

**Ministry of Agriculture and Forests
The Kingdom of Bhutan**

**THE PREPARATORY SURVEY REPORT
ON
THE PROJECT
FOR
IMPROVEMENT OF FARM MACHINERY
FOR HIRING SERVICES OF TILLAGE (Phase 2)
IN
THE KINGDOM OF BHUTAN**

February 2020

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

**KATAHIRA & ENGINEERS INTERNATIONAL
INGÉROSEC CORPORATION**

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey on the Project for Improvement of Farm Machinery for Hiring Services of Tillage (Phase 2), and entrust the survey to the joint-venture consisting of KATAHIRA & ENGINEERS INTERNATIONAL and INGÉROSEC CORPORATION.

The survey team held a series of discussions with the officials concerned of the Royal Government of Bhutan, and conducted field investigations. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Royal Government of Bhutan for their close cooperation extended to the survey team.

February 2020

MAKINO Kouji
Director General,
Rural Development Department
Japan International Cooperation Agency

Summary

1. Background of the Project

In the Kingdom of Bhutan (hereinafter referred to as “Bhutan”), the Ministry of Agriculture and Forests (MOAF) started hiring services directly managed by Agriculture Machinery Centre (AMC) in 2013 to promote hiring services. In January 2016, AMC operated the 102 power tiller units in the whole country divided into four regions. Furthermore, in order to expand the cultivation service nationwide, AMC launched gewog (county) hiring services to meet the demand at the gewog level in September 2015. The gewog hiring services deployed 239 power tillers procured by 2KR in 2013 in 205 gewogs nationwide.

Since July 2016, the hiring services have been transferred to Farm Machinery Corporation Limited (FMCL), a newly established public corporation. FMCL implements two types of farm machinery service in parallel; one is the direct management of Central Hiring Service, another is Gewog Hiring Service. The 353 tillers granted in 2018 by the Phase 1 project, which is the predecessor of this project, are mainly located in the gewog hiring service, which has been successful in increasing the hiring service area.

However, farmers demand for hiring services is more than supply, and the existing farm machinery does not meet the demand. In addition, there are demands for providing a variety of hiring services that can be handled with high work capacity in narrow terraced paddy fields in which it is difficult to use normal tillers, or relatively flat and large-area farm fields. Furthermore, MOAF is promoting the development of new farmland and the reuse of fallow land, which is expected to increase. Thus, it became apparent that it was difficult to achieve the cultivated area target by farm mechanization highlighted in 12th FYP with the existing farm machinery.

Under such circumstances, the Government of Bhutan requested “the Project for Improvement of Farm Machinery for Hiring Services of Tillage (Phase 2)” (hereinafter referred to as “the Project”) to Japan, which procures farm machinery including power tillers and strengthens the hiring service system in order to meet the farmer’s demands for hiring services.

Based on the above situation, the Project aims to improve farmers’ access to farm machinery and contribute to sustainable economic growth by providing farm machinery necessary for hiring services throughout Bhutan.

This Preparatory Survey was conducted for the purpose of verifying the necessity and relevance of the above-mentioned request, as well as drafting a preliminary design appropriate for a grant aid project, to design an equipment procurement plan (quantity, specification of each item, and so forth) and an equipment O&M plan and estimate the approximate project cost. The equipment items finally requested as a result of discussions and confirmations under this Survey are listed in Table below.

Table 1 List of Requested Equipment

Initial Request		Final Request	
Equipment	Quantity	Equipment	Quantity
Power Tiller	400 units	Power Tiller	200 units
—	—	Mini Tiller	150 units
—	—	Tractor	30 units
—	—	Combine Harvester	20 units
—	—	Stone Picker	5 units
—	—	Maintenance Equipment	1 set

The initial request was 400 power tillers, but due to the operation results of the equipment obtained through the previous hiring service and the demands of farmers, the final request was a variety of farm machinery that would enable efficient operation under differing field conditions.

2. Summary and Project contents

(1) Basic Concept of the Project

In Bhutan, when “plowing + rotovating work” is not completed in 15 days, it will miss the appropriate time for cereal cultivation and have a great impact on the harvest. Nearly 3,000 power tillers have been provided by 2KR so far, but this has benefited relatively large-scale and well-funded farmers who can purchase power tillers, and the majority of small-scale farmers still rely on human power and cow cultivation. Because of this, they may not be able to complete the work within the scheduled period and may miss the proper planting time. In recent years, there has been an increase in fallow land due to the labor shortage because of the outflow of young people into urban areas and the aging of rural areas. These became factors that hinder increases in crop production. In response to this situation, the government of Bhutan has raised its food self-sufficiency ratio as one of its objectives in the 12th FYP, and aims to increase the production of crops through the development of farmland and reuse of fallow land.

In order to increase the production of these agricultural products, FMCL plans to provide a wide range of hiring services to farmers who are currently having difficulty accessing hiring services and meet the increased needs of farmers. With this, FMCL aims to expand the cultivated area by hiring services and raise the farm mechanization rate from 17.7% to 24.3% by 2023.

The Project will improve farmers’ access to farm machinery and increase agricultural productivity by procuring farm machinery necessary for hiring services. The Project aims to contribute to the improvement of food security in Bhutan.

(2) Design Policy

The Project covers the whole of Bhutan, and several types of farm machinery were requested depending on the field conditions. The validity of the requested equipment is described below as the scope of grant aid. FMCL's farm machinery operation report and each RFMCL's hiring service staff report that it is difficult to turn a normal cultivator in a steep and narrow terraced paddy field. Also, when moving the power tiller to upper terraced paddy fields, there are no paths, so power tillers over

300 kg are lifted manually from above and below by two people: the operator and the assistant. It is very dangerous and difficult to do this on steep terraced paddy fields. However, a mini tiller is about 80 kg, so it can move easily. In addition, turning in a narrow field is also easy. In order to promote farm mechanization, it is necessary to deal with the terraced paddy fields in Bhutan, and there is great need for mini tillers.

Tractors with high work efficiency are in high demand because they can provide services efficiently in the southern flat areas of Paro and Punakha where there are relatively flat and large fields.

As for combine harvesters, when harvesting paddy by human power, the harvested paddy is placed on the field, dried and then threshed. However, if there is rain when drying after mowing in the late rainy season, the rice ears get wet and the quality deteriorates. In harvesting with a combine harvester, threshing is done at the same time as harvesting, bagging and after that storage in the farmhouse's warehouse. Drying is done in the sun on a sunny day, so the quality of rice does not deteriorate. Therefore, in areas where there are flat and large fields, the need for combine harvesters is high, as is the case with tractors.

The specifications of each piece of equipment shall include actual performance levels suitable for fields in Bhutan. The numbers of each unit will be the minimum necessary to achieve the targets set by FMCL for the 12th FYP.

(3) Equipment to Be Procured (Plan)

The quantity and location of each item of equipment are summarized in the table below.

Table: List of Equipment to Be Procured (Plan)

Item	RFMCL (units)				AMC TC (units)	TOTAL (units)	
	Paro (West)	Bajo (Central)	Samtenling (South)	Khangma (East)			
Power Tiller	50	50	44	50	6	200	
Mini Tiller	20	35	39	50	6	150	
Tractor	6	3	14	5	2	30	
Combine Harvester	9	2	5	3	1	20	
Maintenance Equipment	Mechanical Tool Set	10	14	11	22	0	57
	Hot Water High-Pressure Washer	1	1	1	1	1	5
	Special Wrench	2	2	2	2	0	8
	Torque Wrench	2	2	2	2	0	8
	Grease Gun	2	2	2	2	0	8

3. Project implementation schedule and project cost

If this Project should be implemented pursuant to the Grant Aid Scheme of the Government of Japan, the project design period will be 4.5 months, and the equipment supply period will be 9.5 months. The Project will be implemented in accordance with Japan's Grant Aid scheme and the cost will be determined before concluding the Exchange of Note (E/N) for the Project.

4. Project Evaluation

(1) Relevance

The average farmland area per farmhouse in Bhutan is about 1 ha. It is not reasonable from the scale of farming that a small-scale farmer with less than 1 ha of farmland owns a power tiller. It is appropriate for these farmers to use public hiring services. Considering the scale of farming in Bhutan, there is relevance and appropriateness to support small-scale farmers through public hiring services.

FMCL provides services to farmers who have had difficulty with access to hiring services with the expansion of farm machinery service centers in 41 locations nationwide in order to increase the operational efficiency of the equipment, and the expansion of hiring services using farm machinery. In response to these new demands, power tillers procured in the Phase 1 project have been properly placed and have been operating.

Under the 12th FYP, MOAF is promoting the reuse of fallow land and the development of new farmland to increase food production, so demand for hiring services is expected to increase in the future. FMCL is also strengthening hiring services to achieve the goals of farm mechanization during the 12th FYP period. For that reason, each RFMCL, which is planning to add more AMSC in the future, will require additional power tillers. Also, in order to meet the various demands of farmers, there is a high need for mini tillers that can cultivate steep and narrow rice terraces for which, up to the present, have been difficult to provide hiring services. In addition, there is a great need for tractors and combine harvesters that have high working capacity in large fields. The procurement of equipment will enable FMCL to meet more demand for hiring services and to achieve the 12th FYP target. Therefore, the relevance of the project is sufficient.

(2) Effectiveness

1) Quantitative Effects

Table: Quantitative Effects

Indicator	Baseline (2018)	Target (2023) ^{※1} (2 years after the Project completion)
Cultivated area by hiring services (ha/year)	10,492	17,008
Harvested area by hiring services (ha/year)	805	1,945
Tillage mechanization rate (%) ^{※2}	17.66	24.34

※1: 12th FYP target for FMCL

※2: Tillage mechanization rate (%) = Total cultivated farmland area ÷ (Farmland area cultivated by FMCL hiring service and farmer-owned machinery)

Tillage machines are power tillers, mini tillers and tractors.

2) Qualitative Effects

Qualitative Effects of this Project will be as follows:

- Improvement of efficiency of farm work.
- Promotion of utilization of fallow land
- Improvement of agricultural productivity
- Promotion of employment in rural areas (employment of operators)

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AMC : Agriculture Machinery Center

FMCL : Farm Machinery Corporation Limited

RFMCL : Regional Farm Machinery Corporation Limited
(Location for procured equipment)



Location Map of Survey Area

(1) Power Tiller



Main Unit



Accessory
(Single reversible plow)

(2) Mini Tiller



Main Unit



Accessory
(Rotary)



(Single reversible plow)



(Deep Rotary)

(3) Tractor



Main Unit



Accessory
(Rotary)

(4) Combine Harvester



Main Unit



Accessory
(Aluminum Bridge)

(5) Maintenance Equipment



Mechanical Tool Set



Hot Water
High-Pressure Washer



Special Wrench



Torque Wrench



Grease Gun

Images of Equipment

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Abbreviations

AMC	Agriculture Machinery Centre
AMSC	Agriculture Machinery Service Centre
A/P	Authorization to Pay
B/A	Banking Arrangements
DOA	Department of Agriculture
E/N	Exchange of Notes
FMCL	Farm Machinery Corporation Limited
FMSC	Farm Machinery Service Center
FYP	Five-Year Plan
G/A	Grant Agreement
JICA	Japan International Cooperation Agency
2KR	2nd Kennedy Round
M/D	Minute of Discussion
MOAF	Ministry of Agriculture and Forests
RAMC	Regional Agriculture Machinery Centre
RFMCL	Regional Farm Machinery Corporation Limited
RNR	Renewable Natural Resources

Unit

Nu.	Ngultrum (Bhutan currency unit)
ha	hectare (1ha = 2.47acres)

Local Units of Bhutan

Dzongkhag	Prefecture
Gewog	County
Chiwog	Village

CHAPTER 1. Background of the Project

1-1 Background of the Request and Summary

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However, farmers demand for hiring services is more than supply, and the existing farm machinery does not meet the demand. In addition, there are demands for providing a variety of hiring services that can be handled with high work capacity in narrow terraced paddy fields in which it is difficult to use normal tillers, or relatively flat and large-area farm fields. Furthermore, MOAF is promoting the development of new farmland and the reuse of fallow land, which is expected to increase. Thus, it became apparent that it was difficult to achieve the cultivated area target by farm mechanization highlighted in 12th FYP with the existing farm machinery.

Under such circumstances, the Government of Bhutan requested “the Project for Improvement of Farm Machinery for Hiring Services of Tillage (Phase 2)” (hereinafter referred to as “the Project”) to Japan, which procures farm machinery including power tillers and strengthens the hiring service system in order to meet the farmer’s demands for hiring services.

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The initial request was 400 power tillers, but due to the operation results of the equipment obtained through the previous hiring service and the demands of farmers, the final request was a variety of farm machinery that would enable efficient operation under differing field conditions.

1-2 Natural Conditions

The geology of Bhutan is mostly clay-silt mixed with sand gravel due to river deposits except for the bedrock. The uncultivated land in the river basin contains a lot of human head-sized rocks, so it is necessary to remove these rocks for farmland development. Moreover, there are many cases where rocks that cannot be removed even in a field currently under farming are mixed. As for the mobility and workability of farm machinery in the field, there are no particular geological problems because of past experience. But it is assumed that plows are worn and damaged more than in Japan due to the sandy-gravel soil.

The climate changes greatly due to the difference in elevation from north to south, and can be divided into the following three categories.

- High mountain, tundra climate in the northern Himalayas with an altitude of over 3,000m.
- Monsoon climate in the midland with altitudes from 1,200 to 3,000m.
- Subtropical climate of the Southern Tarai Plain with an altitude below 1,200m.

1-3 Environmental and Social Considerations

The Project, which plans to procure equipment for hiring services, falls under Category C under “JICA Guidelines for Environmental and Social Considerations”. It was also confirmed that there was no environmental and social impact from similar farm machinery procured through past grant aid.

CHAPTER 2. Contents of the Project

2-1 Basic Concept of the Project

In Bhutan, when “plowing + rotovating work” is not completed in 15 days, it will miss the appropriate time for cereal cultivation and have a great impact on the harvest. Nearly 3,000 power tillers have been provided by 2KR so far, but this has benefited relatively large-scale and well-funded farmers who can purchase power tillers, and the majority of small-scale farmers still rely on human power and cow cultivation. Because of this, they may not be able to complete the work within the scheduled period and may miss the proper planting time. In recent years, there has been an increase in fallow land due to the labor shortage because of the outflow of young people into urban areas and the aging of rural areas. These became factors that hinder increases in crop production. In response to this situation, the government of Bhutan has raised its food self-sufficiency ratio as one of its objectives in the 12th FYP, and aims to increase the production of crops through the development of farmland and reuse of fallow land.

In order to increase the production of these agricultural products, FMCL plans to provide a wide range of hiring services to farmers who are currently having difficulty accessing hiring services and meet the increased needs of farmers. With this, FMCL aims to expand the cultivated area by hiring services and raise the farm mechanization rate from 17.7% to 24.3% by 2023.

The Project will improve farmers’ access to farm machinery and increase agricultural productivity by procuring farm machinery necessary for hiring services. The Project aims to contribute to the improvement of food security in Bhutan.

2-2 Outline Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) Basic Policy

The Project covers the whole of Bhutan, and several types of farm machinery were requested depending on the field conditions. The validity of the requested equipment is described below as the scope of grant aid. FMCL's farm machinery operation report and each RFMCL's hiring service staff report that it is difficult to turn a normal cultivator in a steep and narrow terraced paddy field. Also, when moving the power tiller to upper terraced paddy fields, there are no paths, so power tillers over 300 kg are lifted manually from above and below by two people: the operator and the assistant. It is very dangerous and difficult to do this on steep terraced paddy fields. However, a mini tiller is about 80 kg, so it can move easily. In addition, turning in a narrow field is also easy. In order to promote farm mechanization, it is necessary to deal with the terraced paddy fields in Bhutan, and there is great need for mini tillers.

Tractors with high work efficiency are in high demand because they can provide services efficiently in the southern flat areas of Paro and Punakha where there are relatively flat and large fields.

As for combine harvesters, when harvesting paddy by human power, the harvested paddy is placed on the field, dried and then threshed. However, if there is rain when drying after mowing in the late rainy season, the rice ears get wet and the quality deteriorates. In harvesting with a combine harvester, threshing is done at the same time as harvesting, bagging and after that storage in the farmhouse's warehouse. Drying is done in the sun on a sunny day, so the quality of rice does not deteriorate. Therefore,

in areas where there are flat and large fields, the need for combine harvesters is high, as is the case with tractors.

Stone pickers are requested mainly for the purpose of removing rocks in the land under cultivation for farmland development. In the 12th FYP, farmland development is listed as an important point, and the need for stone pickers can be fully understood because the removal of rocks is essential for the development of farmland that contains a lot of them in uncultivated land in Bhutan.

However, FMCL currently does not remove rocks as a hiring service; it only redevelops a small amount of fallow land. Farmland development is mainly carried out by the Central Mechanization Unit (CMU) under DOA, which is engaged in the construction of rural roads, maintenance of irrigation facilities and farmland development. Therefore, the purpose of using stone pickers is judged to be different from the purpose of the Project, which is to improve hiring services by procuring farm machinery. Thus, the stone picker will be excluded from the procurement equipment of the Project.

The specifications of each piece of equipment shall include actual performance levels suitable for fields in Bhutan. The numbers of each unit will be the minimum necessary to achieve the targets set by FMCL for the 12th FYP.

(2) Policy Concerning Climatic Conditions

The natural conditions relating to equipment planning in the target area are as follows:

- Elevation: 100 ~ 3,000m above sea level
- Temperature: -5.0 ~ 35.0°C
- Rainfall: 500 ~ 5,000mm/year

The above climatic conditions to be applied to the equipment procured under this project basically follow the conditions applied to the power tillers procured in the Phase 1 project.

(3) Policy Concerning Operations and Maintenance

FMCL and AMC have properly implemented the operation and maintenance of farm machinery procured so far. In particular, four RFMCL, which are under FMCL throughout the country, have built their own parts sales network and established parts procurement systems. In addition, each RFMCL not only procures parts, but also builds a maintenance implementation system for repairs and runs an operators training system that utilizes an AMC training center. Therefore, FMCL has sufficient capacity for equipment management and parts management systems.

(4) Policy Concerning Procurement of Spare Parts

FMCL has established a way to procure spare parts and consumable parts. FMCL directly orders those parts from machinery manufacturers based on a periodic maintenance plan. FMCL always keeps those necessary parts in its warehouse as stock and they are managed by a computer system. Therefore, spare parts procured under the project considered spare parts for the initial operation period, are those such as fuel filters, rotary blade V-belts and engine throttle cables.

(5) Policy Concerning Grade of Equipment

FMCL and AMC have highly evaluated the quality and performance of farm machinery made by Japanese manufacturers which was procured with Japanese support in the “2KR and Phase 1 project”. Therefore, the same quality and performance as Japanese manufacturers’ equipment that is superior in quality and performance are set as grades for the Project.

(6) Policy Concerning Procurement Method and Schedule

The equipment procured in the Project will be various models, and some manufacturers may have limited models that can be shipped to Bhutan. Therefore, from the viewpoint of securing competitiveness, the lots are divided into three lots and procurement will be carried out.

Since there are a large number of power tillers to be procured, transportation from the manufacturer would be divided into about four trips. In addition, since it is necessary to assemble the main body and engine after arrival at the site, the arrival date and assembly period should be considered, and the shipping time adjusted to ensure an efficient work process.

(7) Policy Concerning Country of Origin

At present, many of the farm machines that are widely used in Bhutan as well as FMCL are made by Japanese manufacturers. For this reason, operators and mechanics are proficient in handling these machines. In addition, the procurement of spare / consumable parts and maintenance does not depend on private agents, and a maintenance network has been built. Therefore, it is expected that the operation and maintenance after procuring Japanese manufacturers’ equipment will be performed smoothly. In addition, Bhutanese officials are highly confident in the farm machinery made by Japanese manufacturers, which have few failures and high operating rates, and strongly desire equipment from Japanese manufacturers.

Based on the above, Japanese manufacturers in Japan or third countries should be considered in this procurement plan. At the time of the survey, possible countries of origin of Japanese manufacturers' farm machinery are Japan, Thailand, and Indonesia.

2-2-2 Basic Plan (Equipment Plan)

2-2-2-1 Overall Plan

The equipment planned for the Project will be used nationwide by hiring services in Bhutan under FMCL operation and management. The target work is plowing / rotovating work and harvesting work in the farm fields. It is also considered that the power tillers use trailers prepared on the Bhutan side to transport crops. Locations are RFMCL and FMSC under FMCL, and there are no problems because workshops and parking spaces are secured at each site.

2-2-2-2 Equipment Plan

(1) Quantity of Equipment

1) Power Tiller, Mini Tiller and Tractor

FMCL aims to carry out 17,008 ha of plowing and rotovating work with hiring services in 2023 as the goal of the farm mechanization plan in the 12th FYP. This is a target increase of 6,516 ha compared to the 2018 baseline of 10,492 ha. This target area can be calculated based on the annual work capacity of the power tiller (actual: 19.85 ha / unit / year), which requires about 328 power tillers (6,516 ha / year ÷ 19.85 ha / unit / year).

As mentioned above, the Project includes mini tillers and tractors in addition to power tillers for plowing and rotovating. The annual work area is calculated as follows based on the results of the annual work capacity of such equipment.

Table 2-1 Number of Plowing and Rotovating Machines Needed (1)

Item	A Quantity (unit)	B Annual Work Results (ha/unit · year)	C=A×B Annual Work Capacity (ha/year)
Power Tiller	200	19.85	3,970
Mini Tiller	150	10.13	1,520
Tractor	30	70.88	2,126
TOTAL	380	—	7,616

When all of the above equipment is operated in the cultivation service, 7,616 ha of hiring service is possible; however, DOA plans to place some of the equipment at AMC Training Center for operator training. The number of units allocated in AMC Training Center was based on the number required for training operators for each type of equipment planned by AMC. In addition, considering the machinery's operation rate¹ for daily and periodic maintenance, the annual work area can be calculated as follows:

Table 2-2 Number of Plowing and Rotovating Machines Needed (2)

Item	A Quantity (unit)	B Training Center (unit)	C Annual Work Results (ha/unit · year)	D Operation Rate (%)	E=(A-B)×C×D Annual Work Capacity (ha/year)
Power Tiller	200	6	19.85	90	3,466
Mini Tiller	150	6	10.13	90	1,313
Tractor	30	2	70.88	90	1,786
TOTAL	380	14	—	—	6,565

¹ Machinery's operation rate: Calculated by dividing the number of operating units per day by the total number of units during the busy farming season.

According to FMCL, the number of machines that can be operated during the busy farming season is about 90% or more. Therefore, in calculating the required number, the machine operation rate is set to 90% in consideration of safety margin.

From the above, taking into account the allocation of the training center and the operation rate, it is considered that the type and amount of equipment used for plowing and rotovating planned to achieve the 12th FYP target is appropriate.

FMCL has a track record of securing operators, training and budgeting for 353 power tillers procured in the Phase 1 project. Therefore, FMCL is considered to be capable of planning and implementing the Project for the implementation of farm machinery of the same scale as the Phase 1 project.

2) Combine Harvester

Rice harvesting by human power is very heavy labor because it is low-posture work that takes a long time, and the mechanization of rice harvesting has become an issue as the labor shortage continues in rural areas. In addition, in harvesting by human power, rice ears are left in the paddy fields for several days for drying, and quality degradation due to rain during that time is also a problem.

Currently, FMCL provides a harvesting service with 15 combine harvesters, but the demand from farmers is high and FMCL is planning to meet the demand. In the 12th FYP, the target area is 1,945ha, which is 1,140ha higher than the baseline of 805ha (2018) for the harvest area by the combine harvesters. Thus, the required number is calculated as follows:

Table 2-3 Number of Necessary Combine Harvester

Item	A Quantity (unit)	B Training Center (unit)	C Annual Work Results (ha/unit · year)	D Operation Rate (%)	$E=(A-B) \times C \times D$ Annual Work Capacity (ha/year)
Combine Harvester	20	1	67.0	90	1,146

From the above, taking into account the allocation of the training center and the operation rate, it is considered that the number of combine harvesters used for harvesting planned to achieve the 12th FYP target is appropriate.

3) Maintenance Equipment

FMCL inspects and maintains the existing farm machinery, but uses aging tools and tools of inferior quality. For this reason, there is a possibility that parts cannot be properly tightened or may be damaged during inspection and maintenance. In addition, there is a shortage of tools due to the increase in equipment procured by the Phase 1 project and the expansion of the service center. At the time of maintenance, it is necessary to clean the attached mud and oil after use, and disassemble and assemble parts in a clean condition. RFMCL and AMC training centers do not have sufficient cleaning equipment, so the allocation of a hot water high-pressure washer is planned.

In consideration of the increase of owned equipment under the implementation of the Project, procurement of the following maintenance equipment that is considered to be the minimum necessary for appropriate maintenance is planned.

Table 2-4 Maintenance Equipment Needed

Item	RFMCL 4 points	FMSC 41 points	AMC TC 1 point	TOTAL
Mechanical Tool Set	16 (4×4 sets)	41 (41×1 set)	0	57 sets
Hot Water High-Pressure Washer	4 (4×1 unit)	0	1 unit	5 units
Special Wrench	8 (4×2 units)	0	0	8 units
Torque Wrench	8 (4×2 units)	0	0	8 units
Grease Gun	8 (4×2 units)	0	0	8 units

(2) Basic Specifications of Equipment

➤ Plowing

Plowing is the deep cultivation of farmland and is preliminary work when the crop season starts. Because of this, one power tiller needs one plow. In this survey, a single reversible plow is recommended as the plow type for plowing work based on FMCL’s experience in the past. For maintenance reasons, during equipment selection it is important to pay attention to compatibility with the existing power tiller.



Plowing



Single Reversible Plow

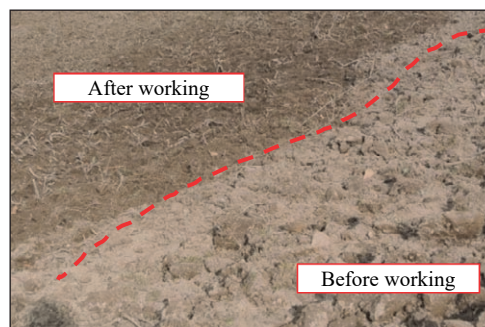
Figure 2-1 Plowing

➤ Rotovating

Rotovating breaks up the surface of farmland with a rotary plow after plowing. The power supply of a rotary plow is from a power tiller. Although rotovating work has a high crushing effect, deep plowing is difficult, so it is necessary to work by plowing. The rotary function is a prerequisite for the tiller.



Rotary Plow



Soil Mass after Rotovating

Figure 2-2: Rotovating

Procured equipment planned for the Project has been used by FMCL and AMC in the past and they are suitable for the farm field conditions in Bhutan. The specifications of each equipment type will be the following basic specifications, depending on the conditions that match the specifications of the Japanese manufacturers' products strongly requested by the Bhutan side.

Table 2-5 Basic Specifications of Each Equipment Type

Item	Quantity (unit)	Specifications	Accessory
Power Tiller	200	Output: 10.0–11.5ps	Rotary Single reversible plow Iron wheel
Mini Tiller	150	Output: 4.7ps	Rotary Single reversible plow Iron wheel, Weight, Extension wheel tube Deep rotary
Tractor	30	Output: 34.5–39.5ps Canopy	Rotary
Combine Harvester	20	Output: 15.9–21.1ps 2 reaping rows, Head-feeding Hopper type (2 exits)	Aluminum bridge

(3) Procurement Plan of Spare Parts

Periodical spare parts and consumable parts can be procured from private agencies. Regarding parts of Japanese manufacturers, the procurement route by FMCL has been established and can be procured easily, so there will be no problem in after-sales service.

FMCL manages the number of parts and items in stock by computer, and always keeps periodical spare parts and consumable parts in the parts warehouse. Therefore, the number of spare / consumable parts to be procured is limited to the minimum necessary for the initial operation, and the necessary items and quantities are planned for the first two years of operation.

2-2-2-3 Location Plan of Equipment

Based on the equipment demand and deployment plan in each region planned by FMCL, proposed location planning of equipment is shown below.

Table 2-6 Location Plan of Equipment

Item	RFMCL (units)				AMC TC (units)	TOTAL (units)	
	Paro (West)	Bajo (Central)	Samtenling (South)	Khangma (East)			
Power Tiller	50	50	44	50	6	200	
Mini Tiller	20	35	39	50	6	150	
Tractor	6	3	14	5	2	30	
Combine Harvester	9	2	5	3	1	20	
Maintenance Equipment	Mechanical Tool Set	10	14	11	22	0	57
	Hot Water High-Pressure Washer	1	1	1	1	1	5
	Special Wrench	2	2	2	2	0	8
	Torque Wrench	2	2	2	2	0	8
	Grease Gun	2	2	2	2	0	8

The quantity of power tillers should be approximately the same in each region. Securing a large number of mini tillers in the areas where there is a lot of demand for narrow rice terraces is important. A large number of tractors and combines are placed in the western and southern areas, where there are relatively large fields. As for the placement at AMC Training Center, the necessary number of pieces of equipment for operator training will be secured. The maintenance equipment will be mainly placed on the RFMCL, and the mechanical tool set (1 set) will be placed on each FMSC.

2-2-2-4 Lot Splitting Plan

The equipment procured in the Project will be various models, and some manufacturers may have limited models that can be shipped to Bhutan. Therefore, from the viewpoint of securing competitiveness, the lots are divided into two to three lots and procurement will be carried out.

2-2-2-5 Soft Component Plan

FMCL and AMC had provided farm machinery similar to the project in the past, and these specifications are the same as the procurement equipment. Therefore, FMCL and AMC are familiar with the operation and maintenance of farm machinery and have sufficient experience and ability to conduct training on farm machinery, so soft components will not be implemented.

2-2-3 Implementation Plan

2-2-3-1 Implementation Policy

(1) Project Implementing Bodies

Figure 2-3 shows the interrelations among the Japanese and Bhutan organizations, which will be engaged in the implementation of the Project if it is to be carried out using Grant Aid from the Government of Japan.

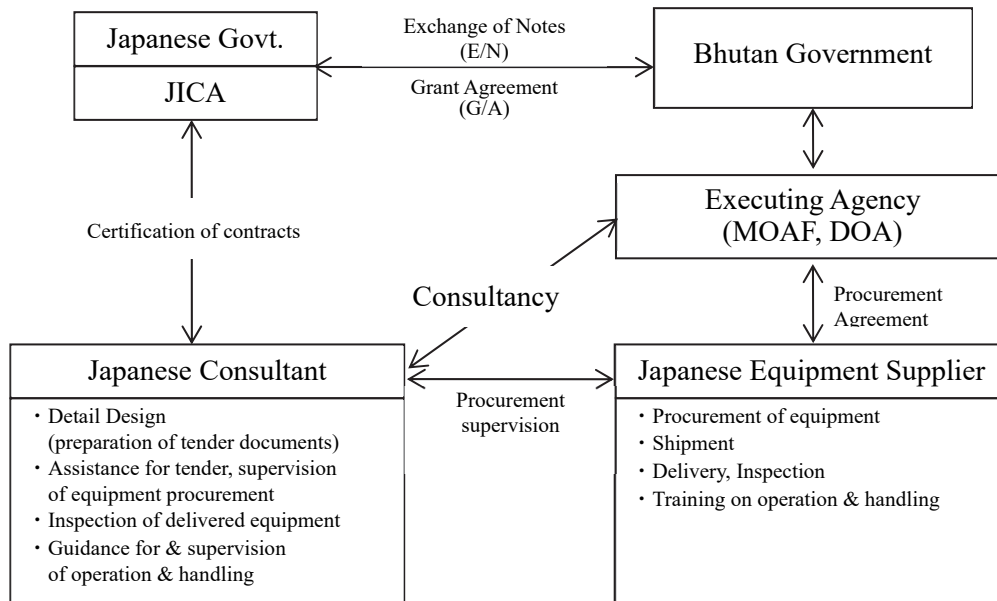


Figure 2-3 Interrelations Among Project Implementing Bodies

The executing agency on the Bhutan side of this Project will be DOA under MOAF. Detailed design and procurement supervision will be undertaken by a Japanese consultant firm (the Consultant) under the Grant Aid Scheme of the Government of Japan. Equipment for this Project will be procured by a Japanese contractor (the Equipment Supplier), which will be the main signatory to the Procurement Agreement.

(2) Partner Country

The executing agency on the Bhutan side of this Project will be DOA. FMCL and AMC will manage and maintain the procured equipment under DOA. FMCL has its head office in Paro and branch offices in Paro, Bajo in Wangdue Dzongkhag, Samtenling in Sarpang Dzongkhag and Khangma in Trashigang Dzongkhag. The head office and each branch office carry out the major operation and management of equipment.

(3) Consultant

Immediately after the signing of E/N and G/A, MOAF will conclude a Consultancy Agreement with the Japanese Consultant, which will, in accordance with the agreement, provide engineering services for the Project, including detail design, preparation of tender documents, assistance for tender execution, and supervision of procurement activities, and assume responsibility for these services until the handover of the equipment is complete.

(4) Equipment Supplier

The Equipment Supplier, which will be selected as a result of satisfying the required qualities and specifications and winning a tender open only to qualified bidders, will conclude a Procurement Agreement with MOAF with respect to the supply of equipment planned for this Project.

2-2-3-2 Implementation Conditions

Equipment procured in Japan will travel approximately 8,800km by sea for about one month, be unloaded and undergo temporary customs inspections at the Port of Kolkata, India, and travel 776km on land across India to Phuntsholing at the Bhutan-India Border to undergo a customs clearance procedure. From there, the equipment will be delivered to FMCL in Paro Dzongkhag, which is approximately 426km away from Phuntsholing, and handed over to the Bhutan side after assembling.

The Japanese side will be responsible for land transportation up to FMCL, and after handover, FMCL will deliver the equipment to the branch offices on its own account. The quantity of each equipment item to be delivered to the branch offices is as shown in Table 2-6.

Because the equipment will have to travel under these conditions, the equipment supplier will need to implement necessary measures so that no misunderstanding or dispute with the Bhutan side will arise over damage, theft, or any other defect liability that could occur during ocean freight, unloading, and land transportation (within India and Bhutan).

Upon delivery of the equipment to the designated locations, the equipment supplier will test each item to ensure that every item operates properly before handing the equipment over to the Bhutan side. Immediately after the handover, the supplier will also provide guidance and instructions to FMCL personnel as to how to operate, handle, inspect, and maintain the equipment.

2-2-3-3 Scope of Work

The cost of transport to the delivery places (FMCL, Paro), unloading and other relevant procurement work will be borne by the Japanese side, whereas the arrangements for tax exemptions related to the imports will be made by the Bhutan side. Table 2-7 shows the division of work.

Table 2-7 Responsibilities of the Two Governments

Work	Content	Responsible party		Remarks
		Japan	Bhutan	
Equipment procurement	Procurement of equipment	○		To custom house Incl. tax exemption From custom house
	Ocean/land transportation	○		
	Customs clearance		○	
	Inland transportation	○		
	Assembling & Test run	○		
Operational guidance, etc.	Training on operation	○		
	Training on inspection & maintenance	○		
Operations and maintenance	Forwarding of equipment		○	To equipment stations
	Securing of storage sites		○	
	Equipment maintenance		○	

2-2-3-4 Consultant Supervision

(1) Basic Policy

After the signing of E/N and G/A, the Japanese Consultant will conclude a Consultancy Agreement with the Government of Bhutan to undertake the supervision of the procurement work defined in the E/N according to the framework of the Grant Aid Scheme. It is important for the Consultant to perform its duties based on a thorough understanding of the background of the Project, as well as the rationale and key points of the outline design.

Expertise required of the Consultant includes detailed knowledge and operational skills of the equipment, as well as experience in teaching equipment operation, inspection, and maintenance. The ability to provide proper guidance on daily inspection and maintenance backed by a high level of knowledge and experience will be especially important, as daily inspection/maintenance is indispensable for the Bhutan side to continue utilizing the equipment effectively for a long period.

(2) Detailed Design Work

The Consultant's detailed design work consists mainly of the following elements:

- Pre-launch consultation, verification of Project sites
- Review of equipment specifications
- Preparation of tender documents
- Briefing on tender documents, obtaining approval
- Assistance for tender procedure (announcement, distribution of documents, execution of tender, evaluation of bids)
- Facilitation of contract signing (negotiation, witnessing, certification)

(3) Procurement Work

The Consultant's procurement work consists mainly of the following elements:

- Confirmation of issuance of purchase orders for equipment
- Factory/pre-shipment inspections
- Pre-shipment inspection (entrusted to a third party)
- Previous arrangements in Bhutan (to confirm delivery/installation schedule, tax exemption, and startup training procedure)
- Witnessing of training for driving, operation, inspection, and servicing
- Acceptance inspection, handover
- Preparation of a completion report
- Support for preparation of a project monitoring report (PMR)

(4) Equipment Production Period

All procurement equipment will be produced to order. Therefore, the Consultant will collect information on the production delivery time from ordering to production / pre-shipment inspection by estimations from the manufacturer. According to information from the manufacturer, the delivery time of equipment is estimated to be about 5 to 6.5 months. Since the number of power tillers shipped is large, about 50 units will be shipped at once, and will be shipped in about 4 lots

and assembled on-site.

In addition, consultants will conduct confirmations of visual inspections, performance test sheets, and packaging condition of each piece of equipment in the factory inspections.

Table 2-8 Equipment Manufacturing Delivery Schedule

Item	Manufacturing Schedule
Power Tiller	6 months, 1 Lot 50 units, 4 Lots shipping
Mini Tiller	6 months, 1 Lot 50 units, 3 Lots shipping
Tractor	5 months, 1 Lot 30 units, 1 Lot shipping
Combine Harvester	5 months, 1 Lot 20 units, 1 Lot shipping
Maintenance Equipment	4 months, 1 Lot 1 set, 1 Lot shipping

(5) Pre-Shipment Inspection

When the equipment is shipped from the factory and transported into the port, pre-shipment inspections will be conducted by a third-party inspection agency. The inspection contents are confirmation of shipping documents such as Packing List (shipment specification) and checking of equipment. If there is no difference in contents, the inspection certificate and report are issued.

Shipping will be done according to the shipment from the factory. The pre-shipment inspection should be carried out as appropriate when each piece of equipment is transported into the port because it is difficult to store in factories or ports. Table 2-9 shows the number of pre-shipment inspections.

Table 2-9 Expected Number of Pre-Shipment Inspections

Item	Frequency	Location
Power Tiller	2	Japan, Indonesia, Thailand
Accessory for Power Tiller	1	Japan
Mini Tiller	2	Japan
Tractor	1	Japan
Combine Harvester	1	Japan
Maintenance Equipment	1	Japan
TOTAL	7	—

(6) Equipment Storage and Unpacking / Assembly Work of Equipment at Final Destination

The final destination of the equipment is FMCL site in Paro. After arriving at the site, the equipment will be temporarily placed in the assembly warehouse, unpacked and assembled. After assembly, the completed equipment will be moved to the pre-shipping storage area waiting for shipment. The floor area of the “the assembly warehouse” is 45m × 30m, and “the pre-shipping storage area” is 40m × 10m.

In this project, the temporary storage and assembly work place of the equipment will be planned by using only 23m × 30m, which is about half of the assembly warehouse. Because, currently, about half of the assembly warehouse is stocked with various farm machinery such as mini tillers and combines.

As described above, since the assembly work is limited, it is necessary to appropriately plan the factory shipment timing.



Figure 2-4: FMCL Site in Paro

The outline of the assembly work plan is shown below.

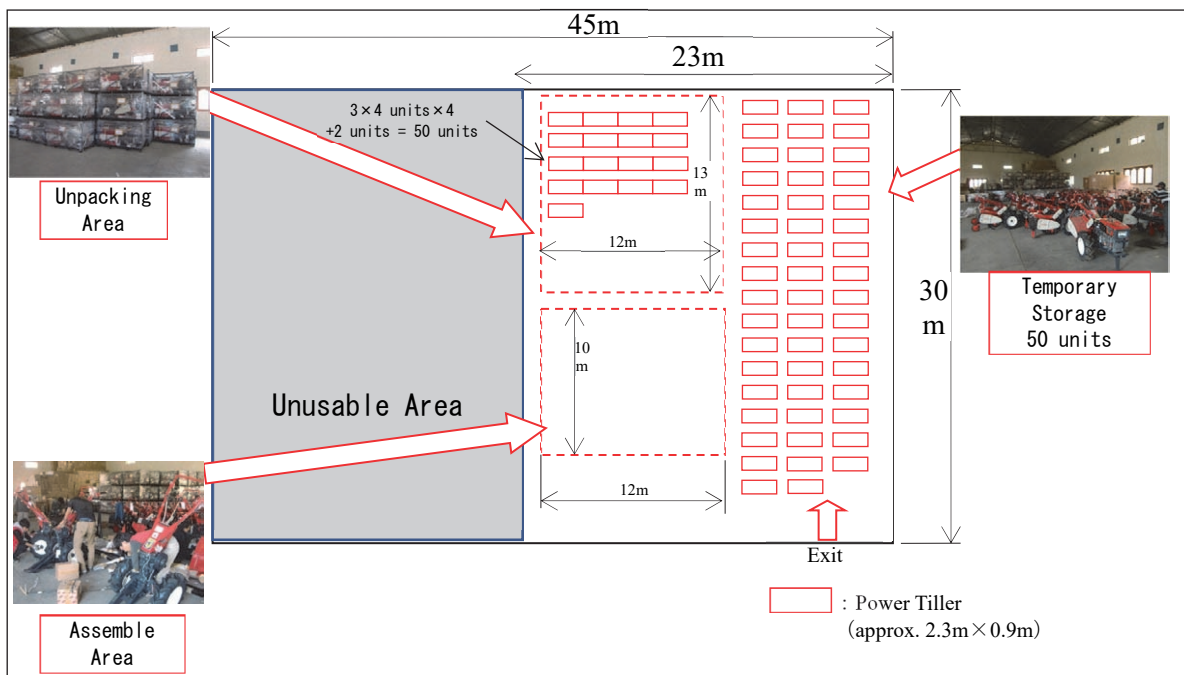


Figure 2-5: FMCL Site in Paro

(7) Inspection and Handing Over

All equipment will be transported by the Japanese side to FMCL in Paro, Bhutan. After the equipment arrives at the site, the Supplier (Japanese trading company) and the Bhutan side will inspect the equipment under the consultant's witness. The contents of inspection are confirmation of quantity, appearance, operation check, accessories and replacement parts for all equipment.

2-2-3-5 Quality Control Plan

In order to ensure that the procured equipment items satisfy the quality requirements and specifications stipulated in the agreement, the Consultant will conduct the following inspections in various stages of the procurement work:

- Factory and pre-shipment inspections at the manufacturing plants of the equipment
- Pre-shipment survey
- Inspection at the time of equipment handover

2-2-3-6 Procurement Plan

(1) Countries of Origin

As most of the equipment items currently used by FMCL are made in Japan, the operators and mechanics are versed in handling Japanese-made products and are highly appreciative of their high quality and performance. In the survey, the popularity, quality, performance, service and parts supply system of Japanese manufacturers’ products were confirmed.

Therefore, the consultants consider procurement from Japanese manufacturers in the procurement plan.

(2) Procurement Route

Figure 2-4 shows the transportation route of the Project.

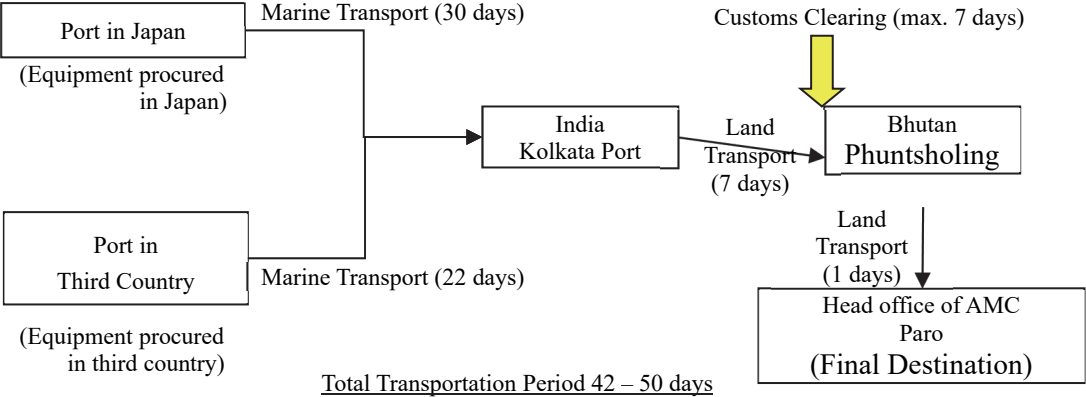


Figure 2-6: Outline of Transportation Route

1) Marine Transport

Equipment items procured in Japan will be transported by sea from a major Japanese port to Kolkata Port in India by 40-foot containers. It takes about 27-35 days for transportation including the unloading, and temporary customs inspection procedures will take about one month. Offshore waiting, unloading, and temporary customs inspections at Kolkata Port will take about four days.

2) Land Transport (India)

From Kolkata Port to Phuntsholing at the Bhutan-India Border, the equipment will be transported on land, taking seven days. The total distance is approximately 780km.

3) Bhutan-India Border (customs clearance)

The customs clearance procedure in Phuntsholing at the Bhutan-India Border will take about two days.

As a procedure for duty exemption, before the arrival of the equipment at Phuntsholing, Japanese equipment suppliers will submit an invoice, packing list, certificate of origin and insurance copy to DOA at the time of each shipping. DOA will make an import duty application based on those documents, and will submit the application to the Department of Revenue and Customs, the Ministry of Finance. The Department of Revenue and Customs will send a duty exemption certification to the customs station at Phuntsholing. After that, the duty exemption of the equipment will be executed. All these procedures will be completed in a maximum of about one week.

4) Land Transport (Bhutan)

From Phuntsholing, the equipment will travel on land for about one day to be delivered to FMCL. It will take about 42 to 50 days to complete the delivery of all equipment items.

2-2-3-7 Operation Guidance Plan

Procured equipment will have initial operation training and operational guidance from the manufacturer through the supplier. On the other hand, the proposed training will satisfy the minimum requirements only because FMCL has long-term experience of power tillers from previous procurement. The training will be focused on handling and maintenance methods that require special attention

2-2-3-8 Soft-Component Plan

Soft component is not implemented.

2-2-3-9 Implementation Schedule

This Project will be implemented pursuant to the Grant Aid Scheme of the Government of Japan according to the schedule shown in Table 2-10.

Table 2-10 Project Implementation Schedule

Process		Month													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Detailed Design	Final confirmation of project content	-													
	Review of equipment specification, etc.	-													
	Preparation of tender documents	-													
	Approval of tender documents	-													
	Announcement of tender	-													
	Distribution of tender document	-													
	Tender	-													
	Evaluation of bids	-													
	Procurement agreement	-													
	Procurement	Production of equipment	-												
Product (factory) inspection		-													
Pre-shipment inspection		-													
Ocean / Inland transportation		-													
Adjustment, trial operation, start-up and operation training		-													
Inspection and handover		-													

: Work in Bhutan
 : Work in Japan

4.5 months

9.5 months

2-3 Obligations of Recipient Country

If this Project is to be implemented as a Grant Aid project of the Government of Japan, the undertakings of the Government of Bhutan will consist of the following:

- Payment of fees associated with Banking Arrangement (B/A) to a designated Japanese bank.
- Provision of facilities necessary for Japanese nationals engaged in this Project to enter and stay in Bhutan and visit Bhutan's government agencies in order to carry out their duties.
- Exempting the Japanese citizens and corporations engaged in this Project from tariffs, duties, and all other internal taxes.
- Preparation of documents necessary for customs clearance and tax exemption of equipment to be procured as part of this Project.
- Assignment of personnel and provision of facilities necessary for training on startup, operation, inspection, and servicing.
- Transportation from head office of FMCL to RFMCL.
- Proper and effective use and maintenance of the procured equipment.
- Payment of all expenses other than those borne by the Government of Japan using Grant Aid.

Based on the track record of the Bhutanese counterpart in properly providing necessary facilities and tax exemption treatment in past Phase 1 projects, no problems are anticipated in this regard. The same can be said about the assignment of personnel and allocation of budget for this Project, which have already been planned by FMCL and are therefore deemed feasible.

2-4 Project Operation and Maintenance Plan

FMCL operates and maintains the procured equipment. RFMCL, where the equipment is deployed, is expected to carry out daily inspections and regular inspections on the equipment as well as the equipment procured in the past. When the equipment is procured in this project, a maximum of 400 operators are required for FMCL hiring services. Each RFMCL requires the operators shown in Table 2-10 based on the number of pieces of equipment allocated. AMC Training Center will need instructors to conduct training using the procured equipment; however, instructors of existing equipment can do this.

Table 2-11 Number of New Operators

Item	RFMCL (peoples)				AMC TC (peoples)	TOTAL (peoples)
	Paro (West)	Bajo (Central)	Samtenling (South)	Khangma (East)		
Power Tiller	50	50	44	50	6	200
Mini Tiller	20	35	39	50	6	150
Tractor	6	3	14	5	2	30
Combine Harvester	9	2	5	3	1	20
TOTAL	85	90	102	108	15	400

Newly hired operators will receive training on the operation and handling and basic maintenance methods of each type of equipment at AMC Training Center. It is a one-month training course for cultivators and small-scale cultivators, and a two-month training course for tractors and combines. Sufficient skills can be acquired in each course.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

The Project will be implemented in accordance with Japan's Grant Aid scheme and the cost will be determined before concluding the Exchange of Note (E/N) for the Project.

(1) Cost to be borne by the Bhutan side

Item	Cost (mil. Nu.)
Banking arrangement fee	0.12

(2) Estimation Parameters

- Timing: August 2019
- Exchange rate: 1.00 USD = 109.71 JPY
Nu 1 = 1.73 JPY
- Procurement period: durations of the detailed design and equipment procurement processes are as shown in the implementation schedule.
- Other: this Project will be implemented under the framework of the Grant Aid Scheme of the Government of Japan.

2-5-2 Operation and Maintenance Costs

Among the newly required personnel, tractor and combine harvester operators who require skill in operation will be hired as annual contract operators, and power tiller and mini tiller operators will be hired as seasonal operators for each type of work. The annual personnel cost is 15,125 thousand Nu as shown below.

Table 2-12 Annual Personnel Cost

Item	Number (people)	Personnel Cost (1,000 Nu/year)
Power Tiller	200	5,900
Mini Tiller	150	3,225
Tractor	30	3,600
Combine Harvester	20	2,400
TOTAL	400	15,125

Annual fuel and oil costs required for operation are calculated based on actual operation of 8 hours per day including travel time. The annual fuel and oil cost is 32,930 thousand Nu as shown below.

Table 2-13 Annual Fuel and Oil Cost

Item	Quantity (unit)	Fuel Cost (Nu/unit · year)	Oil Cost (Nu/unit · year)	Sub Total (1,000 Nu/year)
Power Tiller	200	70,706	890	14,319
Mini Tiller	150	53,526	445	8,096
Tractor	30	268,921	22,000	8,728
Combine Harvester	20	85,566	3,783	1,787
TOTAL	400	—	—	32,930

Maintenance costs, spare and consumable parts costs required for daily and periodical maintenance are 4,410 thousand Nu as shown below.

Table 2-14 Annual Maintenance Cost

Item	Quantity (unit)	Maintenance Cost (1,000 Nu/unit · year)	Sub Total (1,000 Nu/year)
Power Tiller	200	10	2,000
Mini Tiller	150	5	750
Tractor	30	30	900
Combine Harvester	20	38	760
TOTAL	400	—	4,410

Based on the above, the total annual operation and maintenance cost for the procured equipment is 52,465 thousand Nu. This will be covered by 79,419 thousand Nu as shown below, which is the total amount of hiring service fees from procurement equipment and government subsidies.

Table 2-15 Prospected Income

Item	Quantity (unit)	Hiring Service Fee (1,000 Nu/unit · year)	Subsidy* (1,000 Nu/unit · year)	Sub Total (1,000 Nu/year)
Power Tiller	200	82.6	109.5	38,420
Mini Tiller	150	54.6	72.4	19,050
Tractor	30	191.4	253.7	13,353
Combine Harvester	20	184.8	245.0	8,596
TOTAL	400	—	—	79,419

* The subsidy is set to 57% (2021) based on the actual coverage rate of 60% (2019) and the past reduction rate.

CHAPTER 3. Project Evaluation

3-1 Preconditions

Obligations of Recipient Country and others are described in Table 3-1.

Table 3-1: Preconditions for Project implementation

Issues	Description	Note
Obligations of Recipient Country	<p>Subsidies from the government of Bhutan will need to be continued for the hiring services conducted for the procured equipment. The government of Bhutan has a track record of granting necessary subsidies for FMCL hiring services. Therefore, it is considered that there is no problem with subsidizations.</p> <p>The newly 400 operators will be trained at the AMC Training Center. The necessary operators for 353 cultivators were secured in the Phase 1 Project. Therefore, even in the Project, which is almost the same scale as Phase 1, it is judged that securing necessary operators will be implemented smoothly.</p> <p>MOAF, which is the supervising ministry, and DOA, which is the executing agency, have experience with several Grant Aid projects in the past. Therefore, MOAF and DOA will smoothly carry out the obligations of the recipient country.</p>	See “2-3 Obligations of Recipient Country”

3-2 Necessary Inputs by Recipient Country

For effective application of the equipment provided by the Project, the necessary inputs and costs by the Bhutan side are described in Table 3-2.

Table 3-2: Necessary Inputs (costs) by Recipient Country

No.	Content	Note
1	Sufficient budget allocation to operate FMCL hiring services.	Subsidizations
2	Staffing by operators, mechanics and other necessary personnel.	New hiring and reassignment.

3-3 Important Assumptions

Table 3-3 shows important assumptions for realizing and maintaining project effects.

Table 3-3: Important Assumptions

Items	Description	Important Assumptions
Project goals	Improvement of access to farm machinery of Bhutan farmers.	➤ Farmers will continue farming.
Results	Strengthen system of FMCL hiring services.	➤ FMCL will continue hiring services.
Activities	<ul style="list-style-type: none"> ➤ Procure farm machinery for hiring services. ➤ Improvement and enhancement of system of FMCL hiring services ➤ Maintaining farm machinery by FMCL 	<ul style="list-style-type: none"> ➤ Sufficient budget is allocated for AMC. ➤ Demand for the gewog hiring services will continue. ➤ FMCL will secure sufficient personnel.

3-4 Project Evaluation

3-4-1 Relevance

If “Plowing and Rotovating” is not completed in 15 days in Bhutan, the appropriate time for cereal cultivation will be missed and this will have a significant impact on the yield.

Nearly 3,000 power tillers have been provided by 2KR so far. This is expected to benefit relatively large-scale and well-financed farmers who can purchase a power tiller. The majority of small-scale farmers still rely on human power and cattle cultivation. For this reason, the work cannot be completed within a predetermined period, and the proper cropping time may be missed. And, in recent years, there has been an increase in fallow land due to the outflow of young people into urban areas and the labor shortage due to the aging of rural areas. These are factors that hinder the increase in crop production, and further hinder the improvement of food self-sufficiency, which is the national goal of Bhutan.

The average farmland area per farmhouse in Bhutan is about 1 ha. It is not reasonable from the scale of farming that a small-scale farmer with less than 1 ha of farmland owns a power tiller. It is appropriate for these farmers to use public hiring services. Considering the scale of farming in Bhutan, there is relevance and appropriateness to support small-scale farmers through public hiring services.

FMCL provides services to farmers who have had difficulty with access to hiring services with the expansion of FMSC in 41 locations nationwide in order to increase the operational efficiency of the equipment, and the expansion of hiring services using farm machinery. In response to these new demands, power tillers procured in the Phase 1 project have been properly placed and have been operating.

Under the 12th FYP, MOAF is promoting the reuse of fallow land and the development of new farmland to increase food production, so demand for hiring services is expected to increase in the future. FMCL is also strengthening hiring services to achieve the goals of farm mechanization during the 12th FYP period. For that reason, each RFMCL, which is planning to add more FMSC in the future, will require additional power tillers. Also, in order to meet the various demands of farmers, there is a high need for mini tillers that can cultivate steep and narrow rice terraces for which, up to the present, have been difficult to provide hiring services. In addition, there is a great need for tractors and combine harvesters that have high working capacity in large fields. The procurement of equipment will enable FMCL to meet more demand for hiring services and to achieve the 12th FYP target. Therefore, the relevance of the project is sufficient.

3-4-2 Effectiveness

(1) Quantitative Effects

Table 3-4: Quantitative Effects

Indicator	Baseline (2018)	Target (2023) ^{※1} (2 years after the Project completion)
Cultivated area by hiring services (ha/year)	10,492	17,008
Harvested area by hiring services (ha/year)	805	1,945
Tillage mechanization rate (%) ^{※2}	17.66	24.34

※1: 12th FYP target for FMCL

※2: Tillage mechanization rate (%) = Total cultivated farmland area ÷ (Farmland area cultivated by FMCL hiring service and farmer-owned machinery)
Tillage machines are power tillers, mini tillers and tractors.

(2) Qualitative Effects

Qualitative Effects of this Project will be as follows:

- Improvement of efficiency of farm work.
- Promotion of utilization of fallow land
- Improvement of agricultural productivity
- Promotion of employment in rural areas (employment of operators)

Appendices

1. Member List of the Study Team
2. Study Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussion (M/D)
5. Reference

1. Member List of the Study Team

(1) Site Survey (August 2019)

	Name	Responsibilities	Organization
1	Mr. Narihida Nagayo	Team leader	JICA
2	Mr. Hayao Matsui	Planning management	JICA
3	Mr. KOBAYASHI Kiyohito	Chief Consultant/Hiring Services Planner/Operation and Maintenance Planner	Katahira & Engineers International
4	Mr. KAMIHASHI Nobuyuki	Equipment Planner/Procurement Planner/Cost Estimator	Ingerosec Corporation
5	Mr. HORIE Hidehiko	Equipment Planner/Procurement Planner/Cost Estimator	Katahira & Engineers International

(2) Survey for explanation and discussion of Draft Preparatory Survey Report (November,2019)

	Name	Responsibilities	Organization
1	Mr. Narihida Nagayo	Team leader	JICA
2	Mr. Hayao Matsui	Planning management	JICA
3	Mr. KOBAYASHI Kiyohito	Chief Consultant/Hiring Services Planner/Operation and Maintenance Planner	Katahira & Engineers International
4	Mr. KAMIHASHI Nobuyuki	Equipment Planner/Procurement Planner/Cost Estimator	Ingerosec Corporation

2. Study Schedule

(1) Site Survey (August, 2019)

No.	Date	①Team Leader Mr. Narihide Nagayo, JICA ②Planning management Mr. Hayao Matsui, JICA	③Chief Consultant Mr. Kiyohito Kobayashi ④Equipment planner, Cost estimate Mr. Nobuyuki Kamihashi ⑤Equipment planner, Cost estimate Mr. Hidehiko Horie	Place
1	3-Aug (Sat)	Traveling (NRT→Bangkok)		Bangkok
2	4-Aug (Sun)	Traveling (Bangkok→Paro)		Thimphu
3	5-Aug (Mon)	Meeting at JICA Bhutan office Meeting with, AMC, FMCL		Thimphu
4	6-Aug (Tue)	Traveling (Thimphu→Sarpang)		Sarpang
5	7-Aug (Wed)	Meeting at RFMCL in Sarpang		Sarpang
6	8-Aug (Thu)		Transferring (Sarpang→Tongsa→Wandi) Field visit and survey: Tsirang, Dagana	Sarpang
7	9-Aug (Fri)		Transferring (Sarpang→Tongsa→Wandi) Field visit and survey: Tongsa	Wandy
8	10-Aug (Sat)		Transferring (Wandi→Thinpu) Field visit and survey: RFMCL (Wandy)	Thimphu
9	11-Aug (Sun)		Survey team meeting	Thimphu
10	12-Aug (Mon)	Meeting at JICA Bhutan Office	Meeting at AMC, FMCL Meeting at JICA Bhutan office	Thimphu
11	13-Aug (Tue)	Meeting with MOAF		Thimphu
12	14-Aug (Wed)	Signing M/D at MOAF Reporting to JICA Bhutan office		Thimphu
13	15-Aug (Thu)	Traveling (Paro→Bangkok→NRT)	Survey team meeting	Thimphu
14	16-Aug (Fri)		Meeting with AMC, FMCL Survey at Manufacturer agents	Thimphu
15	17-Aug (Sat)		Report writing	Thimphu
16	18-Aug (Sun)		Report writing	Thimphu
17	19-Aug (Mon)		Survey at Manufacturer agents	Thimphu
18	20-Aug (Tue)		Meeting with AMC, FMCL	Thimphu
19	21-Aug (Wed)		Meeting with AMC, FMCL Reporting to JICA Bhutan office	Thimphu
20	22-Aug (Thu)		Traveling (Paro→Bangkok→Haneda)	—
21	23-Aug (Fri)			—

(2) Survey for explanation and discussion of Draft Preparatory Survey Report (November,2019)

No.	Date	①Team Leader Mr. Narihida Nagayo, JICA ②Planning management Mr. Hayao Matsui, JICA	③Chief Consultant Mr. Kiyohito Kobayashi ④Equipment planner, Cost estimate Mr. Nobuyuki Kamihashi ⑤Equipment planner, Cost estimate Mr. Hidehiko Horie	Place
1	21-Nov (Thu)	Survey team meeting	Traveling (Haneda→Bangkok→Paro) Survey team meeting	Thimphu
2	22-Nov (Fri)	Meeting with MOAF		Thimphu
3	23-Nov (Sat)	Survey team meeting Report writing		Thimphu
4	24-Nov (Sun)	Survey team meeting Report writing		Thimphu
5	25-Nov (Mon)	Signing M/D at MOAF Reporting to JICA Bhutan office		Thimphu
6	26-Nov (Tue)	Traveling (Paro→Bangkok→Haneda)		—
7	27-Nov (Wed)			—

3. List of Parties Concerned in the Recipient Country

Name	Position
Gross National Happiness Committee (GNHC)	
Wangunk Namagay	Head, DCD
Sonam Yarphel	DCD
Ministry of Agriculture and forest (MOAF)	
Yahey Penjor	Minister
Rinzin Dorgi	Secretary
Department of Agriculture (DOA)	
Kinley Tshering	Director
Karma Tsethar	Chief (Engineering Div.)
Agricultural Machinery Centre (AMC) Bondey (Paro)	
Kinga Norbu	Program Director
Tshering Droji	Asst.Engineer
Sangay Lhendup	Principal Engineer
UgzenDorji	Assist, Agriculture Engineer
Ugayen Phontsho	Engineer
Pema Wangmo	Engineer
Tshering Droji	Asst.Engineer
Agriculture Mechanization Centre (AMTC) Bonday (Paro)	
Prabhu Praduhan	Head
Farm Machinery Corporation Limited: FMCL Bonday (Paro)	
Karma Thinley	CEO
Chogyal Drukpa	General Manager
Deepa Rai	Office Asst.
HerkaBdr. Ghalley	Technician
Sonam Tobgay	Technical adviser
Regional Agriculture Machinery Centre (Sarpang)	
Kinley Zangmo	Regional Manager
Kharka Bdr. Subba	Regional Manager
Thuntso Dema	Technical Div., RAMC
Gewog Hiring Center, Kikhorthang (Tsirang)	
Boda. M. Chamkegai	GUP
Tshewang Jigmei	Gewog Admission Officer
Sonam Dorji	Extension officer
Dhitra Nenda Ghimery	Focal person

RFMCL Device Center Tsendagang (Dagna)	
Saroj Sabba	In charge
Jambay	Extension, supervisor
POL Service Center Drakteng (Tongsa)	
Thinley Dorji	DFP
Indra Bhadur Pulami	POL Assistant
Farm Machinery Corporation Limited: FMCL Bajo (Wngdue)	
Jurmi Tenzin	Regional Manager
Sangay Wangol	Extension officer
JICA Bhutan Office	
Kozo Watanabe	Chief Representative
Kota Wakabayashi	Representative
Yumiko Yoshizawa	Project Formulation Adviser
Kinley Dorji	Chief Program Officer

4. Minutes of Discussions (MD)

(1) Site Survey (August, 2019)

**Minutes of Discussions
on
the Preparatory Survey for the Project for Improvement of
Farm Machinery for Hiring Services of Tillage (Phase 2)**

In response to the request from the Royal Government of Bhutan (hereinafter referred to as "Bhutan"), the Government of Japan decided to conduct a Preparatory Survey for the Project for Improvement of Farm Machinery for Hiring Services of Tillage (Phase 2) (hereinafter referred to as "the Project"), and entrusted the Preparatory Survey to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") to Bhutan, headed by Dr. Narihide Nagayo, JICA Senior Advisor, and is scheduled to stay in the country from 4th to 15th August, 2019.

The Team held a series of discussions with the officials concerned of the Royal Government of Bhutan and conducted a field survey in the Project area. In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further work and prepare the Preparatory Survey Report.


Thimphu, 14th August, 2019



Dr. Narihide Nagayo
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan



Kinlay Tshering
Director
Department of Agriculture
Ministry of Agriculture and Forests
Royal Government of Bhutan



Rinchen Wangdi
Director
Gross National Happiness Commission
Royal Government of Bhutan

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the accessibility to hiring services for farmers and agricultural productivity by providing Farm Machineries, thereby contributing to improve food security.

2. Project Site

Both sides confirmed that the sites of the Project will be 205 Gewogs, Agriculture Machinery Center (hereinafter referred to as "AMC"), and Farm Machinery Corporation Limited (hereinafter referred to as "FMCL") . Annex 1 shows location map for AMC, FMCL and their regional offices.

3. Line Agency, Executing Agency, and Implementing Agency

Both sides confirmed the line agency, executing agency, and implementing agency as follows:

- 3-1. The line agency is Ministry of Agriculture and Forests, which would be the agency to supervise the executing agency.
- 3-2. The executing agency is the Department of Agriculture (hereinafter referred to as "DoA"). The DoA (AMC) shall coordinate with all the relevant agencies to ensure smooth execution of the Project and ensure that the Undertakings are taken by relevant agencies properly and on time.
- 3-3. The implementing agency is the Farm Machinery Corporation Limited. The FMCL shall coordinate with all the relevant agencies to ensure smooth implementation of the Project. The organization charts are shown in Annex 2.

4. Items requested by the Royal Government of Bhutan

- 4-1. As a result of discussion, both sides confirmed that the items requested by the Royal Government of Bhutan are as follows; 200 Power Tillers, 150 Mini-Tillers, 30 Tractors, 20 Combine Harvesters, 5 Stone Pickers, and Maintenance Equipment.
- 4-2. JICA will assess the appropriateness of the above requested items through the survey and will report findings to the Government of Japan. The final components of the Project would be decided by the Government of Japan.

5. Japanese Grant Scheme

- 5-1. The Bhutanese side understands the Japanese Grant Scheme and its procedures as described in Annex 3, ~~4 and 5~~, and necessary measures to be taken by the Royal Government of Bhutan.



5-2. The Bhutanese side understands to take necessary measures, as described in Annex 6, for smooth implementation of the Project, as a condition for the Japanese Grant to be implemented. The detailed contents of the Annex 6 will be worked out during the survey and shall be agreed no later than by the Explanation of the Draft Preparatory Survey Report.

The contents of Annex 6 will be used to determine the following:

- (1) The scope of the Project.
- (2) The timing of the Project implementation.
- (3) Timing and possibility of budget allocation.

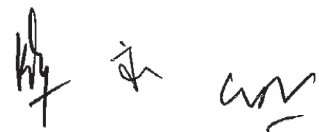
Contents of Annex 6 will be updated as the Preparatory Survey progresses, and will finally be the Attachment to the Grant Agreement.

6. Schedule of the Survey

- 6-1. The Team will proceed with further survey in Bhutan until 21st August, 2019.
- 6-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Bhutan in order to explain its contents around November, 2019.
- 6-3. If the contents of the draft Preparatory Survey Report is accepted in principle and the Undertakings are fully agreed by the Bhutanese side, JICA will complete the final report in English and send it to Bhutan around February, 2020.
- 6-4. The above schedule is tentative and subject to change.

7. Other Relevant Issues

- 7-1. In the meeting which was held between the two sides, the Royal Government of Bhutan expressed that the target to be achieved under farm mechanization in the 11th five year plan was 24,568 acres of agricultural land requiring the capacity of 1450 Power Tillers, which were requested in phase 1 of this project still stands. Further additional 15,339 acres of land is to be brought under farm mechanization in the 12th five years plan.
- 7-2. Although the need of Stone Picker was submitted by the Bhutan side, and the Team confirmed the necessity of the machines, it was not included in the revised list of machineries to be provided under this project, as it was beyond the initial concept that was submitted to Government of Japan.
- 7-3. The Royal Government of Bhutan mentioned that they have submitted the Monitoring Report on utilization of Farm Machineries, which were provided by phase 1 of this project to JICA Bhutan office. The mission asked the Bhutan side to share a copy of the report by 16th August, 2019. The Government of Japan will decide type and number of Farm Machineries, taking into consideration of the monitoring report and the team findings.



7-4. The Royal Government of Bhutan agreed that they submit the basis of the number of each requested Farm Machinery by 20th August, 2019.

7-5 The Royal Government of Bhutan agreed that they submit the operational plan of machineries by the end of October, 2019, which includes budget for employment of new operators, implementation of new training, subsidy for hiring service, which arises due to the increase in the number of farm machineries through this project.

Annex 1 Project Sites

Annex 2 Organization Chart

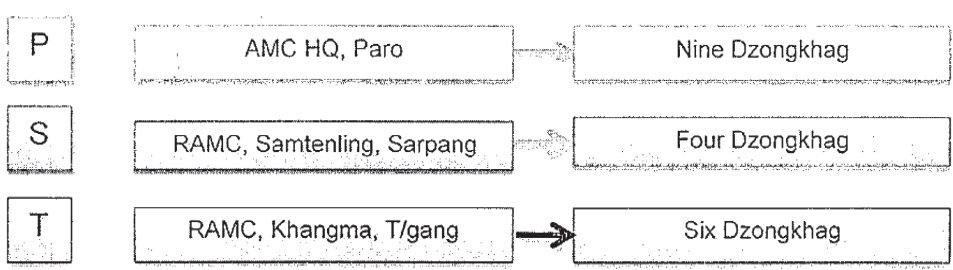
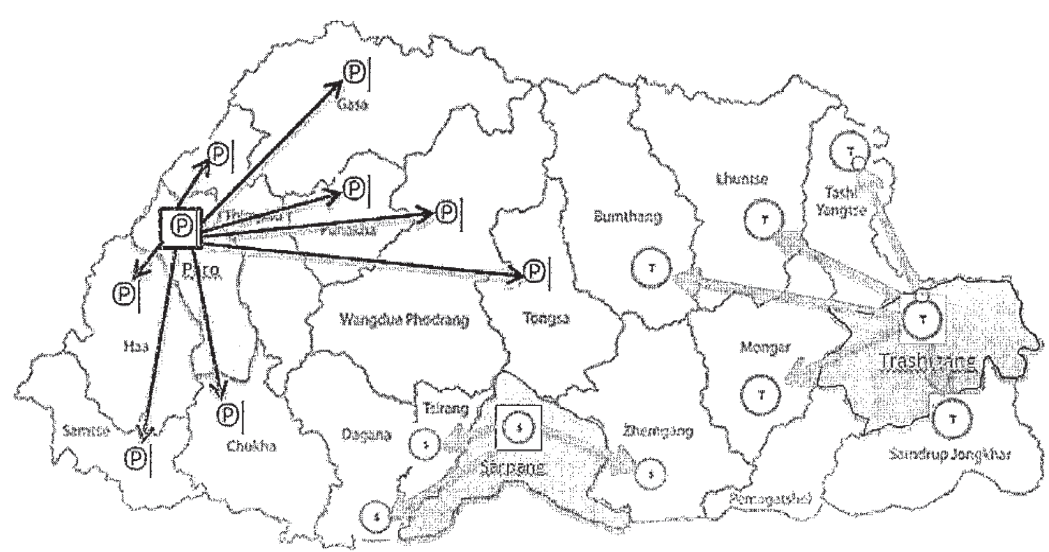
Annex 3 Japanese Grant

Annex 4 Project Monitoring Report

Annex 5 Major Undertakings to be taken by the Royal Government of Bhutan



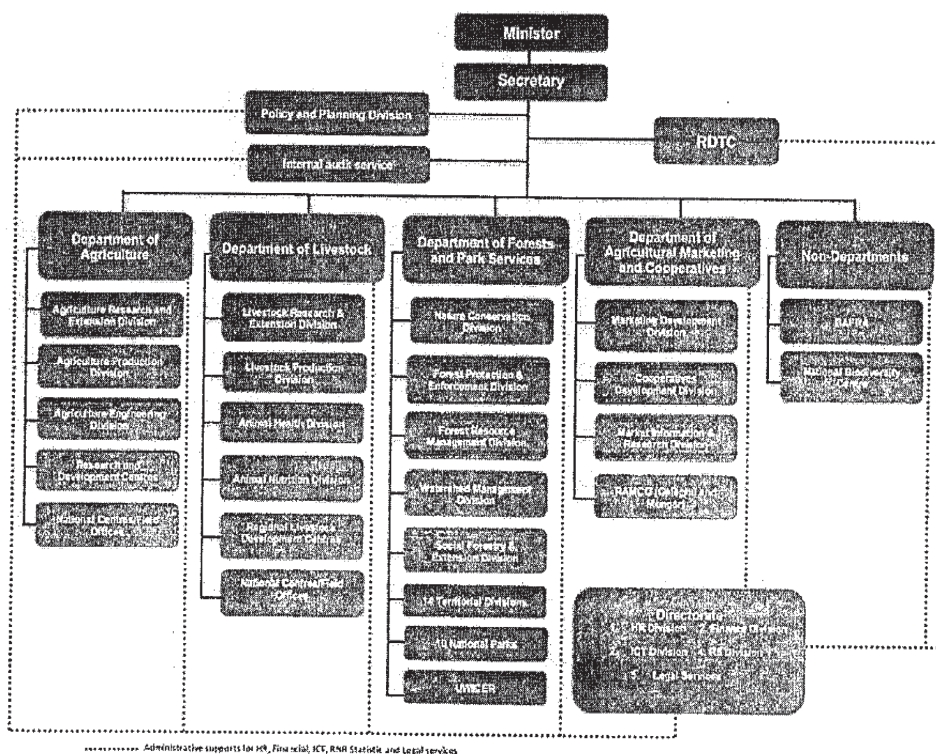
Agriculture Machinery Center and its regional center- Network



13

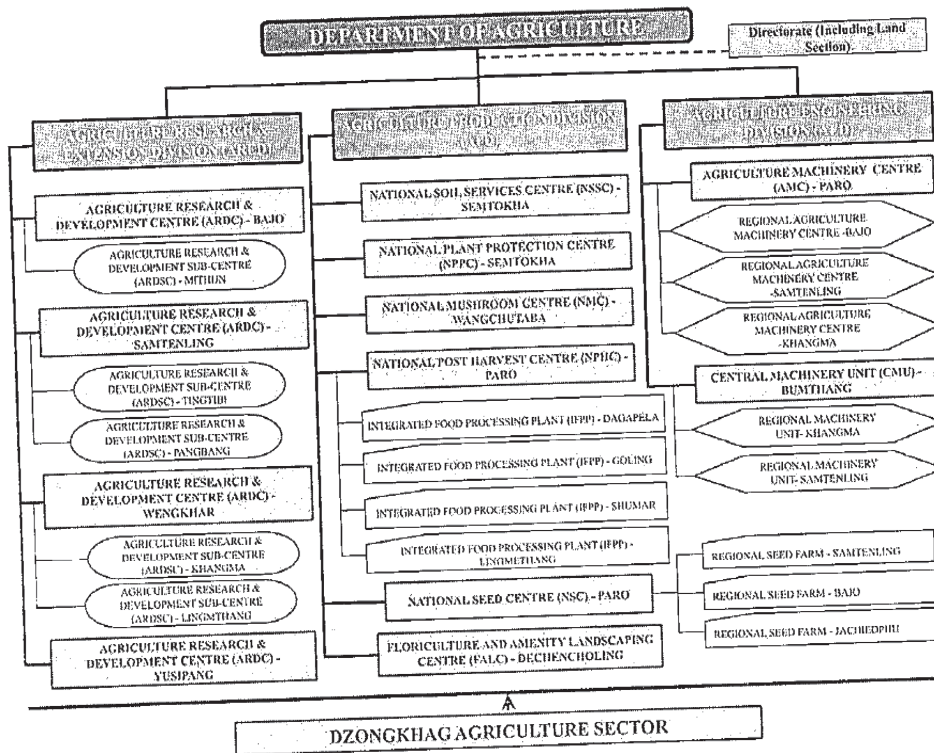
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Organogram- Ministry of Agriculture and Forests



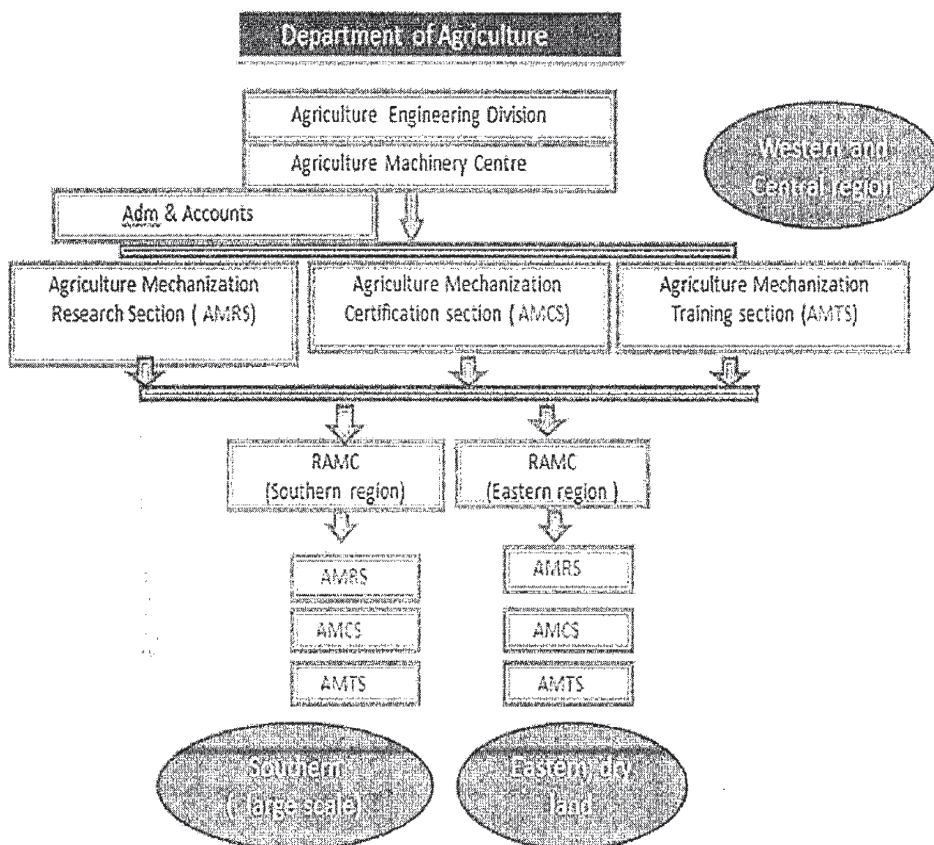
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Organogram- Department of Agriculture



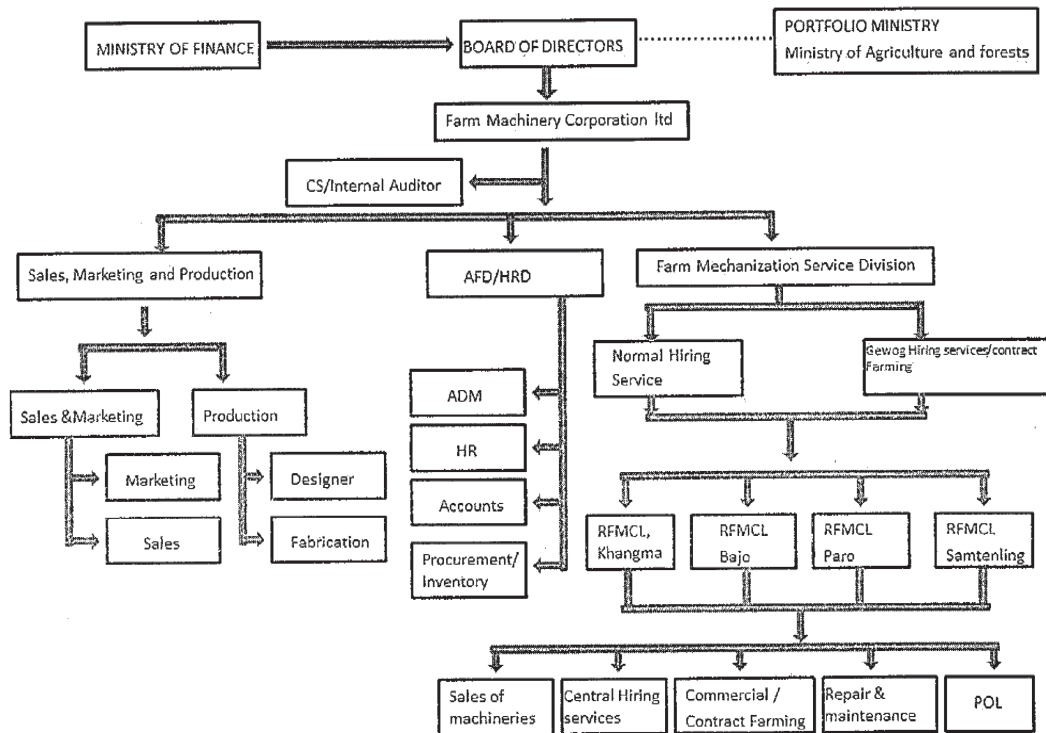
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Organogram- Agriculture Machinery Center



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Organogram- Farm Machinery Cooperation Limited



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JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

- (1) Preparation
 - The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA
- (2) Appraisal
 - Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet
- (3) Implementation
 - Exchange of Notes
 - The Notes exchanged between the GOJ and the government of the Recipient
 - Grant Agreement (hereinafter referred to as “the G/A”)
 - Agreement concluded between JICA and the Recipient
 - Banking Arrangement (hereinafter referred to as “the B/A”)
 - Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant
 - Construction works/procurement
 - Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A
- (4) Ex-post Monitoring and Evaluation
 - Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of

relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

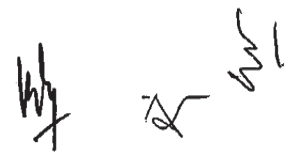
JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."



2) Banking Arrangements (B/A) (See “Financial Flow of Japanese Grant (A/P Type)” for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

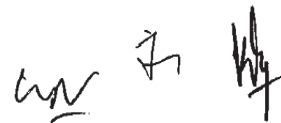
The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the “Meeting”) will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the

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Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as follows:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

- 1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.
- 2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.

3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.



4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

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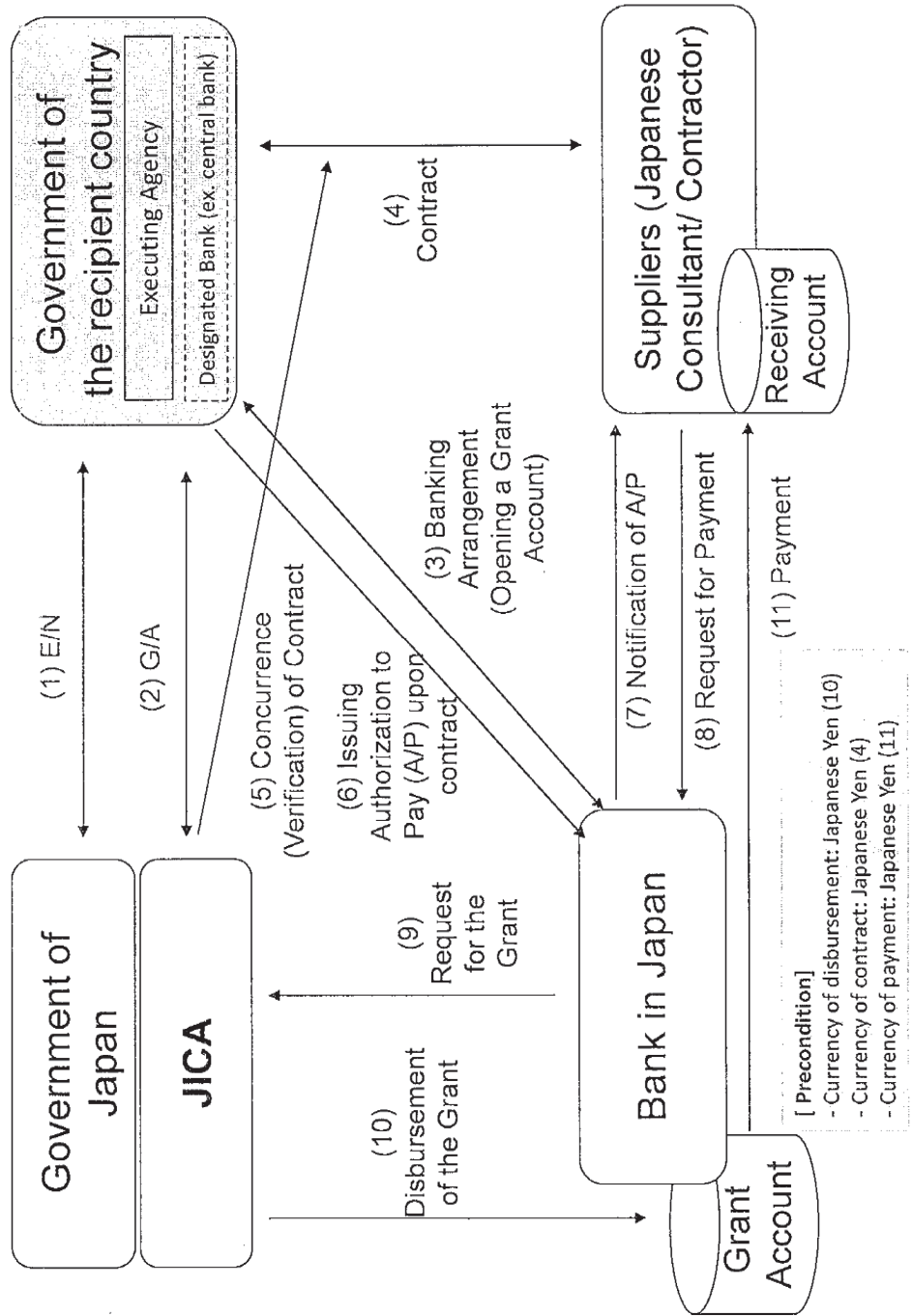
PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
	(2) Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
2. Appraisal	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
	(5) Exchange of Notes (E/N)		x	x				
3. Implementation	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

Financial Flow of Japanese Grant (A/P Type)



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Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXXX
 20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Executing Agency	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Line Ministry	Person in Charge (Designation) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

1: Project Description

1-1 Project Objective

--

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

--

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

2-2 Scope of the work

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

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 WJ, JS, MN

2-3 Implementation Schedule

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

Reasons for any changes of the schedule, and their effects on the project (if any)-

--

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations
 See Attachment 2.

2-4-2 Activities
 See Attachment 3.

2-4-3 Report on RD
 See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original ^{1),2)} <i>(proposed in the outline design)</i>	Actual
1.				
Total				

Note: 1) Date of estimation:
 2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original <i>(proposed in the outline design)</i>	Actual <i>(in case of any modification)</i>	Original ^{1),2)} <i>(proposed in the outline design)</i>	Actual
1.				

WV Z WY

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original (at the time of outline design)

name:

role:

financial situation:

institutional and organizational arrangement (organogram):

human resources (number and ability of staff):

Actual (PMR)

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original (at the time of outline design)

Actual (PMR)

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original (at the time of outline design)

Actual (PMR)

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (at the time of outline design)

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):

	Contingency Plan (if applicable):
Actual Situation and Countermeasures (PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

--

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

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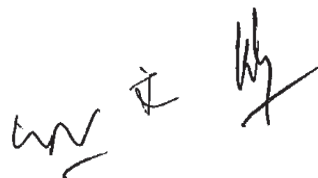
5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

--

Attachment

1. Project Location Map
 2. Specific obligations of the Recipient which will not be funded with the Grant
 3. Monthly Report submitted by the Consultant
- Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
 - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/ Agreement and Schedule of Payment)
 5. Environmental Monitoring Form / Social Monitoring Form
 6. Monitoring sheet on price of specified materials (Quarterly)
 7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
 8. Pictures (by JPEG style by CD-R) (PMR (final) only)
 9. Equipment List (PMR (final) only)
 10. Drawing (PMR (final) only)
 11. Report on RD (After project)

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Monitoring sheet on price of specified materials

L. Initial Conditions (Confirmed)		Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	% of Contract Price D	Condition of payment Price (Increased) F=C+D
1	Item 1	●●t	●●	●●	●●	●●
2	Item 2	●●t	●●	●●	●●	
3	Item 3					
4	Item 4					
5	Item 5					

2. Monitoring of the Unit Price of Specified Materials

(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

Items of Specified Materials	1st month, 2015	2nd month, 2015	3rd month, 2015	4th	5th	6th
1	Item 1					
2	Item 2					
3	Item 3					
4	Item 4					
5	Item 5					

(3) Summary of Discussion with Contractor (if necessary)

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Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
 (Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Wm

Wm

Major Undertakings to be taken by the Royal Government of Bhutan

1. **Specific obligations of the Royal Government of Bhutan which will not be funded with the Grant**

(1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after G/A	MOAF		

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract	MOAF		
	2) Payment commission for A/P	every payment	MOAF		
2	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	during the Project	MOAF		
3	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted Such customs duties, internal taxes and other fiscal levies mentioned above include VAT, commercial tax, income tax and corporate tax of Japanese nationals, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract	during the Project	MOAF		
4	To bear all the expenses, other than those to be borne by the Grant Aid				
	1) Necessary for construction of the facilities (space for assembling equipment)	before the shipment of the equipment	MOAF		
	2) Necessary for the transportation within project site	during the Project	MOAF		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid	After completion of the construction	MOAF		
	1) Allocation of maintenance cost				
	2) Operation and maintenance structure				
	3) Routine check/Periodic inspection				

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

2. Other obligations of the Government of the Royal Government of Bhutan funded with the Grant

No	Items	Deadline	Amount (Million Japanese Yen)*
1	To provide equipment		/
	1) To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	a) Marine (Air) transportation of the products from Japan to the recipient country	during the Project	
	b) Internal transportation from the port of disembarkation to the project site	during the Project	
	2) To provide equipment with installation and commissioning	during the Project	
2	To implement detailed design, tender support and construction supervision (Consultant)	during the Project	/
	Total		

* The Amount is provisional. This is subject to the approval of the Government of Japan.

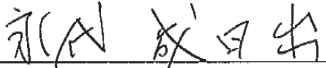
(2) Survey for explanation and discussion of Draft Preparatory Survey Report (November,2019)

Minutes of Discussions
on the Preparatory Survey for the Project for
Improvement of Farm Machinery for Hiring Services of Tillage (Phase 2)
(Explanation on Draft Preparatory Survey Report)


With reference to the minutes of discussions signed between Department of Agriculture, Ministry of Agriculture and Forests, Royal Government of Bhutan and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 14th August, 2019 and in response to the request from the Royal Government of Bhutan (hereinafter referred to as "Bhutan") dated 1st July, 2017, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Improvement of Farm Machinery for Hiring Services of Tillage (Phase 2) (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets.


Thimphu, 25th November, 2019



Dr. NAGAYO Narihida
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan



Kinlay Tshering (Ms.)
Director
Department of Agriculture
Ministry of Agriculture and Forests
Royal Government of Bhutan



Rinchen Wangdi
Director
Gross National Happiness Commission
Royal Government of Bhutan

ATTACHEMENT

1. Objective of the Project

The objective of the Project is to improve the accessibility to hiring services for farmers and agricultural productivity by providing Farm Machineries, thereby contributing to improve food security.

2. Title of the Preparatory Survey

Both sides confirmed the title of the Preparatory Survey as “the Preparatory Survey for the Project for Improvement of Farm Machinery for Hiring Services of Tillage (Phase 2)”.

3. Project site

Both sides confirmed that the sites of the Project will be 205 Gewogs, Agriculture Machinery Center (hereinafter referred to as “AMC”), and Farm Machinery Corporation Limited (hereinafter referred to as “FMCL”), which is shown in Annex 1.

4. Responsible authority for the Project

Both sides confirmed the authorities responsible for the Project are as follows:

- 4-1. The AMC, Department of Agriculture (hereinafter referred to as “DoA”) will be the executing agency for the Project (hereinafter referred to as “the Executing Agency”). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be taken care by relevant authorities properly and on time. The organization charts are shown in Annex 2.
- 4-2. The line ministry of the Executing Agency is the Ministry of Agriculture and Forests (hereinafter referred to as “MoAF”). The MoAF shall be responsible for supervising the Executing Agency on behalf of the Royal Government of Bhutan.
- 4-3. The FMCL will be the implementing agency for the Project (hereinafter referred to as “the Implementing Agency”). The Implementing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project.

5. Contents of the Draft Report

After the explanation of the contents of the Draft Report by the Team, the Bhutan side agreed to its contents. JICA will finalize the Preparatory Survey Report based



on the confirmed items. The report will be sent to the Bhutan side around February, 2020.

6. Cost estimate

Both sides confirmed that the cost estimate explained by the Team is provisional and will be examined further by the Government of Japan for its approval.

7. Confidentiality of the cost estimate and technical specifications

Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8. Procedures and Basic Principles of Japanese Grant

The Bhutan side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 3 shall be applied to the Project. In addition, the Bhutan side agreed to take necessary measures according to the procedures.

9. Timeline for the project implementation


The Team explained to the Bhutan side that the expected timeline for the project implementation is as attached in Annex 4.

10. Expected outcomes and indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Bhutan side will be responsible for the achievement of agreed key indicators targeted in year 2023 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative indicators]

Indicator	Baseline	Target (2 years after completion of the project)
Farming area by hiring service (ha/year)	10,492	17,008
Harvesting area by hiring service (ha/year)	805	1,945



[Qualitative indicators]

- (1) Farming gets more efficient.
- (2) Utilization of fallow land is improved.
- (3) Agriculture productivity is improved.
- (4) Food security in Bhutan is improved.
- (5) Employment in rural area is improved (by hiring new operators)

11. Ex-Post Evaluation

JICA will conduct ex-post evaluation after two (2) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Bhutan side is required to provide necessary support for the data collection.

12. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 5. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in (2) of Annex 5, both sides confirmed that such customs duties, internal taxes and other fiscal levies, which shall be clarified in the bid documents by MoAF during the implementation stage of the Project.

The Bhutan side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 5 will be used as an attachment of G/A.

13. Monitoring during the implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 6. The timing of submission of the PMR is described in Annex 5.

14. Project completion

Both sides confirmed that the project completes when all the facilities constructed and equipment procured by the Grant are in operation. The completion of the Project will be reported to JICA promptly by the Executing Agency, but in any event not later than six months after completion of the Project.



15. Other Relevant Issues

15-1. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

15-2. Securing budget and human resource

The Bhutan side agreed that they submit the letter of ensuring necessary budget and human resource for the operation and maintenance of provided machineries by the end of December, 2019, based on the Draft Preparatory Survey Report which is submitted by JICA.

15-3. Reallocation of provided machineries

If the reallocation of provided machineries arises, it is necessary to reallocate them based on the appropriate criteria, in order to be able to track them.

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 Japanese Grant

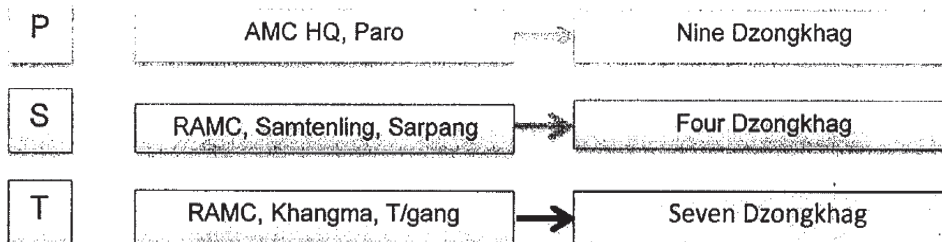
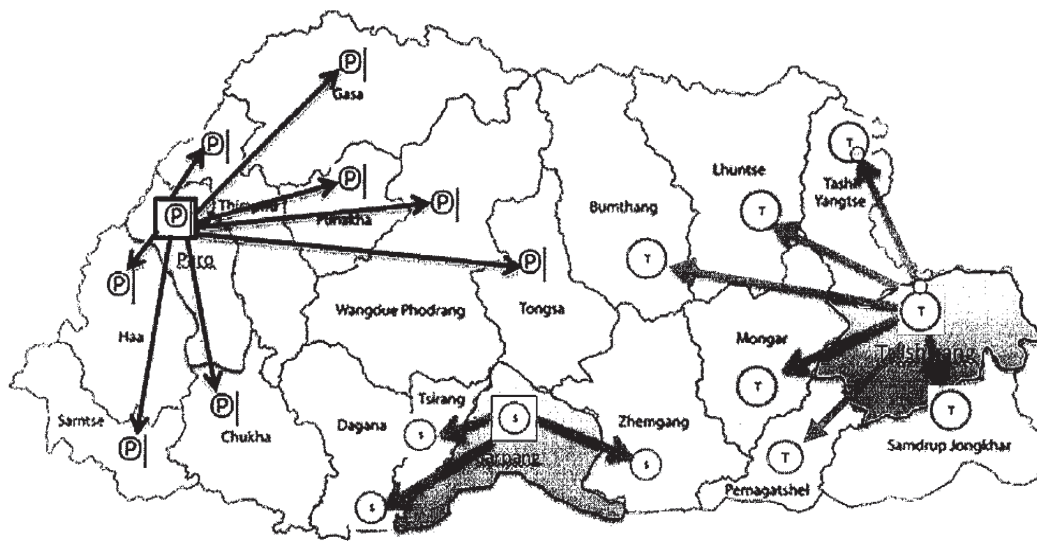
Annex 4 Project Implementation Schedule




Annex 5 Major Undertakings to be taken by the Royal Government of Bhutan

Annex 6 Project Monitoring Report (template)

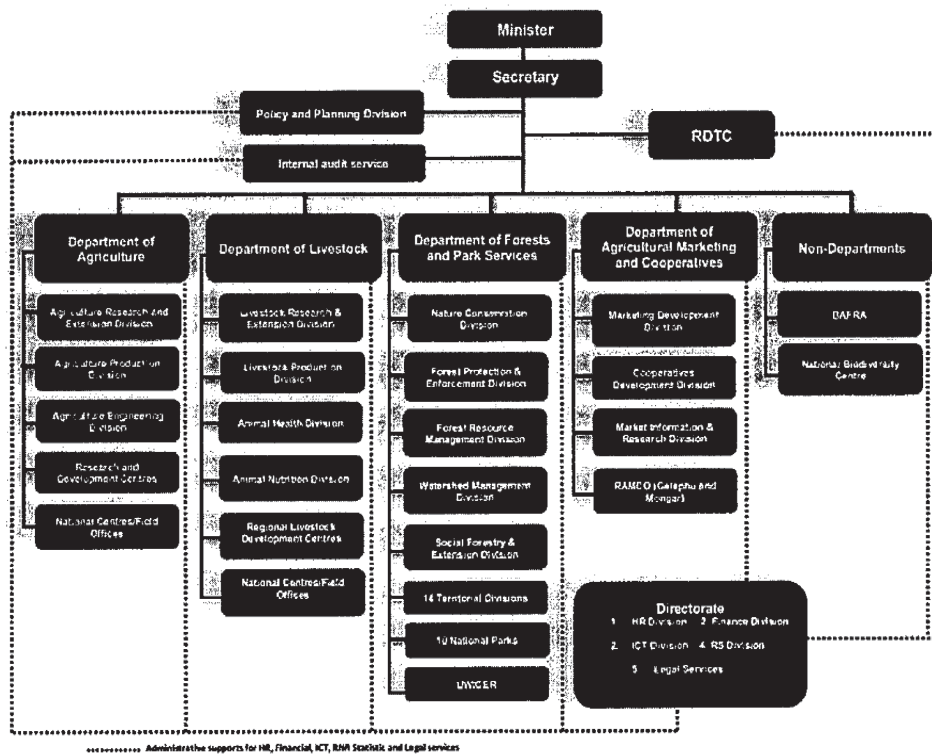


Agriculture Machinery Center and its regional centers- Network



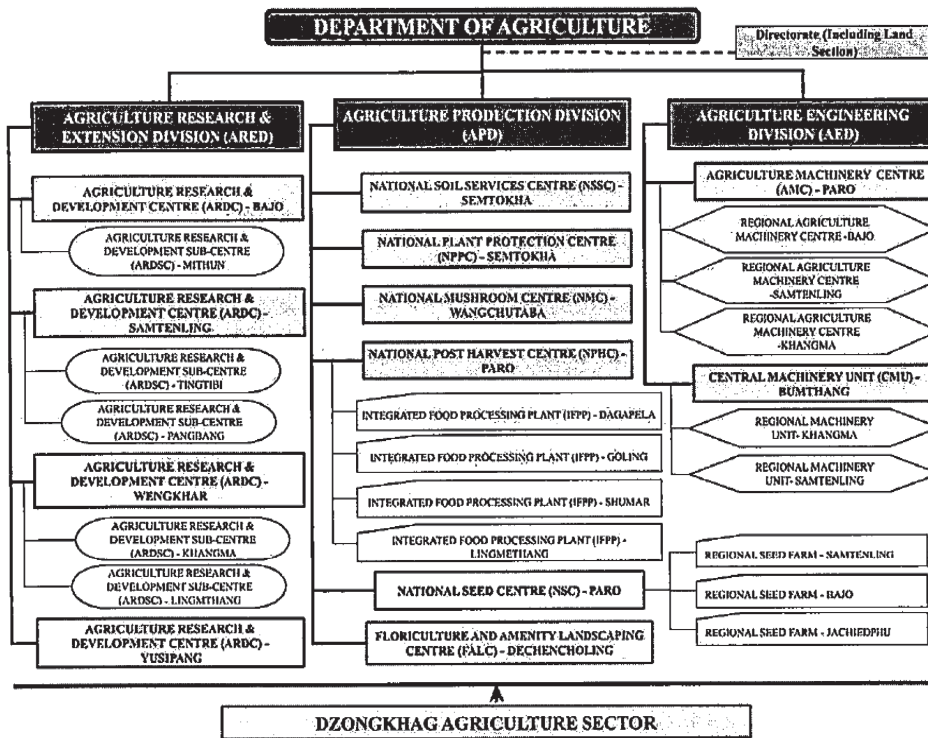




Organogram - Ministry of Agriculture and Forests



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Organogram - Department of Agriculture

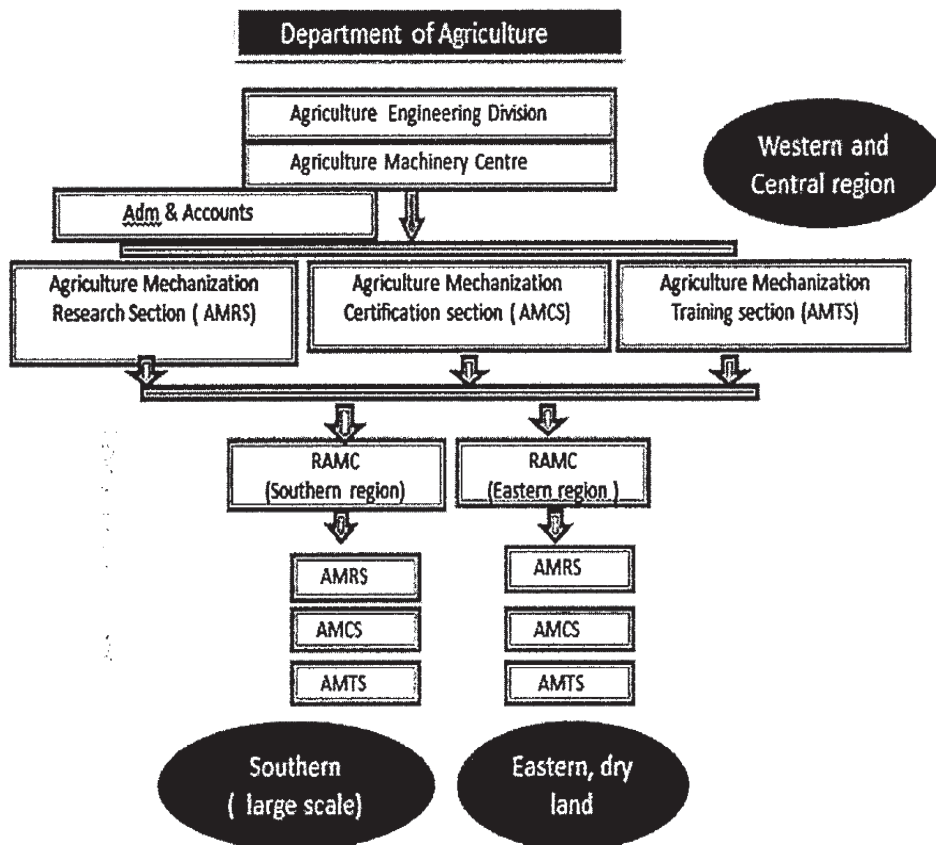


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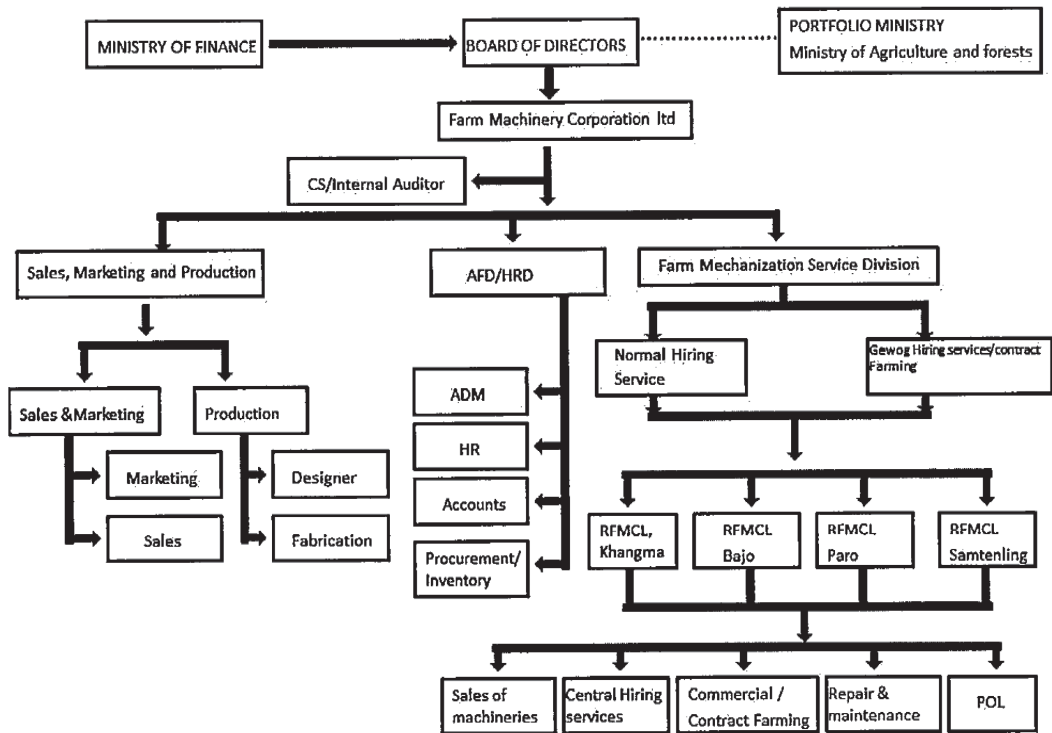
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Organogram - Agriculture Machinery Center



Organogram - Farm Machinery Cooperation Limited



JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as “the Recipient”) to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as “Project Grants”).

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See “PROCEDURES OF JAPANESE GRANT” for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as “the Survey”) conducted by JICA

(2) Appraisal

- Appraisal by the government of Japan (hereinafter referred to as “GOJ”) and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

- The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as “the G/A”)

- Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as “the B/A”)

- Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as “the Bank”) to receive the grant

Construction works/procurement

- Implementation of the project (hereinafter referred to as “the Project”) on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

- Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of

relevant agencies of the Recipient necessary for the implementation of the Project.

- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

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2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the



Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

- a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.
- b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

- 1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.
- 2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund comes from the Japanese taxpayers.


3) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.



4) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

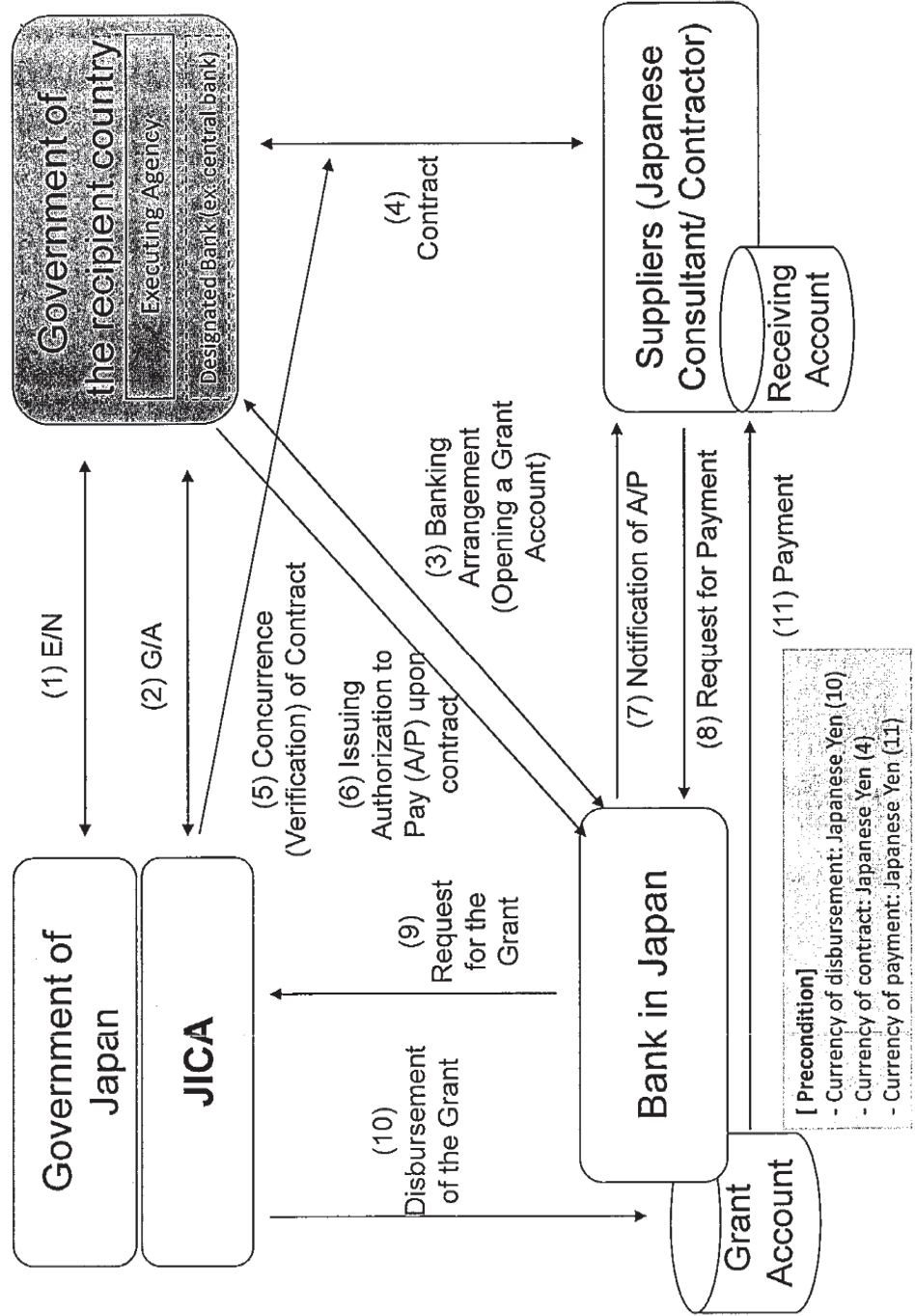
PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2) Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3) Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
4. Ex-post monitoring & evaluation	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

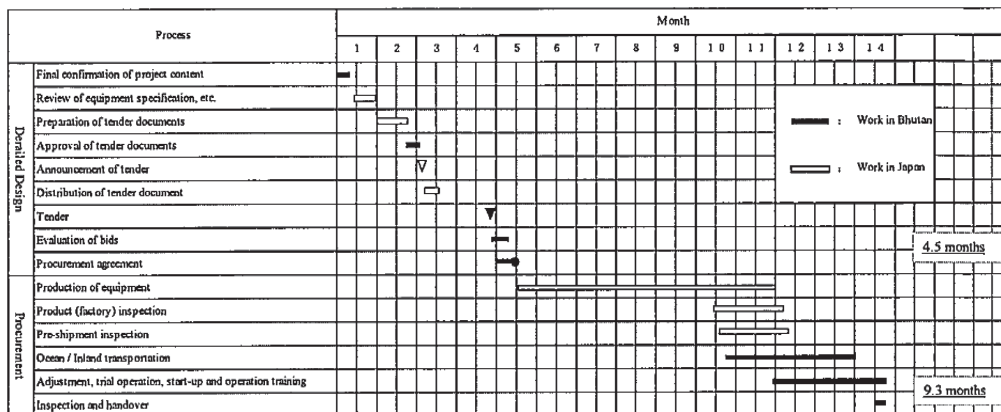
Financial Flow of Japanese Grant (A/P Type)



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Project Implementation Schedule



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Major Undertakings to be taken by the Royal Government of Bhutan

1. Specific obligations of the Royal Government of Bhutan which will not be funded with the Grant

(1) Before the Tender

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after G/A	MoAF		

(2) During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the signing of the contract	MoAF		
	2) Payment commission for A/P	every payment	MoAF		
2	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	during the Project	MoAF		
3	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted Such customs duties, internal taxes and other fiscal levies mentioned above include VAT, commercial tax, income tax and corporate tax of Japanese nationals, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract	during the Project	MoAF		
4	To bear all the expenses, other than those to be borne by the Grant Aid				
	1) Necessary for construction of the facilities (space for assembling equipment)	before the shipment of the equipment	MoAF		
	2) Necessary for the transportation within project site	during the Project	MoAF		
5	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	MoAF		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid	After completion of the construction	MoAF		
	1) Allocation of maintenance cost				
	2) Operation and maintenance structure				
	3) Routine check/Periodic inspection				

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

2. Other obligations of the Royal Government of Bhutan funded with the Grant

No	Items	Deadline	Amount (Million Japanese Yen)*
1	To provide equipment		/
1)	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
a)	Marine (Air) transportation of the products from Japan to the recipient country	during the Project	
b)	Internal transportation from the port of disembarkation to the project site	during the Project	
2)	To provide equipment with installation and commissioning	during the Project	
2	To implement detailed design, tender support and construction supervision (Consultant)	during the Project	/
	Total		/

* The Amount is provisional. This is subject to the approval of the Government of Japan.

<p><u>Project Monitoring Report</u> on <u>Project Name</u> <u>Grant Agreement No. XXXXXXXX</u> 20XX, Month</p>
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Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) _____ Contacts _____ Address: _____ Phone/FAX: _____ Email: _____
Executing Agency	Person in Charge (Designation) _____ Contacts _____ Address: _____ Phone/FAX: _____ Email: _____
Line Ministry	Person in Charge (Designation) _____ Contacts _____ Address: _____ Phone/FAX: _____ Email: _____

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____




1: Project Description

1-1 Project Objective

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1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

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1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original <i>(proposed in the outline design)</i>	Actual
1.		

2-2 Scope of the work

Components	Original* <i>(proposed in the outline design)</i>	Actual*
1.		

Reasons for modification of scope (if any).

(PMR)

2

2-3 Implementation Schedule

Items	Original		Actual
	<i>(proposed in the outline design)</i>	<i>(at the time of signing the Grant Agreement)</i>	

Reasons for any changes of the schedule, and their effects on the project (if any)

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2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations

See Attachment 2.

2-4-2 Activities

See Attachment 3.

2-4-3 Report on RD

See Attachment 11.

2-5 Project Cost

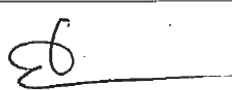
2-5-1 Cost borne by the Grant(Confidential until the Bidding)

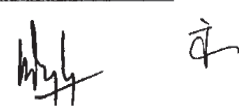
Components	Original		Actual	
	<i>(proposed in the outline design)</i>	<i>(in case of any modification)</i>	<i>(proposed in the outline design)</i>	<i>(in case of any modification)</i>
1.				
Total				

Note: 1) Date of estimation:
 2) Exchange rate: 1 US Dollar = Yen

2-5-2 Cost borne by the Recipient

Components	Original		Actual	
	<i>(proposed in the outline design)</i>	<i>(in case of any modification)</i>	<i>(proposed in the outline design)</i>	<i>(in case of any modification)</i>
1.				





- Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original (at the time of outline design)

name:

role:

financial situation:

institutional and organizational arrangement (organogram):

human resources (number and ability of staff):

Actual (PMR)

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement

- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original (at the time of outline design)

Actual (PMR)

3-2 Budgetary Arrangement

- Required O&M cost and actual budget allocation for O&M

Original (at the time of outline design)

Actual (PMR)

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks (at the time of outline design)

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:

5



	Contingency Plan (if applicable):
Actual Situation and Countermeasures (PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

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5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

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5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant
Appendix - Photocopy of Contractor's Progress Report (if any)
 - Consultant Member List
 - Contractor's Main Staff List
4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final) only)
8. Pictures (by JPEG style by CD-R) (PMR (final) only)
9. Equipment List (PMR (final) only)
10. Drawing (PMR (final) only)
11. Report on RD (After project)



5. Reference

No.	Titles	Type	Original / Copy	Publisher	Publishing Year
	Twelfth Five-Year Plan 2018-2023 RNR Sector	Book	Copy	Ministry of Agriculture and Forests	2019
	Statistical Yearbook of Bhutan 2017	Book	Copy	National Statistics Bureau	2017
	Statistical Yearbook of Bhutan 2018	Book	Copy	National Statistics Bureau	2018
	Agriculture Statistics 2017	Book	Copy	Ministry of Agriculture and Forests	2017
	Bhutan - Renewable Natural Resources Statics 2017	Book	Copy	Ministry of Agriculture & Forests	2007
	2017 Population & Housing Census	Book	Copy	National Statistics Bureau	2017
	National Accounts Statistics 2018	Book	Copy	National Statistics Bureau	2018
	Gewog Power Tiller Hiring Guideline 2019	Book	Copy	Agriculture Machinery Centre	2019
	Central Hiring Services Guideline 2019	Book	Copy	Agriculture Machinery Centre	2019
	Agriculture Research and Development Highlights 2016-2017	Book	Copy	Agriculture Machinery Centre	2017
	RNR Statistical Framework 2018	Book	Copy	Agriculture Machinery Centre	2018
	Monitoring and Evaluation Report on Government Hiring Service	Book	Copy	Agriculture Machinery Centre	2019

