Ministry of Agriculture and Forests The Kingdom of Bhutan

THE PREPARATORY SURVEY REPORT ON THE PROJECT FOR IMPROVEMENT OF FARM MACHINERY FOR HIRING SERVICES IN THE KINGDOM OF BHUTAN

July 2016

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, 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.

July 2016

MITUGI Keito Director General, Rural Development Department Japan International Cooperation Agency

Summary

1. Background of the Project

The national development plan is the 11th FYP (2013-2018) in which the Ministry of Agriculture and Forests (MOAF) intends to make a variety of food products available through increased production and productivity of agriculture, forest and livestock resources.

However, agriculture is the main occupation in the country and most agricultural activities are carried out manually. The level of farm mechanization at present is very low.

Additionally, due to the trend of rural-urban migration, the main constraint faced by farmers is the labor shortage. The majority of agriculture workers are found to be female. With the cost of labor being very high (Nu.500 per day or more depending on different *Dzongkhags*), the cost of production for paddies becomes very high for farmers who do not use machines.

It is clear that, in agriculture development, farm mechanization is given the highest priority for development. Farm mechanization in Bhutan is mainly carried out in the form of two-wheel tractors, which Bhutan has been receiving through the 2KR Grant. Until now, for the last 23 years, Bhutan has received the 2KR Grant in the form of power tillers from the Government of Japan. These tillers have assisted the farmers and brought about immense changes in agricultural activities in Bhutan. Unfortunately, the machines received are still not adequate and the demand for the machines is increasing yearly, and is further boosted with increased investment in irrigation and new farm roads.

The recent intervention by the Department of Agriculture (DOA) through the Agriculture Machinery Centre (AMC) in providing hiring services has proved to be very helpful to all farmers at all levels.

The experience gained by the AMC in hiring out agriculture machinery to farmers shows that the communities are willing to and very much interested in hiring small machinery provided that there are service providers. Hiring Centers are seen as better options for promotion of farm mechanization over farmers owning their individual machines.

Under these circumstances, the Royal Government of Bhutan requested the Government of Japan to carry out the project for Improvement of Farm Machinery for Hiring Services.

Based on the above situation, this project will procure the necessary power tillers for the enhancement of *gewog* hiring services in Bhutan. As a result, the project will make a contribute to the sustainable economic growth.

2. Summary and Project contents

(1) Basic Concept of the Project

This Project will procure power tillers necessary for the enhancement of *gewog* hiring services in Bhutan to increase agricultural production.

(2) Design Policy

Gewog hiring services are managed by a *gewog* extension officer (EO) working in each *gewog* nationwide based on the *gewog* power tiller hiring guidelines prepared by AMC and approved by DOA. *Gewog* hiring services start with an annual work plan prepared by EO. The annual work plan presents farmers' cultivation demands collected from farmers through *gewog* officials. The working day of the work plan shows the number of days for cultivation using a power tiller such as plowing and rotavating under the *gewog* hiring services. The working plan for the second half of FY 2015-2016 has shown a total of 14,136 working days from all 205 *gewog* in Bhutan. To satisfy annual cultivation demand with power tillers, twice the above number of working days is needed. Accordingly, 28,272 working days is calculated as the annual working days of the *gewog* hiring services. A total of 28,272 working days needs 558 power tillers. *Gewog* hiring services are operating 205 power tillers in total nationwide in 2016. Within this, 353 (=558-205) power tillers are requested to manage the urgent demands in the work plan.

(3) Equipment to Be Procured (Plan)

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

E	Specifi	cations	Quantity		
Equipment	Initial	Final	Initial	Final	
Dama Tillar	12.5hp	12.5hp 11.0hp		444 units	
Power Tiller and over and over		and over	(Total 1,450)	(Total 1,450)	
Plow	_	_	400 units	444 units	
FIOW			(Total 1,450)	(Total 1,450)	
Spear Parts	—	—	set	set	

Table: List of Requested Equipment

Source: MOAF

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 3.7 months, and the equipment supply period will be 9.8 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

In Bhutan, it is necessary to complete cultivation work, plowing and rotavating within 15 days otherwise the proper farming season will be missed and agricultural production lost. The Government of Japan procured nearly 3,000 power tillers between 1984 and 2013 to assist Bhutanese farmers under the Second Kennedy Round (2KR) project. Most of the beneficiaries of these procurements were large-scale farmers who were able to purchase power tillers with their own money. Most of the small-scale farmers still cultivate farmland by animals or manual labor. Those farmers find it difficult to complete cultivation within the proper period without machinery assistance. Because of this reason, they fail to achieve proper agricultural production levels every year. And, as expected, poor farm mechanization leads to a failure to increase food self-sufficiency in Bhutan, which is one of the national targets. Procurement of farm machinery through the project under a Japanese grant will provide many opportunities for those farmers to access farm machinery through the enhancement of the *gewog* hiring services.

The implementation of this project as Japanese grant aid has necessity and relevance, from the standpoint of the necessity and urgency with demand for farm through the procurement the equipment to enhance *gewog* hiring services.

(2) Effectiveness

1) Quantitative Effects

Table: Quantitative Effects

Indicator	Baseline (January 2016) ^{**1}	Target (October 2018) ^{**2}
Cultivated area (ha)	136 ^{**1}	$7,118^{3}$

*1: Actual cultivated area of the six eastern dzongkhag between July and December 2015 with 61 power tillers

*2: One year after machinery procured

*3: 558 power tillers (existing 205+procured 353) x 45 days (annual working day) x 0.7 acres/day = 17,577 acres = 7,118 ha (17,577 acres x 0.405)

2) Qualitative Effects

Qualitative Effects of this Project will be as follows:

- ① Improvement of efficiency of farm work.
- ② Improvement of efficiency of agricultural productivity.

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Note: FMCL is established on the same office of AMC and RAMC

Location Map of Survey Area







1. Power Tiller

2. Accessory (Single Reversible Plow)

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Abbreviations

AMC	Agriculture Machinery Centre
AMCHS	AMC Hiring Services
AMDC	Agriculture Machinery Development Centre
AMSC	Agriculture Machinery Supply Centre
AMTC	Agriculture Machinery Training Centre
B/A	Banking Arrangements
CO	Contract Operator
DAMC	Decentralized Agriculture Machinery Centre
DOA	Department of Agriculture
DOR	Department of Roads
DRDP	Decentralized Rural Development Project
DSP	Decentralized Support Project
(A)EO	Agricultural Extension Officer
(F)EO	Forestry Extension Officer
(L)EO	Livestock Extension Officer
E/N	Exchange of Notes
FYP	Five-Year Plan
G/A	Grant Agreement
GHS	Gewog Hiring Services
GNHC	Gross National Happiness Commission
GDP	Gross Domestic Product
HP	Horsepower
JICA	Japan International Cooperation Agency
2KR	Kennedy Second Round Project
MOAF	Ministry of Agriculture and Forests
LO	Local Operator
NHC	National Hiring Coordinator
PT	Power Tiller
RAMC	Regional Agriculture Machinery Centre
RHC	Regional Hiring Coordinator

Local Units of Bhutan

Dzongkhag	Prefecture
Gewog	County
Chiwog	Village

CHAPTER 1. Background of the Project

1-1 Background of the Request and Summary

Over the past 29 years, between 1984 and 2013, the Government of Japan has procured nearly 3,000 power tillers to assist Bhutanese farmers through the Second Kennedy Round scheme (2KR: Increased food production aid and support of farmers in poverty). However, this amount of power tillers was not enough to cover the farmers' demands nationwide. Small-scale farmers, who are not able to purchase power tillers, still cultivate farmland by animal or manual labor.

From 2009, the Royal Government of Bhutan intends to cover the current farmers' demands through AMC hiring services using the existing power tillers.

To cope with nationwide farm mechanization through hiring services, since 2015, the Royal Government of Bhutan has implemented the *gewog* hiring services for a total of 205 power tillers, arranging for one power tiller per one *gewog*. After starting the services, it is immediately clear that additional power tillers are needed urgently because farmers' demands in each *gewog* outstrip the performance of one power tiller for each *gewog*.

Based on the above situation, this project will procure the necessary power tillers for the enhancement of *gewog* hiring services in Bhutan. As a result, the project will make a contribute to the sustainable economic growth.

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 selected as a result of discussions and verifications under this Survey are listed in Table 1-1 below.

Eminment	Specifi	cations	Quantity		
Equipment	Initial	Final	Initial	Final	
Derver Tiller	12.5hp	11.0hp	400 units	444 units	
Power Tiller	and over	and over and over		(Total 1,450)	
Dlow			400 units	444 units	
Plow			(Total 1,450)	(Total 1,450)	
Spear Parts	—	—	set	set	

Table 1-1: List of Requested Equipment

Source: MOAF

1-2 Environmental and Social Considerations

This Project, which plans to procure equipment for road maintenance, falls under Category C under "JICA Guidelines for Environmental and Social Considerations" (issued in April 2010). When implementing the Project, it should be confirmed that existing and new equipment is used for farm road construction with due consideration to the effect on the environment and society.

Currently, Bhutan doesn't have strict regulations on emissions control for power tillers. No particular problems have occurred among existing power tillers, which were procured by past projects in 2KR (Kennedy Round II), because of the inferior quality of the fuel available in Bhutan. Therefore, it is considered that measures concerning fuel are somewhat unnecessary.

CHAPTER 2. Contents of the Project

2-1 Basic Concept of the Project

2-1-1 National Development Plan

The 11th Five-Year Plan (FYP) is the National Development Plan of Bhutan. The Ministry of Agriculture and Forests (MOAF) and the Department of Agriculture (DOA) presented the following four targets in the 11th FYP.

i) Irrigation and water management
ii) Farm Mechanization
iii) Human wildlife conflict mitigation
iv) Land development

The Agriculture Machinery Centre (AMC) is under DOA to support farm mechanization and presented the following target in 11th FYP as shown in the table below.

Items	Baseline (2013)	Target (2018)
1 Area covered under Farm Machinery Hiring Services (acres)	1,500.00	55,747.50
2 Area covered under Farm Machinery excluding Hiring Services (acres)	56,543.00	67,793.00
Area Total (acres)	58,042.50	123,539.50
3 Power Tiller for Gewog power tiller hiring (nos.)	0	1,450
4 Other Power Tiller (nos.)	2,513	3,263
5 Farm machines (processing machines, etc.) (nos.)	4,954	7,287
6 Farm mechanization (%)	7.82%	16.64%

Table 2-1: AMC Farm Mechanization Target in 11th FYP

Source: MOAF

2-1-2 Gewog Hiring Services

The target of the agricultural sector of Bhutan is an increase in food self-sufficiency to mitigate the shortage of labor and improve agricultural productivity through farm mechanization. Farm mechanization gradually advanced in the past, but currently, about 80 percent of farmers in Bhutan still cultivate their farm land with animals.

The Royal Government of Bhutan procured nearly 3,000 power tillers through 2KR. However, this amount of power tillers was not enough to cover farmers' demands nationwide as previously explained in Chapter 1. From 2009, The Royal Government of Bhutan intends to cover the current farmers' demands through AMC hiring services using the existing power tillers.

To cope with nationwide farm mechanization through hiring services, since 2015, The Royal Government of Bhutan has started other hiring services, namely *gewog* hiring services with a total of 205 power tillers (205 from 239 power tillers procured in 2KR in 2013). After starting the services, it is immediately clear that additional power tillers are needed urgently because the farmers' demands in each *gewog* exceed the performance of one power tiller per *gewog*. The 2KR scheme stopped in 2014 and, accordingly, procurement of power tillers through 2KR also finished.

Based on the above situation, this project will procure the necessary power tillers for the enhancement of *gewog* hiring services in Bhutan. As a result, the project will make a contribute to the sustainable economic growth.

2-2 Outline Design of the Requested Japanese Assistance

2-2-1 Design Policy

2-2-1-1 Basic Policy

(1) **Priority** Gewog

AMC has prepared criteria for priority *gewog* from the 205 nationwide *gewog* for the purpose of arranging power tillers for the *gewog* hiring services with the following conditions in the table below.

Itama	Index						
items	6	5	4	3	2	1	
1 Household	—	More than 600	450	300	150	Less than 149	
2 Road condition (%)	—	More than 80%	60	40	20	Less than 19%	
3 Existing PT (nos)	Less than 3	More than 4	More than 8	More than 12	More than 16	More than 20	
4 Wet land (acres)	More than 1,700	1,400	1,050	700	350	Less than 350	
5 Dry land (acres)	More than 3,000	2,450	1,750	1,150	600	Less than 600	

Table 2-2: Criteria for Priority Gewog

Source: AMC

Priority gewog are shown in the table below.

1 st Priori	ty	2 nd Prior	ity	3 rd Priority		4 th Priority		
Dhongkhag	Gewog	Dhongkhag	Gewog	Dhongkhag	Gewog	Dhongkha	ıg	Gewog
Chhukha	2	Bumthang	3	Chhukha	2	Bumthang		1
Dagana	3	Chhukha	2	На	3	Chhukha		5
Lhuentse	1	Dagana	6	Lhuentse	1	Dagana		5
Mongar	1	На	2	Mongar	3	Gasa		4
Paro	2	Lhuentse	4	Paro	2	На		1
Punakha	9	Mongar	6	P/gatshel	2	Lhuentse		2
S/jongkhar	1	Paro	4	S/jongkhar	2	Mongar		7
Samtse	7	P/gatshel	4	Samtse	3	Paro		2
Sarpang	2	Punakha	2	Sarpang	5	P/gatshel		5
Thimphu	2	S/jongkhar	3	Thimphu	3	S/jongkhar		5
Trashigang	1	Samtse	3	Trashigang	3	Samtse		2
Tsirang	4	Sarpang	3	T/yangtse	1	Sarpang		2
Wangdue	7	Trashigang	5	Tsirang	2	Thimphu		3
Zhemgang	1	T/yangtse	3	Wangdue	1	Trashigang		6
		Trongsa	2	Zhemgang	2	T/yangtse		4
		Tsirang	5			Trongsa		3
		Wangdue	4			Tsirang		1
		Zhemgang	1			Wangdue		3
						Zhemgang		4
Sub-total	43	Sub-total	62	Sub-total	35	Sub-total		65
							Total	205

 Table 2-3: Gewog Priority Ranking

Source: Survey Team from AMC Information

These priority *gewog* were applied to quantity calculation and arrangement of power tillers as necessary.

(2) Work Plan

This project is aimed at enhancing the capabilities of the *gewog* hiring services through machinery procurement. *Gewog* hiring services started in 2015 under AMC's management with one power tiller in each *gewog*. *Gewog* hiring services on-site are managed by a *gewog* extension officer (EO) working in each *gewog* nationwide based on the *gewog* power tiller hiring guidelines prepared by AMC and approved by DOA. *Gewog* hiring services start with an annual work plan prepared by the EO. The annual work plan presents farmers' cultivation demands collected from farmers by *gewog* officials. The working day of the work plan shows the number of days for cultivation using power tillers such as plowing and rotavating under the *gewog* hiring services. The working day shows farmers' urgent demands for power tiller use. Therefore, for an estimation of the necessary number of power tillers for the *gewog* hiring services the above working day of the annual work plan was applied in this survey. The latest work plan was prepared for the second half of FY 2015-2016 with a working day of 14,136 days as shown in the table below.

Dhongkhag	Gewog	Working day
Bumthang	4	203
Chukha	11	800
Dagana	14	460
Gasa	4	170
Haa	6	338
Lhuentse	8	610
Mongar	17	766
Paro	10	960
Pemagatshel	11	641
Punakha	11	1,317
Sandrupjongkhar	11	1,027
Samtse	15	804
Sarpang	12	968
Thimphu	8	786
Trashigang	15	530
Trashiyangtse	8	302
Trongsa	5	498
Tsirang	12	580
Wangdue	15	1,278
Zhemgang	8	1,098
Total	205	14,136

Table 2-4: Working day from Gewog Work Plan

Source:AMC

The working day in Table 2-4 is for a half year. To satisfy annual cultivation demand with power tiller use, twice the number of the above working days is needed. Accordingly, a working day of 28,272 (=14,136 x 2) is calculated as an annual working day of the *gewog* hiring services. The necessary number of power tillers for the *gewog* hiring services is calculated based on this working day of 28,272 days.

2-2-1-2 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
- \blacktriangleright Temperature: -5.0 ~ 35.0°C
- Rainfall: 500 ~ 5,000mm/year

The above climatic conditions to be applied to the power tillers procured under this project basically follow the conditions applied to the power tillers procured in the past 2KR.

2-2-1-3 Policy Concerning Operations and Maintenance

Equipment to be procured for this Project will be delivered to, and operated and maintained by, AMC under DOA. Because personnel have been properly operating and maintaining the existing equipment from past 2KR experience, they are also deemed to possess the basic skills and knowledge to operate and maintain the planned equipment. Operation and maintenance of the *gewog* hiring services is under AMC's services. AMC is able to undertake proper operation and maintenance of power tillers based on experience from the past 2KR. Therefore,

It has been confirmed that MOAF will allocate a budget based on the estimated cost for employing additional personnel for the planned equipment.

Software components (technical assistance) will not be implemented, as AMC personnel are well versed in farm land cultivation, equipment operation, and parts management.

2-2-1-4 Policy Concerning Procurement of Spare Parts

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

2-2-1-5 Policy Concerning Grade of Equipment

Japanese-made power tillers procured for the past 2KR are highly evaluated by the executing agency AMC for their excellent quality and ease of use. Thus, we will set the quality/performance grades of the equipment items for this project at the levels that match those of Japanese products having excellent quality and performance.

2-2-1-6 Policy Concerning Procurement Method and Schedule

The equipment procured for this project is only power tillers and their accessories. Thus, lot division for tender is not considered.

Shipments from machinery manufacturers might occur three times because the number of power tillers is 353, which is too many for one shipment. Adjustment of shipping timing is needed to consider a space in AMC for assembling the power tillers.

2-2-1-7 Policy Concerning Country of Origin

As most of the existing equipment of AMC is made in Japan, operators and mechanics are well versed in handling Japanese-made equipment and desirous to receive Japanese products for 2KR as well.

Accordingly, we will consider selecting the planned equipment mostly from Japanese manufacturers' products. For items that are not made by Japanese manufacturers or are made only by a limited number of manufacturers, we will consider third-country products carrying Japanese brand names or having comparable quality to those made in Japan. Possible countries of origin are Japan, Indonesia and Thailand.

2-2-2 Basic Plan (Equipment Plan)

2-2-2-1 Overall Plan

The equipment planned for this Project will be used nationwide by the *gewog* hiring services in Bhutan under AMC management. The power tillers of the *gewog* hiring services cultivate farm land located on steep mountainous areas and narrow spaces. In addition, not only cultivation but also towing of Bhutanese-made trailers is being considered.

2-2-2-2 Equipment Plan

(1) The Quantity of Each Equipment Item

As described in section 2-1-1, 1,450 power tillers are needed to reach the mechanization target at the end of the 11th FYP in June 2018. The power tillers procured under this project will be operational in November 2017. With this condition, there are only eight months remaining until the end of 11th FYP. The remaining 8-month period is not enough to realize the mechanization target of the 11th FYP with 1,450 power tillers.

The purpose of this project is capability improvement of the *gewog* hiring services through machinery procurement.

As described in section 2-2-1-1 (2), the farmers' urgent cultivation demands for *gewog* hiring services are presented as the working day and summarized in the work plan.

The latest work plan was prepared for the second half of FY 2015-2016 with a working day of 14,136 days as shown in Table 2-4 and annually 28,272 days is calculated referring to the previously mentioned section. The necessary number of power tillers for the *gewog* hiring services is calculated based on this working day of 28,272 days.

The calculation process for the number of proposed power tillers is summarized in Table 2-5 below.

	(1)	(2)	(3)	(4)	Poy			
Gewog Priority	Gewog (nos.)	Working day of the half year (day)	(2)×2 One year (day)	(3)/3 times cropping (day)	(5) Necessity	(6) Existing	(7) Additional	Total
1	43	3,885	7,770	2,602	179	43	136	136
2	62	4,032	8,064	2,707	185	62	123	259
3	35	2,470	4,940	1,653	112	35	77	336
4	65	3,749	7,498	2,499	173	65	108	444
Total	205	14,136	28,272	9,481	649	205	444	_

 Table 2-5: Validation of Quantity of Power Tillers Based on Work Plan (1)

Source: Survey Team from AMC Information

Gewog priority in Table 2-5 refers to the same priority indicated in Table 2-2.

The working day of each *gewog* shows farmers' work demands for the *gewog* hiring services.

The calculation in column (3) is twice that of column (2) to convert the working day of the half year to one year. Column (3) is divided by three. Meaning in Bhutanese agriculture, there are three annual crops.

The working day after the above division shows the necessary working day with one power tiller in one cropping season. The working day in one cropping season is within 15 days and is estimated by AMC based on actual agricultural experience in the past in Bhutan.

The necessary number of power tillers is calculated with a process of the working day of column (4) divided by the above 15 days. The number of power tillers in column (6) is the existing power tillers using the *gewog* hiring services.

Subtracting the existing one from the necessary power tillers indicated in column (5) shows the number of power tillers to be able to complete cultivation work within 15 days.

This number of power tillers is additionally necessary to satisfy farmers' urgent demands and these power tillers will be procured under the project. As a result, 444 power tillers are necessary to cope with the farmers' urgent demands indicated in the work plan of the *gewog* hiring services.

Currently, only one EO is in charge of power tiller operation and management of the *gewog* hiring services. Considering the above current condition, the performance of the existing EO is also to be considered to decide the number of power tillers procured through the project.

From the above point of view, under this survey the maximum operational number of power tillers by one EO is considered to be four power tillers. Accordingly, procurement of three power tillers is the maximum additional number of power tillers for each *gewog*. The result of the power tiller quantity calculation with the above consideration is shown in Table 2-6.

Gewog Priority	(5) (6) Necessity Existing		(7) Additional (Maximum=3)	Total
1	137	43	94	94
2	166	62	104	198
3	99	35	64	262
4	156	65	91	353
_	558	205	353	—

Table 2-6: Validation of Quantity of Power Tillers Based on Work Plan (2)

Source: Survey Team from AMC Information

On this plan, it was confirmed that the work plan shows farmer's needs of power tiller at survey. Therefore, making a study of quantity of power tiller targeting at all *Gewogs* without the order of priority is appropriate. From the above consideration, it is judged that 353 power tillers as a maximum 3 unit to each *Gewog* are appropriate scale of procurement.

Procurement of 353 power tillers is recommended in this survey. These procured power tillers satisfy farmers' urgent demands within the existing EO's management capacity.

Arrangement of the additional power tillers is as shown in Table 2-7 below.

Additional PT (nos.)	1 (0)	2 (1)	3 (2)	4 (3)	Total
Gewog (nos.)	37	56	39	73	205
Procured PT	0	56	78	219	353

 Table 2-7: Quantity of Power Tillers on Gewogs after Procurement

Note: () *is the number of additional power tillers Source: Survey Team from AMC Information*

As a result, *gewog* hiring services of 37 *gewog* will use the same one power tiller as is used at present (no additional power tillers). And 73 of the *gewog* hiring services will use 4 power tillers including the procured 3 power tillers.

Bhutanese side agreed the number and placement plan of the equipment. On the other hand, it is necessary to consider that the demand of hiring services will change along of a situation of cultivation year by year. Therefore, under the situation that hiring service should make maximal use of the power tillers with no difficulty on the target *gewogs* and keeping the *gewog's* responsibility, Bhutanese side are able to manage the power tillers among the *gewogs* within the same *dzongkhag*.

(2) The Basic Specifications of Each Piece of Equipment

1) Power Tiller

Specifications of the machinery basically follow that of existing machinery procured under 2KR in the past. Few of the specifications are necessary to improve as found out during this survey and are proposed as below.

Maximum Power

The rated output of the existing power tiller is categorized into two different types. One is 10.0 HP and the other is 11.0 HP, having an output difference of about 10%. This approximate 10% difference in output does not make any significant difference in cultivation work based on an interview with AMC.

Therefore, in this survey, the minimum output of the procured power tillers is set at more than 10 HP in order to avoid traffic accidents on the road and machinery damage due to high output.

Transmission Shift Stages (Forward)

The transmission shift stages of power tillers needs to be adjusted for three different stages, such as for plowing, cultivating by a single plow and traveling on the road. Thus, these three transmission shift stages are applied to the specifications of procured power tillers. The transmission shift stages of the power tillers should exceed the actual requirements to minimize procurement costs.

➤ Tread Width

In the case of power tiller movement between fields, a power tiller can be loaded on a trailer towed by another power tiller. For this purpose, the tread width of the procured power tiller is set at less than 90 cm of the rear deck width of the existing Bhutanese trailer.

Major specifications are as shown in Table 2-8.

Items	Specifications
Engine	4cycle water cooled diesel
Displacement	580cc ~ 680cc
Rated Power Output	10.0 hp ~ 13.0 hp
Transmission	Forward 3 range, Reverse 1 equal or over
Weight	300kg ~ 375kg
Tread Width	90cm equal or less
Head Light	With light guard
Accessory	Single reversible plow

Table 2-8: Basic Specifications of Equipment

Source: Survey Team

2) Accessories

Cultivation work with a power tiller is divided into two major areas: plowing and rotavating. Each area uses different accessories. A single reversible plow for plowing is not attached to the procured power tiller. A rotary plow is attached to the procured power tiller. Bhutanese farm land cultivation is done by continuously plowing and rotavating during one cropping season.

> 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 AMC'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 Source: Survey Team



Single Reversible Plow

Figure 2-1: Plowing

Rotavating

Rotavating breaks up the surface of farmland with a rotary plow after plowing.

The power supply of a rotary plow is from a power tiller. A power tiller and rotary plow are procured as one product.



Rotary Plow Source: Survey Team



Soil Mass after Rotavating

Figure 2-2: Rotavating

(3) **Procurement Plan of Spare Parts**

Spare parts and consumable parts for the proposed power tiller will be procured in two different ways, both possible in the current situation. One is from a private agency of power tillers in Bhutan. The other is through RAMC's parts supply service, which has considerable operating experience over the past 30 years. The procurement of the parts for the proposed power

tiller seems to be easy at present and sustainable in the future because both ways are well managed.

RAMC (AMC) has established a way to procure spare parts and consumable parts. RAMC (AMC) directly orders those parts from machinery manufacturers based on a periodic maintenance plan. RAMC (AMC) always keeps those necessary parts in its warehouse as stock, and parts distribution is managed by a computer system. Due to this condition, spare parts procured under the project considered spare parts for the initial operation period, are those such as fuel filters, V-belts, engine throttle cables, and rotary tines.

	-		
Item		Time for Replacement	Quantity
Periodic replacement parts	Fuel filter	Once/year	2set
	V-belt	Twice/year	1set
E-man dahlar	Engine throttle cable	Twice/year	1set
Expendables	Rotary blade	Up to condition	1 set
	Engine valve	Twice/year	1set

 Table 2-9: List of Spare Parts (tentative)

Source: Survey Team

2-2-2-3 Equipment to Be Procured (plan)

In light of the above deliberations, the quantity and location of each equipment item (tentative) are summarized in Table 2-10 below.

Items	Specifications
Engine	4cycle water cooled diesel
Displacement	580cc ~ 680cc
Rated Power Output	10.0 hp ~ 13.0 hp
Transmission	Forward 3 range, Reverse 1 equal or over
Weight	300kg~375kg
Tread Width	90cm equal or less
Starting System	Manual
Tire	6-12 (tubeless)
Head Light	With light guard
Accessory	Single reversible plow
Spare parts and	Fuel filter, V-belt, Engine throttle cable,
Expendables	Rotary blade, Engine valve

Table 2-10: List of Equipment to Be Procured (plan)

Source: Survey Team

	*() Quantity of Located E	Equipmen						
	Region 14 D	Q'ty						
	Priority 1: 14 Dzongkhags, 43 Gewogs	-						
Dzongkhag	Gewog							
Chhukha:	Dala(3), Sampheling(3)							
Dagana:	Karmaling(0), Kana(1), Khipisa(0)							
Lhuentse:	Menbi(3)							
Mongar:	Mongar: Narang(1)							
Paro:	Paro: Naja(3), Tsento(3)							
Punakha:	Bapisa(3), Chhubu(3), Dzoma(3), Guma(3), Kabjisa(3),							
	Lingmuk(3), Shengan(3), Toepisa(3), Toewang(3)							
S/jongkhar:	Pemethang(3)							
Samtse:	Dophugchen(1), Namgayechholing(1), Norbugang(2), Sangachholing(1), Trashichhoeling(2), Ugyentse(2), Yoeselts(0)							
Sarpang:	Dekilin(3), Taraythang(1)							
Thimphu:	Dagala(3), Mewang(3)							
Trashigang:	Bartsham (1)							
Tsirang :	Kikhorthang(3), Phuentenchhu(1), Semjong(2), Tsiran(0)							
Wangdue:	Bjena(3), Gase Tshogom(3), Gase Tshowom(3), Nyisho(3),							
C	Phangyuel(3), Phobji(0)							
Zhemgang:	Thedtsho(3), Ngangla(3)							
00	Priority 2: 18 Dzongkhags, 62 Gewogs							
Bumthang:	Chhume(1), Tang(1), Ura(1)	-						
Chhukha:	Geling(0), Phuentsholing(3)							
Dagana:	Gaserling(0), Lhamoy Zingkha(2), Trashiding(2), Tsangkha(1),							
	Tsendagang(0), Tseza(0)							
Ha:	Bii(2), Sama(0)							
Lhuentse:	Gangzur(3), Jaray(1), Metsho(2), Miniay(3)							
Mongar:	Balam(1), Chali(3), Drametse(1), Drepung(2), Ngatshang(1),							
0	Sherigmuhung(1)							
Paro:	Doga(3), Doteng(3), Hungrel(3), Wangchang(3)							
Pemagatshel:	Chongshing(1), Khar(0), Nanong(2), Norbuga(2)							
Punakha:	Goensha(3), Talo(3)	104						
Samdrupiongkhar	Martshala(2) Phuntshothang(3) Wangnhu(0)							
Samtse:	Phuntshopelri(3) Samtse(3) Tendruk(1)							
Sarnang ·	Samtenling(3) Serzhong(3) Shompangkha(3)							
Trashigang:	Bidung(2) Khaling(0) Shongnhu(0) Udzorong(1) Vangnyer(0)							
Trachivangtee	Jankhar(1) Ramiar(2) Vanotse(1)							
Trongsa:	Dragteng(3) L anoth(3)							
Teirang:	Barshong(0) Mandragang(2) Patealing(2) Sargithang(1)							
Tstrang.	Tsholing(b), Wendregang(2), 1 atsanng(2), Sergiunang(1),							
Wangdue	Daga(2) Gangte(0) Ruenica(3) Senhu(2)							
7hemgang:	Bardo(3)							
Zhengang.	Priority 3: 15 Dzongkhage 35 Gewoge							
Chhukha	Dungno(2) Logohino(1)	-						
	Gakidling(2) Katsho(2) Uasu(2)							
Па: I huontee:	$\frac{ \nabla_{u} }{ \nabla_{u} } = \frac{ \nabla_{u} }{ \nabla_{u} } + \frac{ \nabla_{u} }{ \nabla$							
Monger:	$\frac{\operatorname{Kuttov}(2)}{\operatorname{Chaskhar}(1) \operatorname{Salang}(3) \operatorname{Tsakaling}(2)}$							
Mongar:	Densheri(2) Shape(2)	64						
Paro:	Dupshan(s), Shapa(s)							
remagatshel:	Snumer(1), $Lope(2)$							
Samarupjongkhar:	Urong(1), Sertnig(1) $P_{1}(2)$, $P_{2}(1)$, $T_{2}(1)$, $T_{2}(1)$							
Samtse:	Den(2), Pemaling(1), Iading(1)							
Sarpang :	Cnnuzargang(0), Gakidling(3), Gelephu(3), Jigmechoeling(2),							

Table 2-11: Location of Equipment (plan)

	Region	Q'ty				
	Senge(1)					
Thimphu:	Chang(3), Genye(3), Kawang(2)					
Trashigang:	ng: Lumang(0), Phongme(1), Samkhar(2)					
Trashiyangtse:	Khamda(1)					
Tsirang:	Dunglagang(2), Gosaling(1)					
Wangdue:	Kazhi(2)					
Zhemgang:	Goshing(3), Shingkhar(3)					
	Priority 4: 19 Dzongkhags, 65 Gewogs					
Bumthang:	Chhoekhor(1)					
Chhukha:	Bjachho(3), Bongo(3), Chapcha(3), Getana(1), Metap(1)					
Dagana:	Dorona(0), Drukgyalgang(0), Gozhing(0), Lajab(0), Nichula(2)					
Gasa:	Goenkhame(1), Goenkhatoe(1), Laya(1), Lunana(1)					
Ha:	Sangbay(0)					
Lhuentse:	Khoma(1), Tsenkhar(1)					
Mongar:	Gongdue(1), Jurmey(0), Kengkha(0), Mongar(1), Silambi(0),					
	Thangrong(1), Tsamang(1)					
Paro :	Lamgong(3), Lungnyi(2)					
Pemagatshel:	Chhimung(0), Chokhorling(2), Dechhenling(3), Dungme(1),					
	Yurung(1)	91				
Samdrupjongkhar:	Deothang(3), Gomdar(1), Langchenphu(3), Lauri(0), Samrang(3)					
Samtse:	Dungtoe(2), Norgaygan(2)					
Sarpang:	Chhuzom(2), Umling(3)					
Thimphu:	Lingzhi(0), Naro(0), Soe(0)					
Trashigang:	Kanglung(2), Kangpara(1), Merak(0), Radi(1), Sakteng(0),					
	Thrimshing(1)					
Trashiyangtse:	Bumdeling(1), Toetsh(0), Tongmijangsa(1), Yalang(1)					
Trongsa:	Korphu(3), Nubi(3), Tangsibji(1)					
Tsirang :	Rangthangling(0)					
Wangdue:	Athang(3), Darkar(3), Nahi(3)					
Zhemgang:	Bjoka(3), Nangkor(3), Phangkhar(3), Trong(3)					
	Total	353				

Source: Survey Team

2-2-2-4 Lot Splitting Plan

The equipment procured for this project is only the power tiller and its accessories. Thus, lot division for tender is not considered.

Shipments from machinery manufacturers might occur three times because the number of power tillers is 353, which is too many for one shipment.

2-2-2-5 Soft Component Plan

Equipment to be procured for this Project will be delivered to, and operated and maintained by, AMC under DOA. Because personnel have been properly operating and maintaining the existing equipment from past 2KR experience, they are deemed to also possess basic skills and knowledge to operate and maintain the planned equipment. Operation and maintenance of the *gewog* hiring services is under AMC's services. AMC is able to undertake proper operation and maintenance of power tillers based on experience from the past 2KR.

Therefore, software components (technical assistance) will not be implemented, as AMC personnel are well versed in farm land cultivation, equipment operation, and parts management.

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. The Agriculture Machinery Centre (AMC) will manage and maintain the procured equipment under DOA. AMC has its head office in Paro and branch offices in Bajo in Wangdue Dzongkhag, Bhur in Sarpang Dzongkhag and Khangma in Trashigang Dzongkhag. The head office and each branch carry out the main equipment operation.

(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 AMC 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 AMC, and after handover, AMC will deliver the equipment to the Branch Offices on its own account. The quantity of each equipment item to be delivered to the Target Regions is as shown in Table 2-11.

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 AMC 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 (AMC, Paro), unloading and other relevant procurement work will be borne by the Japanese side, whereas the arrangements for tax exemption related to the imports will be made by the Bhutan side. Table 2-12 shows the division of work.

XX7. 1	Contract	Respons	sible party	, Durali		
WORK	Content	Japan	Bhutan	Remarks		
Equipment	Procurement of equipment	0				
procurement	Ocean/land transportation	0		To custom house		
	Customs clearance		0	Incl. tax exemption		
	Inland transportation	0		From custom house		
	Assembling	0				
Operational	Training on operation	0				
guidance, etc.	Training on inspection & maintenance	0				
Operations and	Forwarding of equipment		0	To equipment stations		
maintenance	Securing of storage sites		0			
	Equipment maintenance		0			

 Table 2-12: Responsibilities of the Two Governments

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

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:

- · Checking of the contents of purchase orders issued by the Equipment Supplier
- · 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 AMC 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.

As a result of discussions with the executing agency of this Project (DOA/MOAF) regarding the potential sources of equipment, it was revealed that they were eager to receive the equipment items, which most preferably are Japanese-made products because of their reliability for meeting production/delivery schedule, as soon as possible so that they could be put into full use during the period of the 11th FYP. In addition, the field survey on the requested equipment confirmed that Japanese products of good quality and performance were widely used in Bhutan, where technical support and parts supply systems for such products are also adequately in place. Table 2-13 shows the information of manufacturers' agencies.

		0
Agents	Main Office	Manufacture
M/S Kuenga Automobiles	Thimphu	Yanmar
Singye Agencies	Phuentsoling	Kubota
~~~~~		

Table 2-13: Information of Manufacturers' Agencies

Source: Survey Team

In light of the above, it was decided to select most of the equipment for the project from products made by Japanese manufacturers. Items that are not manufactured by Japanese manufacturers or are produced only by a limited number of manufacturers will be selected from third-country products having comparable quality to that of Japanese products.

# (2) **Procurement Route**

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



Source: Survey Team

#### Figure 2-4: 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, which, 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 Phuentsholing 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 AMC. It will take about 40 to 50 days to complete the delivery of all equipment items.

# 2-2-3-7 Operation Guidance Plan

Procured machinery will have initial operation training and operational guidance from the machinery manufacturer through the machinery supplier. On the other hand, the proposed training will satisfy the minimum requirements only because AMC has long-term experience of power tillers from previous 2KR procurement.

# 2-2-3-8 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 2-14.

Process		Month																						
			1		2	3		4	5	6	7	8	9	10	11	12	- 1	3					Т	
	Final confirmation of Project content					*****																	Τ	
	Review of equipment specifications, etc.		F																					Г
	Preparation of tender documents		E															:Wo	ork in	Bhu	ıtan			Г
etai	Approval of tender documents																							Γ
led I	Announcement of tender				$\nabla$											:Work in Japan					Γ			
Desig	Distribution of drawings, briefing				5	- [															Γ			
gn	Tender						1	V																Γ
	Evaluation of bids							-											1	T	1			Т
	Procurement agreement							+•											_		otal 3.	7 moi	<u>iths</u>	1
	Production of equipment					-	-	_																
P	Product (factory) inspection, pre-shipment inspection																							Γ
ocur	Pre-loading survey																							Г
eme	Ocean/ inland freight																							Γ
nt	Adjustment, trial operation, start-up and operation training																		1	T	otal0	•	nthe	T
	Acceptance inspection, handover																			i			<u>nuns</u>	

**Table 2-14: Project Implementation Schedule** 

Source: Survey Team

# 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 AMC to *gewog* sites.
- · 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 2KR 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 approved by MOAF and are therefore deemed feasible.

# 2-4 Project Operation Plan

DOA of MOAF, the executing agency of this project, is performing power tiller hiring services at AMC. Most of the equipment items presently owned by AMC are Japanese products procured under the past projects and have been operating without any major failures due to proper maintenance through daily and periodic inspections, and so forth. AMC is deemed to also possess the basic skills and knowledge to operate and maintain the planned equipment. Operation and maintenance of the *gewog* hiring services is managed by *gewog* officials and EO with support from AMC.

After procurement of the proposed power tillers, 353 new operators for the proposed power tillers will be needed. Operators will be recruited from the *gewog* level through *gewog* officials and EO. They will be trained in RAMC before procurement of the proposed power tillers. It has been confirmed that MOAF will allocate sufficient budget based on the estimated cost for employing additional personnel for the planned equipment.

Dzongkhag	Operator	Operator Dzongkhag						
Bumthang	4	Sandrupjongkhar	20					
Chukha	23	Samtse	24					
Dagana	8	Sarpang	27					
Gasa	4	Thimphu	14					
Наа	8	Trashigang	12					
Lhuentse	16	Trashiyangtse	7					
Mongar	20	Trongsa	13					
Paro	29	Tsirang	16					
Pemagatshel	15	Wangduephodrang	33					
Punakha	33	Zhemgang	27					
	•	Total	353					

Table 2-15: Placement of Needed Personnel for Project (Operator)

Source: Survey Team

# 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	0.08

# (2) Estimation Parameters

- Timing: February 2016
- Exchange rate: 1.00 USD = 121.95 JPY
  - Nu 1 = 1.97 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

Operation costs basically will be paid from the hiring revenue amount. The budget taken from the work plan for the second half of FY 2015-2016 was presented as shown in in the top row of Table 2-16 below. Expenditure and hiring revenue, in the top row below, were budgeted based on operation of the existing 205 power tillers.

The Survey Team estimated the necessary operation and maintenance cost for the 353 proposed power tillers, indicated in the third row below, based on the above budget and for the 558 power tillers in total (= Existing: 205 + Procured: 353 ) in the fourth row below.

		1			0	5	
Douvor	Expenditure (1000 Nu)			Hiring	Balance of		
Tiller	Enal	Operator	Spare	EO	Total	Revenue	Payments
The	ruei	Charge	Parts	DATA	Total	(1000 Nu)	(1000 Nu)
205**1	4,693	6,225	2,412	14,787	28,117	17,287	-10,830
Actual	From the work plan by AMC for the second half of FY2015-2016.					Y2015-2016.	
$205^{*2}$	9,386	12,450	2,412	29,574	56,234	34,574	-21,660
Estimation	One year cost from twice of the cost at the row marked *1 above.						
353	16,163	21,438	8,307	50,926	96,834	59,537	-37,297
Estimation	One year operation cost for 353 power tillers based on the cost at the row marked *2 above.						
558	25,550	33,888	13,131	80,501	153,070	94,112	-58,958
Estimation	One yea	ar operation cost	for 558 power	tillers based o	n the cost at th	ne row marked	d *2 above.

Table 2-16: Operation and Maintenance Cost of Gewog Hiring Services

Source: *1 AMC Budgeted for the second-half work plan of 2015-2016, *2 One year operation cost for 205 power tillers estimated by Survey Team

The balance of payments in the table is a deficit. This deficit is the same deficit as the AMC's hiring services. MOAF will allocate a sufficient budget to cover the deficit. This budget allocation is defined in the *gewog* power tiller hiring guidelines prepared by AMC and approved by MOAF. MOAF

has covered the deficit of AMC hiring services since the services started. A Letter on "Budget assurance for the operation of farm machinery for hiring services" after procured 353 power tillers is attached in the appendices of this report.

A total of 353 new power tiller operators will be needed as shown in Table 2-17 after the machinery is procured. Operators will be recruited from the *gewog* level through *gewog* officials and EO and they will be trained in RAMC before procurement of the power tillers.

The training costs for the 353 new operators are estimated as below based on the current training cost of RAMC's operator training.

Tuble 2 177 Huming Costs of See Operators		
Number of Trainee	Cost (Nu)	
10	75,000 (actual)	
353	2,700,000 (estimation)	

<b>Table 2-17:</b>	Training	Costs (	of 353	Operators
	11 anning	COBL	01 555	Operators

The training costs are estimated by the survey team at around 2,700,000 Nu. This is only 3.7% of the AMC budget of FY 2014-2015 (73,546,000 Nu). It is believed that personnel assignment, in both budgetary and human resources terms, will be easily solved.

Source: Survey Team from AMC Information

# **CHAPTER 3.** Project Evaluation

# **3-1** Preconditions

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

Issues	Description	Note
Obligations of	Solid and continuous future financial support at the national	See "2-3 Obligations of
Recipient	level is requested for sustainability of the gewog hiring	Recipient Country"
Country	services.	
	MOAF has allocated sufficient budget to assist AMC hiring	
	services since the services started. With this experience,	
	MOAF's support of the gewog hiring services is also	
	expected.	
	A total of 353 new power tiller operators will be needed	
	after the machinery is procured. Operators will be recruited	
	from the gewog level through gewog officials and EO. These	
	new operators will be trained in the RAMC before	
	procurement of the power tillers.	
	The training costs are estimated by the survey team at	
	around 2,700,000 Nu. This is only 3.7% of the AMC budget	
	for FY 2014. It is believed that personnel assignment, in both	
	budgetary and human resources terms, will be easily solved.	
	MOAF has managed many Japanese grant aid projects.	
	With this experience, MOAF will smoothly carry out the	
	obligations of the recipient country.	

Table 3-1:	Preconditions	for Project	implementation
Iubic c Ii	I i ccontaitions	IOI I I OJCCU	mprementation

# 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.

No.	Content	Note
1	Sufficient budget allocation to operate the gewog hiring services.	Filling deficit amount of the services.
2	Staffing by operators, mechanics and other necessary personnel.	New hiring and reassignment.
3	Continuous training of agricultural extension officers	Sufficient budget allocation.

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

# **3-3** Important Assumptions

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

Items	Description	Important Assumptions	
Project goals	Improvement of access to agricultural	➢ Farmers will continue farming.	
	machinery of Bhutan farmers.		
Results	Strengthen system of the gewog hiring services.	➤ MOAF and AMC will continue hiring	
		services.	
Activities	Procure power tillers for hiring services.	Sufficient budget is allocated for AMC.	
	> Improvement and enhancement of system of	> Demand for the gewog hiring services will	
	the gewog hiring services	continue.	
	Maintain power tillers	Sufficient personnel are employed by AMC.	

**Table 3-3: Important Assumptions** 

#### **3-4** Project Evaluation

#### 3-4-1 Relevance

In Bhutan, plowing and rotavating in cultivation should be completed within about 15 days otherwise the farmers will miss the proper farming season and agricultural production lost. The Government of Japan procured nearly 3,000 power tillers between 1984 and 2013 to assist Bhutanese farmer under the 2KR project. Most of the beneficiaries from this assistance were large-scale farmers who were able to purchase power tillers with their own money. Most of the small-scale farmers still cultivate farmland by animal or manual labor. These farmers find it difficult to complete cultivation within the above-stated proper period. Because of this reason, they fail to achieve agricultural production targets every year. And it is assumed that the national food self-sufficiency target for Bhutan will not increase without improvement in current farm mechanization levels. Procurement of farm machinery by the project under the Japanese grant will provide small-scale farmers with the opportunity to access farm machinery through an enhancement of *gewog* hiring services.

The implementation of this project as Japanese grant aid has necessity and relevance, from the standpoint of the necessity and urgency with demand for farm through the procurement the equipment to enhance *gewog* hiring services.

# **3-4-2** Effectiveness

# (1) Quantitative Effects

# **Table 3-4: Quantitative Effects**

Indicator	Baseline (January 2016) ^{**1}	Target (October 2018) ^{**2}
Cultivated area (ha)	136 ^{**1}	7,118 ^{**3}

*1: Actual cultivated area of the six eastern dzongkhag between July and December 2015 with 61 power tillers *2: One year after machinery procured

*3: 558 power tillers (existing 205+procured 353) x 45 days (annual working day) x 0.7 acres/day = 17,577 acres = 7,118 ha (17,577 acres x 0.405)

# (2) Qualitative Effects

Qualitative Effects of this Project will be as follows:

- ① Improvement of efficiency of farm work.
- ② Improvement of efficiency of agricultural productivity.
# Appendices

- 1. Member List of the Survey Team
- 2. Survey Schedule
- 3. List of Parties Concerned in the Receipient Country
- 4. Minutes of Discussions
- 5. References

	Name	Responsibilities	Organization
1	Dr. Inaba Makoto	Team leader	JICA
2	Mr. Imamura Makoto	Planning management	Ditto
3	Mr. Kono Takuji	Chief Consultant/Hiring Services	Katahira & Engineers
		Planner/Maintenance Planner	International
4	Mr. Kamihashi Nobuyuki	Equipment Planner /Procurement	Ingerosec Corporation
		Planner(1) /Cost Estimator	
5	Mr. Kiyohito Kobayashi	Equipment Planner /Procurement	Katahira & Engineers
		Planner(2)	International

## 1. Member List of the Survey Team

## 2. Survey Schedule

2-1 First survey January and February 2016

			①Dr.INABA/Team Leader	(3)Mr. Takuji Kono/Chief Consultant, Hiring Service Planner. Maintenance	
			2 Mr. IMAMURA/Planning Management	Planner	
No.	Date			(4)Mr. Nobuvuki Kamihashi/Equipment Planner(1), Procurement Planner.	
				Cost Estimator	
1	5-Jan	Tue		Moving from Japan to Bhutan, Paro, PM Mmeeting with AMC	
C	6 Jan	Wod		AM Courtesy call to DOA, Thimphu	
2	0-3411	weu		PM Meeting with AMC and RAMC, Paro	
3	7-lan	Thu		AM Meeting with AMC and RAMC	
0	7 9 411	ma		PM Field visit in Paro (AMC Hiring service), Paro	
4	8-Jan	Fri		AM Paro to RAMC-Bajo (Wandue)	
	oodii			PM Meeting with RAMC-Bajo	
5	9-Jan	Sat		Bajo (Wandue) to Bumthang	
6	10-Jan	Sun		Bhumtang to Mongar	
7	11-Jan	Mon		Mongar to Lhuentse:FMSC, Membee gewog, Menji gewog	
8	12-Jan	Tue		Mongar:Salin gewog, Mongar gewog	
9	13-Jan	Wed		AM Mongar to Trashigang, PM Khangma RAMC	
10	14-Jan	Thu		Trashigang:Radh gewog, Kanglung gewog	
11	15-Jan	Fri		Trashigan to Mongar	
12	16-Jan	Sat		Mongar to Bumthang	
13	17-Jan	Sun		Bumthang to Wandue	
14	18-Jan	Mon		Punakha:Wokuna gewog, Kabjisa gewog, Shengana gewog	
15	19-Jan	Tue		Wandue:Nyisho gewog	
16	20-Jan	Wed		Wandue:Kazhi gewog	
1/	21-Jan	Thu		AM Bajo RAMC, PM Wandue to Thimphu	
18	22-Jan	Fri		Thimphu:Chang gewog, Meadwang gewog	
19	23-Jan	Sat		Report writing	
20	24-Jan	Sun		Report writing	
21	25-Jan	IVION		Paro: Meeting with AMC and RAMC	
22	20-JdII	rue	Moving from Japan to Bhutan, Paro to Inmphu		
<u> </u>			AM Monting stuits UCA Platen Office and DOA M		
23	27-Jan	Wed	AM Meeting atminuture brutan Unice and DUA, MUAF and Win GHINC		
24	28 Jan	Thu	rw minipha vita AVC DM Dara ta Temphu		
24	20-Jan	Fri		Attendance on Cewag hiring services progress meeting of Thimphy	
25	30-1an	Sat		Deport writing	
20	31- Jan	Sun		Report writing	
27	1-Feb	Mon	AM Finalization of M/M_PM Signing of M/M_Repo	rt to IICA Bhutan Office	
20	1-1 00	WOT	AM Thimphu to Paro PM Bhutan to New Delhi of		
29	2-Feb	Tue	India and EOI	AM Thimphu to Paro, PM Paro Bhutan to Bangkok Thailand	
30	3-Feb	Wed	New Delbi India to Tanan	Bangkok Thailand to Janan	
50	MOAF:Mir	nistry of A	Agruculture and Forests	AMC:Agriculture Machinery Center	
	DOA:Depa	artment of	of Agriculture	RAMC:Regional Agriculture Machinery Center	
	FMSC:Far	m Mach	ninerv Service Center	FOJ:Embassy of Japan	

M/M:Minutes of Meeting

## 2-2 Second survey May 2016

No.	Date	)	①Dr.INABA/Team Leader ②Mr.IMAMURA/Planning Management	<ul> <li>③Mr. Takuji Kono/Chief Consultant, Hiring Service Planner, Maintenance</li> <li>Planner</li> <li>④Mr. Nobuyuki Kamihashi/Equipment Planner(1), Procurement Planner,</li> <li>Cost Estimator</li> </ul>	
1	8-May	(Sun)	Japan to Bangkok to Bhutan, Paro, PM Mmeeting with AMC		
2	9-May	(Mon)	Thimphu, JICA Bhutan office DOA, MoAF		
3	10-May	(Tue)	Thimphu, Meeting with DOA&AMC for MD		
4	11-May	(Wed)	Thimphu, Signing on MD, report to JICA Bhutan office		
			Paro, Meeting with AMC		
5	12-May	(Thu)	Bhutan Paro to Bangkok		
6	13-May	(Fri)	Bangkok to Japan		

MOAF:Ministry of Agriculture and Forests DOA:Department of Agriculture AMC:Agriculture Machinery Center

Name	Position	
Gross National Happiness Commission: GNHC		
Kuenzang L Sangey	Deputy Chief Programme Coordinator	
Ministry of Agriculture & Forests, Department of Agricu	lture	
Nim Dorji	Director General	
Karma Tshethar	Chief Engineer	
Ministry of Finance, Department of Revenue & Customs		
Tashi Namgay	Deputy Commissioner	
AMC, RAMC Bondey, Paro		
Karma Thinley	Program Director	
Tenjin Waurdi	Store Manager	
Melia Bd Chhetri	Assistant Engineer	
Sangay Lhendup	Inspection of Quality Control (Extended Engineer)	
Dechen Nurbu	Senior Technician	
Tigme	Senior Technician Inspection of Quality Control	
Keizang Namgay	Assistant Engineer	
Oishi Tsuneo	Project Coordinator/ Agriculture Machinery	
RAMC, Bajo, Wangduephodrang		
Kinzang	Regional Manager	
Phuntsho Dema	Hiring Coordinator	
Kama Wangchuk	Focal Person	
Pilku	Basic Operator	
Santa Bdk Rai Agriculture Engineer		
RAMC, Khangma, Trashigang		
Le hi Duay	Regional Manager	
Chhopeel	Hiring Coordinator	
Noshu Wangdi	Senior Supervisor	
Jochu Drulepe	Assistant Agriculture Engineer	
Soam Wangchuk	Technician	
Gyeltshen	Senior Technician	
Phuntolw Wanegchi	Assistant Agriculture Engineer	
Norbu Wangchi	Senior Technician	
Lhuntshe, Membee		
Wang Chulk	Agriculture Extension Officer	
Sangay Khandu	Group Accountant	
Nima Gyeltsher	Livestock Sector	
Dorji Wangchuk	Forest Ranger	

3. List of Parties Concerned in the Receipient Country

Name	Position
Lhuntshe, Menji	
Ugyen Wangdi	Agriculture Extension Officer
Mongar, Salin	
Choney Dorji	Administration, Manager
Mongar, Mongar	
Sagay wangs	Agriculture Extension Officer
Trashigang, Radh	
Tenzin Rabgay	Agriculture Extension Officer
Trashigang, Kanglung	
Pema Wangcen	Agriculture Extension Officer
Punakha, Kabjisag	
Tenzin Rabgay	Agriculture Trainees
Wangdue, Nyisho	
Gembo Dorji	Agriculture Extension Officer
Wangdue, Kazhi	
Choehi Wangchuk	Agriculture Extension Officer
Thimphu, Chang	
Pema Lhaden	Agriculture Extension Officer
Thimphu, Meadwang	
Karma Choden	Agriculture Extension Officer
Thimphu	
Dodo	Dzongkhag Agriculture Officer Thimphu
JICA Bhutan Ofice	
Asakuma Yumiko	Chief Representative
Yamada Koji	Chief Representative
Sunada Masanori	Project Formulation Adviser
Shiomi Masahiro	Project Formulation Adviser
Kinley Dorji	Chief Program Officer

#### 4. Minutes of Discussions

4-1 First survey January and February 2016

## Minutes of Discussions on the Preparatory Survey for the Project for Chiwog Grant Assistance for Farm Mechanization and Services

In response to the request from the Government of the Royal Government of Bhutan (hereinafter referred to as "Bhutan", the Government of Japan decided to conduct a Preparatory Survey for the Project for Project for Chiwog Grant Assistance for Farm

Mechanization and Services (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. Makoto Inaba, JICA Senior Advisor, and is scheduled to stay in the country from 5th January to 1st February, 2016.

The Team held a series of discussions with the officials concerned of the 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 works and prepare the Preparatory Survey Report.

Thimphu, 1st February, 2016

Dr. Makoto Inaba Leader Preparatory Survey Team Japan International Cooperation Agency Japan

Nim Dorji

Director General Department of Agriculture Ministry of Agriculture and Forests

Royal Government of Bhutan

Thinley Namgyel / 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 by procuring Farm Machinery, thereby contributing to increase of Farm Mechanization.

2. Title of the Preparatory Survey

Both sides agreed to change the title of the Preparatory Survey as "the Preparatory Survey for the Project for Improvement of Farm Machinery for Hiring Services" from the original one.

The Bhutanese side agreed that the title will be confirmed and be finalized by Japanese side and will accept it.

#### 3. Project Site

Both sides confirmed that the sites of the Project will be at all 205 Gewogs and Agriculture Machinery Center (hereinafter referred to as "AMC") and its 4 regional offices (RAMC) will be responsible for the Project. Annex 1 shows location Map for AMC and RAMC.

4. Line Agency and Executing Agency

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

- 4-1. The line agency is Ministry of Agriculture and Forests, which would be the agency to supervise the executing agency.
- 4-2. The executing agency is the Department of Agriculture. The executing agency shall coordinate with all the relevant agencies to ensure smooth implementation of the Project and ensure that the Undertakings are taken by relevant agencies properly and on time. The organization charts are shown in Annex 2.
- 5. Items requested by the Government of Bhutan
- 5-1. As a result of discussions, both sides confirmed that the items requested by the Government of Bhutan are as follows ;
  - 1,450 Power tillers with spare parts
- 5-2. The Team explained that JICA would consider based on current work plans for power tillers at Gewog level as urgent demand and the tentative number is 444 Power tillers. The Bhutanese side understood. 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.

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- 6. Japanese Grant Scheme
  - 6-1. The Bhutanese side understands the Japanese Grant Scheme and its procedures as described in Annex 3, 4 and Annex 5, and necessary measures to be taken by the Government of Bhutan.
  - 6-2. The Bhutanese side understands to take the 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.

- 7. Schedule of the Survey
  - 7-1. The Team will proceed with further survey in Bhutan until May, 2016.
  - 7-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Bhutan in order to explain its contents around in April, 2016.
  - 7-3. 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 July, 2016.
  - 7-4. The above schedule is tentative and subject to change.
- 8. Other Relevant Issues
  - 8-1. The Team understands the necessity of additional power tillers which the Ministry of Agriculture and Forests estimated around 1,450 based on the current Ministry's 5 year plan that aims to increase farm mechanization rate by about 10%.
  - 8-2. The Bhutanese side understands the difference of the schemes between General Grant Aid and 2KR. The Bhutanese side also understands the process of study by JICA for the Project under General Grant aid.
  - 8-3. Both sides agreed that the Project will focus on "urgent demand" of power tiller based on the work plan prepared by Gewog and will continue to discuss about necessity of total power tillers based on an another request from the Bhutanese side for responding to farmers' demand for hiring services and the Ministry's farm / mechanization strategy.

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- 8-4. The Team was informed of the establishment of new Government owned Corporation which is responsible for hiring services near future. The Team requested the Ministry to inform the details (progress, mandate of the Corporation, any change of AMC and RAMC, implementing structure of hiring services at Gewog level, etc.) to JICA Bhutan Office and the Ministry agreed to respond. The Team confirmed that AMC would continue to supervise for Gewog hiring service and operate direct hiring service until hiring services are handed over to new Corporation.
- 8-5. The Team understands that even if Decentralized Agriculture Machinery Centers are not yet established based on original plan, the Ministry and AMC have decided to establish alternative structure for Gewog hiring services by utilizing existing manpower (extension officers).
- 8-6. The Ministry of Agriculture and Forests shall allocate necessary budget to AMC for Gewog hiring services by the Project as well as existing hiring services (AMC direct hiring and Gewog hiring). The Ministry also agreed to train extension officers and operators for the Project.
- 8-7. Both sides agreed that the Ministry and AMC will collaborate with on-going Technical Cooperation Project "Strengthening Farm Mechanization Project Phase II " for further strengthening of Gewog hiring service and appropriate and effective implementation.

Annex 1 Project Sites

Annex 2 Organization Chart

Annex 3 Japanese Grant (Project Monitoring Report (template) included)

Annex 4 Flow Chart of Japanese Grant Procedures

Annex 5 Financial Flow of Japanese Grant

Annex 6 Major Undertakings to be taken by Each Government

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#### JAPANESE GRANT

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Japanese Grant for Projects for construction of facilities, purchase of equipment, etc.

The Japanese Grant (hereinafter referred to as the "Grant") is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and 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. The Grant is not supplied through the donation of materials as such.

#### 1. Grant Procedures

The Grant is supplied through following procedures :

Preparatory Survey

- The Survey conducted by JICA

Appraisal & Approval

-Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet

-Authority for Determining Implementation

-The Notes exchanged between the GOJ and a recipient country

·Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and a recipient country

Implementation

-Implementation of the Project on the basis of the G/A

#### 2. Preparatory Survey

#### (1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the COJ 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 country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.

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- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

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

JICA requests the Government of the recipient country to take whatever 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 organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

#### (2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (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 appropriateness of the Project.

#### 3. Japanese Grant Scheme

#### (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 singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles, in accordance with the E/N, to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

#### (2) 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 country to continue to work on the Project's implementation after the E/N and G/A.

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#### (3) Eligible source country

Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

#### (4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, 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, since the Grant fund comes from the Japanese taxpayers.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant.

#### (7) "Export and Re-export"

The products purchased under the Grant should not be exported or re-exported from the recipient country.

#### (8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"), in principle. JICA will execute the Grant by making payments in Japanese yen, in principle, to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b)7he payments will be made when payment requests are presented by the Bank to JICA under an

Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

#### (10) Environmental and Social Considerations

The Government of the recipient country must carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the recipient country and JICA Guidelines for Environmental and Social Consideration (April, 2010).

(11) Monitoring

The Government of the recipient country must 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 must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

## Project Monitoring Report on <u>Project Name</u> Grant Agreement No. <u>XXXXXXX</u> 20XX, Month

## Organization Information

Authority (Signer of the G/A)	Person in Charge Contacts	(Division) Address: Phone/FAX: Email:	
Executing Agency	Person in Charge Contacts	(Division) Address: Phone/FAX: Email:	
Line Agency	Person in Charge Contacts	(Division) Address: Phone/FAX: Email:	

## **Outline of Grant Agreement:**

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

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## 1: Project Description

1-1 Project Objective

#### 1-2 Necessity and Priority of the Project

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

# **1-3** Effectiveness and the indicators

- Effectiveness by the Project

Quantitative Effect (Operation	and Effect indicators)			
Indicators	Original (Yr	)	Target (Yr	)
				~
Qualitative Effect	· ·			
			8	
948-458 & 2584 & 254		2		

## 2: Project Implementation

#### 2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

Teastion	Original: (M/D)	Actual: (PMRand PCR)	
Location	Attachment(s):Map	Attachment(s):Map	3

Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
(M/D)	(M/D)	(PMR and PCR)
	2 CL	Please state not only th e most updated schedul e but also other past re visions chronologically.

'Soft component' shall be included in 'Items'.

All change of design shal 1 be recorded regardless of its degree.

2-1-2 Reason(s) for the modification if there have been any.

(PMR and PCR)

# 2-2 Implementation Schedule2-2-1 Implementation Schedule

#### Table 2-2-1: Comparison of Original and Actual Schedule

Itomo	Original		Astrol
Items	DOD	G/A	Actual
[M/D]	(M/D.)		<i>(PMR,PCR)</i> As of (Date of Revision)
'Soft component' shall be stated in the column of 'Items'.			Please state not only the most updated schedule but also other past revisions chronologically.
Project Completion Date*	efined as	· · · · ·	at the time of G/A

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

(PMF	R and PCR)	
2-3	Undertakings by each Government	
2-3-1	Major Undertakings	

- 2-3-2 Activities See Attachment 3.
- 2-3-3 Report on RD See Attachment 4.
- 2-4 Project Cost

2-4-1 Project Cost

Table 2-3-1 Comparison of Original and Actual Cost by the Government of Japan (Confidential until the Tender)

3

Items		(Mi	Cost Ilion Yen)	
	Original	Actual	Original	Actual
Construction Facilities (or Equipment)	'Soft component' shall be included in 'Items'.			Please state not only the most updated schedule but also other past revisions chronologically.
Consulting Services	- Detailed design -Procurement Management -Construction Supervision			

Note:

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

	Items		Cost (Million USD)	
	Original	Actual	Original	Actual
	'Soft component' shall be included in 'Items'.		- - -	Please state not only the most updated schedule but also other past revisions chronologically.
Total		<u> </u>		×

## Table 2-3-2 Comparison of Original and Actual Cost by the Government of XX

Yen

Note: 1) Date of estimation:

2) Exchange rate: 1 US Dollar = (local currency)

#### 2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

(PMR, PCR)

-

#### 2-5 Organizations for Implementation

- 2-5-1 **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.

+ KM

Original:	(M/D)
-----------	-------

Actual, if changed: (PMR and PCR)

2-6

#### **Environmental and Social Impacts**

Report based on the agreed environmental checklist and monitoring form (See Attachment 4)

#### 3: Operation and Maintenance (O&M)

#### 3-1 O&M and Management

- Organization chart of O&M

- Operational and maintenance system (structure and the number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

Original: (M/D) Actual: (PCR)

#### 3-2 O&M Cost and Budget

- The actual annual  $\tilde{O}\&M$  cost for the duration of the project up to today, as well as the annual O&M budget.

Original: (M/D)

#### 4: Precautions (Risk Management)

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

Potential Project Risks	Assessment	
/1.	Probability: H/M/L	
K	Nº K	

(Description of Risk)	Impact: H/M/L
()	Analysis of Probability and Impact:
	Mitigation Measures:
	Magadormeduaes
	Action during the Implementation:
a	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
20	Analysis of Probability and Impact:
2	
	Mitigation Measures:
	Action during the Implementation:
9	
	Contingency Plan (if applicable):
2	Dechatility II () ( /I
(Description of Risk)	Impacts H/M/L
(Description of Nisk)	Analysis of Probability and Impact:
	mayor of robusing and impact.
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
	contaction a nation of the second second
Actual issues and Countermeasure	(s)
(PMR and PCR)	

## 5: Evaluation at Project Completion and Monitoring Plan

5-1 **Overall** evaluation Please describe your overall evaluation on Project. Math

(16/22)

(PCR)
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.
(PCR)
5-3 Monitoring Plan for 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.

W/ UL

#### Attachment

- 1. Project Location Map
- 2. Undertakings to be taken by each Government
- 3. Monthly Report
- 4. Report on RD
- Monitoring report on environmental and social considerations
   Monitoring sheet on price of specified materials (Quarterly)
- 7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (Completion Report Only)

1. K

(18/22)

FLOW CHART OF JAPANESE GRANT PROCEDURES Recipient Government Japanese Government Consultant Contract Others JICA Flow & Works Stage Request Application *if necessary  $\mathbf{v}$ Project Identification Evaluation of the Screening of Project request Survey* Field Survey, Examination and Reporting Preliminary *if necessary Project Formulation & Survey* J Preparation Selection & Preparatory Survey Field Survey, Examination and Reporting Contracting of Consultant by Proposal Outline Design Explanation of Draft Survey Report Final Report Appraisal of Project Appraisal & Approval V Inter Ministerial Consultation Ψ Presentation of Draft Notes V Approval by the Cabinet (E/N: Exchange of Notes) E/N and G/A (G/A: Grant Agreement ) (A/P : Authorization to Pay) Banking Arrangement V Issuance of A/P Verification Consultant Contract Implementation Detailed Design & Tender Documents Approval by Preparation for Tendering Recipient Government Tendering & Evaluation V Procurement /Construction Contract Verification A/P Completion Construction A/P Certificate V Operation Post Evaluation Study  $\overline{V}$ Evaluation& Ex-post Evaluation Follow up Follow up MU N

(19/22)

Financial Flow of Grant Aid (A/P Type)



## Major Undertakings to be taken by Recipient Government

#### 1. Before the Tender

NO	Items	Deadline	In charge	Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after	DOA/MOAF		
		G/A	0	1	

#### 2. During the Project Implementation

NO	Items .	Deadline	In charge	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 singing of the contract	GNHC		
	2) Payment commission for A/P	every payment	GNHC		
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	DOA/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	DOA/MOAF		
4	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment	during the Project	DOA/MOAF		

#### 3. After the Project

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

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

MOAF: Ministry of Agriculture and Forests

DOA: Department of Agriculture

GNHC : Gross National Happiness Commission

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(21/22)

## Major Undertakings to be Covered by the Japanese Grant

No	Items	Deadline	Cost Estimated (Million Japanese Yen)*	Ref.
1	To provide equipment			
	<ol> <li>To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country</li> </ol>			
	a) Marine(Air) transportation of the products from Japan to the recipient country dur		XX.XX	
0	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	YY.YY	2
	Total		ZZ.ZZ	

*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

& All

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

On the basis of the discussions and field survey in Royal Government of Bhutan (hereinafter referred to as "Bhutan") in January and February 2016, and the subsequent technical examination of the results in Japan, the Japan International Cooperation Agency (hereinafter referred to as "JICA") prepared a draft Preparatory Survey Report on the Project for Improvement of Farm Machinery for Hiring Services in the Kingdom of Bhutan (hereinafter referred to as "the Draft Report").

In order to explain the Draft Report and to consult with the concerned officials of the Government of Bhutan on its contents, JICA sent to Bhutan the Preparatory Survey Team for the explanation of the Draft Report (hereinafter referred to as "the Team"), headed by Dr. Makoto Inaba, JICA Senior Advisor, and is scheduled to stay in the country from 8th to 12th May, 2016.

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

Dr. Makoto Inaba

Leader

Preparatory Survey Team Japan International Cooperation Agency Japan Thimphu, 11th May 2016

Nim Dorji

Director General Department of Agriculture Ministry of Agriculture and Forests Royal Government of Bhutan

Rinchen Wangdi Officiating 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 by procuring Farm Machinery, thereby contributing to increase of Farm Mechanization.

2. Title of the Preparatory Survey

Both sides reconfirmed the change of the title as "the Preparatory Survey for the Project for Improvement of Farm Machinery for Hiring Services" from the original one.

The Bhutanese side agreed that the title will be confirmed and be finalized by Japanese side and will accept it.

3. Project Site

d

Both sides reconfirmed that the sites of the Project will be at newly established Farm Machinery Corporation Limited (hereinafter referred to as "FMCL") in the compound of Agriculture Machinery Center (hereinafter referred to as "AMC") and its 4 regional offices in the compound of 4 regional AMC(RAMC)s. Annex 1 shows location Map for AMC and RAMC as well as FMCL and its 4 regional offices.

4. Line Agency and Executing Agency

Both sides reconfirmed the line agency and executing agency as follows:

- 4-1. The line agency is Ministry of Agriculture and Forests, which would be the agency to supervise the executing agency.
- 4-2. The executing agency is the Department of Agriculture. The executing agency shall coordinate with all the relevant agencies to ensure smooth implementation of the Project and ensure that the Undertakings are taken by relevant agencies properly and on time. The organization charts are shown in Annex 2.
- 4-3. The actual implementing agencies for Gewog hiring services are AMC for certification of quality clearance of power tillers and newly established government owned corporation that is FMCL for assembling and transporting of power tillers procured under the Project to respective Gewogs and support and supervision of Gewog hiring services.
- 5. Contents of the Draft Report After the explanation of the contents of the Draft Report by the Team, the

6

Bhutanese side agreed in principle to its contents.

6. Cost Estimation

Both sides confirmed that the Project cost estimation described in the Draft Report was provisional and would be examined further by the Government of Japan for its final approval.

- Confidentiality of the Cost Estimation and Specifications
   Both sides confirmed that the Project cost estimation (Annex 3) and technical
   specifications in the Draft Report should never be duplicated or disclosed to any
   third parties until all the contracts of the Project are concluded.
- 8. Japanese Grant Scheme

The Bhutanese side understands the Japanese Grant Scheme and its procedures as described in Annex 4, 5 and 6, and necessary measures to be taken by the Government of Bhutan.

9. Project Implementation Schedule

The Team explained to the Bhutan side that the expected implementation schedule is as attached in Annex 7.

#### 10. Expected outcomes and Indicators

Both sides agreed that key indicators for expected outcomes are as follows. The Bhutanese side has responsibility to monitor the progress of the indicators and achieve the target in year 2018.

(1) Quantitative Effects

Indicators	Original (Jan 2016)	Target (October 2018) 1 year after the Project
Annual cultivated area (ha)	0	4,503 ※2

%1 : area cultivated by the power tillers procured under the Project (excluding existing power tillers)

%2 : 353 power tillers x 45 working days (15 days x 3 cropping seasons) x 0.7 acres/day=11,119 acres (1 acres = 0.405 ha)

## (2) Qualitative Effects

Improvement of efficiency of farm work.

Improvement of agricultural productivity.

11. Undertakings Taken by Both Sides

Both sides confirmed to undertakings described in Annex 8. The Bhutanese 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. Contents of Annex 8 will be updated as the Detailed Design progresses, and will finally be the Attachment to the Grant Agreement.

#### 12. Monitoring during the Implementation

The Project will be monitored every 3 months by the executing agency and using the Project Monitoring Report (PMR).

13. Ex-Post Evaluation

JICA will conduct ex-post evaluation three (3) years after the project completion with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability) of the Project. Result of the evaluation will be publicized. The Bhutanese side is required to provide necessary support.

#### 14. Schedule of the Study

JICA will complete the Final Report of the Preparatory Survey in accordance with the confirmed items and send it to the Bhutanese side around July, 2016.

#### 15. Other Relevant Issues

- 15-1. The Bhutanese side explained that the FMCL has been established in March, 2016 and AMC hiring services and Gewog hiring service will be transferred from AMC to FMCL including staff engaged in by 1st July, 2016.
- 15-2. The Bhutanese side also explained that AMC would continue to be responsible for (1) policy matters, (2) R&D, (3) quality control of farm machinery and (4) training, and FMCL will be responsible for (1) all hiring service operation and supervision first, then, (2) sales of farm machinery, implements and spare parts, (3) repair and maintenance of farm machinery, (4) fabricate farm machinery, implements and spare parts will be also transferred from AMC gradually.
- 15-3. The Bhutanese side understands the difference of the schemes between General Grant Aid and 2KR. The Bhutanese side also understands the process of study and analysis by the Team for the Project under General Grant aid and accepted the planned number of power tillers(353) explained by the Team.
- 15-4. Both side confirmed that 353 operators will be secured and be trained under the responsibility of AMC and FMCL by the time power tillers procured under the Project transported to respective Gewogs.

15-5. The Team confirmed that the Ministry of Agriculture and Forests shall allocate

necessary budget to DOA for supporting FMCL (for example, training for extension officers and operators, hiring services and others).

- 15-6. The Bhutanese side requested the flexible utilization of 353 power tillers distributed to respective Gewogs based on the current work plan within the same District (Dzongkhag), because of work plan in each Gewogs will be prepared annually and it might be different from the current one based on the latest needs from farmers and the needs of power tillers in each Gewogs might be changed year to year, and also for the effective utilization of power tillers on off season in each Gewogs. The Team understood the point and requested the Bhutanese side to utilize power tillers at respective Gewogs based on the current work plan first and if the Bhutanese side need to response to request for hiring service beyond the existing power tillers and/or fill up the gap for achieving work plan in a Gewog, power tillers in an another Gewog can be utilized for such need for higher efficiency and for responding to farmers' need. The Team also requested that management of power tillers distributed to respective Gewogs should done by the extension officer in the Gewog including mobilization to other Gewog.
- 15-7. The Bhutanese side explained that due to the establishment of FMCL, FMCL would not only supervise Gewog hiring service but also might appoint focal person and/or contract operators deployed by FMCL depending on capacity of extension officers for higher efficiency of hiring services. The Team understood the on-going efforts by the Bhutanese side and such efforts would contribute to the strengthening of implementation structure and to provide better and efficient hiring service to farmers.
- 15-8. The Bhutanese side requested some amendments in the Draft Report for clarifications as below. The Team accepted and would reflect them to the Final Report.
  - "2-2-2-4 Lot Splitting Plan" will be planned due to the long manufacturing period (about 7 months for 353 power tillers) but not due to a space in FMCL/AMC.
  - (2) "2-2-2-5 Soft Component Plan" is different component from the initial training for general operation and daily maintenance by a manufacturer to the Bhutanese side. Both side confirmed that initial training is planned but Soft Component is not necessary for the Project.
- 15-9. Disclosure of Information

1

Both sides confirmed that the study results excluding the Project cost will be disclosed to the public after completion of the Preparatory Survey. All the study results including the project cost will be disclosed to the public after all the contracts for the Project are concluded.

(5/26)

Annex 1 Project Site

Annex 2 Organization Chart

Annex 3 Project Cost Estimation

Annex 4 Japanese Grant (4-2 Project Monitoring Report (initial version) included)

Annex 5 Flow Chart of Japanese Grant Procedures

Annex 6 Financial Flow of Japanese Grant

Annex 7 Project Implementation Schedule

Annex 8 Major Undertakings to be taken by Each Government

(6/26)







## CONFIDENTIAL

## **Project Cost Estimation**

1. Cost to be Borne by the Government of Japan

# CONFIDENTIAL

2. Cost to be Borne by the Government of the Bhutan

Total Cost: Approximately 0.08Nu (Approximately 0.15 Million Yen)

Indostatings by the Phyton side	Cost Estimation		
Undertakings by the Brutan side	(Million Nu)	(Million Yen)	
Banking arrangement fee	0.08	0.15	
Total	0.08	0.15	

3. Condition of the Cost Estimation

- Estimated timing: February, 2016
- Exchange rates: Nu 1.0 = Yen 1.97

USD1.0 = Yen 121.95

- Others:

.....

The Project is implemented in accordance with the system of Japan's Grant Aid
#### Annex 4

#### JAPANESE GRANT

Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Japanese Grant for Projects for construction of facilities, purchase of equipment, etc.

The Japanese Grant (hereinafter referred to as the "Grant") is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and 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. The Grant is not supplied through the donation of materials as such.

#### 1. Grant Procedures

The Grant is supplied through following procedures :

Preparatory Survey

- The Survey conducted by JICA

Appraisal & Approval

-Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet

Authority for Determining Implementation

-The Notes exchanged between the GOJ and a recipient country

·Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and a recipient country

Implementation

-Implementation of the Project on the basis of the G/A

#### 2. Preparatory Survey

#### (1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of 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 country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Scheme from a technical, financial, social and economic point of view.

Confirmation of items agreed between both parties concerning the basic concept of the Project.

(10/26)

- Preparation of a outline design of the Project.
- Estimation of costs of the Project.

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

JICA requests the Government of the recipient country to take whatever 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 organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

#### (2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (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 appropriateness of the Project.

#### 3. Japanese Grant Scheme

#### (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 singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles, in accordance with the E/N, to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

#### (2) 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 country to continue to work on the Project's implementation after the E/N and G/A.

(11/26)

#### (3) Eligible source country

Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

#### (4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, 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, since the Grant fund comes from the Japanese taxpayers.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant.

#### (7) "Export and Re-export"

The products purchased under the Grant should not be exported or re-exported from the recipient country.

#### (8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"), in principle. JICA will execute the Grant by making payments in Japanese yen, in principle, to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an

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(12/26)

Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

#### (10) Environmental and Social Considerations

The Government of the recipient country must carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the recipient country and JICA Guidelines for Environmental and Social Consideration (April, 2010).

(11) Monitoring

The Government of the recipient country must 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 must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

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(13/26)

Annex 4-2 G/A NO. XXXXXXX PMR prepared on DD/MM/YY

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<u>Proj</u>	ect Monitoring Report
	on
Improvement of F	Farm Machinery for Hiring Services
Grant A	greement No. XXXXXXX
	2016, XXXX

# **Organization Information**

	Gross National Happiness Commission		
	Person in Charge	MR.Rinchen Wangdi	
Authority (Signer		(Division)Development Cooperation	
of the G/A)	Contacts	Address:	
		Phone/FAX:3 25192/3 322928	
		Email: rwangdi@gnhc.gov.bt	
x x x	Department of Agriculture		
	Person in Charge	MR.Nim Dorji, Director General	
Executing	Contacts	Address:Post Box 392, Thimphu	
Agency		Phone/FAX:+975 3 631804, 3 631477	
		Email: ndorji@mof.gov.bt	
8		,	
8 (d) K	Ministry of Agriculture & Forests		
	Person in Charge	MR.Nim Dorji	
Line Agency	(Division) Department of Agriculture, Director Gener		
	Contacts	Address: Post Box 392, Thimphu	
		Phone/FAX: +975 3 631804, 3 631477	
5 		Email: ndorji@mof.gov.bt	
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# **Outline of Grant Agreement:**

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Source of Finance	Government of Japan: Not exceeding JF F
Project Title	9. B
E/N	Signed date: Duration:
G/A	Signed date: Duration:

N

(14/26)

#### 1: **Project Description**

#### 1-1 **Project Objective**

The target of the agricultural sector of Bhutan is an increase in food self-sufficiency to mitigate the shortage of labor and improve agricultural productivity through farm mechanization. Farm mechanization gradually advanced in the past, but currently, about 80 percent of farmers in Bhutan still cultivate their farm land with animals. The Royal Government of Bhutan procured nearly 3,000 power tillers through 2KR. However, this amount of power tillers was not enough to cover farmers' demands nationwide. From 2009, The Royal Government of Bhutan intends to cover the current farmers' demands through AMC hiring services using the existing power tillers. To cope with nationwide farm mechanization through hiring services, since 2015, The Royal Government of Bhutan has started other hiring services, namely gewog hiring services with a total of 205 power tillers (205 from 239 power tillers procured in 2KR in 2013). After starting the services, it is immediately clear that additional power tillers are needed urgently because the farmers' demands in each gewog exceed the performance of one power tiller per gewog. The 2KR scheme stopped in 2014 and, accordingly, procurement of power tillers through 2KR also finished. Based on the above situation, this project will procure the necessary power tillers for the

enhancement of gewog hiring services in Bhutan to increase agricultural productivity through farm mechanization, with the final aim to improve farmers' lives.

#### 1 - 2Necessity and Priority of the Project

Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

In Bhutan, plowing and rotavating in cultivation should be completed within about 15 days otherwise the farmers will miss the proper farming season and agricultural production lost. The Government of Japan procured nearly 3,000 power tillers between 1984 and 2013 to assist Bhutanese farmer under the 2KR project. Most of the beneficiaries from this assistance were large-scale farmers who were able to purchase power tillers with their own money. Most of the small-scale farmers still cultivate farmland by animal or manual labor. These farmers find it difficult to complete cultivation within the above-stated proper period. Because of this reason, they fail to achieve agricultural production targets every year. And it is assumed that the national food self-sufficiency target for Bhutan will not increase without improvement in current farm mechanization levels. Procurement of farm machinery by the project under the Japanese grant will provide small-scale farmers with the opportunity to access farm machinery through an enhancement of gewog hiring services.

The implementation of this project as Japanese grant aid will have necessity and relevance, from the standpoint that the necessity and urgency of the procurement of farm machinery to assisting management of small-scale farms through the enhancement of the capabilities of gewog hiring services.

1-3

Effectiveness and the indicators - Effectiveness by the Project

(15/26)

### (1) Quantitative Effects

Indicators .	Original (Jan 2016)	Target (October 2018) 1 year after the Project
Annual cultivated area (ha) ※1	0	4,503 ※2

※1 : area cultivated by the power tillers procured under the Project (excluding existing power tillers)

%2: 353 power tillers x 45 working days (15 days x 3 cropping seasons) x 0.7 acres/day=11,119 acres (1 acres = 0.405 ha)

### (2) Qualitative Effects

0	Improvement of efficiency of farm work.	
2	Improvement of agricultural productivity.	

## 2: Project Implementation

# 2-1 Project Scope

### Table 2-1-1a: Comparison of Original and Actual Location

Location	Original: (M/D)	Actual: (PMRand PCR)	
Locution	Attachment(s):Map	Attachment(s):Map	

#### Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
(M/D)	(M/D)	(PMR and PCR)
'Soft component' shall be included in 'Items'.		Please state not only th e most updated schedul e but also other past re visions chronologically. All change of design shal l be recorded regardless of its degree.

**2-1-2** Reason(s) for the modification if there have been any.

(PMR and PCR)

# 2-2 Implementation Schedule2-2-1 Implementation Schedule

# Table 2-2-1: Comparison of Original and Actual Schedule



(16/26)

[M/D]	(M/D)	<i>(PMR,PCR.)</i> As of (Date of Revision)
'Soft component' shall be stated in the column of 'Items'.		Please state not only the most updated schedule but also other past revisions chronologically.
Project Completion Date*		
*Project Completion was do	efined as	at the time of G/A.

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

(PMR and PCR)

2-3 Undertakings by each Government
2-3-1 Major Undertakings See Attachment 2.
2-3-2 Activities See Attachment 3.

2-3-3 Report on RD

- See Attachment 4.
- 2-4 Project Cost
- 2-4-1 Project Cost

Table 2-3-1 Comparison of Original and Actual Cost by the Government of Japan (Confidential until the Tender)

al omponent' shall be	Actual	Original	Actual
omponent' shall be			
ea manens .	,		Please state not only the most updated schedule but also other past revisions chronologically.
iled design rement gement ruction vision	×		
	led design rement ement ruction rision	led design rement ement ruction rision	led design rement ement ruction rision

Yen

Note:

Date of estimation:
 Exchange rate: 1 US Dollar =

	Items		(Mi	Cost llion USD)
	Original	Actual	Original	Actual
	'Soft component' shall included in 'Items'.	be		Please state not only the most updated schedule but also other past revisions chronologically.
Total			2004 022.00	
Note: 1)	Date of estimation:			

Table 2-3-2 Comparison of Original and Actual Cost by the Covernment of YY

2) Exchange rate: 1 US Dollar = (local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

(PMR, PCR)

#### 2-5 **Organizations for Implementation** 2-5-1

- **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: (M/D)

Actual, if changed: (PMR and PCR)

#### 2-6 **Environmental and Social Impacts**

Report based on the agreed environmental checklist and monitoring form (See Attachment 4)

### 3: Operation and Maintenance (O&M)

#### 3-1 O&M and Management

- Organization chart of O&M

- Operational and maintenance system (structure and the number , qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

Original: (M/D)

Actual: (PCR)

### 3-2 O&M Cost and Budget

- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

Original: (M/D)

# 4: Precautions (Risk Management)

 Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

Potential Project Risks	Assessment
1,	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
,	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	, Impact: H/M/L
	No

	Analysis of Probability and Impact:
	Mitigation Measures:
	8
	Action during the Implementation:
	Contingency Plan (if applicable):
Actual issues and Countermeasur	re(s)
(PMR and PCR)	

# 5: Evaluation at Project Completion and Monitoring Plan

# 5-1 Overall evaluation

Please describe your overall evaluation on Project.

(PCR)

### 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.

(PCR)

### 5-3 Monitoring Plan for 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.

(PCR)

N/

(20/26)

Attachment

- 1. Project Location Map
- 2. Undertakings to be taken by each Government
- 3. Monthly Report
- 4. Report on RD
- 5. Monitoring report on environmental and social considerations
- 6. Monitoring sheet on price of specified materials (Quarterly)
- Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (Completion Report Only)

Annex 5



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(22/26)



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(23/26)

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Annex 7

	roject implementation Schedule																		
Process		Month																	
			2	3	4	5	6	7	8	9	10	11	12	13	[	1			
-	Final confirmation of Project content														T				
Detailed Design	Review of equipment specifications, etc.	þ											-	<u></u>		•			
	Preparation of tender documents				=			$\square$					L	Work in Bhutan					
	Approval of tender documents																		
	Announcement of tender				V								:Work in Japan						
	Distribution of drawings, briefing				<b></b>													1.1	
	Tender					T													
	Evaluation of bids						-												
	Procurement agreement					-	-							Total 5.5 months					
	Production of equipment															4			
P	Product (factory) inspection, pre-shipment inspection	20																	
OCUI	Pre-loading survey								5										
reme	Ocean/ inland freight																		
E I	Adjustment, trial operation, start-up and operation training																		
	Acceptance inspection, handover															Tota	<u>19.5 m</u> 	onths -	

Project Implementation Schedule

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# Annex 8

# Major Undertakings to be taken by Recipient Government

NO	Items	Deadline	In charge	Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after	GNHC	0.15 M	5

### 2. During the Project Implementation

NO	Items	Deadline	In charge	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 singing of the contract	GNHC		
	2) Payment commission for A/P	every payment	GNHC		
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	DOA/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	DOA/MOAF		20
4	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the transportation and installation of the equipment	during the Project	DOA/MOAF		

### 3. After the Project

NO	Items	Deadline	In charge	Cost	Ref.
1	To maintain and use properly and effectively equipment provided under the Grant Aid	After completion of	DOA/MOAF		
	<ol> <li>Allocation of maintenance cost</li> </ol>	the construction	AMC/DOA		
	<ol><li>Operation and maintenance structure</li></ol>		FMCL/MOF		
	3) Routine check/Periodic inspection				

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

MOAF: Ministry of Agriculture and Forests

DOA: Department of Agriculture

AMC : Agriculture Machinery Center

MOF: Ministry of Finance

FMCL: Farm Machinery Corporation Limited

GNHC : Gross National Happiness Commission

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(25/26)

# Major Undertakings to be Covered by the Japanese Grant

No	Items	Deadline	Cost Estimated (Million Japanese Yen)*	Ref.
1	To provide equipment			
	<ol> <li>To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country</li> </ol>		2	
	a) Marine(Air) transportation of the products from Japan to the recipient country	during the Project	232.4	
	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	17.8	
	Total		250.2	

*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

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Annex 8

(26/26)

# 5. References

Copy of the letter of "Budget assuarnace for the operation of farm machinery for hiring servics".



**Hiring Services** 

#### Sir,

As discussed and agreed during the recent JICA mission on the Preparatory Survey for the "Project for Improvement of Farm Machinery for Hiring Services ", we are pleased to accord highest assurance that the Ministry of Agriculture and Forests will allocate necessary and adequate budget for operating the hiring services of 558 power tillers (existing 205 plus 353 under consideration in the project mentioned above).

Yours sincerely,

Nim Dorji Director General

Copy to:-

- 1. PS to Hon'ble Ministry, MoAF, for Excellency's kind information
- 2. Dasho Secretary, MoAF, for kind information

Department of Agriculture PABX: 322228, 331316; Fax No. 323562; Director: 322805; Chief Agriculture Officer: 321291; Chief Engineer: 329122; Chief Horticulture Officer: 336946; Horticulture Division PABX: 323183,323184 Fax No: 325837