



Manual on the dissemination of the False Bottom Technology

Submitted to the Government, Republic of Guinea,  
Embassy of Japan in Guinea, and  
Japan International Cooperation Agency

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## Abbreviation

ANPROCA: Agence Nationale pour la Promotion et le Conseil Agricole (in English, National Agency for Promotion and Advices on Agriculture)

FB method: false bottom method

FBT: False Bottom Technology

FG method: chaff method

JICA: Japan International Cooperation Agency

Ministry of Artisan: le ministère de l'Hôtellerie du Tourisme et de l'Artisanat (in English, Ministry of Hotel Industry, Tourism, and Artisan)

Ministry of Women: le ministère de l'Action sociale, de la promotion féminine et de l'enfance (in English, Ministry of Social Action and Promotion of Women and Children)

Sand Casted FB: Sand Casted Aluminum False Bottom

## About this manual

This is the first version of the manual on dissemination of the false bottom technology (FBT) in Guinea. This technology, good for small scale parboilers, introduced to Guinea in order to improve the quality of local parboiled rice. As a JICA Expert/Senior Agricultural Advisor for the Ambassador of Japan in Guinea, with the government of Republic of Guinea, the author have conducted dissemination activities of this technology. The package of the works of a demonstration/training and the preparatory activities were used as the main dissemination tool. The demonstration/training<sup>1</sup> includes the theory and practical sessions while the preparatory activities include the provision of the prototype false bottoms to the participating groups/villages in the demonstration. One package of these works needs minimum one week although it depends the number of the groups/villages to whom the prototypes are to be provided.

It was found that FBT was accepted by parboilers in Guinea and this package worked well. According to the study on the outcomes of the demonstrations conducted in November 2018 and March 2019, all of the interviewed parboiling groups and villages, which obtained the prototypes and participated in the demonstration, adopted FBT. Therefore, it was concluded that this well functioned package should be shared with relevant actors including the government and development partners as a manual. Although this manual was developed based on the experiences of the works mainly in Maritime Guinea, the works explained in this manual would function well in other natural regions, namely, Upper Guinea, Forested Guinea and Middle Guinea.

This manual has two parts. Part I describes about FBT and its advantages (Chapter 1). In addition, in this part, after explaining necessary conditions for the adoption of FBT by a parboiler (Chapter 2), the explanation is done how this package works as the dissemination tool, comparing it with other tools (Chapter 3). Part II describes the details of this package, from the planning of the training (Chapter 4), preparatory works of the training including the provision of the prototypes of false bottoms (Chapter 5), and the training (Chapter 6). The proposed monitoring method is also described (Chapter 7). This manual is mainly for the organizations which promote, or

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<sup>1</sup> The program of the dissemination is the same as that of the training.

interested in FBT. The dissemination of this technology would contribute not only to the improvement of the quality of parboiled rice, but also to the increase on the incomes of rural women<sup>2</sup>, and capacity development of local artisans. Therefore, this technology must attract a variety of development partners, which have assisted the agricultural development, the empowerment of the women, or the development of the local industry. Part I is mainly for the policy makers and the policy shapers while Part II is for the organizers and the implementers of the training including the trainers. In the case of ANPROCA in Guinea, Part I is mainly for the staff of the central, regional and prefectures office while extension officers on the ground can be the readers of Part II. This manual can also be used for the dissemination of FBT in other parboiling countries because this technology has also been accepted by parboilers and this package worked well in other countries including Nigeria, Guinea Bissau and Senegal.

Since this is the first version, the author would like many actors refer to this manual in their dissemination activities of FBT and improve the dissemination methods. He hopes that this manual contribute to the improvement of the quality of parboiled rice and lives of rural women in Guinea.

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<sup>2</sup> In Nigeria, in 2018, UN WOMEN conducted the training on FBT in order to improve economic wellbeing of women. [Nasamu, 2018b]

## Part I: False Bottom Technology and its Dissemination Approaches



## 1. About the False Bottom Technology

False bottom technology was born in Nigeria. This technology was developed under JICA project 'Rice Post-Harvest and Marketing Pilot Project in Nasarawa and Niger States' conducted in Nigeria from 2011 to 2016. In Nigeria, previously, most of the parboilers had conducted parboiling with traditional method (please see the photo of traditional parboiling in Nigeria on Figure 1). For adoption of this technology, a parboiler does not need to buy new parboiling equipment. She needs to only add a 'false bottom', a new part, and the lid,



**Figure 1: Traditional Parboiling**

existing part, to the parboiling pot. With this less cost technology, a parboiler can produce better quality parboiled rice (Please see the photos of rice parboiled with and without a false bottom and the lid on Figure 2.). These advantages attracted many small scale parboilers in Nigeria. First, the beneficiaries of this JICA project in two states adopted his technology. Since those beneficiaries very much appreciated this technology, the nationwide dissemination activities had started. This technology also attracted many parboilers in other states, and by March 2019, 16,532 small scale parboilers in Nigeria have adopted this technology. [RIPMAPP, 2020]

This technology is also called as JICA Improved Parboiling Technology. However, since the introduction of the false bottom is the core of this improved technology, in this manual, this technology is named as the False Bottom Technology (FBT). Although this technology includes other various technical advices under the whole parboiling process, which is described in the leaflet 3 in Annex 18 and Section 3. 2 in 'A Guideline for RIPMAPP Technology Dissemination [RIPMAPP, 2016] (French translated Chapters 2 and 3 of this guideline are attached in Annex 1 in detail, these are not mandatory. The author advices parboilers to conduct the best parboiling

works under their own circumstances. For example, the leaflet advises the parboiler, prior to the soaking, to wash paddy thoroughly, and in during the training, 4 – 5 times washing is advised. However, in some areas, there is the problem of the water scarcity. In this case, the author advises parboilers to winnow very carefully before the washing.



**Figure 2: Rice parboiled without (left) and with the false bottom and the lid (right)**

### 1.1 The mechanism through which FBT improves the quality of parboiled rice

Rice is the staple food in Guinea and most of the locally produced rice is parboiled. Parboiling is conducted also in other countries in Western Africa and South Asia. In general, parboiled milled rice has several advantages over non parboiled milled rice. Parboiled rice has

- Small number of broken grains
- More protein, vitamins, and minerals
- More resistance to insect infestation (Parboiling, 1976)

Parboil in Guinea has been conducted by small scale parboilers in rural areas with traditional parboil pots. In general, the quality of the rice parboiled with this method is low. Figure 3 shows the reasons. In the traditional parboiling method, the paddy and the water are put in the pot together. At the lower part, because the paddy is cooked with water, it is over parboiled and becomes darker. In addition, since some of the grains are directly on the fire, these are burned and the milled grains cannot be sold. In contrast, at the upper part, because no lid, the steam escapes from the pot and the temperature of this

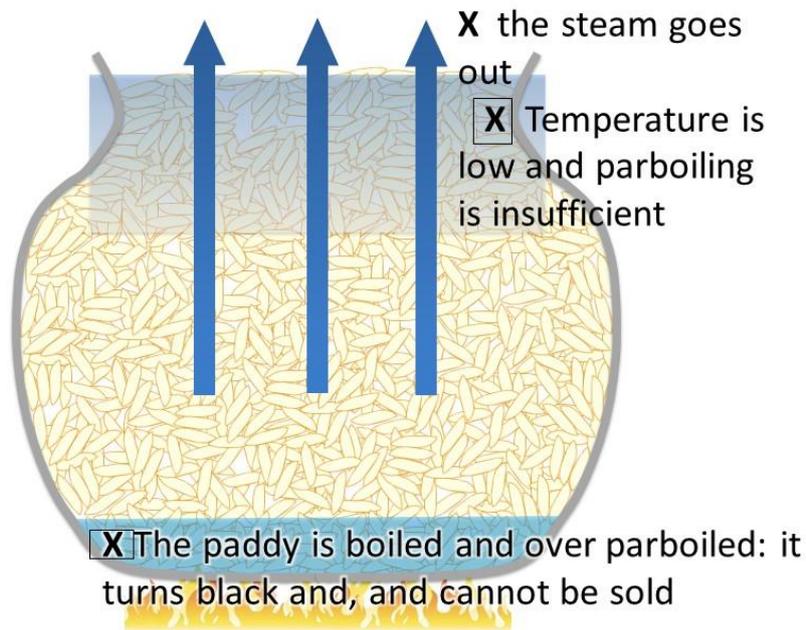


Figure 3: The reasons of the low quality of rice parboiled with traditional method

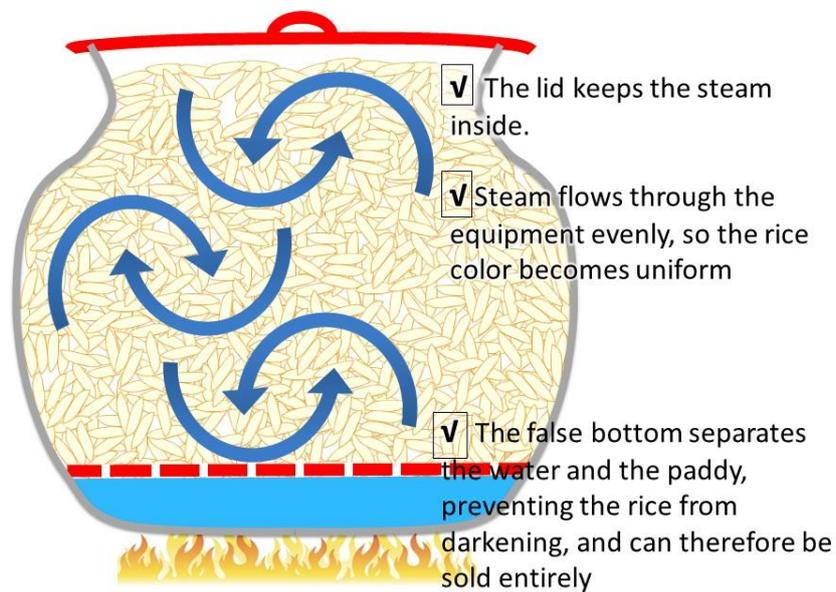


Figure 4: Reasons why a false bottom and a lid improve the quality of rice part does not increase enough. As the result, the paddy of this part is under parboiled. In order words, the color and the degree of parboiled rice is not uniform. Because of this, in general, the quality of locally parboiled rice is

lower than imported. FBT solves this problem through the mechanism shown in Figure 4. The false bottom in the pot separates the paddy from the water. Once the heating starts, water is boiled, and the steam goes to the paddy part. Because of this, first, the paddy at the lower part is not cooked but steamed. In addition, since the paddy is not directly on the fire, grains are not burned. At the upper part, the lid prevents the steam from escaping, and the steam circulates evenly in the pot. Therefore, the paddy there is also well parboiled. This even circulated steam produces uniformly parboiled rice. Since the color and the degree of the rice parboiled with FBT is uniform and somehow crystal, and the rice has lesser burned grains, this rice attracts buyers. They buy it with higher price. According to the study on the outcomes of the demonstrations on FBT in Guinea, on average, rice parboiled with FBT was sold with 21 % higher price than that parboiled with traditional method. [Kodama Bah, 2020]

## 1.2 Various kinds of False Bottoms

There are various kinds of false bottoms. The sand casted aluminum false bottom (Figure 5) is the most popular in Nigeria. The false bottoms can also be made of various kinds of metal sheets<sup>3</sup> such as iron (non galvanized and galvanized) and aluminum (new and scrapped). The commercial products or parts of the products sold for other purposes can be used as the false bottoms. Those include circular tray (see figure 6), fan cover, and the cover of the petro drum (see figure 7). These kinds of false bottoms were discovered and invented by parboilers in Nigeria. In principle, a circular sheets or similar to the sheets with appropriate size, which are durable (strong enough to support the weight of paddy in the parboiling pot and water proof) and can be perforated, can be used as the false bottom. Parboilers in Guinea might be able to find other products for false bottoms.

For the marmit type pot, the false bottom is enough as the additional part because the marmit supports the false bottom. However, if the parboiling

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<sup>3</sup> In Nigeria, metal sheet such as aluminum sheet is used as the material of the false bottom. Some Nigerian parboilers use bigger parboiling equipment, and the false bottoms for these are also bigger. For bigger false bottom, metal sheet, which is much lighter than sand casted aluminum, is used. However, in Guinea, the author has not seen any bigger parboiling pots. For smaller pots, the sand casted aluminum and the circular metal tray are better. Leaflet 10 in Annex 18 discusses the advantages and disadvantages of each material.

equipment has cylindrical shape, in addition to the false bottom, the support to it is necessary. In Guinea, the maize type pot needs the support. (See Figure 8.)



**Figure 5: A False Bottom (Sand Casted) and a Parboiling Pot (Left: FB is inserting in the pot, Right: FB in the pot. A parboiler put paddy on inserted FB)**



**Figure 6: Tray – a tray sold in the market (Left) can be a false bottom through perforating it with a nail (Right)**



**Figure 7: Petro drum lid (left, good as a false bottom because it resists rust) and Fun cover (Right)**



**Figure 8: Left: A Support in the Pot, Right: A False Bottom is on the Support**

In addition, the combination of chaff and cloth is used as the alternative. In this combination, a coarse-woven cloth such as cotton can serve as a false bottom and chaff can serve as a support (see Figure 9). In this manual, the parboiling practice using this combination is included in FBT.



**Figure 9: Combination of Chaff and the Cloth**

When the method with this combination is discussed, it is called as chaff method while the method with false bottom as false bottom method. The combination of chaff and the cloth is called as the chaff.

The table 1 compares three kinds of false bottoms, which should be well explained in the training in Guinea, namely, **sand casted aluminum false bottom (hereafter, `sand casted FB`), false bottom from circular metal tray sold in the market, and chaff.**

**Table 1: Three Most Popular False Bottoms in Guinea**

	Sand Casted Aluminium	Circular Tray Sold in the Market	Faux Grains
Applicability to any sizes of the parboiling pots	Applicable to all sizes of pots	One size fits only certain sizes of the pots.	Applicable to all sizes of pots
Availability	A Blacksmith can fabricate it. In general, a town has a Blacksmith.	Only certain sizes are available in the market. The market in Conakry has many sizes while the market in a small town has only few.	Both of faux grains and cloth are available at any places
Price	GNF 300,000 – 400,000	GNF 100,000	Almost zero (only the cost of the cloth)
Additional work during the parboiling	Only put the FB in and out from the pot	Only put the tray in and out from the pot	Faux Grains should be kept, and transfer them in the pot for preparation. After the parboiling, the faux grains should be scraped out from the pot.
Durability	Durable as the aluminium pot	Less durable than sand casted aluminium FB	N.A.

The **sand casted FB** (see figure 5) is most popular in Nigeria. This false bottom is made by a local blacksmith. In Guinea, a blacksmith can be found even in a small town. In Guinea, the shape and the size of the traditional parboiling pot varies, and the size of false bottom depends on the size of the pot. Therefore, the false bottom should be customized to their pots. Because of manual fabrication, a blacksmith in a town can make a sand casted FB with any size. A sand casted FB is as much durable as the sand casted aluminum pot. Therefore, this type is the most popular in Nigeria and would also be the most popular in Guinea. However, the sand casted FB is a little bit expensive. In Guinea, in 2019, most of the false bottoms costed GNF 300,000 – 400,000<sup>4</sup>.

A false bottom made from a **circular metal tray sold in a market** is cheaper than a sand casted FB. In 2019, the medium size tray could be procured around GNF 100,000<sup>5</sup>. Once making holes through the tray, a parboiler can use it as the false bottom. Perforation can be conducted by ordinary person with a hummer and a nail. However, there are only certain sizes of the trays in a market. If the parboiler cannot find a tray with the appropriate size, she cannot use it as the false bottom.

The initial investment cost of **chaff (the combination of chaff and the cloth)** is almost zero. Since chaff are separated during the winnowing and washing, these are free. The cloth is very cheap. In addition, since this combination can fit all kinds of traditional parboiling pots, this combination could be used by any of the parboilers. However, preparation of chaff and setting in and removing it from the parboiling pot needs some works.

After the demonstrations in Koba in December 2018 and Tounifily in March 2019, some groups/villages were given prototype false bottoms while the other groups/villages were not given. After the parboil season, we conducted the study and found that all 13 groups/villages which have accesses to given false bottoms use these. In contrast, among 11 groups/villages which did not have accesses to the prototypes, five could not start the parboiling with FBT although all of these were interested in this technology. Six started this technology. Among these six, only one produced sand casted FB. Two used trays as the false bottoms. One used a fan cover. Two used chaff. From this result, we can assume how difficult parboilers make sand casted FB without

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<sup>4</sup> Cost depends on the size.

<sup>5</sup> The price depends on the size and material.

the prototype. We can also assume that all the groups/villages which do not have false bottoms do not necessarily adopt chaff method. [Kodama Bah, 2020]

The promoters of the FBT should understand advantages and limitations of each material, and according to the reality of the parboilers, they should suggest each of the parboilers her best option.

### 1.3 Advantages of FBT

FBT has several advantages over the traditional parboiling methods. The most significant advantage is, as mentioned in Section 2.2, the higher quality of rice parboiled with this technology. Since the color of the rice is uniform and more transparent, and less broken and no burned grains, the rice can be sold with 10 – 20 % additional value, and the parboiler can obtain additional benefit and profit. This technology has also other following advantages:

- ① Shorter time of parboiling required and then less consumption of firewood;
- ② Smaller quantity of water required for parboiling;
- ③ Shorter drying time required after the parboiling; and
- ④ Better milling recovery rate of parboiled rice.

These advantages were firstly witnessed by the parboilers who adopted FBT. Later, advantages ①, ②, ③ were verified by a laboratory test [Kodama, Halilu, Bello, Jumai, 2017]<sup>6</sup>. Among these three advantages, advantage ① **Small amount of firewood required for parboiling**, would contribute to the reduction of the cost and the increase of the profit of the parboilers. Advantage ② **Smaller quantity of water required for parboiling**, also could contribute to the reduction of the cost, especially, at the place where water is expensive. Advantage ③ **Shorter drying time required after the parboiling**, could open the possibility of parboiling in the wet season in Guinea. In Nigeria, parboilers witnessed that, even on the cloudy day in wet season, after the parboiling in early morning, the rice parboiled with FBT could be dried enough in the evening of the same day while the rice parboiled with traditional method could not. Due to the security reason, in the night, the parboilers have to pack half-dried rice in the sack and brought it into a house or a storage. At the morning of the next day, when they open the sacks, the

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<sup>6</sup> This report is attached as Annex 2

rice with FBT does not have sickening smell made by the fermentation while the rice with traditional method has. The rice with FBT, therefore, can be dried up in the next day without the problem of the odor. Parboilers in Guinea could also conduct parboiling during the wet season without the problem of the fermentation.

Advantage ④ `Better milling recovery rate of parboiled rice` were verified at the demonstration in Tounifily in March 2019. After the drying of the rice parboiled during the demonstration, the rice was milled with an Engelberg Steel Huller. The recovery rates of the rice parboiled in 5 pots, four of them had been with TFB and the other with traditional method, are shown in Table 2. The recovery rates of all of the rice with FBT are from 64.8 % to 69.9 % (average 66.8 %) while that with traditional method is only 59.8 %. [Bah, 2019] If the recovery rate increases from 59.8 % to 68.8 %, a parboiler can get additional 11.7 % benefit<sup>7</sup> from parboiling.

**Table 2: Milling Recovery Rate of the Parboiled Rice with False Bottom (FB) and Traditional Method**

	FB 1	FB 2	FB 3	FB 4	Total of 4 FB s	Traditional
Paddy (kg)	37.2	32.6	23.9	35.9	129.6	9.7
Milled Rice (kg)	24.1	22.1	16.7	23.7	86.6	5.8
Recovery rate (%)	64.8	67.8	69.9	66	66.8	59.8

Source: The results on the milling of the parboiled rice in the demonstration in Tounifily in March 2019

This technology also has several advantages over improved drums, many of which had been donated to the parboiling groups in Guinea. Off course, the improved drum has an advantage over the FBT. Because of the size, a drum can parboil bigger amount of paddy. While popular traditional pots can parboil only 30 – 40 kg paddy per batch, even a small drum can parboil can around 100 kg par batch. However, FBT has following advantages:

- ① No need to change her parboiling pot for adopting the technology
- ② Very simple technology

<sup>7</sup>  $(68.8 - 59.8) / 59.8 \times 100 = 11.7$

- ③ Locally available (Chaff are available at any parboiling place. In addition, if the local Blacksmith is trained, sand casted FF would be available in the area<sup>8</sup>.)
- ④ Less expensive (Therefore, this technology could also be adopted by individual parboilers.)
- ⑤ Durable (Sand casted FB is as much durable as the aluminum parboiling pot.)

The improved drums used by parboiling groups are usually donated from the donors to the parboiling groups. Common individual parboiler cannot afford to buy these drums. The individual parboilers who are not in any groups have only FBT as the option in order to produce higher quality parboiled rice. Even for the individuals within a group<sup>9</sup>, when they produce parboiled rice individually, only FBT is their option.

The study made by the team of the author (hereafter `our study`) in 2019 found that some parboiling groups which have improved drums also use traditional pots with false bottoms. As the reasons why they use both, some groups replied that when they have bigger amount of order, they use a big drum, but if they have small order with higher quality, they use FBT. (According to them, the quality of rice parboiled with FBT is better than that of rice with improved drum. The mechanism used for FBT is almost the same as that used for improved drum. The author assumes that because the pot is smaller than the drum, the quality would be better.)

#### 1.4 Target of the dissemination activities of FBT

In Guinea, there are three possible adopter groups of FBT, namely, the individual parboilers who do not belong to any parboiling groups, individual who are in a group, and parboiling groups. The author firstly thought that individual parboilers who are not in any groups are the main adopters thus the main targets of the dissemination activities. However, as described in the section 2.4, our study in 2019 found that some parboiling groups which have improved drums also use traditional pots with FBs. As the reasons why they use both, some groups replied that when they have bigger order, they use a big drum, but if they have small order with higher quality, they use FBT.

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<sup>8</sup> It should be noted that some types of improved drums can also be fabricated by local artisans.

<sup>9</sup> The study of the outcomes of the demonstrations on FBT in 2018 and 2019 found that many of the members of the parboiling groups also conduct parboiling individually. [Kodama Bah, 2020]

Other groups used FBT because their improved drum had been broken and the drum was under repair. From these voices, we can understand that the groups use either of the technologies according to the needs of the buyers and occasions. We can conclude that in parboiling activities, at least, in certain groups, improved drum and FBT can coexist<sup>10</sup>. Our study also revealed that, in addition to the adoption as the group, many members in adopting groups also adopted FBT in their individual practices. Probably, through the group parboiling activities with FBT, members learned this technology, and understood the advantages, and many of them adopted it individually. Although individual parboilers outside of the groups are also the target of the dissemination activities of FBT, in general, dissemination activities through organized groups can be done more effectively and efficiently. Therefore, from the viewpoint of the effectiveness and efficiency, in the early stage of the dissemination such as the stages 1 and 2 to be described in Chapter 3, parboiling groups should be the main target of the dissemination activities.

For the efficient dissemination activities, the prioritization of the areas is important. The prioritized areas could have:

- Good pipelines (route of the transportation) to the big parboiling markets (In the case of Guinea, Conakry is the biggest market.) (Even if no good pipeline, if the area is close to a big market, this area could be prioritized.)
- Many parboilers
- Active parboiling unions/groups (If a group/union is active, the information of this technology would soon be disseminated in the group.)

## 2. Necessary conditions for the adoption of FBT

For the adoption of FBT by a parboiler, first, she should be aware of this technology. Once she became interested in it, she begins to consider the introduction of this technology in her parboiling activity. For her adoption to this technology, there are several conditions. The following are these necessary conditions.

- ① Awareness of the technology
- ② Understanding of FBT and its advantages
- ③ Ability to parboil with FBT

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<sup>10</sup> In order to conclude whether, in general, the groups with improved drums still need FBT, we have to introduce FBT to other parboiling groups who have improved drums and check whether they also adopt this technology and listen to them why they use both.

- ④ Availability/Accessibility of the False Bottom
- ⑤ Financial capacity to procure the False Bottom

This chapter explains how these conditions could be fulfilled.

**Awareness raising on FBT** is the first step. A parboiler would be **aware of this technology** through the explanation of the technology in a meeting, distributed leaflets, a radio program, television news, internet web site, and information from her peer.

**A parboiler can understanding FBT** and its advantages if she is well explained and observe the rice parboiled with FBT. A promotion video developed in Nigeria<sup>11</sup> could assist her understanding. Through the practices with a coach, a parboiler becomes **able to parboil with FBT**. The careful observation of the practices of an adopter of this technology and additional explanation could also make a parboiler able to conduct FBT. Instead of observing the practice of FBT physically, through watching the promotion video and additional explanation, the parboilers might become able to practice this technology. In the case of adoption only through watching the video, a couple of try and error might be necessary since the parboiler might not fully understand correct way of parboiling with the false bottom.

**In addition, a false bottom good for her parboiling pot should be available/accessible.** As described in Section 1.2, in Guinea, the parboiling pot varies in sizes from small to large, and the size of appropriate false bottom depends of the size of the parboiling pot. Although the chaff fits all sizes of the pots, the local parboilers should be given the option of the false bottom method. If a locally available tray fits her parboiling pot, she can buy it and perforate it. However, if not, the size of the false bottom, which fits the equipment, should be identified. For this, someone should measure the equipment, identify the appropriate size of the false bottom, and ask local blacksmith to fabricate the sand casted FB.

The author assumes that, technically, making the false bottom available/accessible would become the bottleneck of the dissemination and popularization of FBT, especially in the early stages of the dissemination. There are two reasons. First, it seems difficult for the majority of the

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<sup>11</sup> Production of Quality Milled Rice by Small scale Parboilers using False Bottom Technology, FMARD and JICA. URL: <https://www.ripmapp.com/> [RIPMAPP, 2020]

parboilers to identify the sizes of suitable false bottoms. Therefore, they cannot inform the blacksmiths of the sizes of the false bottoms they need. Unfortunately, the blacksmiths does not solve this problem. Usually, they do not go to the sites of the clients to measure the sizes of the pots. They work only if the clients come to their places with the information on the sizes. Second, blacksmiths usually fabricate sand casted pots through copying existing pots as the prototypes, and, therefore, they do not know how to fabricate the false bottoms without their prototypes. One blacksmith the author visited did not have either a compass or a measuring tape. Without these, it is almost impossible to fabricate the false bottom without a prototype. In order to solve these issues, for the parboiler, someone should identify the size of the appropriate false bottom and create the carton or wood prototype. Once obtaining the prototype, the parboiler can bring it to the blacksmith.

The final issue is the **financial capacity of the parboilers**. The affordability of the false bottom depends on the financial status of the parboilers. As explained in the section 1.2, in the case of the sand casted FB, it costs GNF 300,000 – 400,000. Once FBT becomes common in the area, the price of sand casted FB could be lower. However, its fabrication needs amount of aluminum as the material and laborious works, the price could not become drastically lower. If a parboiler can afford to buy the false bottom good for her now, she can buy it and start the FBT with it. However, if not, she cannot start the parboiling with a false bottom. In fact, during the demonstrations conducted in Koba (November 2018) and Tounifily (March 2019), some participants complained about the price of sand casted FB. The author suggests two kinds of assistance to parboilers who do not have enough money. The first assistance is motivating parboilers to save money for the procurement. Showing them possible recouping plan could lead a parboiler into saving. For a parboiler, based on the information of the cost of the false bottom, possible price difference of rice parboiled between with and without FBT, and the capacity of the parboiling pot, someone make the recouping plan and explain it to the parboiler. (Annex 3 is the instruction to the trainers on the explanation of recouping and the model recouping plan.) According to the model recouping plan, the initial investment on the sand casted FB can be recouped after 10 times of parboiling with FBT. Once she understand this recouping plan, and still she wants sand casted FB, she can start parboiling with chaff, save the additional profits and once she saved enough money, she can buy the sand

casted FB. Second assistance is linking parboilers to local financial services. Since the cost for the sand casted FB is within the amount to be able to lend through the microcredit scheme, in addition to the explanation on recouping plan, the person could link her to the local financial organizations including local NGOs which provide women micro loan.

### 3. Stages of dissemination

The goal of the dissemination activities of FBT is the upgrading the quality of the parboiled rice in the country. In order to reduce or at least not increase the import of the parboiled rice, in addition to the price competitiveness, the majority of the domestic parboiled rice produced in the country should, also in the quality aspect, compete with the imported parboiled rice. Therefore, FBT, which could upgrade the quality of local rice parboiled by small scale parboilers, should be disseminated to and adopted by the majority of the parboilers in Guinea.

This chapter discuss the ways of dissemination. Basically, if all of the five conditions described in the previous chapter are fulfilled, a motivated parboiler will adopt FBT. Among five conditions, 4 conditions could be fulfilled without any serious difficulties. However, the provision of the accessibility to the false bottom entails some difficulties, which was discussed in the previous chapter. Since the appropriate false bottom for a parboiler might be different from the one for her neighbor, customized service is necessary. However, the customized assistance to each parboiler is not cost effective in the early stage of the dissemination. From the viewpoint of effectiveness and efficiency, the better dissemination tools depend on the dissemination stage. The author theoretically divided the whole dissemination period of the technology in the country into 5 stages below.

- Stage 1: Introduction to the country
- Stage 2: Introduction to major parboiling natural/administrative regions<sup>12</sup>
- Stage 3: Introduction to the major parboiling areas in natural/

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<sup>12</sup> In Guinea, there are four natural regions and 8 administrative regions. If the government wants, Stage 2 could be divided into Stage 2-1 and Stage 2-2. During the stage 2-1, the trainings are conducted in all of the parboiling natural regions while during the stage 2-2, the trainings are conducted in all of the parboiling administrative regions. Basically, works to be done in the stage 2-2 are the same as those in Stage 2-1.

administrative regions

- Stage 4: Introduction to the motivated groups/parboilers of villages in areas
- Stage 5: Popularization of the technology in the groups/villages

In this chapter, `introduction` is defined as fulfilling all the five conditions for the parboilers, at least, in one parboiling place in the targeted area. This chapter describes possible dissemination tools to be used and other critical issues in each stage.

### 3.1 Stage 1: Introduction of FBT in to country

First, the FBT should be introduced to the country. The first step is the explanation to the policy makers and policy shapers. If they show interest, with these people, the demonstration of this technology on the ground could be planned. The main purposes of this demonstrations are letting relevant people know this technology and understand it and its advantages, and letting participating parboilers have a feeling that `we can adopt this technology`. Therefore, to this demonstration, the governmental staff and local parboilers, and representatives of parboilers from other main parboiling natural regions should be invited. In order to let participating parboilers have a feeling that `we can adopt this technology`, making them practice this technology is the best. There are two proverbs, `seeing is believing`, and `doing is believing`. Under this stage, through only seeing, many parboilers might not believe. For the demonstration, a few sets of the parboiling pots and false bottoms are necessary. As a part of the preparatory works, few appropriate false bottoms to the prevailing parboiling pots in the host village are fabricated using a local blacksmith.

During the demonstration, two clues should be checked to find the possibility on the acceptance of the FBT by the parboilers in the country. The first clue is the voices of the participating parboilers. At the end of the demonstration, if the participants are pleased to this technology and show the motivation toward the adoption, it could be accepted. Second clue is the price difference of the parboiled rice. During the demonstration, the interview with the parboilers should be conducted to know whether there is the difference of prices according to the quality of parboiled rice. If the quality is reflected into the price, it is highly possible for parboilers to be able to sell the rice parboiled with FBT with higher price than that with traditional method, and then many

parboilers would adopt this technology.

In Guinea, in 2018, during the demonstration in Koba, the author obtained the price information of parboiled rice from participants in some main parboiling areas, and found the price differences in all areas. As shown in Table 3, there were GNF 1,000 – 2,000 price differences between good and bad quality rice. Since we had a confidence that the rice parboiled with FBT can be sold as good quality rice, we concluded that FBT can be accepted by many parboilers.

Then, after the demonstration, the consultant who assisted the author during the demonstration and found that some parboilers in Koba soon adopted the FBT and they could sell the rice parboiled with this technology with higher price. With these information, we decided to go to the stage 2.

**Table 3: Prices of the parboiled rice according to the quality in some parboiling areas**

Unit: GNF/kg

Location	Quality of Milled Rice			Price Difference (Good - Poor)
	Good	Mean	Poor	
Koba	6,500	6,000	5,500	1,000
Tounifily	6,000	5,500	4,500	1,500
Kolaboui	6,000	5,500	4,500	1,500
Dubreka	8,000	7,000	6,000	2,000
Kankan (Upper Guinea)	5,500	5,000	4,800	1,700
Gueckeudou (Forested Guinea)	5,500	5,000	4,500	1,000

Source: Interview with the parboilers during the demonstration in Koba, November 2018

### 3.2 Stage 2: Introduction of FBT to the parboiling natural/administrative regions

In Stage 2, FBT is to be introduced to parboiling natural/administrative regions (Hereafter, both of the natural region and administrative region are called `region`). At least until this stage, the central office of the government

should initiate the dissemination activities. For this stage, the author suggests the combination of the one day or three day training and its preparatory works as the dissemination tool. These combined works should be conducted by a team dispatched from the central office since, in this stage, no one knows about this technology in the regional or prefectural offices. The travel of the team lasts minimum one week.

The preparatory works to the suggested training include the visit to some parboiling groups/villages in the invitation list and the fabrication of the prototype false bottoms good for prevailing pots in the groups/villages. Through these works, in visited groups/villages, parboilers know FBT, and understand somehow the technology and its advantages. In addition, for the parboilers who have prevailing pots, the false bottom becomes accessible.

During the one day or three day training<sup>13</sup>, the participants fully understand FBT and its advantages in the theory session, and become capable to parboil with FBT through the practice of the parboiling with this technology. In addition, participants understand possible financial plan for obtaining their false bottoms.

For the smooth transition of the stages from 2 to 3, it is advisable for staff of, at least, the regional office to accompany the team. Through the collaborative works, these staff would become capable as the trainers of the training under Stage 3. The detail of the preparatory works are to be described in Chapter 5 while those of the training are in Chapter 6.

There are two strategies of the prioritization on the selection of the participants. The first is putting the priority on the presentation of the technology to the parboilers in all the main parboiling areas of the region. Through the training, the information on FBT is disseminated in all major parboiling areas and the participating parboilers would have a feeling `we can adopt this technology`. If the organizer of the training follows this strategy,

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<sup>13</sup> The author calls this event conducted under the dissemination stage 1 as the demonstration. Under this stage, no one knows what FBT is. Under this situation, the technology should be demonstrated. Once this technology is appreciated by the policy makers, shapers and parboilers in the country, from the stage 2, the same event is conducted and called as the training. To the training, only parboilers who show interest in this technology are invited and trained. In this manual, this event is generally called as the training and when specified only activities under the stage 1, this is called as the demonstration.

small number of the parboilers (two to three) from each of the major parboiling areas in the region should be invited in the training. The second strategy is concentrating the works in a certain place for creating a cluster of the adopters of FBT there first, and then spreading the technology in the other places and areas in Stage 3. If the organizer follows this strategy, first, it conducts the training in the most popular parboiling place, and in the selected place it provides prototypes of false bottoms to active parboiling groups. Most probably, the groups which received this intensive assistance will adopt FBT. According to our study on the outcomes of the demonstrations in November 2018 and March 2019, all the groups/villages which had received this intensive assistance adopted FBT, whereas, among groups/villages which had only participated in a demonstration, around half adopted this technology. [Kodama Bah, 2020] Therefore, when a training is planned, in order to certainly create FBT adopter groups villages, it is advisable to provide this intensive assistance to several groups or villages in specific places.

The author would like to suggest the creation of a cluster of the adopters in a parboiling union through intensive assistance to some groups in this union. The creation of a cluster of the adopters in a union would have four positive effects. First, through the clustering, the quality of the rice become better. After the training, most probably, all the groups which obtained prototypes start parboiling with FBT. Since these groups communicate with each other, they must share with each other the results of the trials, and if some groups have better quality rice than the others, better groups teach the others how to obtain better quality rice. Through this process, the quality of all rice from this union become better. Second, the cluster attracts buyers. Once the cluster is created, relatively big amount of better quality rice would be produced, and buyers even who are little bit far from the place of the cluster, including institutional buyers, could come to the place to buy their rice with higher price. This would increase the profits of this union. Third, the success story of a cluster motivate other parboilers. Since this technology is still new in the country, parboilers might not be fully enthusiastic if they do not know the success stories of their peers. If they know one success story, parboilers in other areas would become more enthusiastic to FBT. This success story might also let developing partners consider including activities on this technology in their projects. Finally if the organizer provides the prototype to each group,

most of the parboilers could start FBT in individual parboiling<sup>14</sup>. Through the provisions of several prototypes, in this area, a couple of sizes of the false bottoms would be available, and most of the parboiling pots in that area would fit one of these prototypes. This means that the false bottoms become accessible for the most of the parboilers. A parboiler can choose one from variety of sizes as her prototype and bring it to the blacksmith for copy. Through joining of individual parboilers, this cluster become bigger. In addition, because of the single union, the organizer can easily monitor the outcomes of the training.

Therefore, it is advisable, first, to invite several groups in an active parboiling union to the training and give them the prototypes, and then, within the availability of the budget, invite the most active groups in the other major parboiling areas. Through this kind of assistance, after the training, the cluster would be created within the union and FBT would also be disseminated to other parboiling areas.

The author also suggest that, during this stage, the central office start disseminating information on FBT to their regional and prefectural offices and requesting them to share the information with their local staff as well as parboilers in their locality. Although this work could not fulfill all the conditions, once aware, parboilers would become interested and some of them might try introducing this technology through their human network. The information should be disseminated through at least three ministries, namely, the Ministry of Agriculture, the Ministry of Social Action and Promotion of Women and Children (hereafter `Ministry of Women`) and the Ministry of Hotel Industry, Tourism, and Artisan (hereafter `Ministry of Artisan`). The Ministry of Agriculture has communication channels with major parboiling groups. The Ministry of Women also has communication channels with parboiling groups because it knows women`s groups, many of which in rural areas are parboiler groups. The Ministry of Artisan has communication channels with the blacksmiths and other artisans such as the drillers and ironworks. Through these works, many parboilers and artisans would be aware of FBT.

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<sup>14</sup> Our study revealed that most of the members in FBT adopting groups also adopted this technology in their individual parboiling. [Kodama Bah, 2020]

Slide presentation<sup>15</sup>, promotion video, leaflets, sample false bottom can be used as the materials. The central office also should create and update the list of the unions/groups which have already adopted this technology and the one on the capable blacksmith, and share these with regional and prefectural offices. The parboilers motivated by the local staff could contact and/or visit some of these unions/groups and if they want, they would contact the nearest blacksmith on the list.

### 3.3 Stage 3: Introduction to the major parboiling areas

In Stage 3, the dissemination activities of this technology focuses on main parboiling areas in the region. In the case of Guinea, the coverage of one prefecture or the cluster of the parboiling towns/villages would be called as `an area`. Since there are many parboiling areas, the priority should be set. The prioritization should be done based on the number of the parboilers in the area and the existence of active parboiling union/group, which has great interest in this technology, and others. The author assumes that, still, the suggested combination of the training and its preparatory works would be the most effective way under the first half of this stage. First, since still in the most of the parboiling areas no one knows this technology the proverb `doing is believing` is still true. Suggested training could let the participants believe. Second, in many areas, still the false bottoms good for locally prevailing pots are not available. In this case, some interventions are necessary for making false bottoms available. The preparatory works includes this intervention.

In the latter half, the situations might change. Once a cluster of adopters are created in an area, some motivated parboilers of the same of neighboring areas might want to visit this cluster to learn FBT. In this case, the local staff under the government is expected to link these parboilers to the representatives of the cluster. A tour of the parboilers to the cluster would be helpful. If the size of a false bottom used in the cluster fits her own parboiling pot, she can copy it and start parboiling with the copied false bottom. Therefore, from the latter half, the awareness raising activities by local staff of relevant ministries become more important. These awareness raising activities might conduce the actions of some quality sensitive parboilers.

From this stage, it becomes difficult for the central office to organize all the

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<sup>15</sup> Model slide presentation is attached as Annex 4.

training. Instead, after few collaborative trainings with regional and prefectural offices, it should request these offices and development partners to conduct the training and other kinds of dissemination works, and concentrate in the capacity development of the trainers for these trainings. For the wider dissemination of this technology, the number of trainers should be increased. The central office could ask the organizer of the training to invite some local staff to the training as well as a part of the preparatory works. Once they know about FBT and how to identify the size of appropriate false bottom and explain the specification to the blacksmith, he/she can share what learnt with the parboilers. When the local staff is invited to the training, it is advisable to conduct special 30 minutes Q and A session for the dissemination of this technology in their areas.

The training of trainers could be a good tool. In Nigeria, 4 day training of trainers has been conducted. In the first two days, the master trainer trains candidate local trainers such as agricultural extension agents on FBT, including the explanation of the technology, practices, and the teaching methods. Then, on the third day, with the assistance of the master trainer, some of the trained trainers jointly conduct a 70 minutes theory session to parboilers in one village. On the fourth day, the other trainers conduct the same training in another village. Through this training, the trainers become capable to conduct 70 minutes short training in the village. Since this 70 minutes training can be conducted no cost or with minimum cost, this is called as `Low Cost Extension Session`. This training could be done under the stages 3 and 4. After this training, the trained local staff is expected to conduct the low cost extension sessions when they make routine visits to the villages. This extension method is one of the most effective dissemination tools in Stages 4 and 5. Guideline of the whole training of trainers and that for the 70 minutes training in the village are attached as Annexes 5 and 6, respectively.

In the context of Guinea, in addition to the contents of the training in Nigeria, especially for the dissemination activities under the stage 3, it is advisable to include teaching how to identify the size of appropriate false bottoms. In addition, if the budget allows, it is advisable for participating local staff to bring the representatives of parboilers from their assigned villages to the training of trainers. If the representatives from their villages fully understand this technology, these parboilers could assist their trainers in

their dissemination activities in their villages. Therefore, the author would like to suggest the revision of the program of 1<sup>st</sup> and 2<sup>nd</sup> days of this training. The proposed program is in Annex 7.

With only the purpose of making false bottom available in the areas, there could be the special training for the local staff under the Ministry of Artisan as well as those under the Ministry of Agriculture. In this training, the participants learn how to identify the size of the appropriate false bottom and making carton prototype of the identified false bottom for the order to the blacksmith. Once they learned, in their localities, they can assist parboilers in obtaining any sizes of false bottoms they want.

#### 3.4 Stage 4: Introduction to the motivated groups/parboilers of villages in areas

In this stage, FBT becomes popular and, generally, the dissemination of the technology between parboilers could easily be conducted. Our study found that parboilers in neighboring villages adopted this technology through the dissemination between parboilers. The author calls it as `peer dissemination<sup>16</sup>`. Probably, in this stage, in a specific area, a cluster of the adopters of FBT exists. This means that the number of potential peer trainers become bigger. Through these potential trainers, this technology is disseminated to other villages. In addition, these clusters have few sizes of false bottoms. One of them might fit the pot of a motivated parboiler in a neighboring area. If so, what this parboiler should do is only borrowing this false bottom and bring it to the same blacksmith as that who fabricated the false bottoms for this cluster, for copying.

In addition, the dissemination of this technology would be a part of the everyday activities of the local staff of relevant ministries. If the local staff has already participated in the 4 day training described in the previous section, he/she can conduct low cost extension session in the villages. Even not, the local staff could make parboilers aware of this technology. In addition, he/she can assist the dissemination activities of the parboilers through the coordination of the tour to nearby cluster. He/she can also link the parboilers or the group of the parboilers to the local financial organizations including microfinance institutions.

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<sup>16</sup> This dissemination system is the same as `Farmer to Farmer extension`.

Through the combination of the peer dissemination and extension activities of the local staff under relevant ministries, this technology would be disseminated into many of the groups/villages.

### 3.5 Popularization of the technology in the groups/villages

Once FBT is disseminated in the specific group/village, some parboilers adopt it and obtain bigger profits, and then many peers would follow. Local staff could assist this peer dissemination activities. Under this stage, it is not necessary to ask all of the parboilers in the particular group/village to adopt this technology. Since parboiling is the economic activity, and, as an entrepreneur, each parboiler should make a decision whether she will adopt FBT. The staff of the government should provide parboilers the option of FBT and assist motivated parboilers in adopting it through fulfilling the five necessary conditions.

Please note that the staging of the dissemination activities is only conceptualized idea. In some places, introduction of FBT (Stage 4) is done through the training under Stage 1 or 2. At the first demonstration in Guinea, which was conducted in November 2018 at Koba, few prototypes of false bottoms were provided to the local parboilers. This means that in the village, the stage comes from 1 to directly 4. After the demonstration, some of the parboilers there adopted FBT<sup>17</sup>. After the second demonstration in Tounifily in March 2019, the parboiling union in Tounifily adopted this technology and almost of all the parboiler also adopted it individually [Kodama Bah, 2020]. This means that in the union of Tounifily, the stage came from 2 to 5. Also, through the peer dissemination, in the specific area, FBT was introduced from the participating groups in the demonstrations in Koba and Tounifily to neighboring parboilers. [Kodama Bah, 2020] This means that in the specific area, the stage comes from 1 or 2 directly to 4.

Several ministries could work for fulfilling the conditions identified in this chapter. Especially, as mentioned in this chapter, on the ground, the Ministry of Agriculture, the Ministry of Women, and the Ministry of Artisan could make various contributions through their local staff. Possible contributions are summarized on Table 4. In addition, it is advisable for these ministries to collaborate with each other in fund raising. They could allocate some from

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<sup>17</sup> See Section 3.1

their budgets, and, since FBT would contribute to the upgrading of the parboiled rice, increase income of rural women, and capacity development of local artisans, each ministry could explain to their development partners on these specific possible contributions of FBT to the development goals of each sector in order to obtain the fund from them.

**Table 4: Possible Roles of the Three Ministries on the Ground**

	Ministry of Women	Ministry of Agriculture	Ministry of Artisan
Awareness of FBT	Explain TFB and its advantages during the meetings of rural women and visits to parboiling villages..		
Understanding FBT and its advantages			
Capability on conducting parboiling with FBT	Conduct training for the parboilers in the specific areas, and assist extension activities among parboiler.		
Accessibility of FBT		Identify the sizes of appropriate false bottoms in the place and link parboilers to the local blacksmiths. Capacity development of local blacksmiths..	
Financial capability on purchase	Explain to parboilers how many batches of parboiling is necessary for recouping the investment for FBT. Link parboilers to local financial institutions.		

## Part II: Theoretical and Practical Training on FBT and its Preparatory Works



#### 4. Development of the training plan

For efficient and effective dissemination of the FBT, well designed plan of the training is necessary. The initial plan should include: **the target area, the place** (city/town) and **the date of the training, number of participants**, the **coverage of the participants** (From which areas/places parboilers should be invited), and **the cost estimate**. Although each decision point is discussed in this chapter independently, many of these decision points depend on the size of the resource to be allocated to this training. For example, if a big amount can be allocated to this training, it can invite many parboilers, many of whom live in the areas very far from the venue. If the resource is restricted, some of the decision points are in the relation of the trade-off. For example, the cost of inviting one parboiler from very far place would be the same as the one of inviting a few parboilers close to the venue of the training. If the organizer has already set the priorities among various parboiling groups in the targeted area, it can easily make the decisions.

If the training is planned by the government, the target area could be identified based on the dissemination plan of FBT. If the training is planned by the specific project, the implementation area of the project would be the targeted area.

The selection criteria on **the place** (city/town) of the training are as follows.

- The parboiling is popular in the place (For the training in the stage 2, the place should be one of the most popular places in the regions. For the training in the stage 3, the place should be one of the most popular places in the area.)
- Access to the place from most of all the other areas in the region/area is relatively easier
- A blacksmith and a driller is in the place or close (In general, a city has a blacksmith and a driller)
- (Preferable) the place has very active union of the parboiling groups

**The date of the training** should be decided taking into account the parboil season in the target area. First, the best time of the training for the highest adoption rate is before the start of the peak parboil season in the area. In Maritime Guinea, peak parboiling season is from December to March. The adoption of FBT, new technology, needs initial investment. In order to recoup

the initial investment, an adopter should conduct parboiling many times. If a parboiler starts a new parboiling season with FBT, she can spend the whole season for recouping the investment cost. However, if she adopts FBT at the very final moment of the peak parboiling season, she cannot recoup the cost in that season. Also usually parboilers do not consider changing the way of parboiling at the very final moment of the season<sup>18</sup>. In our study in 2019, one non-adopter of FBT responded that she did not adopt FBT because she knew it only after the parboiling season. For the easy acquisition of paddy, the training should be conducted sometime after the start of the harvest. It is difficult to find out paddy for the training before the harvest season. Therefore, the best timing is right before the peak parboil season. The training in the early months of the parboiling season still works. It is also advisable to conduct the training in a dry season since the practical session of the training is usually conducted outside of the building.

Although **the number of the participants** depends on the size of the budget for the training and the space of the venue, the maximum number of one group during the practical session is around 15. If four pots are used for the training, the maximum number of the participants is  $15 \times 4 = 60$ . Although more than 60 could be invited, if the number of the participants is bigger, some of the participants could not actively participate in the practices. If the organizer wants to invite more than 60 parboilers, in order for all the parboilers to participate in the practical training, the number of pots should be increased or the number of one practice group should be increased. Although the participation of all the parboilers in practical training is desirable, parboilers can also understand FBT and become capable to conduct parboiling with this technology even through only careful observation of the practice and additional explanation. Parboilers know how to proceed the parboiling and the secret of the FBT is only how to put the false bottom in the pot. If the organizer is not stuck on the involvement of all participants in the practice, it can convene up to 100 parboilers. (The training in Kindia in December 2019 was participated by around 100. Although some of the participants did not actively participate in the practices, most of the participants were satisfied

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<sup>18</sup> As the reason why she did not adopt FBT, one of the parboilers of the group which dispatched the representatives to the demonstration in Tounifily in March 2019 responded 'The demonstration was conducted belatedly'. March is in the final stage of the peak parboiling season.

with the training.)

**The coverage of the participants** also depends on the size of the budget and the priority of the places/groups in the dissemination strategy. If the prioritized places/groups have already been set, the parboilers from these places/groups should first be invited. In addition, if the organizer wants to invite parboilers who must have at least one night stay for the participation, it has to find out the lodgings close to the training venue and check the capacity of these lodgings.

**The cost estimation** should be done simultaneously with the development of the other parts of the training plan. If the budget for the training has already been set, the other parts of the plan should be designed within the budget. For the reference, the initial cost estimate of the demonstration in Tounifily is attached as Annex 8.

The training plan including the cost estimate should be revised when new information comes. For example, the organizer might not be able to know the capacity of the lodging before the visit of the preparation team at the place of the training. Once the capacity of the lodging is found, the number of the participants from a little bit far places could be identified.

## 5. Preparation for the training

The preparation for the training contains many works as follows. Most of the works are to be conducted in the planned training place. For these works, the preparation team should be dispatched to the area.

- ① Identification of the training venue in the place
- ② Development of the list of the participants
- ③ Visit to some parboiling groups/villages in the list
- ④ Visit to the mill close to the venue
- ⑤ Fabrication of the false bottoms
- ⑥ Dispatch of the invitation letter to the participants
- ⑦ Preparation at the training venue

In this chapter, specific activities of each work are described.

### 5.1 Identification of the training venue

Once the place of the training is selected, first, the preparation team should go to this place and select the venue of the training. The selection criteria are

as follows.

- ① Existence of enough open space for the practical training  
For the comparison, parboiling is conducted with three or four parboiling pots simultaneously. Since one pot is practiced by a group of 10 – 15 parboilers, 10 m<sup>2</sup> is necessary for one pot. The place for the parboiling should not be paved since parboiling needs fire. The space for other works such as washing and drying is also necessary.
- ② Existence of a source of the water nearby  
The parboiling process, especially washing, needs much water. It is better to have a water source in or close to the training venue.
- ③ Existence of big trees which makes a shadow or an indoor meeting space  
Since the training is conducted during the dry season and it starts at 10:00 and ends at around 16:00, the participants should be kept under the shadow.
- ④ Existence of the parboiling group around the venue  
Since the practical training traces all the process of the parboiling, the organizer needs the various kinds of parboiling equipment and assistance by the parboilers. Therefore, the participation by local parboiling group members (around 8) is necessary. It is better to work with a parboiling group which show an interest in the FF technology. For the training, the false bottoms good for their pots are fabricated and after the training these false bottoms are provided to the group. These false bottoms would be often used if the group has an interest.
- ⑤ Existence of the lodgings around the venue  
Lodgings should be found out for the participants who need to stay night for the participation.

In the year 2018 and 2019, three demonstrations/training were conducted. Table 5 shows how the selected venues fit the conditions above.

**Table 5: Comparison of the Appropriateness as the Venue of the Demonstration among Three Venues**

Place of the demonstrations/training		Agricultural Research Station at Koba	Parboiling Centre of the Union of the Parboiling Groups in Tounifily	Training Centre of ANPROCA at Bamban
Month		Nov-18	Mar-19	Dec-19
①	Existence of enough open space for the practical training	The station had a big (more than 400m <sup>2</sup> ) open space.	There was a big (more than 400m <sup>2</sup> ) open space next to the centre.	The centre had a big (more than 400m <sup>2</sup> ) outdoor parking space.
②	Existence of a source of the water nearby	The water was brought from the well around 100 m far from the site.	The water was brought from the well within the centre.	The water was brought from the well within the centre.
③	Existence of big trees which makes shadow or an indoor meeting space	The open space had a big mango tree.	The open space had a big mango tree.	In addition to the open space, there was one big space under the roof.

## 5.2 Development of the list of the participating groups/villages

Within the available budget, based on the information from local authorities, Federation of Enterprises on Rice, and other relevant players such as donor projects and NGOs, the list of the participating groups/villages is drafted. If the training is conducted during the extension stage 2, the team should select the active groups in the selected training area<sup>19</sup> and if the budget still allows, the most active groups in other parboiling area are invited.

## 5.3 The visit to some parboiling group/village

In addition to the visit to the parboiling group who will assist the practical training, it is advisable, prior to the training, to visit as many participating groups/villages as possible, especially those around the training venue. If some highly prioritized groups are far from the training place, the organizer should consider the dispatch of other teams to these villages. The purposes of the visit includes the confirmation of the interest in the technology,

<sup>19</sup> As suggested in the section 3.2, it is better to invite several groups in one active parboiling union.

identification of proper sizes of the false bottoms for their parboiling pots, and obtaining the information on their parboiling. The visiting team should have someone who knows FBT.

During the visit, the team conducts following works. These works need around 2 hours in one place.

- ① Explanation of FBT to the parboilers;
- ② Confirmation on the interest of the parboilers in the technology;
- ③ Interview with the parboiling group leader and individual parboilers; and
- ④ Identification of the appropriate sizes of the false bottoms.

First, **FBT and its advantages should be well explained**. The explanation on the technology can be done with the leaflet No. 1. If available, show a false bottom and rice parboiled with FBT to the parboilers.

During the explanation of the advantages of this technology, the outcomes of the previous trainings, some of them are described in the report of our study in 2019, should also be referred. If the group has an improved drum, share the information on other groups who use both FBT and improved drums, and explain the reasons why they use both. After the explanation, **confirm the interest in this technology**. If the parboilers show the interest, verbally invite this group to the training. If not, no need to invite it. Since sometimes the mobile network in rural area does not work well, when inviting to the training, the team should inform the group of the venue, date, and starting time, and the number of parboilers to be invited from this group. From the same group, at least two parboilers should be invited<sup>20</sup>. The team can let the group decide by itself who will attend the training. However, the team should confirm the contact of the group for future communication.

Once their interest is confirmed, the **interview is conducted**. Questions are for the parboiling activities of the group (Questionnaire is attached as Annex 9), individual parboilers (Questionnaire is attached as Annex 10) if they also parboil individually, and their traditional parboiling practice (Questionnaire is attached as Annex 11.). Through the interview on group parboiling activities, the organizer can see a couple of important information. First, it

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<sup>20</sup> If only one parboiler is invited, after the training, the dissemination activities of the FBT solely depends on her. If she is not interested, even most of the group member might be interested, this technology will not be introduced to this group.

can see whether the group conducts group parboiling activities. If they conduct as the group, once the group adopt FBT, all of the group members can get the benefit. Second, it can see the frequency of the parboiling activities. If the group parboils rice frequently, it can shortly recoup the investment for FBT. Third, the organizer can know about the clients. If any of the clients want better quality rice, the group would be more motivated to adopt FBT. Fourth, the organizer can see the price difference according to the quality. If there are in the area, the rice with FBT could be sold with the higher price. Finally, the organizer can see the value chain of rice in the area. If the parboilers are the one who sell their products to rice buyers, they are the decision makers on the adoption of FBT. If the parboilers are only requested to parboil from someone else and these people sell parboiled rice to the rice buyers, they are the decision makers. The team should also explain FBT to them. In addition, it should also be found whether parboilers in the group also parboil individually. If so, through the participation of the group in the training, the FBT could also be adopted by individual parboilers. Obtained information can be used for the selection of interviewed groups/villages under the monitoring, which will be discussed in Chapter 7. Through the interview on their traditional parboiling, possible suggestions for the improvements in their parboiling process can be found.

During the visit to the group, **identification of the appropriate sizes of the false bottoms** should also be conducted. For this work, it is advisable to bring one from each available size. First, ask parboilers to show the prevailing parboiling pots in the village. Then, ask them to pour the same amount of water as used for parboiling. The height of the false bottom should be 2 cm higher than the water level. Then, measure the diameter on this height of the pot. However, sometimes, parboilers do not know how many liter of water they use for parboiling. In this case, for the drum or the maize type pot, it is advisable to set the height of the false bottom as 1/5 of the height of the pot<sup>21</sup>. If the identified size corresponds to the size of an existing sand casted FB or a metal tray sold at the markets in the area, this existing false bottom or tray

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<sup>21</sup> From the experience of the expert, usually, 1/5 is too high. However, if the false bottom is set lower than the appropriate height, during the parboiling, the water could be boiled up and the pot could be burned. In order to avoid this accident, we should take safer side. After the first parboiling with the false bottom, the parboiler can see the amount of water remaining. For the next parboiling, she can reduce this amount and make the false bottom lower.

can be used. If not, the team has to create the paper or wooden prototype. The procedure of the identification of the size of appropriate false bottom is shown on Table 6, and ways of identification is illustrated on the leaflet 3 in the Annex 18.

When identifying the size of the appropriate false bottom, the team can also measure other parts of the parboiling pot. Once the information on the sizes of the pots and the appropriate false bottoms is accumulated, the size of appropriate false bottom might be able to find only through measuring some parts of the pot. Table 7 and 8 show sizes of prevailing pots in some villages of Koba and Tounifily. The names of the parts described in these tables are shown on the pictures on Figure 10.

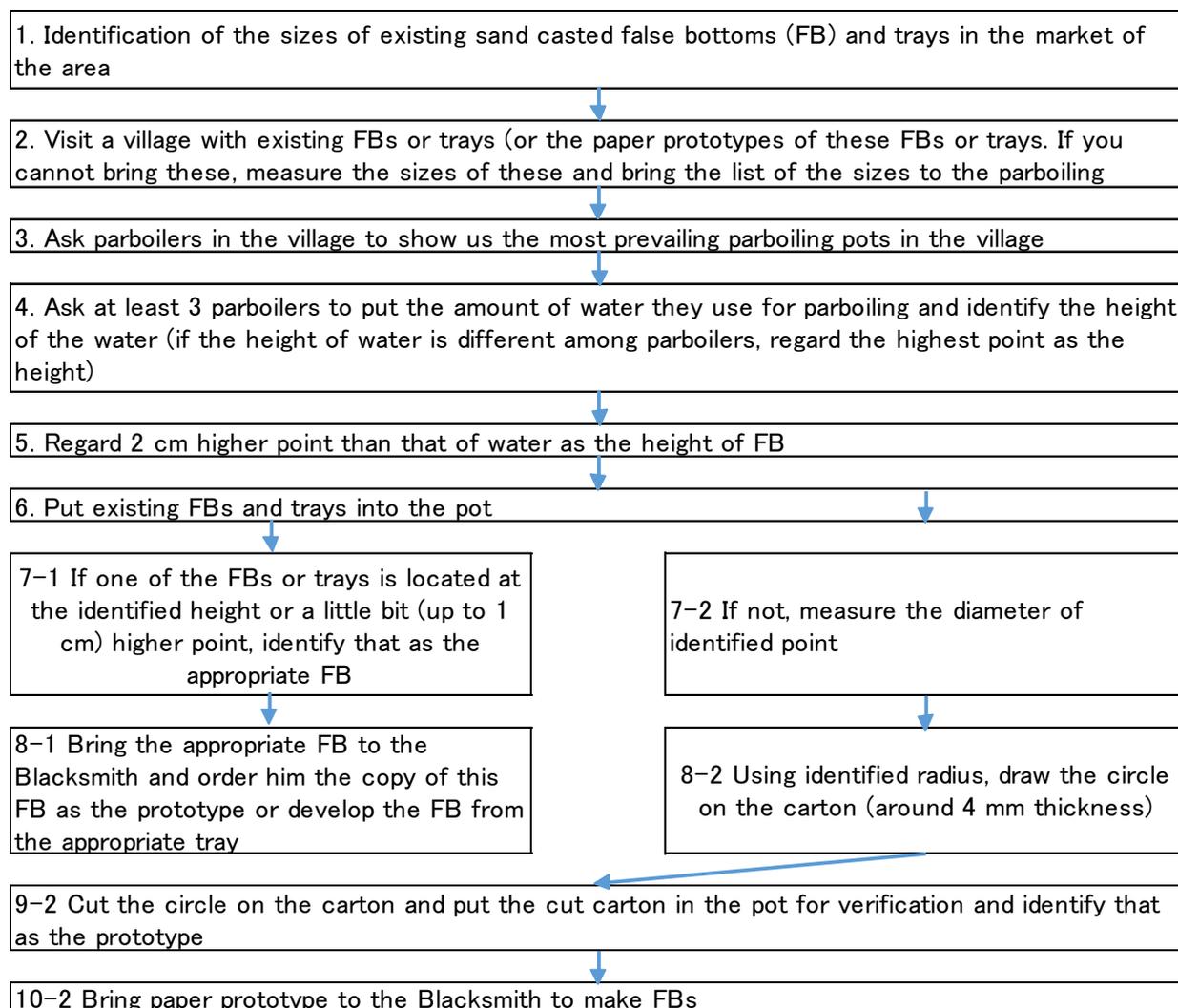
#### 5.4 Visit to the mill close to the venue

After the identification of the training place, the team should find out the mill which will mill the rice parboiled in the training. In the case of 3 day training, the milled rice should be given to the participants on the final day. Therefore, the rice should be milled immediately after the finish of the drying. First, check whether the milling machine works. Then, check whether it has a generator. If it has, even if the electricity network is down, it can operate the milling machine with the generator. In addition, in order to check the situation of the mill in the area, interview the miller. Through this interview, the type of the milling machine, peak season, and the business model of the miller can be found (Please see the questionnaire to a miller in Annex 12.).

#### 5.5 Fabrication of the false bottoms

Once the diameter of appropriate false bottom is identified, the fabrication on the prototype of the false bottom should be started. If the diameter of a tray in the market corresponds to the identified diameter, this tray can be used as the prototype. Ask a local artisan to perforate the tray. The ways of making the false bottom from a tray in the market is illustrated on the leaflet 7 in Annex 18.

**Table 6: Procedure for Identification of the Size of Appropriate False Bottom and Ordering the Blacksmith the Copying of the Prototype**



Remark: If the blacksmith has a large compass and the enumerator has experience on the identification of the sizes of appropriate false bottoms, he can omit 8-2 and 9-2, and inform the blacksmith of the diameter of the false bottom.

**Table 7: Sizes of Maize Type Pot in some parboiling villages**

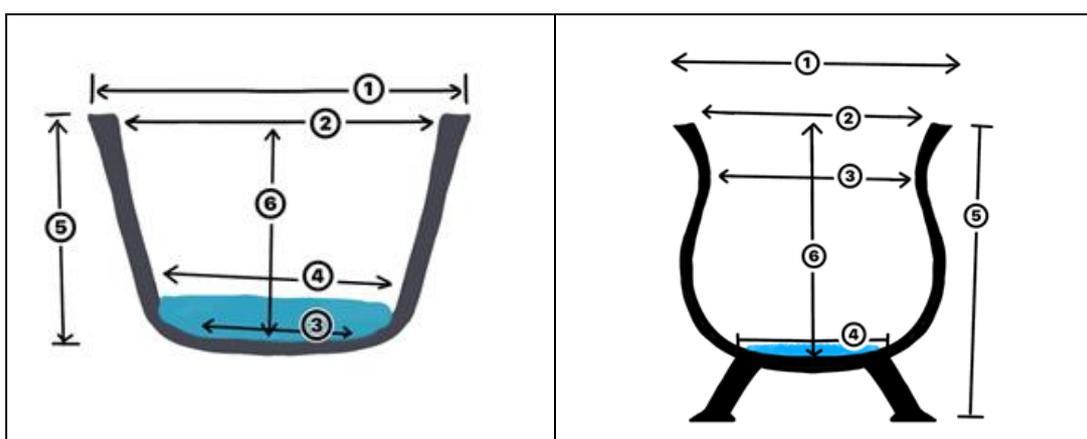
Unit: cm

		Tounifily				Koba			
		Kifinda	Mintani	Monchon	Djogoya	Katep	Katia	Kassangbeya	
Diameter	Top	①Outside	62	66	61.5	61.5	62.5	63.5	63.5
		②Inside	60.7	64.5	60.5	60.5	61	62	62
	③Bottom	52			51	53.5	54	52	
	④Water height		49	43.4	46	47.5	37	43	
	Water height + 2cm	49	52.6		48	51	46	45.5	
	False Bottom	49.5	52.6	49	50	51	50.5	46	
	Height								
	⑤Outside	33	35	33.5	33	34	34	33	
	⑥Inside	32.5		31	32	34.5	33.5	32.5	

**Table 8: Sizes of Marmites (Canary Type) in some parboiling villages**

Unit: cm

		Tounifily				Koba			
		Kifinda	Mintani	Monchon	Djogoya	Katep	Katia	Kassangbeya	
Diameter	Top	①Outside		51	49	54.5	56	55.5	57
		②Inside	54.5	50	48	53	54.7	54.9	55.5
	③Neck	50.2	46	45	49	49.5	50	50	
	④Water height		40		43	43	37	41	
	Water height +	44	43	42	46	46.5	41.5	44	
	False Bottom	44	42	42	46	46	46	44	
	Height								
	⑤Outside	60	57	45	62	57.5	58	64	
	⑥Inside			38	47	46	47	57	



**Figure 10: Sizes of parts of Maize Type Pot (Right) and Canary Type Pot (Left) (Figures in these pictures corresponds those in the Table 7 and 8)**

However, in order to make the local blacksmith capable to fabricate the false bottom, it is advisable to ask him to make one sand casted FB. If the preparation team has enough time and budget, even the tray in the market can be used, ask the blacksmith to make one. If one of the existing false bottoms fits the pot, the team can use this false bottom as the prototype. Ask the blacksmith to copy this false bottom. If not, a false bottom should be fabricated from the paper or wooden prototype. If the blacksmith has a compass and he is capable to fabricate the circular board only with the information of the diameter, inform him of the diameter. If not, make a prototype with a cardboard or wooden board, and give it to the Blacksmith. In addition, check with the Blacksmith if he can find the artisan who can perforate the sand casted circular board with an electric drill. If not, find the artisan and ask him to conduct the perforation.

#### 5.6 Dispatch of the invitation letter to the participants

Even if the participants have been verbally invited to the training, the invitation letters should be sent to them.

#### 5.7 Preparation at the training venue

Preparation to the training at the venue needs some time. First, the preparation for the hosting the training is necessary. This includes the booking of the lodging and necessary number of the chairs. Second, the preparation for the practical session should also be conducted. In the practical session, participants conduct parboiling. Therefore, the preparation for parboiling practice (for 3 or 4 pots) is necessary. Although a checking list of the preparation is attached as Annex 13 the list should be customized for each training.

### 6. Training

Originally, the training was conducted for 3 days. (The program of the 3 day training is attached in Annex 14.) The 3 days training follows the process of parboiling.

In the evening of the first day, the training starts from winnowing, and then, goes to washing and soaking. From the experience of the author in Guinea, the quality of paddy is not good. It has many impurities such as straws, chaff, soil, and small stones. Through thorough winnowing and washing, these impurities should be removed. Our study revealed that one group adopted

only washing method taught in the demonstration and found that through only this improvement the quality of their parboiled rice became much better. [Kodama Bah, 2020] Although the recommended washing and soaking methods are described in the leaflet 3 and Section 3. 2 in ‘A Guideline for RIPMAPP Technology Dissemination [RIPMAPP, 2016] (French translated Chapters 2 and 3 of this guideline are attached as Annex 1) in detail, the author has one additional recommendation that the trainer should have a thermometer in the training. Before soaking, the container for the soaking should be heated up to 75°C. However, parboilers do not have any thermometers. Therefore, the author recommends that the trainers should procure a thermometer for cooking<sup>22</sup>, bring it to the place of the training and measure the temperature of the water through putting the thermometer in the water. When the water becomes 75 °C, the trainer makes participants put their fingers in the water and sense this temperature. Since it is expected that several trainers conduct trainings and show appropriate temperature of the water to the participants, with the thermometers, they can show the participating parboilers exact the same temperature.

The second day is the main of the training. Prior to the official opening of the training, in early morning, soaking should be terminated. Since the soaking in the training starts around 18.00 of the first day, and recommended duration of the soaking is 8.00 hours, the soaking should be terminated as soon as possible. The soaked paddy should be taken from the container. However, the practice of the steaming in the training is usually conducted around 11:00. In order to avoid the dry up of the paddy, it should be moved to another container filled with cold water.

After the official start of the second day, the training is conducted. The model procedure of the training is shown on Figure 11. The training includes the first theory session, the practical session and the second theory session. The first theory session is the introduction on FBT. The trainer should explain FBT and its advantages. Sample parboiled rice would attract participants. In the practical session, the participating parboilers should be divided into the groups. Maximum number of one group is 15. Although each group conducts

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<sup>22</sup> A digital thermometer for cooking is accurate but not expensive.

### Figure 11: Procedure of the one day training

10:00: Opening and theory session

1. Introduce the technology (distribution of the parboiled rice)
2. Explain the detail: How the false bottom (FB) and the cover work? (with Leaflet 1)
3. Introduce three types of FBs (sand casted aluminum, trays, and faux grains) (Comparison of these three is on Table 1 of this manual.)
4. Explain the amount of the water (Explanation is on Leaflet 4)
5. Show how to set FBs (explanation with equipment.)
6. Identify time keeper for each pot (time of start, time of start boiling, time of stop)

11:30: Practical session (Parboiler are into groups. 15 are maximum of the group)

7. Start steaming (4 pots – traditional, FB, faux grains (Leaflet 12), and passoire<sup>23</sup>). During the setup, explain the advantages of FB over the passoire (Explanation is on Leaflet 13).
8. Upon steaming<sup>24</sup>, start drying, each treatment should be dried separately, (FB and traditional – separate into top, middle, and bottom)
9. See the amount of remaining water in the pot and explain that the parboiler can adjust the amount of water from the second trial.

13:30: Lunch break (Interview with groups)

14:30: Second theory session

10. Explain advantages of FBT (Leaflet 2) and recommended practices in the whole process parboiling process with Leaflet 3.
11. Explain how to fabricate FB and various FB (Leaflets 5 – 11, and 14)
12. Explain the cost and benefit of the parboiling with FB and calculate times of parboiling in order to recover the cost of FB (See Annex 3). If any, introduce local microfinance institutes.
13. Introduce the local blacksmith
14. Share success stories of the parboilers who adopted the FBT
15. Q and A
16. Listen to the voices of the participants
17. Explain the next day

15:30: Close of the training

18. Pay travel expenses of participants
19. Pack dried parboiled rice and distribute it to the participants from outside of the town
20. Conduct the special session with extension agents

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<sup>23</sup> If passoire is not used in the area of the training, instead, the pot is parboiled with another kind of FB.

<sup>24</sup> Timing of the end of steaming should be decided by local parboilers.

It is advisable to measure the time taken for parboiling. Since theoretically the time taken for parboiling with FBT is shorter than that with traditional method, participants can understand the advantage of FBT that steaming needs less time. Once the steaming is done, each group dries rice. It should be noted that the timing of the end of the steaming depends on the parboiling areas. Therefore, it is advisable to let local parboilers decide the ending time.

After the lunch, the second theory session starts. Under this session, the tips of FBT such as the size of the holes on the false bottom should be explained. The various types of false bottoms should also be presented. Once participants understand FBT and they feel that 'I can do it!', the recouping model of the investment for this technology should be explained. It is also advisable, if any, to ask one of the FBT adopters to participate in the training and share her success story with the participants. Knowing the success story of their peers, participants would be more motivated.

On the third day, once the parboiled paddy has dried and become cool, the paddy is brought to the local miller. The paddy should be milled the treatment by treatment. If a weight scale is available, check the weights of the paddy and milled rice, and get the milling recovery rates of the parboiled paddy with FBT and traditional method. Milled rice is brought back to the training venue and shown to the participants. Parboilers are requested to evaluate the quality of each milled rice. Their views should be explained with the reasons.

During the 3 day training, participants can practice all the process of parboiling from the washing to the milling, and they can see the quality of the milled rice parboiled by themselves. However, if many parboilers from outside of the place of the training are invited, the 3 day training would cost a lot. Therefore, the program of the one day training was created. (The program of the 1 day training is attached in Annex 15.) Since the parboiling process lasts 3 days, the trainers should be in the training venue with the host group for three days. However, the other participants are invited to only the second day. 1 day training has two possible limitations. Firstly, participants from outside of the area of the training might not understand suggested washing or soaking practices because they do not practice or watch these practices. In order to solve this problem, the explanation on suggested practices is conducted during the training with the leaflet and stress the importance of these practices. Second, they might not realize the good quality

of rice parboiled with FBT since they do not participate in the milling. In order to solve this problem, in the late afternoon of the training day, dried paddy should be packed and given to the participants. After coming back to their villages, they can mill given paddy and find the quality. Since one day is very short, the trainer should proceed the training efficiently. If the leaflets in the Annex 18 can be posted on a wall, participants can also discuss on FBT during the break (Please see the photo on Figure 12.).



**Figure 12: Participants Looking at the Leaflets during the Lunch Break**

## 7. Monitoring

In order to find the outcomes of the trainings and find better dissemination methods of FBT, it is advisable to monitor the outcomes of the training. The peak parboiling season continues until March or April, and, during the peak season, in a parboiling group/village, the number of adopters on this technology would gradually increase. The study in Nigeria revealed that in some parboiling groups, some parboilers adopted this technology first and then other parboilers followed. [Nasamu, Evaluation of Improved Parboiling Technology Dissemination, 2018a] Therefore, if possible, the monitoring should be conducted periodically, and the season-end monitoring should be conducted in May or later.

From selected participating parboiling groups, at least following information should be obtained.

- ① If the group adopted the FBT;
- ② How many individual parboilers adopted this technology;
- ③ How much the price of rice with this technology is higher than prevailing parboiled rice; and
- ④ For what the group/parboilers use their additional profits.

If the enumerator has time and capacity, he can also obtain the qualitative information such as the reasons why some parboilers did not adopt this technology. These information could improve the dissemination methods of this technology. Face to face interview is better. However, if there is the

limitation on the budget and the number of enumerators, the telephone interviews can be conducted <sup>25</sup>. The questionnaires for the face-to-face interview and the telephone interview are attached as Annexes 16 and 17, respectively. The results of the season-end monitoring should be analyzed for the possible improvements of the dissemination methods.

FBT was developed in Nigeria. During the dissemination activities in Nigeria, the feedbacks from the parboilers have been collected and, based on these feedbacks, the technology and dissemination methods have been improved. In Guinea, feedbacks have been used for the improvements. The author wish that, through the dissemination activities and monitoring, this technology reach to as many parboilers as possible in Guinea and the dissemination methods be further improved.

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<sup>25</sup> The study on the outcomes of the demonstrations conducted in Koba in November 2018 and Tounifily in March 2019 was conducted as the combination of the face-to-face interview and the telephone interview.

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## Annex

Annex 1: Chapter 2 and 3 of a Guideline for RIPMAPP Technology Dissemination

Annex 2: Experiment on the comparison of JICA improved parboiling technology and traditional method

Annex 3: How to Make and Explain Parboiler-Friendly Recouping Model of the Initial Investment to the False Bottom Technology (Instruction to the trainer)

Annex 4: Model Slide Presentation of FBT

Annex 5: Guideline for Training of Trainers for Low Cost Extension Session (70 min. on site session) of the Improved Parboiling Technology

Annex 6: Guideline for Low Cost Extension Session (70 min. on site session) of the Improved Parboiling Technology

Annex 7: Program of the Training of Trainers for Low Cost Extension Session (70 min. on site session) of the Improved Parboiling Technology

Annex 8: Initial Cost Estimate of the Demonstration in Tounifily

Annex 9: Questionnaire to Leaders de Group

Annex 10: Questionnaire to Individual Parboilers

Annex 11: Questionnaire on Traditionnal Parboiling

Annex 12: Questions to a Miller

Annex 13: The Checking List of the Preparation for the Training at the Venue

Annex 14 Agenda of the 3 days Training on False Bottom Technology

Annex 15: Program of the 1 day Training on False Bottom Technology

Annex 16: Questionnaire for face à face Interview

Annex 17: Questionnaire on telephone interview

Annex 18: Technical Leaflets

