

Republic of Madagascar

**Preparatory survey on BOP Business for
Building Food Value Chain of Cocoa in**

Madagascar

Final Report

(Executive summary)

April, 2018

Japan International Cooperation Agency

THEOBROMA Company Limited

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1-1. Outline of Preparatory survey

1) Survey Overview

Main development issues	Details of development issues
1. Market side needs	a) Market needs and information are not shared among various actors in the Cocoa FVC, b) Quality standard of cocoa beans is not recognized between small scale farmers and collectors/ Agents.
2. Lack of equipment and skill for quality improvement	c) Most of small scale farmers do not own wooden fermentation boxes (37% of possession rate), and they have poor skills and knowledge on the quality standards, agroforestry, fermentation, drying, and sorting, and etc.
3. Low yields of cocoa beans, and not much place for yields improvement,	d) Average cocoa farming area of small scale farmer is 0.87ha, the average tree age is 26th years old, and annual average yields is 340k /ha dry beans base. e) Small scale farmers gain income from cocoa, it accounts for 50% to 80% of annual household income. Moreover, cocoa farmers cultivate vanilla, coffee, pepper as cash crops by agroforestry system. However, there is not much expanding place of agroforestry or new cocoa plantation in this area.
4. Vulnerable transport system between Ambanja and upstream site	f) This road is the main road to transport agricultural products and daily commodities, however this one is an unpaved road and deep ruts, therefore vehicles used are limited to tractors and small trucks. And more, it cannot transport in the rainy season ((January to March)
5. Natural disasters	g) Some top of hill or mountain which cocoa farming's backland are grass land without trees, and mudslide (<i>lavaka</i>) are occurring in several places. The flowing sand/ soil accumulates in Sambirano, and the riverbed rises. Therefore, floods are likely to occur in Sambirano where the river beds have risen. As a result, cocoa plantation directly suffers the damages caused by natural disasters.
6. Others	h) As of local survey, the inspection system of agricultural pesticide residue for exporting was not established in Madagascar.

2) Background of this survey

THEOBROMA is a confectionery, pastry and chocolate producing company in Japan. The CEO Mr. Tsuchiya Koji, responsible for this survey, as a pâtissier for using high quality cocoa beans, and using techniques which got some awards in world confectionery competition, is a well-known person recognized by his peers in Japan, Europe and other countries as a Great Chocolate maker. Cocoa beans, raw materials for chocolate production, is only cultivated and produced in the limited area called the Cocoa Belt which are located between South North latitude 10°~20° of the equator including West Africa, Middle and South America, and Asia. And then, cocoa beans is exported from their producer countries to Europe, North America and Asia. Chocolate, cocoa butter and various products such as cosmetics could be made out of cocoa beans (See figure 4).

Tastes of final consumers is distinguished by 2 types, a) Sweet and low-price chocolate, and b) High price but Rich flavored chocolate. Chocolate flavor is dependent on the varieties of cocoa ; the high quality cocoa beans is called Flavor beans or Fine beans, and typical variety is Criollo and or its crossbreed Trinitario, production of high quality cocoa beans accounts for only a small percentage in the world production estimated at 4,470,000 tons in 2016. On the other hand, Forastero, flavor is lower than fine beans, called Bulk beans, easy to cultivate, accounts for more

than 95% of cocoa beans production. High quality cocoa beans which THEOBROMA seeks is Fine beans or Flavors beans.

High quality cocoa beans are produced only in well-defined areas which are: Venezuela, Mexico, Brazil, Peru, and Madagascar else. To secure high quality cocoa beans, European luxury chocolate makers have contracts with local cocoa farming companies which are owners of cocoa farming. On the other hands, most of cocoa beans production is made in small scale farmer, and then is purchased by collectors, via various agents and import intermediaries, to be exported in the international cocoa market. Thus, it is difficult for a confectionery company to purchase directly high quality cocoa beans from farmers. And another thing, cocoa beans, is a food material for commodity, should comply with food security requirements such as a food security standard (related to Residual pesticide standard), on the export and import in each country.

In case of purchasing cocoa beans from the international market, it is difficult to ensure the traceability of cocoa beans such as usage records of pesticide, chemical fertilizer, with the exception of direct purchase from cocoa farming company,



Phot.1. Cocoa flower, Cocoa pod, Cocoa beans enveloped by pulp, and THEOBROMA chocolate

As for cocoa farming, Agroforestry and or agroforestry farming is characterized by cocoa tree grow up under tall "shading tree". Indeed, there is an agroforestry forest (20~40m tree height) on both side of Sambirano River, and cacao trees of several meters in height and cash crops such as vanilla, coffee, and pepper are also cultivated under shade trees.



Phot. 2. Situation of cocoa farming in the Sambirano River

The survey area is the Sambirano located in Ambanja district, DIANA region in the Republic of Madagascar. An annual total production of cocoa beans is about 11,000 tons and they all come

from this area. Compared to the world total production which is about 4.447.000 tons in 2016, Madagascar’s production is quite small and only accounts for 0.2% (See Table 13). However, since cocoa beans from this area is estimated as Flavor beans and or Criollo, and this area is widely known as a high quality cocoa beans production area in the world cocoa market.

Various varieties such as Forastero, Criollo, and Trinitario cultivated by small scale farmers in this area, their varieties have various pod forms and fresh beans color. In general, Criollo’s fresh beans are white color, and the greater white beans, the higher purity of Criollo will be. Forastero’s fresh beans are purple color. Trinitario’s beans are white and purple beans, and different colored beans be mixed in cocoa pod. Since it has not fixed cultivars of cocoa in this area, so variety of quality is large, and it is desired to implement a breeding program with high quality as selection index in the future.



Phot. 3 Typical cultivars of cocoa pod and fresh beans

In fact, high quality cocoa beans are produced by only representative of high quality producer cocoa companies Millot and Akesson in Madagascar, both cocoa farming companies ferment, dry, and sort the harvested cacao beans from own farming with their own facilities. But Cocoa beans produced by many other small scale farmers and producers' association are obviously lower in quality than cocoa farming companies cocoa beans. Because of beans produced by small scale farmers and producers' association were low quality mostly of unfermented beans which dried fresh beans, poor fermented beans which fermented in various ways, flat beans, and unsorted beans. Furthermore, these low quality cocoa beans are labelled as a "Superieur (high quality)" or "Standard "cocoa beans, and exported by local exporting companies. Madagascar quality Standard of cocoa beans was defined in 1964, and is quite old, but we assume that Madagascar quality Standard had defined based on the Maximum contamination rate of Moldy beans, Slaty beans, and Defective beans at that time. Each value of Maximum contamination rate are different from them of current international quality Standard, however the idea of Quality standard is the same as today.

Table 1. Cocoa beans quality Standard in Madagascar (1946)

	Madagascar ^{a)}			International Standard ^{b)}	
	Superieur (High quality)	Current/ Standard	Limite (low quality)	Grade 1	Grade 2
Moldy beans	Less than 5%	Less than 10%	Less than 15%	Less than 3%	Less than 4%
Slaty beans	Less than 5%	Less than 10%	Less than 15%	Less than 3%	Less than 8%
Defective beans	Less than 5%	Less than 10%	Less than 15%	Less than 3%	Less than 6%

Defective beans: flat beans, infected beans, sprouted beans and else

a): Decree N°46-1474 on May 15th, 1946 , b) : International Cocoa Standard (1975/1985)

Cocoa growing area is about 24,000 ha and work about 27,000 farmers in Ambanja district. Farmer's average growing area is 0.87 ha. In the downstream Sambirano, cocoa growing area is about 11,000 ha and about 13,000 farmers (See table16). Cocoa farming companies (about 10 companies) are scattered in low area, and small scale farmers are formed around farming companies.

Usually, the fermentation of the cocoa beans has to start within 8 to 10 hours after breaking the cocoa pods. The National road N° 6 crosses in Ambanja district, a lot of small farmers who do not own wooden fermentation box in the downstream area, and have easy to sell cocoa fresh beans at an average price of 2,500 MGA/kg to nearby cocoa farming companies, and/or to collectors and brokers who own fermentation boxes. And Fermented and dried cocoa beans are traded at an average price of 7,100 MGA/kg between farmers and collectors/ brokers (See table 30).

Furthermore, cocoa farming area spreads out on the upstream of Sambirano up to 70 km from the city of Ambanja. The upstream cocoa farming area is about 13,000 ha and about 14, 000 farmers. And the unpaved road connecting Ambanja and Upstream area is nutty and deep, and closed during rainy season (January to March). There is only one cocoa farming company in the middle Sambirano, and so, most of small cocoa farmers don't have means of transport to take their fresh cocoa beans to a cocoa farming company or brokers who have fermentation boxes. Moreover, a price of wooden fermentation box is expensive for farmer, the number of farmers having the wooden fermentation boxes was 26 farmers of the surveyed 78 farmers (37% of possession rate). Consequently, most of farmers produce an unfermented-dried fresh beans, or a low quality beans by fermented various ways such as using a plastic jugs and bags, and they cannot help but sell low quality beans to collectors/ brokers at cheap price regardless of quality.

Collectors/ brokers make it priority to quantity rather than quality. Thus, the quality standard has been ambiguous, collectors/ brokers sort out cocoa beans to "Superior" or "Standard" based on the local standard how to be a beans appearance color, or a presence/ absence of fermented odor. It frequently happens that "Superior and Standard" quality beans are mixed together after purchase. And even the "Superior" is not sufficiently sorted out, and many unfermented beans, poor fermented beans, and defective beans are mixed in. In fact, THEOBROMA had examined two sample of "Superior and Standard" provided from one producer's association, both sample were not sufficiently sorted out, and "Superior" were below Grade 2 of the international Standard. Normally, there are many cases of troubles in international trading of cacao beans, the samples before order are high quality but really the received cocoa beans after order are low-quality beans

with no commercial value. Therefore, Buyer must carefully evaluate the exporter company/ Agent's technology and reliability.

As a result of baseline survey, the income from cocoa beans sales for small scale cocoa farmer accounts for 50 % to 80% of annual household income. However, a yield's peak of cocoa tree is around 10th year after planting, yet the annual average yield was 340kg/ ha dry beans base, and the average tree age was 26th years in the surveyed 78 farmers (See, Table 27 and Table 34). In the future, if farmers do not renew old-aged trees, it seems that farmer's yield decrease immediately.

Besides, most of farmers of the Sambirano are directly affected by various natural disasters such as cyclone, flood, landslide behind the cocoa farming etc. As a result of this survey, cocoa small-scale farmers have been facing the following development issues:

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3. Low yields of cocoa beans, and not much place for yields improvement,	d) Average cocoa farming area of small scale farmer is 0.87ha, the average tree age is 26th years old, and annual average yields is 340k /ha dry beans base. e) Small scale farmers gain income from cocoa, it accounts for 50% to 80% of annual household income. Moreover, cocoa farmers cultivate vanilla, coffee, pepper as cash crops by agroforestry system. However, there is not much expanding place of agroforestry or new cocoa plantation in this area.
4. Vulnerable transport system between Ambanja and upstream site	f) This road is the main road to transport agricultural products and daily commodities, however this one is an unpaved road and deep ruts, therefore vehicles used are limited to tractors and small trucks. And more, it cannot transport in the rainy season ((January to March)
5. Natural disasters	g) Some top of hill or mountain which cocoa farming 's backland are grass land without trees, and mudslide (<i>Javaka</i>) are occurring in several places. The flowing sand/ soil accumulates in Sambirano, and the riverbed rises. Therefore, floods are likely to occur in Sambirano where the river beds have risen. As a result, cocoa plantation directly suffers the damages caused by natural disasters.
6. Others	h) As of local survey, the inspection system of agricultural pesticide residue for exporting was not established in Madagascar.

3) The Objective of this survey

The objective of this survey is to build the safety and security of high quality cocoa food value chain by supporting small scale cocoa farmers located in the upstream Sambirano with improving a quality and yield of cocoa beans, and prevailing Agroforestry.

4) Outline of business model

The big picture from cocoa beans to chocolate which THEOBROMA assumed is shown in figure 1. Small scale farmers are in charge of farming, harvest and a primary processing step (fermentation, drying, sorting), collectors/ brokers are in charge of transaction with farmers, collecting, and transport to Ambanja. Exporters are in charge of transport to Ambanja. This survey's coverage is from farming, primary processing, transaction, collect, transport until export. The rest process for shipping after export, importing in Japan, transport to THEOBROMA, and chocolate production process and sales are not included in the present research.

5) Consistency with development issues

As a results of survey about the needs and the development issues of small scale farmers of the Sambirano, the task to be addressed first is to improve cocoa beans quality produced by small scale farmers, and need to support the wooden fermentation boxes. Thus, THEOBROMA conducted the cocoa basic training and the cocoa on the job training on lending small wooden fermentation boxes by a repayment in crops system as a pilot project, with small scale farmers in the upstream site. Among 23 trainees in 2016 and 2017, 7 farmers were trained successfully.



Phot. 4 Fermentation process of cocoa beans on the cocoa basic training

THEOBROMA is targeting on the two years 2018 and 2019 as a preparation period for business starting, and plans to continue on the job training, and more will support the training of farmer's group. THEOBROMA hopes to cooperate with a) the program PIC 2 of the World Bank, and THEOBROMA is discussing with them in the direction of implementation.

Besides, THEOBROMA is discussing some development issues that Theobroma (or any other private sector) cannot address, discussions with JICA Madagascar office or the international donors which are working in similar activities; b) early introduction of cocoa breeding program to improve quality and yield, c) The inspection system of agricultural pesticide residue, and d) Rehabilitation of unpaved road between Ambanja and the Upstream site in Sambirano.



Phot. 5 Unpaved road condition between Ambanja and the Upstream site

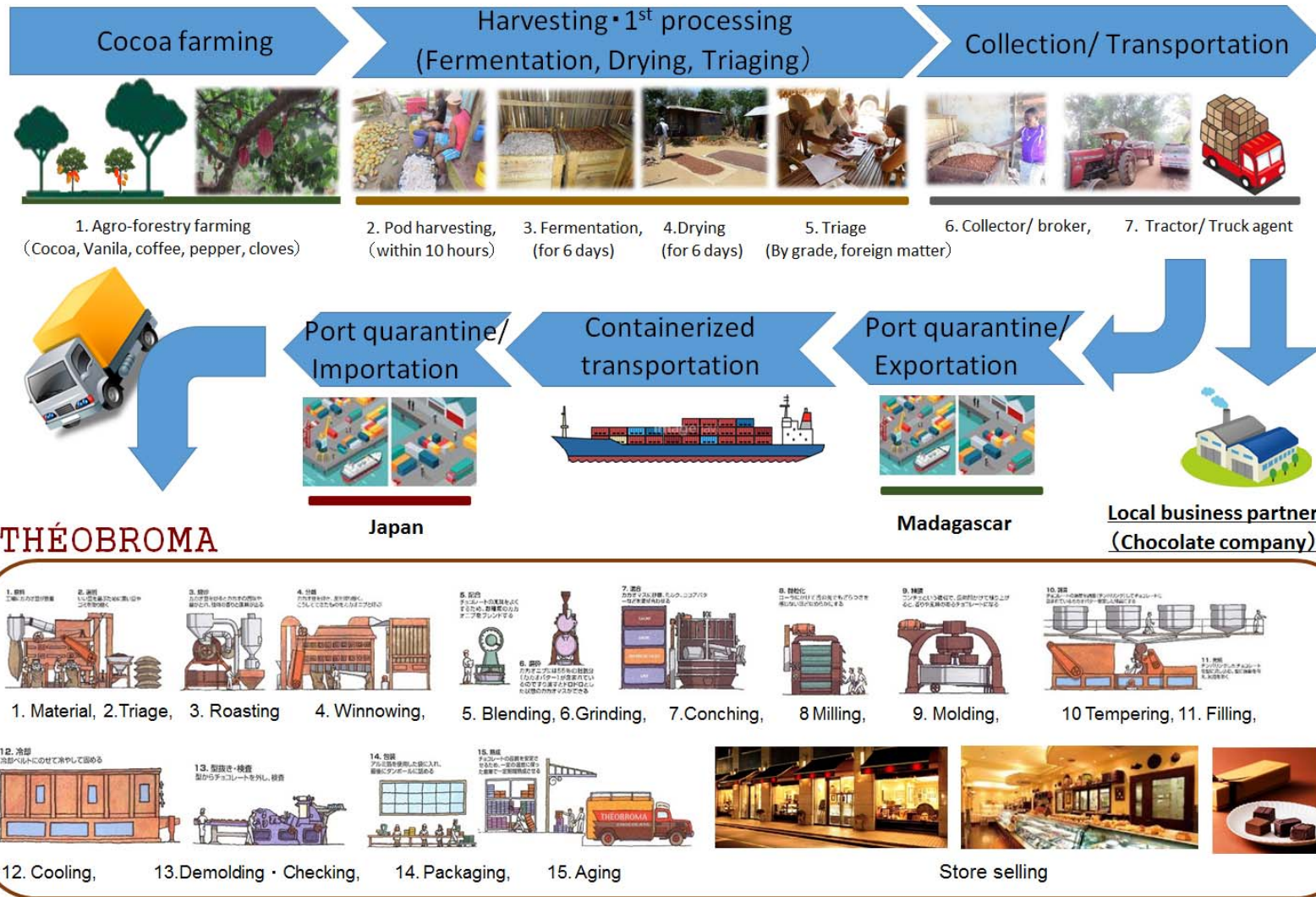


Figure 1. A big picture of THEOBROMA's cocoa Food Value Chain

1-2. Survey methods

1) Overall survey plan

In order to clarify the development issues and the needs of small-scale cocoa farmers on the upstream of Sambirano, surveys on the current situation of FVC were done in June 2016 with ADAPS (Association pour le Développement des Agriculteurs et Petites Entreprises Agricoles de Sambirano). Afterwards, survey on the region development situation (baseline survey) was done in July 2017 with FOFIFA in Ambanja (Centre national d'étude d'application agricole).

As the result of these surveys, it is defined that the task which THEOBROMA should address first was an improving cocoa beans quality produced by small scale farmers, and planed to the cocoa basic training and the cocoa on the job training. The 10 persons in September 2016 and the 13 persons in July 2017, were trained on the cocoa basic training and on the job training was carried out. Afterwards, FOFIFA conducted the evaluation and verification of the pilot activities in October 2017. Furthermore, THEOBROMA and other chocolate companies conducted the quality survey of chocolate made by cocoa beans sample from provided good skill farmers.

In addition, Theobroma has been discussing about a possibility of business partnership with a local chocolate company "C" which does not own cocoa farming. And also, the Japanese confectionery company "M" is interested in THEOBROMA's activity and made a visit on the site in September 2017.

In addition, THEOBROMA has been discussing about some development issues that private sector cannot address, and the future collaboration possibility with International donors. This survey member and a timing of dispatching are shown in the table below.

Table 2. Main local survey

Implementation period	Implementation responsible	Content to be implemented
June 2016	ADASP	Survey on the current cocoa FVC
July 2016	FOFIFA	Survey on the development issue on the survey target area.
September 2016	THEOBROMA	Basic cocoa training of 10 small scale cocoa farmers
October 2016 -	THEOBROMA	On the job training on cocoa (OJT) for 10 persons.
July 2017	THEOBROMA	Basic cocoa training of 13 small scale cocoa farmers.
July 2017	Chief Advisor	Prospection on the land use in the Upsyreann site. Discussion and presentation about THEOBROMA with International donors.
September ~December 2017	THEOBROMA Chief Advisor	On the job training on cocoa (OJT) for 13 persons who finished basic cocoa training.
September 2017	THEOBROMA Chief Advisor	Discussion with C firm, a local Business Partner Candidate. Site visit of M firm, a big Japanese confectionery company.
November 2017	FOFIFA	Examination and evaluation of Pilot Project.
January 2018	Chief Advisor	Discussion about possibilities of collaboration with Ministry of agriculture, International donors and else.

2) Survey term

The survey term was realized from May 13rd, 2016 to June 29th, 2018, and the local survey term was carried out from June 2016 to January 2018.

3) Target survey area

The target area is the Sambirano situated in Ambanja administrative district, in DIANA region in the Republic of Madagascar. Ambanja is situated at 250km from Antsiranana, the main town in the northern part of Madagascar, and 1,200km from Antananarivo which the capital city of the country.



Figure 2. Sambirano in Ambanja administrative district



Phot. 6 Cacao farmer are trying to expand the cocoa farming in the upstream site

4) Survey structure

The survey was carried out by a team of 8 persons and some parts of the activities were realized by ADAPS and FOFIFA Ambanja. FOFIFA, ADASP, and Aga Khan Ambanja (International NGO) were participating as a lecture in the cocoa basic training. Besides, the land use survey of the Upstream Sambirano area was done in collaboration with MNP (Madagascar National Parks). The timing of local survey was carried out by the 8 persons are shown in the table below.

Table 3. The timing of local survey

Survey member	Organization	On the timing of local survey (Number of days)
(Responsible) TSUCHIYA Koji	THEOBROMA	August (15 days) in 2016, July (7 days), October (12 days) in 2017
SHIBUYA Mamiko	THEOBROMA	October (15 days) in 2016, June (14 days) in 2017
YUASA Takuya	THEOBROMA	-
(Chief advisor) HARAGUCHI Naoto	Japan Paper Association	May (16 days) in 2016, February (11 days), June (23 days), September (17 days) in 2017, January (8 days) in 2018
ASAKAWA Hideo	Madagascar Services (MDS)	June (9 days), August (7 days), October (9 days) in 2016, May (8 days), July (10 days) in 2016
HARISONA Herdmane	(MDS)	May (9 days), August (7 days), September (9 days), December (6 days) in 2016, May (8 days), July (17 days), September (7 days), October(11 days), December (7 days) in 2017
RAHOLIMASINA Sylviane	(MDS)	-
OKAZAKI Yuji	OKAZAKI & Partners Co.Ltd	February (7 days) in 2017

1-3. Validation result

1) Validation result in commercialization

In order to build a safety and security of high quality cocoa FVC, a) Improvement of cocoa beans quality, b) Improvement of cocoa beans yield quantity, c) Securing the major actors on cocoa FVC, and d) Implementation of pilot project, discussion with business partner candidate company "C", estimating FOB price were estimated the total cost and evaluated the possibility of commercialization.

As a result, Theobroma's purchase amount is an annual 12,500kg of cocoa beans, and as a breakdown is an annual 2,500kg from trained farmers group/ good skill farmers on the upstream site and an annual 10,000kg from company "C" who company "C" would collected from several hundred farmers of the downstream area, and THEOBROMA would evaluated this business model be feasible. However, to start a cocoa business from 2020, THEOBROMA needs to verify the feasibility and fact of the Farmers group training, the traceability and quality of cocoa beans from 'C' company, and the progress of discussion about future cooperation activities with JICA and international donors and else. And therefore, THEOBROMA is targeting on the two years 2018 and 2019 as a preparation period for business starting in 2020.



Phot. 7 Discussions and recognition with good skill farmers trained

Table 4. Validation result in commercialization

Validation items		a) Quality improvement		b) Yield improvement	c) Securing the major actors on the Cocoa Food Value Chain					d) Price competitiveness
Validation results	Objective indicators	Good skill farmers	Stabilization of quality by training of farmers group	Expanding farming area, and renewal of old cocoa trees	Secured quantity	Good skill farmers and Farmers group)	Collectors/ Brokers	Transport company / Exporters etc)	Business Partners	(Production/Collection/ Transport/ Export)
		5 persons	2 groups (10pers x 2grp)	Difficult	Annual 2,500kg from the Upper Valley	5 persons & 2 groups	1 or 2 persons	Tractor provider: 1 pers. Exporter: 1 pers.	1 company	Other company's FOB price
	Measure of the possibility	Possible	Possible and fixed	Difficult	Possible	Possible (from trainees)	Possible	Possible	Possible (ongoing discussion)	Possible, Existence of competitiveness
	Outline	7 good farmers were evaluated from 10 trainees by 2016 cocoa basic training and on the job training. Training for 13 trainees in 2017 is ongoing.	One successful farmer in 2016 and one trainee in 2017 are now participating in the PIC2 producer group of the World Bank.	The cultivated area of a small-scale farmer is less than 1ha to 2ha. Annual yield is 340kg per ha. The average age of cocoa tree is 26 years old.	Plan to purchase 2,500 kg from 5 good skill farmers and 2 groups which collaborate with 2 farmers groups of PIC 2. Purchase 500kg from 5 good skill farmers in 2016/2017. Training 2 farmer's groups of 20 good skill farmers (1 group of 10 good skill farmers) in collaboration with PIC 2 project.	Use of existing collectors/ brokers, tractor providers and exporters (including transportation with truck)	Purchase 10,000kg from company C in the downstream and of 2,500kg from good skill farmers / farmer's group from the upstream.	The FOB price of 2,500kg in the upstream site was calculated and it was competitiveness to other companies price.		
Next correspondence	Continuation of the on the job training for the 13 trainees who were trained in 2017 and training of good skill farmers. For the good skill farmers, work on the organization of farmers 'group and collaborate with the PIC 2 project.			Implement a breeding program with high quality as selection index in the future.	Continue the purchase of cocoa beans from good skill farmers, continue the guidance on techniques for quality improvement	Use the distribution system of C company, which is a local Business Partner Candidate. Company "C" sold to Theobroma 12 500kg secured from good skill farmers and farmer's group of 2500 kg on the upstream site and from farmers of 10 000kg on the downstream site.	Plan to negotiate about the collecting cost of 2,500kg from the upper valley with company C.			

2) Business plan (draft)

Theobroma's annual purchase amount is 12,500kg, and 2,500kg of small-scale farmers/ farmer's group on the upstream site and 10 000kg of company C bought from the downstream site. Furthermore, THEOBROMA plans to use the transport and collect system which company "C" owned from the upstream site, and order for local export companies for truck transport and export from Ambanja to harbor are planned.

Table 5. Cocoa production plan (proposal)

			1st yr. (2020)	2nd yr. (2021)	3rd yr. (2022)	4th yr. (2023)	5th yr. (2024)	Total
THEOBROMA	Individual farmer	(kg/person)	100	100	100	100	100	-
		(Person)	5	5	5	5	5	-
	(Subtotal)	(kg)	500	500	500	500	500	2,500
	Farmer's group	(kg/Group)	1,000	1,000	1,000	1,000	1,000	-
		(Group)	2	2	2	2	2	-
	(Subtotal)	(kg)	2,000	2,000	2,000	2,000	2,000	10,000
	(Total)	(kg)	2,500	2,500	2,500	2,500	2,500	12,500
Candidate company of BP in the downstream		(kg/person)	100	100	100	100	100	-
		(Person)	100	100	100	100	100	-
		(kg)	10,000	10,000	10,000	10,000	10,000	50,000
	(Total)	(kg)	12,500	12,500	12,500	12,500	12,500	62,500

3) Remaining development issues in commercialization and their counterplans

Theobroma assumes that the start of business would be in June 2020, and has determined that the period of two years from June 2018 to October 2019 as a preparation period for starting business. In order to improve quality dispersion of each farmer, THEOBROMA will carry out the training of 2 farmers 'group (2 groups x 10 persons) and of the 5 good skill farmers in collaboration with the PIC 2 farmer's group. Currently, it is planned to use the distribution with farmers and their group, and collect of the company C, as a local BP candidate, and transportation and export of local export company. Consequently, the measures to be taken related to remaining issues about the implementation of activities are arranged as follow:

Items	Remaining issues	Counterplans	Period
Production	In order to improve dispersion of quality for each farmer, training of producers ' group formed by the 5 good skill farmers and 20 good skill farmers (10 persons x 2 groups)	While continuing the 2017 cocoa on the job training, advance the training of 5 good skill farmers and of farmers' group. For the training of farmers ' group, collaboration with the PIC 2 project and technical support for quality improvement and else will be undertaken.	After June 2018
	Improvement of yield: (after the start of business) Introduction the breeding program on selection index for high quality	Establish collaboration with JICA and other International donors	After the start of business in June 2020
Sale	The quantity of high quality cacao that could be provided by the present good skill farmers is about 500kg. However, the quality of produced chocolate from beans of each farmer is varied in each.	Popularizing high quality cocoa beans of Madagascar To Japanese confectionery companies, and so as to expand beneficial effects.	After October 2018