irrigation System in Sarpang District" (Grant Agreement (G/A) in 2013)[9] and 2KRs from 1984[10] of JICA was planned at the time of ex-ante evaluation and was implemented, and the positive effects were confirmed at the time of ex-post evaluation.

<Cooperation with other institutions/ Coordination with international framework>

Any cooperation/coordination with other institutions/international framework was not clearly planned at the time of ex-ante evaluation.

<Evaluation Result>

In light of the above, the coherence of the project is ③.

[Evaluation Result of Relevance/Coherence]

In the light above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

<Status of Achievement of the Project Purpose at the Time of Project Completion>

At the time of project completion, the Project Purpose was mostly achieved as planned. In total, 4 types of farm machinery[11] (target: at least 4 types) with a total of 7 models were tested and the test results sheets were issued by AMC (Indicator 1). In the project sites, the "farm mechanized area ratio" of "land preparation" (i.e., the ratio of the total area of land preparation by the HS to the total cultivated area) increased by 7.6 points (target: 10 points) from 4.1 % in BFY2013/14 to 11.7% in BFY2017/18[12] (Indicator 2). Farm machines modified/developed by the project (5 types of machines in total) were introduced in the project sites (Indicator 3).

<Continuation Status of Project Effects at the Time of Ex-Post Evaluation>

By the time of the ex-post evaluation, the project effects have been continued. The test codes and standards for the 6 types of farm machines developed under the project[13] have been endorsed by BSB as Bhutanese Standard and have been utilized in Bhutan. In addition, the test codes and standards for the additional 2 types of farm machines have been newly developed, endorsed by BSB, and used. In the project sites, both Central and Gewog (block)[14] HS models developed under the project have been operational. Further, the Central HS

4 The figure stated in the proposed indicator (68,300) is a simple error of "68,400" because the tentative target by BFY2021/22 shown in the CR is 68,421.

5 The phrase used in the proposed indicator ("a yearly accumulated acreage") was considered as a simple error of "accumulated yearly acreage".

6 Through the field survey, FMCL confirmed that the base, the interim target, and the final target years shown in the proposed indicator (i.e., 2019, 2021, and 2023) meant BFY2018/19 (the first year of the 12th FYP), BFY2020/21, and BFY2022/23 (the final year of the 12th FYP).

7 ④:very high, ③:high, ②:moderately low, ①:low * To be the same afterwards.

8 ODA country data collection (2014).

9 Sarpang District was the target area of this project, and synergy effects were expected to be achieved by combining the improvement of farmers' access to irrigation water and the promotion of the use of farm machines through this project.

10 By establishing an efficient way of using farm machines through this project, it was expected to make more effective use of the farm machines provided under 2KRs.

11 Power tiller, walk behind power reaper, oil expeller, and mini tiller.

12 Physical progress in BFY2017/18 was a significant expansion comparing to the previous years. One of the improvements was that the central HSs had large expansion areas where AMC/FMCL had never deployed before. In addition, the power tiller, which had been procured through the Japanese grant aid "The Project for Improvement of Farm Machinery for Hiring Services of Tillage" (G/A in 2016), targeting Paro District, were distributed and contributed to the expansion.

13 Power tiller, walk behind power reaper, oil expeller, mini tiller, rice mill and cereal flaking machine.

14 Gewog (block) is the administrative division under District.

model has been expanded to 3 other existing regional centers and 19 newly established Farm Mechanization Service Centers (FMSC)[15] of FMCL. The Gewog HS model has been expanded to all gewogs in all 20 districts. As for the 4 types of farm machines for which the test results sheets were issued under the project, 50 additional models have been developed and tested, but only 3 types of machines[16] have been distributed/utilized in the project sites. In the project sites, the "farm mechanized area ratio" of "land preparation" by the HSs was increased from 11.7% in BFY2017/18 to 29.3% in BFY2021/22[17]. All of the 5 types of farm machines modified/developed under the project have been not only utilized in the project sites but also in other districts. In addition, 11 types of farm machines have been modified with 11 newly developed appropriate technologies. Seven of them have been already introduced in the project sites and other districts (see the results of SI-1 below).

<Status of Achievement of the Overall Goal at the Time of Ex-Post Evaluation>

At the time of ex-post evaluation, the Overall Goal has been mostly achieved as planned. Average of farm mechanization area ratio[18] in Bhutan increased by 19.2 points (target: 10 points) from 7.8% in BFY2015/16 to 27.0% in BFY2020/21. The actual result largely exceeded the target mainly due to (i) expansion of the HS models as stated earlier, (ii) increased interests of farmers in the FMCL's HSs promoted by provision of experienced operators, (iii) offering the HSs at a lower rate than the private sector with subsidies from the RoGB, and (iv) distribution of new machines procured under the Japanese grant aid projects for the HSs (Phase 1 and Phase2) (see footnote16) (Indicator). From BFY2019/20 to 2021/22, as many as 14 quality and safe farm machines and spare parts were ensured by AMC by testing them with the developed test codes and standards, utilizing the knowledge and techniques of the project and with support from BSB. This number already exceeded the target by BFY2022/23 (i.e., 12), but AMC plans to test 3 more machines to ensure quality and safety in BFY2022/23 (SI-1). From BFY2019/20 to 2021/22, AMC developed 11 appropriate technologies, utilizing the knowledge and techniques of the project, and disseminated 7 technologies, which was respectively 92% and 58% of the target by BFY2022/23 (i.e.,12 technologies developed and disseminated) and, for reference, 109% and 88% of the target by BFY2021/22 (i.e., 8 technologies developed and disseminated). In BFY2022/23, AMC plans to develop 3 technologies and disseminate 7 technologies[19]. So, it is likely that AMC will develop and disseminate 14 technologies by BFY2022/23 (SI-2). From BFY2018/19 to 2020/21, FMCL covered 46,822 acres by the HSs in Bhutan, which accounted for 68% of the tentative target and 79% of the official target by BFY2020/21. The actual results were below the targets primarily due to (i) aging deterioration of the existing farm machines[20] and (ii) the border closure caused by the COVID-19 pandemic in BFY2020/21, which led to increase of number of non-functional machines due to unavailability of spare parts[21] (SI-3-(a)). The adverse effect of the COVID-19 pandemic continued in the following year. By BFY2021/22, FMCL covered 54,765 acres by the HSs in Bhutan, which accounted for 45% of the tentative target and 50% of the finalized official target by BFY2022/23. According to FMCL, the service demand has increased since new farm machines were received through the Japanese grant aid project for the HSs (Phase 2) in March 2022, and it expects to achieve not only the official target of approximately 109,000 acres but also the tentative target of approximately 122,000 acres by BFY2022/23 (SI-3-(b)).

<Other Impacts at the Time of Ex-Post Evaluation>

The HS models developed under the project is very essential and useful for socially vulnerable farmers who cannot afford to purchase agriculture machinery on their own. The farmers have availed the farm machinery through the HSs provided by FMCL. Positive impacts on gender have been observed such as availability of the mini tiller modified and tested by AMC, which can be operated by females, and farm feminization due to mechanization promoted by the HSs by FMCL. As explained earlier, the farm machines received through the Japanese grant aid projects for the HSs (Phase 1 and Phase 2) have been used in the HSs of FMCL, which is greatly contributing to increase of the farm mechanization and availability of the HSs for farmers. Meanwhile, negative impacts have not been observed.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ③.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results	Source
(Project Purpose) Farmers have better access to appropriate farm machinery in the sites.	Indicator 1: At least 4 types of farm machines with certificate of AMC are distributed.	Status of the Achievement (Status of the Continuation): achieved as planned (continued) (Project Completion) -Four types of farm machines (7 models) were tested, and the test results sheets were issued by AMC. (Ex-Post Evaluation) Additional 50 models for the 4 types of farm machines have been tested, but only 3 out of the 4 types of farm machines have been distributed and used (see footnote 15 for the reason)	Completion Report (CR), questionnaire and interview survey to AMC
	Indicator 2: Farm mechanized area ratio" of "land preparation"	Status of the Achievement (Status of the Continuation): mostly achieved as planned (continued and further developed) (Project Completion) >Farm mechanized area ratio of land preparation by HSs in the project sites.	CR, questionnaire and interview survey to

15 FMSC is a small service centre established to facilitate operation and maintenance of farm machines in remote area.

16 Power tiller, walk behind power reaper, and mini tiller. The other one (oil expeller) has not been distributed/utilized due to lack of demand. There are few farmers who use oil expeller because there are few private companies who deal with it.

17 The new farm machines became available to FMCL through the grant aid project for the HSs mentioned in footnote 11 as well as its Phase 2 project (G/A in 2020) targeting the whole Bhutan (handover in March 2022).

18 It means the ratio of total number of farm machines to total cultivated area in a year according to the definition confirmed by AMC.

19 In BFY2022/23, it is the main priority of AMC to disseminate all the existing technologies, including the 3 technologies it plans to develop.

20 According to FMCL, the use of the FMCL's HSs is maximum during a time when FMCL has new farm machines and the demand for the HSs decrease as machines get older.

21 It is noted that JICA has dispatched a Senior Volunteer at FMCL, who are specialized in molding and fabrication of spare parts. This is expected to meet some demand of spare parts once FMCL would be able to multiply. FMCL has also started with best staff award system to motivate the staff to utilize the farm machines more efficiently. AMC has also continued to train farmers on O&M at Agriculture Machinery Training Center (AMTC) to ensure the efficient use of the farm machines.

	increases by 10 points from 4.1% in the sites.	BFY / 2013/14 / 2014/15 / 2015/16 / 2016/17 / 2017/18 Total area of land preparation by HS (acres)=(A): 2,228 / 4,250 / 4,892 / 4,286 / 6,298 Total cultivated area (acres) =(B): 53,742 Farm mechanized area ratio of land preparation =(A)/(B): 4.1% / 7.9% / 9.1% / 8.0% / 11.7% (Ex-Post Evaluation) >Farm mechanized area ratio of land preparation by HSs in the project sites. BFY / 2018/19 / 2019/20 / 2020/21 / 2021/22* Total area of land preparation by HS (acres) =(A): 5,015 / 4,844 / 4,951 / 4,336 Total cultivated area (acres) =(B): 16,689 / 16,487 / 16,348 / 14,818 Farm mechanized area ratio of land preparation =(A)/(B): 30.1% / 29.6% / 30.3% / 29.3% *As of June 21, 2022.	FMCL
	Indicator 3: Machines modified / developed by AMC are introduced in the sites.	Status of the Achievement (Status of the Continuation: mostly achieved as planned (continued and further developed) (Project Completion) -Five types of farm machineries with technologies developed by the project were introduced in the project sites. (Ex-Post Evaluation) -All of the 5 types of farm machines have been used in the project sites and other districts. In addition, new technologies have been developed for 11 more types of farm machines and 7 of them have been already introduced to the project sites and other districts (see the results of SI-2).	CR, questionnaire and interview survey to AMC, field observation
(Overall Goal) Farmers have better access to appropriate farm machinery in Bhutan.	Indicator 1: Average of farm mechanization area ratio increase by 10 points from 7.8% in Bhutan by BFY2020/21.	(Ex-Post Evaluation) achieved beyond the plan >Average farm mechanization area ratio in Bhutan. (Base year) BFY 2015/16: 7.8% BFY2018/19: 16.5% BFY2019/20: 16.8% (Target Year) BFY2020/21: 27.0% Degree of increase[22]: 19.2 points	Questionnaire and interview survey to AMC
	SI-1: 12 numbers of quality and safe farm machineries and spare parts are ensured by the end of BFY2022/23.	(Ex-Post Evaluation) achieved beyond the plan >Number of quality and safe arm machineries and spare parts ensured. BFY / 2018/19 / 2019/20 / 2020/21 / 2021/22 / (Ref) 2022/23 AMC's target in 12th FYP: 2 / 3 / 2 / 3 / 2 Actual: 2 / 5 / 3 / 4 / (Plan: 3)	Questionnaire and interview survey to AMC
	SI-2: 12 numbers of appropriate technologies for farm machineries are developed and disseminated through R&D activities by the end of BFY2022/23.	(Ex-Post Evaluation) mostly achieved as planned >Number of appropriate technologies developed and disseminated. BFY / 2018/19 / 2019/20 / 2020/21 / 2021/22 / (Ref) 2022/23 AMC's target in 12th FYP: 1 / 1 / 4 / 2 / 4 Actual number of appropriate technologies developed: 1 / 1 / 2 / 7 / (Plan: 3) Actual number of the appropriate technologies disseminated: 1 / 1 / 2 / 3 / (Plan: 7)	Questionnaire and interview survey to AMC
	SI-3: (a) 68,400 acres is covered by HSs by the end of BFY2020/21 and (b) 122,000 acres by BFY2022/23 respectively as accumulated yearly acreage in the whole country from BFY2018/2019.	(Ex-Post Evaluation) (a) mostly achieved as planned: (b) partially achieved (See < Special Perspectives Considered in the Ex-Post Evaluation>.) >Coverage by HSs in Bhutan (unit: acres) BFY / 2018/19 / 2019/20 / 2020/21 / (a)By 2020/21 / 2021/22 / 2022/23 / (b)By 2022/23*4 Unofficial tentative target at project completion: 20,260 / 23,072 / 25,089 / 68,421 / 26,879 / 26,879 / 122,179 Official target finalized after project completion: 19,334 / 17,104 / 23,031 / 59,469 / 25,000 / 25,000 / 109,469 Annual result: 13,913 / 16,641 / 16,268 / 7,943 Accumulated result: 13,913 / 30,554 / 46,822 / 46,822*2 / 54,765*3 *1: The annual results were below the targets primarily due to aging deterioration of the existing farm machines and the border closure caused by the COVID-19 pandemic, which led to increase of number of non-functional machines due to unavailability of spare parts. *2: Achievement rates of the tentative and official targets by BFY2020/21 were 68% and 79% respectively. *3: Achievement rates of the tentative and official targets by BFY2022/23 were 45% and 50% respectively. *4: FMCL expects to achieve not only the official but also the tentative target for the 12th FYP by BFY2022/23 because the demand for HS has increased since the new machines were received through the Japanese Grant Aid project in March 2022。	Questionnaire and interview survey to FMCL

[22] For major promoting factors, please see footnote 16.

3 Efficiency

The project cost was within the plan (the ratio against the plan: 80%) and the project period exceeded the plan (the ratio against the plan: 136%). The project period was extended because there were some lapses in implementing the project activities due to bifurcation of FMCL from AMC (see footnote 2 for details). Outputs were produced as planned. In the light above, the efficiency of the project is ③.

4 Sustainability

<Policy Aspect>

The 12th FYP for Renewable Natural Resource Sector, prepared by MoAF, sets forth enhancement of agriculture infrastructure and farm mechanization, including promotion of farm mechanization through supply of machineries and HSs. In addition, the AMC's target under DOA's 12th FYP is to provide technical support services in the agriculture technology.

<Institutional/Organizational Aspect>

At AMC, organizational structure to promote farm mechanization has been unchanged and functioning. FMCL is in the process of expanding the services center: 19 FMSCs have been established across the country since 2017. The expanded structure has been functioning. Both AMC and FMCL have secured necessary staff to assume their roles (40 technical staff members at AMC and 248 staff members at FMCL, including 45 machine operators and 42 staff members closely related to the Mechanization Service Department). AMC has maintained the linkages with the international agencies like International Organization for Standardization (ISO), Asian and Pacific Network for Testing of Agricultural Machinery (ANTAM) and agencies in other countries like Bureau of Indian Standards and Japan Industrial Standard Committee through BSB.

<Technical Aspect>

Both AMC and FMCL have sustained necessary skills and knowledge to promote farm mechanization through various types of training.[23] The manuals, guidelines, and materials developed under the project have been continuously used. All the equipment provided under the project have been maintained in good condition and used as well.

<Financial Aspect>

AMC has secured the necessary budget to promote farm mechanization from the RoGB through MoAF. FMCL has also secured the necessary budget from the subsidy from the RoGB and the income generated from the HSs. However, the RGOB has determined to withdraw the subsidy from FMCL from BFY 2022/23 due to the limited budget caused by the COVID-19 pandemic. Therefore, FMCL is working on developing a strategic plan to execute the HSs even in the absence of the subsidy: the plan to offer the HSs to the private HS companies in addition to individual farmers.

<Environmental and Social Aspect>

No issue on environmental and social aspect has been observed and it has not been necessary to take any countermeasures.

<Evaluation Result>

In light of the above, slight problem has been observed in terms of the financial aspect. Therefore, the sustainability of the project effects is ③.

5 Summary of the Evaluation

The project mostly achieved as planned the Project Purpose ("Farmers have better access to appropriate farm machinery in the sites") and mostly achieved as planned the Overall Goal ("Farmers have better access to appropriate farm machinery in Bhutan"). After the project completion, the effects of the project have continued. As for the sustainability, no problems have been observed in terms of the policy, institutional/organizational, technical, and environmental and social aspects. Considering all of the above points, this project is evaluated to be highly satisfactory.

III. Recommendations & Lessons Learned

Recommendations for Implementing Agency:

- In response to the government's decision to withdraw the subsidy, FMCL need to complete development of the strategic plan to offer HSs to the private sector as soon as possible. While developing the strategic plan, FMCL need to consider constructive consultation with private HS providers and farmers. FMCL could provide technical and other necessary support to enhance the service delivery by the private sectors, ultimately playing a vital role as nodal agency.

Lesson Learned for JICA:

- In technical cooperation project in the agriculture sector, including establishment of a HS system of farm machines, JICA may carefully consider understanding the stand of government effort and issue in procuring the spare parts of farm machines to be used in the HS system to be established at the time project planning, so that the lack of easily available spare parts would not affect the HS system after the project completion. Dispatch of JICA experts/volunteers to address the identified issue during the implementation of the project will be also useful in trying to resolve the issue.
- Through the project, some positive impact towards gender approach was seen, increasing women engagement in farm machineries. Therefore,when selecting the farm machines, it is necessary to predict distribution and usage demand including gender aspects in advance to ensure continued utilization after the project completion.

[23] AMC provides in-service training on farm machinery for the existing staff and training related to its core mandates and hands-on training to the new staff. FMCL provides both on-the-job training and training modules on mechanical maintenance and operation to the technical staff. In addition, the technical staff is given a chance to participate in the training related to farm machines whenever there is such training. For example, when FMCL received farm machines through the Japanese grant aid for HSs (Phase 2), the technical staff participated in the training given by the consultant of JICA. Further, AMC continues training for farmers on O&M of farm machines at AMTC, including topics introduced under the project such as farm machinery safety and quality and developed techniques/standards.

Face-to-Face interview with farmer (Beneficiaries) of Chuzergang Gewog, a project site in Sarpang District

Paddy field in Senggey Gewog, Sarpang district. A farmland that was initially developed through FMCL HS by farmers, who are still active users of HS today