

Institute of Food Research and Product
Development, Kasetsart University

Summary Report

Thailand

Verification Survey with the Private Sector
for Disseminating Japanese Technologies
for
the Indica based
Low-Protein Processing Rice

August, 2017

Japan International Cooperation Agency

Forica Foods Co., Ltd

1. BACKGROUND

In Thailand, the rice production reached 20.20 million tons and the domestic rice consumption reached 10.60 million tons in 2013 and so the rice is an influential export item. In addition, the rice was the largest export item in the agriculture products of Thailand, and Thailand became the first rice exporting country in the world in 2014. On the other hand, the international price of Thai rice peaked in 2008 and its trend is downward. This situation has stimulated concern over a decline in international competitiveness of Thai rice.

In these circumstances, the government of Thailand regards the enhancement of competitiveness of rice and rice-related industry as the policy challenge. It regards both development of new rice varieties and development of the new processing technology to introduce the value-added products to a market as the countermeasures.

The low-protein processing method is the unique and useful technology for the rice-based food processing industry to develop and introduce the value-added products to the potential market in Thailand. This is because the market for the product based upon this technology might be chronic kidney disease (hereinafter referred to as “CKD”) patients and the number of CKD patients is increasing rapidly in Thailand. This survey is to conduct based upon the request from Institute of Food Research and Product Development, Kasetsart University (hereinafter referred to as “IFRPD”) based upon the background above.

2. OUTLINE OF THE PILOT SURVEY FOR DISSEMINATING SME’S TECHNOLOGIES

(1) Purpose

1. To establish a production environment that initiates research and development on the low-protein processing rice used by the Thai Indica rice as the raw material by installing the product used for producing the low-protein processing rice (hereinafter referred to as “Product”) at IFRPD.
2. To build a foundation that leads to continuous Research and Development on the low-protein processing rice at IFRPD transferred by the technology of low-protein processing method from Forica Foods Co., Ltd (hereinafter referred to as “FFK”) and producing an low-protein processing rice which fits Thai’s palatability.
3. To develop a dissemination and deployment plan conducted by FFK after the Survey based upon the study on the appropriate purchasing model of the low-protein processing rice and the results from seminars about the diet therapy to CKD’s patients utilized by the low-protein processing rice.

(2) Activities

1. Preparation Activities

- To place the order to the Japanese manufacturer for the Product for the pilot production of the low-protein processing rice and install the Product at the site of IFRPD.
- To prepare the manual of operation and maintenance for the Product.
- To export the enzyme to Thailand.

2. Demonstration Activities

- To transfer the technology of low-protein processing method to research staffs of IFRPD.
- To produce the samples of Indica-based low-protein processing rice utilizing the Product at IFRPD.
- To provide the samples of Indica-based low-protein processing rice to medical personnel and acquire feedbacks in terms of Thai's palatability.
- To process the Indica-based low-protein processing rice improved to fit Thai's palatability based on the result of the feedbacks.
- To provide the additional trainings to research staffs of IFRPD on the low-protein processing method.
- To support IFRPD to build a foundation that leads to continuous research and development on the low-protein processing rice at IFRPD.

3. Dissemination Activities

- To investigate the laws and regulations and current trends and issues of CKD in Thailand.
- To investigate the laws and regulations on the functional food such as FDA permitting in Thailand.
- To hold seminars about the low-protein diet therapy for CKD patients to medical personnel.
- To investigate the local enterprises as candidates for the joint-venture with FFK.
- To consider the appropriate model of purchase of the low-protein processing rice for CKD patients in Thailand.
- To formulate the dissemination plan on the low-protein diet therapy for CKD patients in Thailand.

(3) Information of Product/ Technology to be Provided

Technology:

Low-protein processing technology utilizing the enzyme, which has high affinity with Indica rice for low-protein processing

Product:

(1) Dipping tank

The tank as the dipping treatment apparatus for dipping the rice into the enzyme

(2) Food Steamer

The steamer as the heating cooking apparatus for cooking the enzyme dipped rice

(3) Refrigerator

The cooling apparatus for processing of aging starch and making the cooked rice single-grained

(4) Heating cabinet

The heating apparatus for drying out the single-grained rice

(4) Counterpart Organization

Japanese Side: Forica Foods Co., Ltd. (FFK)

Thailand Side: Institute of Food Research and Product Development, Kasetsart University (IFRPD)

(5) Target Area and Beneficiaries

Target Area : Rice-oriented food processing industry and CKD patients and medical personnel in Thailand

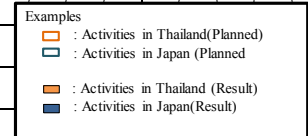
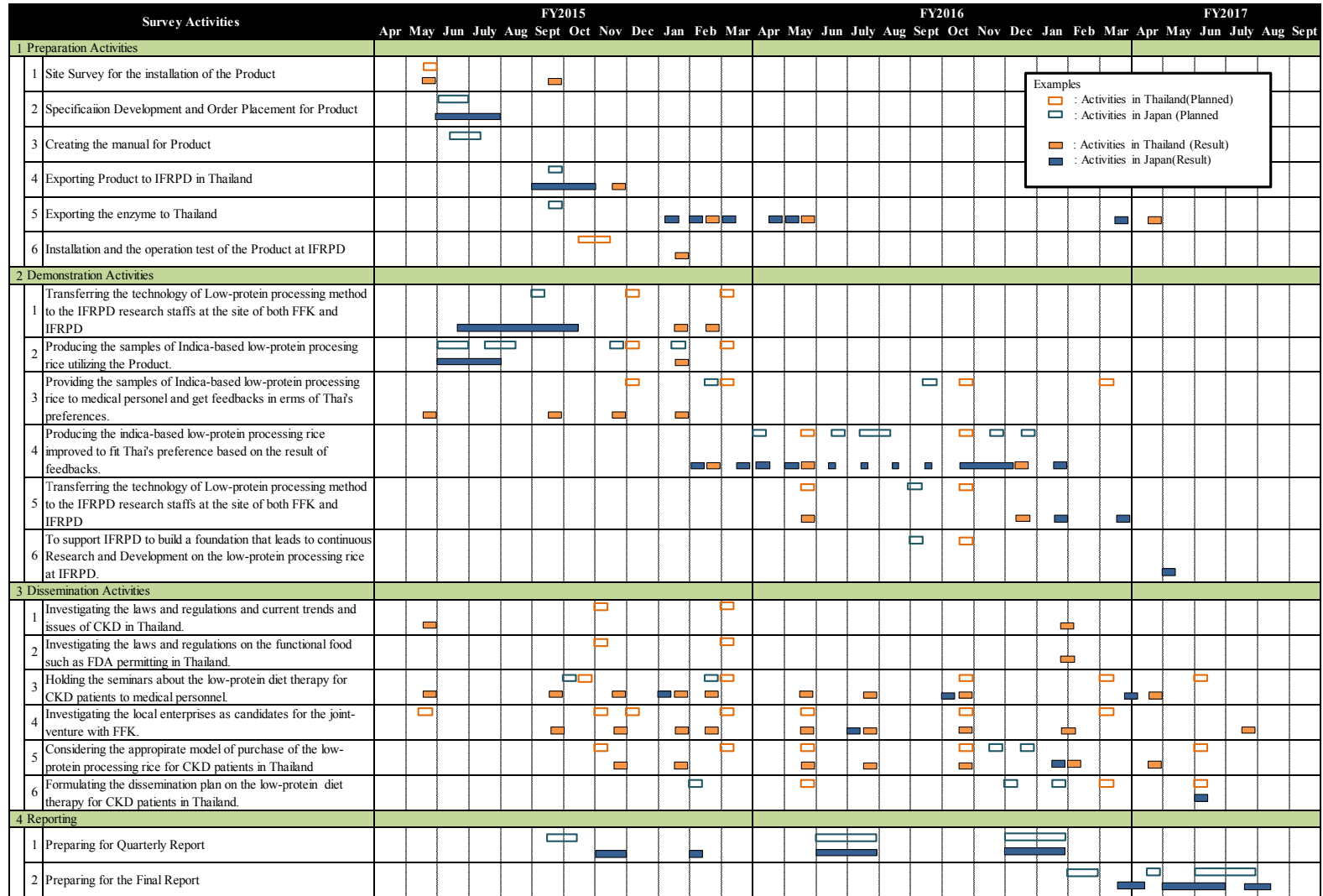
Beneficiaries : SMEs in the rice-oriented food processing sector and CKD patients in Thailand

(6) Duration

2 years 6 months from the day of the signing of the contract between FFK and JICA.

The exact duration period shall be shared through the Implementation Plan which will be presented to IFRPD at the beginning of the Survey

(7) Progress Schedule



(8) Manning Schedule

Schedule 1 May, 2015 – Aug. 2016

Task	Name	Organization	Year Plan/Result	FY2015												FY2016																																					
				Month	May			June			July			Aug.			Sept.			Oct.			Nov.			Dec.			Jan.			Feb.			Mar.			Apr.			May			June			July			Aug.			
				Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
				Reporting																																																	
Project Manager	Shigeru Beppu	Forica Foods. Co., Ltd	Plan			4	7			1			1			1			6			4	14		1	7	1			1			6	7	6			4			7	1		1			1			1			
			Result			6			2			2			2			4	5			4			4	3		4			5	7			4	4			4			3			6	2		2	2	5	2		
Production/Technology	Naoki Nakajo	Forica Foods. Co., Ltd	Plan			7			10			5			5			5						5			7			5										5						5			5			5	
			Result			5			5			5			5			3													3	5			2	4									6				1				5
Productin Equipment	Masatoshi Sato	Forica Foods. Co., Ltd	Plan			7			15						5								14																														
			Result			5			5			4			5			5			3										1			4	5			2															
Technoloy Development	Michinobu Takei	Forica Foods. Co., Ltd	Plan					5			10			5			10						14	5		7			5			5			5			7			5			7		5		5		5		5	
			Result					5			10			5			10			3						5	3		3			5	8		5	4		5			5			6	3		3		2		3		3
Quality Control	Naoki Watanabe	Forica Foods. Co., Ltd	Plan					5			5			10								5			7			5									7			5			7		5		5		5		5		
			Result					2			5			5			10																				2					5			7		5		5		5		5
Chief Adviser	Katsuharu Takatsu	SIB Consulting	Plan			1	7			4			5			1			9			6	14		1	7	1		3			7			7	3			10			7	2		3		4		1		1		
			Result			7			5			3			2			4	3			4			4	6	4		6		4	8		6	4		4			4			4		6	4		6		4	5		2
Medical Education	Shaw Watanabe	Life Science Association, a Public Interest Incorporated Association	Plan																																																		
			Result																																																		
Medical Market Development	Akira Watari	Banpoh Trading Co., Ltd.	Plan																																																		
			Result																																																		

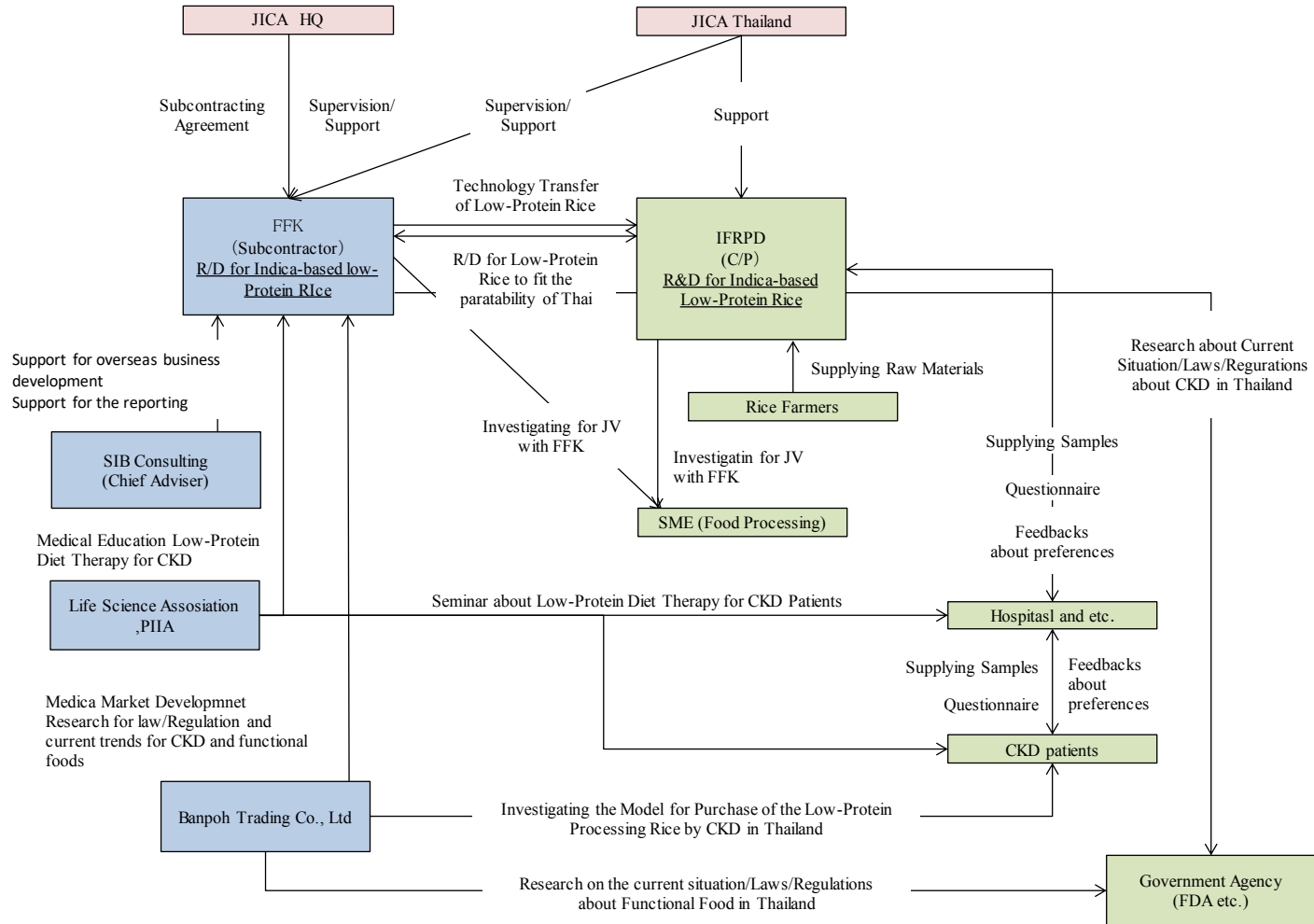
Example:
7 : Number of Working Day in Thailand
3 : Number of Working Day in Japan

Schedule 2: Sept 2016 – Oct. 2017

Task	Name	Organization	Plan/Result	FY2016												FY2017												Total																				
				Month	Sept.			Oct.			Nov.			Dec.			Jan.			Feb.			Mar.			Apr.			May			June			July			Aug.			Sept.			Oct.			Thai	Jan
				Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
				Reporting													Creating the Final Report																															
Project Manager	Shigeru Beppu	Forica Foods. Co., Ltd	Plan			6		4	7		11		11		6		4		7	1		6		6		7	1		11		1		1		1		63	110										
			Result		2		3	11		4		5		5	2	3	3		2		4	8		3		2		2	5								65	79										
Production/Technology	Naoki Nakajo	Forica Foods. Co., Ltd	Plan		5																															14	60											
			Result							1	2	6																										26	27									
Productin Equipment	Masatoshi Sato	Forica Foods. Co., Ltd	Plan																																		21	20										
			Result																																			10	29									
Technology Development	Michinobu Takei	Forica Foods. Co., Ltd	Plan		10		10	7	5		10																										42	100										
			Result		1		2		10	7	6		2				8		4																			24	104									
Quality Control	Naoki Watanabe	Forica Foods. Co., Ltd	Plan		10			7																													28	60										
			Result				2		5	3	6		2			8																						6	30									
Chief Adviser	Katsuharu Takatsu	SIB Consulting	Plan		10		3	7		9		9		10		10		7	5		10		10		7	3		3		3		3		1		63	150											
			Result		2		3	7		3		6		4	2	3	3		4		3	8		5		4		2	5								63	102										
Medical Education	Shaw Watanabe	Life Science Association, a Public Interest Incorporated Association	Plan				2	5							2		5				2							2								25	22											
			Result				8	4									2				2		7	8													16	25										
Medical Market Development	Akira Watari	Banpoh Trading Co., Ltd.	Plan				3				5		5		3							4					2									28	28											
			Result																																			4	1									

Exmample:
7 : Number of Working Day in Thailand
3 : Number of Working Day in Japan

(9) Implementation System



3. ACHIEVEMENT OF THE SURVEY

(1) Outputs and Outcomes of the Survey

a. Development of the Low-protein Rice with the Indica rice as raw material

The following is the production processes of low-protein processing rice.

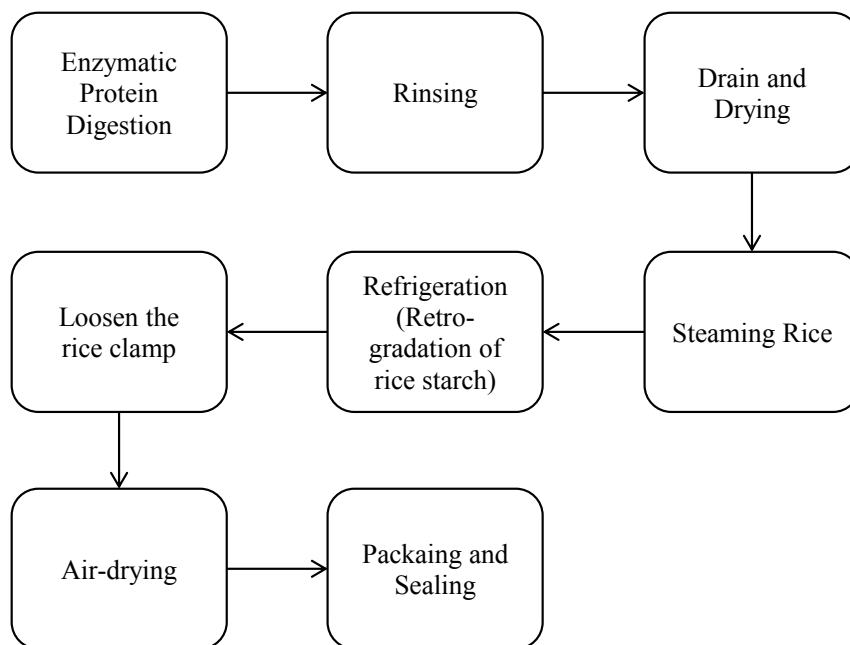







Figure 1: Production Processes of Low-Protein Processing Rice

The following is the summary of the activities of FFK and IFPRD for the development of low protein processing rice with Indica rice as a raw material.

Table 1: Activities Summary for the Development of low protein processing rice

No.	Period	Activities
1	Sept. 27, 2015 – Oct. 3, 2015	<p><u>Production Training of low protein processing rice at FFK</u></p> <ul style="list-style-type: none"> Transferring the basic processing technology of low protein rice to IFPRD at the site of FFK research institute 
2	Oct. 2015 –	<u>Preparation of the importing/ installing the equipment for the</u>

	Jan. 2016	<u>trial production of low protein processing rice</u> <ul style="list-style-type: none"> Finalizing lay-out of the equipment at IFPRD Tax exemption application
3	Jan.25, 2016 – Jan. 29, 2016	<u>Installation of the equipment and 1st trial production</u> <ul style="list-style-type: none"> Installation of the equipment Operation check of the equipment Trial production of low-protein processing rice 
4	Feb., 2016	<u>Variety Selection of Indica Rice</u> <ul style="list-style-type: none"> Select the variety of Indica rice suitable to the raw materials of low protein processing rice
5	Feb. 24, 2016 – Feb. 25,2016	<u>2nd trail production</u> <ul style="list-style-type: none"> Trail production using the 15 varieties of Indica rice selected by IFPRD 
6	Mar.,2016 – May 2016	<u>Research for the suitable processing conditions</u> <ul style="list-style-type: none"> Activities to find out the suitable processing conditions (focusing on steaming condition)
7	May 17,2016- May20, 2016	<u>3rd trial Production</u> <ul style="list-style-type: none"> Decided the variety of Indica rice for the trail production among the 15 varieties selected by IFPRD

		
8	June 2016 – Nov. 2016	<u>Research for the suitable processing conditions</u> <ul style="list-style-type: none"> • <u>Activities to find out the suitable processing conditions (focusing on Enzymatic protein digestion, drying and steaming)</u>
9	Dec. 13,2016- Dec.16,2016	<u>4th trail production</u> <ul style="list-style-type: none"> • Establishment of all processing conditions of low protein rice for the observation study of the diet therapy at Bhumibol Adulyadej Hospital 
10	Jan 2017 - Current	<u>Optimization of the processing conditions of Low protein processing rice</u> <ul style="list-style-type: none"> • Optimizing the processing conditions based upon the resolutions of the problems founded by the continuous trail productions conducted by IFPRD researchers.

Remarks:



indicates the activities conducted at the FFK site



indicates the activities conducted by both FFK and IFPRD as the field survey at the IFPRD site

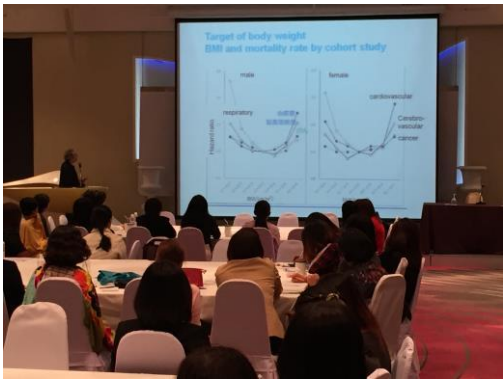


indicates the activities conducted mainly by IFRPD and supported remotely by FFK

b. Diffusion of low protein diet therapy for Chronic Kidney Disease (CKD) patients

In this survey, the following five seminars have been conducted for the purpose of the diffusion of low protein diet therapy for CKD patients. The participants of the seminars are approximately 470 in total and these seminars could have a big influence on Thai medical professionals, and low protein diet therapy for CDK patients has become widely recognized by Thai medical professionals, mainly Bangkok area.

Table1: Seminar Description for the diffusion of low-protein diet therapy for CKD patients

No.	Date	Seminar Descriptions
1	Jan.24, 2016	<p><u>Seminar Title:</u> Low-protein diet therapy for prevention of renal failure</p> <p><u>Name of Conference:</u> The 3rd Renal Conference 2016</p> <p><u>Number of participants:</u> approximately 54</p> <p><u>Location:</u> Baiyoke Sky Hotel Conference Center</p> 
2	Jan. 25, 2016	<p><u>Seminar Title:</u> 1st Session: Save Medical Cost by Healthy Longevity 2nd Session: Low protein processed rice and low protein diet therapy</p> <p><u>Number of participants:</u> Approximately 80</p> <p><u>Location:</u> IFPRD Seminar Hall</p>
3	Oct. 20, 2016	<p><u>Seminar Title:</u> Management for Aging and Longevity: Japan model</p> <p><u>Name of Conference:</u> The 10th Thailand Congress of Nutrition (TCN)</p> <p><u>Number of participants:</u> approximately 230</p> <p><u>Location:</u> BITEC</p>

		
4	Feb 2, 2017	<p><u>Seminar Title:</u> Low Protein Processing Rice, Medical Food, and Care Food</p> <p><u>Number of participants:</u> approximately 26</p> <p><u>Location:</u> Tokyo SME Support Center, Bangkok Office</p> 
5	Apr.28, 2017	<p><u>Seminar Title:</u> Low-protein rice for prevention of renal failure</p> <p><u>Name of Conference:</u> The Post Twenty-First Century Disruptive Technology</p> <p><u>Number of participants:</u> approximately 80</p> <p><u>Location:</u> Rangsit University, Seminar Hall</p> 

(2) Self-reliant and Continual Activities to be Conducted by Counterpart Organization

The low-protein rice processing technology has been transferred from FFK to IFPRD and IFPRD researchers are currently able to conduct the trial production of the low protein processing rice from Indica rice as raw material only with their own knowledge. In addition, all equipment necessary for the trial production has been installed through the JICA project and the budget for the research grants of Thai government can be applied for the trial development of the low protein processing rice. Therefore, the self-reliant and continual activities are to be conducted by IFPRD in the future.

4. FUTURE PROSPECTS

(1) Impact and Effect on the Concerned Development Issues through Business

Development of the Product/ Technology in the Surveyed Country

a. Increasing the added value of Thai rice utilizing low protein production technology

The low-protein rice with the Thai Indica rice as the raw material has been developed; however, there exist two major concerns. The first concern is the stable procurement of Indica rice as a raw material with the stable quality in Thailand. The variability of its ingredients varies depending on the harvest time and area/region. If the Indica rice, which has difference in the amount of protein, is used as a raw material, the amount of protein contained in the final product will also vary, causing the product quality to become unstable. Since the large amount of the procurement of raw material with the larger amount than the trial production is necessary for commercial production in the future.

It is necessary for our joint venture to select the variety of the Indica rice, which is suitable to the raw material and then to consider the appropriate cultivation method. Then we need to establish a stable procurement system of the raw material by contract farming managing by the rice mill company which has a relationship with the local SME.

The second challenge is to obtain a license from the Thai FDA to import the effective enzyme, which is effective for low proteinization of Indica rice. At present, the enzymes for food processing are not produced domestically in Thailand, and overseas enzymes that have import permission are also limited. Under these circumstances, it is known about the existence of enzymes highly effective for low protein production of Indica rice among the enzymes produced in Japan.

These enzymes have not used for the production of Indica-based low protein processing

rice in Thailand, but in the future commercial production, it is necessary to produce larger quantity of the products with higher quality and lower production cost than the trial production. Therefore, we need to keep negotiating with Thailand FDA in cooperation with IFPRD and FFK with local Thailand agent of Japanese enzyme manufacturers to acquire import permission for these enzymes.

- b. Being able to delay the progression of the symptoms of chronic kidney disease by the diet therapy using the low-protein rice

Implementation of low-protein diet therapy for the chronic kidney disease (CKD) patients in Thailand is a response to the CKD patients, who are rapidly increasing due to aging. This is because this implementation causes the maintenance of quality of life of the patients, the reduction of medical expenses burden, and the suppressant effect of the social security expenditures in Thailand. Therefore, it is a powerful solution to social/development problems in Thailand.

In addition, it is theoretically understood by medical professionals and government officials in Thailand that CKD patients need to limit the amount of protein intake in order to delay the progression of the disease state of CKD; however, the lack of experience in medical care has become a bottleneck in the spread of low protein diet therapy utilizing low protein processing rice in Thailand. Now we are preparing to conduct observation study on low protein diet therapy for CKD at Bhumibol Adulyadej Hospital. If the result of the observation study reveals the usefulness/effectiveness of the low protein therapy from medical perspectives, it will be a big foothold for the spread of the diet therapy in Thailand.

(2) Lessons Learned and Recommendation through the Survey

a. Application for tax exemption of equipment

Just before the initiation of this project, IFPRD as C/P organization introduced us the tax exemption through the Ministry of Education in Thailand for the equipment importing to Thailand for the purpose of research and development usage at the university. Then we started for the preparation of tax exemption application.

In particular,

- Documents describing the purpose of export and usage of the equipment
- A letter of appeal from IFPRD to FFK for receiving the equipment for R&D usage

- Equipment List
- Drawing of the each equipment
- B/L
- Invoice
- Packing List

Then IFPRD applied and negotiated for tax exemption through Ministry of Education and finally accepted the tax exemption for the equipment. This is the result of careful preparation of the IFPRD and negotiations with related organizations and we would like to express our appreciation to IIFPRD.

b. Application for the permission to manufacture and sales of the low protein rice to FDA

When conducting commercial production and sales of processing food in Thailand, it is necessary to obtain approval for production and sales from Thai FDA. Even in Japan, in order to produce and sell the processing foods, it is necessary to receive business license from public health center, but acquisition of permits from Thai FDA has more complex procedures than Japanese standard.

Especially, Thai FDA requests the large amount and highly qualified documents to approve the production and sales of the highly value-added processing foods such as health food and the low-protein processing food as part of “Novel food” for “Medical food.” We are still facing the difficulties to get the approval from Thai FDA for the low-protein processing rice, IFPRD keeps working with FDA for this subject using the their network with Thai FDA.

ATTACHMENT: OUTLINE OF THE SURVEY

Thailand

Verification Survey with the Private Sector for Disseminating Japanese Technologies
for the Indica based Low-Protein Processing Rice
Forica Foods Co., Ltd. Niigata Prefecture , Japan

