

添付資料

1 ニーズ調査報告会・有識者検討会における検討事項

(1) 第1回ニーズ調査報告会・有識者検討会における検討事項

- 具体的な数字の把握をすること。(菅原)
- 北海道の候補企業の意向も踏まえて、現地ニーズとのマッチングを図るべき。(菅原)
- ポストハーベスト・ロスを把握するにあたって、多くの数字が出回っている状況ではないので、現地の研究者を見つけられれば情報源として最も的確で早い。この人物をキーパーソンとして、枝葉を広げてほしい。(菅原)
- 道内企業の関心を引くために、どのような作物が・どこで・いつ・どのくらい採れるのかを把握した上で企業に紹介すると良い。(佐藤)
- 現地に行くと様々なニーズが見えると思うが、全体に対応するのは不可能なので、ターゲットを絞り込んでモデル化し実証するといった方向に向けていくと良い。(寛)
- インドネシアの大豆に関して、20年ほど前にJICAでチームを作り大豆栽培を手掛けた際のリーダーが札幌にいる。当時の問題点や品種選定など、参考になる話は聞けると思われる。(佐藤)

(2) 第2回ニーズ調査報告会・有識者検討会における検討事項

- 各国共に複数の仮説が挙げられているが、もっと絞り込んで数字を用意する必要があるのではないか。努力して(情報を集め)捨てることも仕方のない世界である。(菅原)
- 4ヶ国の担当者が各々検討・発表を行っているが、4ヶ国を通じたキーマッセージが欲しい。総花的に見える。(菅原)
- 調査対象国の違いがあまりに大きい。国によって全く課題が異なるであろう。共通の理解、共通の方針を持った上で3回目調査に望んでほしい。(佐藤)
- 貧困の改善において、GDPだけで見れば改善効果が出ても、それが例えば生産の集約化によって行うのであれば、かえって格差が広がっている可能性がある。人口分布の中でどの位置の人にどう作用するのか。最終的な社会のグランドデザインをどう描いているのか、今一度確認してほしい。(宮下)
- 現状はニーズを情報として集めただけである。データとして統計的に分析し、ある程度の試算が出れば専門家のアドバイスも聞ける。(宮下)
- 経験的には小さな国が成功し易い。今回の対象国ではヨルダン。(宮下)
- ニーズとエゴを勘違いしないこと。現地ではあらゆる要望を聞くと思うが、個人の希望なのか、国民のニーズなのか、きちんと捉えてほしい。(宮下)
- 仮にモロッコを企業に紹介するとしたら、付加価値の高い商品、たとえば機能性が注目されるザクロやアルガンなどを原料としてまず検討してみてはどうか。これがきっかけとなって徐々に広がりを見せるかもしれない。(佐藤)
- モロッコは最近積極的に誘致を行っており、盛り上がりがある。幾つか進出している日本企業は皆ヨーロッパから進出している。ヨーロッパに出た企業が、ヨーロッパでのビジネスにおいてモロッコを必要とした。この点がポイントである。(大矢)

2 各国の食品消費量比較

(1) 一人あたり年間消費量 (単位 : kg / 年) 2009 年

	日本	「イ」国	「バ」国	「ヨ」国	「モ」国
アルコール飲料	42.4	1.0	0.0	0.7	3.4
動物性油脂	1.6	0.5	0.3	1.0	2.4
穀物	114.7	186.7	197.5	154.2	244.4
卵	19.1	4.5	1.2	4.6	5.1
魚・水産物	56.6	25.4	18.9	7.1	11.2
フルーツ	52.7	68.1	24.2	53.1	87.7
肉	45.9	11.6	4.0	42.0	30.1
牛乳	73.9	11.4	20.2	94.8	47.3
くず肉	2.5	1.8	0.6	1.1	1.8
油料作物	9.1	28.4	1.9	9.4	2.7
豆類	1.7	1.3	6.8	7.5	7.2
スパイス類	1.2	1.1	2.8	0.6	1.7
澱粉類・澱粉作物	31.9	57.9	31.4	21.9	33.9
コーヒー・茶	5.8	2.2	0.4	5.3	3.2
砂糖・甘味料	27.8	14.2	8.8	43.6	41.7
ナッツ類	1.5	0.8	0.8	1.7	4.1
サラダ油	15.2	9.1	5.3	19.9	12.3
野菜類	101.6	39.5	26.8	99.2	131.2

出所) FAOSTAT

(2) 年間消費量 (単位 : 1,000t / 年) 2009 年

	日本	「イ」国	「バ」国	「ヨ」国	「モ」国
アルコール飲料	5,371	232	4	4	108
動物性油脂	201	120	43	6	77
穀物	14,521	44,337	29,035	929	7,730
卵	2,416	1,063	176	28	160
魚・水産物	7,164	6,041	2,778	43	354
フルーツ	6,670	16,157	3,553	320	2,775
肉	5,812	2,745	594	253	952
牛乳	9,356	2,716	2,966	571	1,497
くず肉	322	417	86	7	58
油料作物	1,148	6,742	277	57	86
豆類	221	298	996	45	228
スパイス類	156	271	416	4	54
澱粉類・澱粉作物	4,037	13,744	4,624	132	1,073
コーヒー・茶	736	519	55	32	101
砂糖・甘味料	3,520	3,380	1,293	263	1,320
ナッツ類	194	181	121	10	129
サラダ油	1,923	2,165	773	120	390
野菜類	12,862	9,371	3,947	598	4,150

出所) FAOSTAT



**Needs Assessment Survey Regarding
Food Processing and Distribution
Technologies
for the Reduction of Post-Harvest
Losses at Normal Temperature**

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Date: 27 January, 2014

Objectives

- To strengthen cooperation between Japan and Bangladesh in the field of Food Promotion
- To reduce the post-harvest loss
- To improve the storage methods
- To ensure the food safety and hygiene
- To ensure proper nutritional content of foods

Reasons Why We Need this Research/ Assessment

● Development issues in Indonesia, Bangladesh, Morocco and Jordan

- 925 million people are suffering nutritional deficiency in the world. On the other hand from 20% to 50% of food produced in developing countries are lost because of harvest losses, shortage of storage facilities, and distribution infrastructure.
- It takes time and money to develop farmland, fishery ground and distribution.
- In troubled area, it is difficult for people to reside permanently even the land has been developed.
- High youth unemployment rate is causing social unrest.



Carrying milk on pushcart...no cold chain

● Utilizing Hokkaido products and technologies

Technology transfer from Hokkaido: Autoclaving Food Processing Technology (e.g. Canning)

- ✓ Normal-Temperature Storage, especially canning has been established technology.
- ✓ No need for huge initial investment.
- ✓ Since Hokkaido is far from consumption area, technology of processing food to be stored and distributed in normal temperature has been developed. Canned food was important industry in early time of Hokkaido.(Exporting canned salmon to England.)



The first Japanese canning factory established in 1877.

● ODA projects suggested and expected effects

● Projects suggested

Making a process and supply base by transferring Autoclaving Food Processing Technology

Expected Effects by country

- Indonesia Dissolve nutritional deficiency of 21 million domestic people and creating a South-south cooperation base toward Southeast Asian countries by cutting losses of rich agricultural & fishery resources.
- Bangladesh..... Dissolve nutritional deficiency of 25 million domestic people and creating a low-cost food supply base for neighboring countries by cutting losses of rich agricultural & fishery resources.
- Morocco..... Create a South-south cooperation base toward Sub-Saharan Africa by cutting losses of rich agricultural & fishery resources.
- Jordan..... Dissolve Social unrest by becoming food processing trade country and make a stable food supplying system to neighboring countries.

● Direct effects

Able to supply food stably to prevent starvation

- Increase food supply by reducing post-harvest losses
- Enlarging distribution area
- Improving in nutrition domestically and in surrounding countries.

● For independent and continuous development

- Become independent from relying on importing food.
- Stop starvation of the poor
- Create jobs for local youth by growing food industry

● In Bangladesh

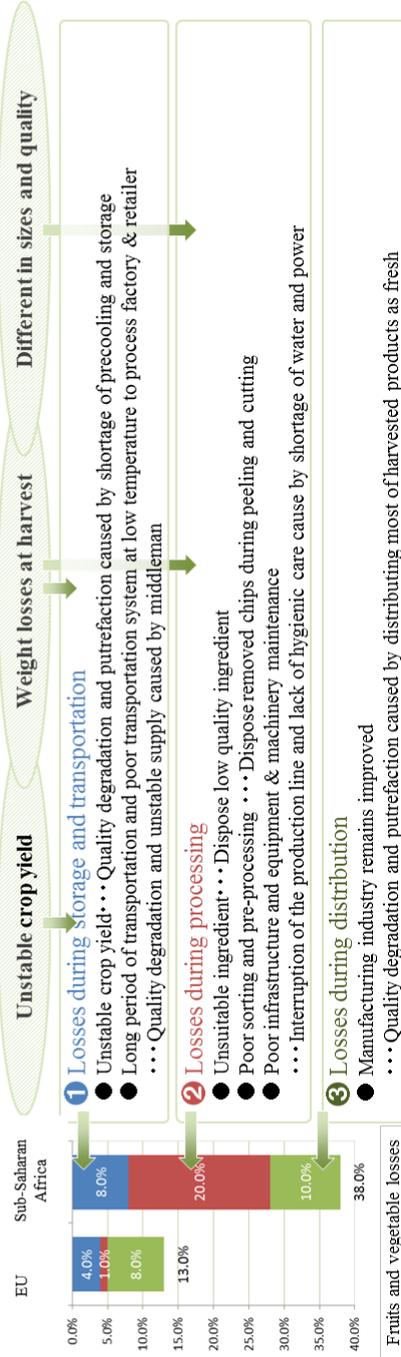


Research possibilities of agricultural & fishery business
Transfer processing technology

↓
Processing trade country as buffer state

Tentative Plan of Researches

● Problems: Any losses on the process of food production to distribution?



● Solutions: Transfer Japanese technology to new factories and facilities

① Introduce movable factory such as canned food

- Improve low operation rate and poor distribution infrastructure by making "movable process facilities"

Reducing losses during transportation and distribution by making local-based process facilities

② Have one pre-process facility per one producing area

- Have pre-process facility close to producing area
- Properly pre-process and utilize unused part of the products by sorting ingredient

Reducing losses by properly pre-processing and sorting ingredient

③ Introduce contract farming led by food process maker

- Management of planting and cropping by food process maker
- Transfer technology to make crop rotation system
- Promote to mechanize agriculture. Use rental agricultural machinery to keep low cost with speed

Reducing losses during storage and transportation by planting and harvesting as planned.

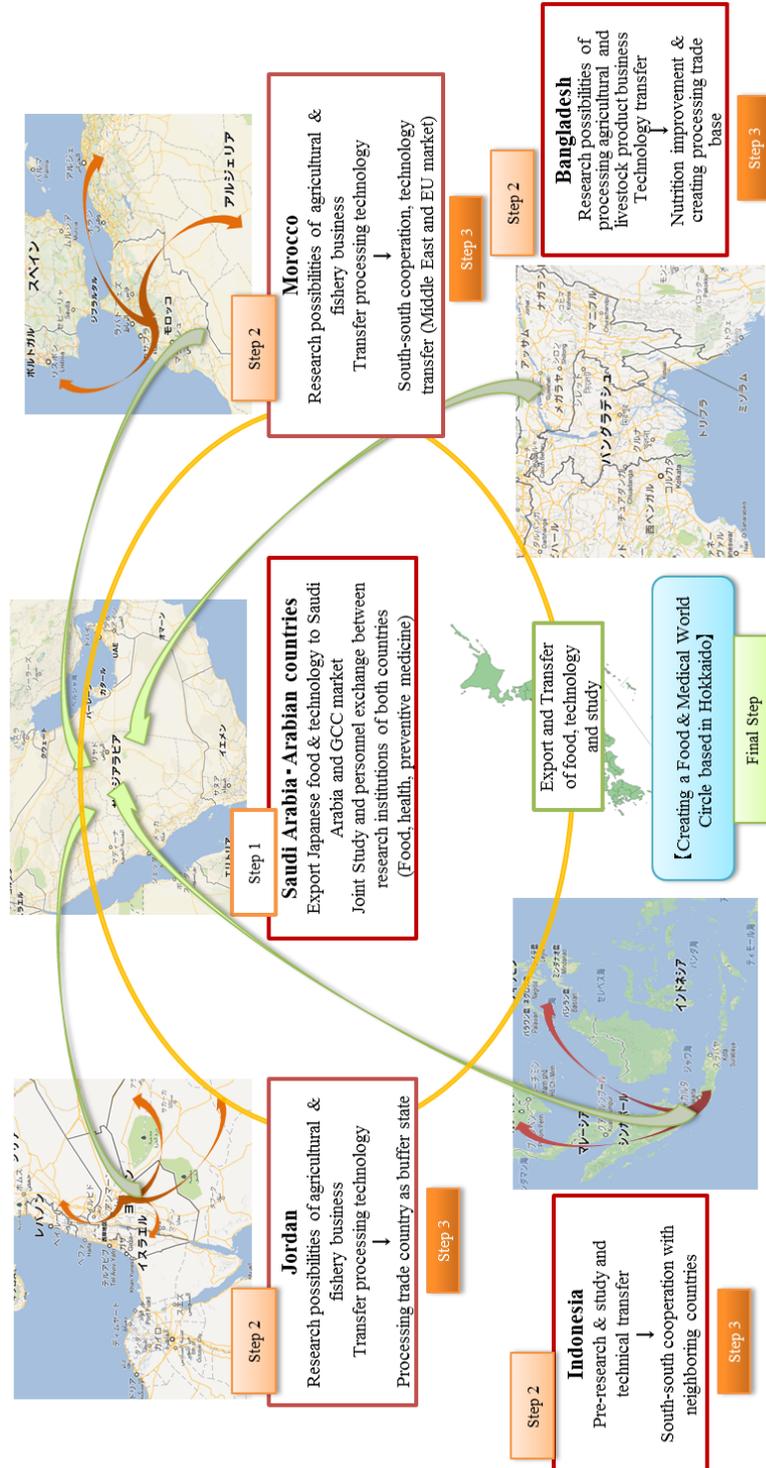
Prevent food shortage
Job creation
Stop relying on import

High productivity

Low productivity

Planning to Promote Food Market by Entering Islamic Countries / Arabian Wealthy Class (Export・Transfer of Technology)

	Country	Step 1	Step 2
Step 1	Entering Arabian wealthy class market	Continuous economical exchange such as business symposium and seminar	Export and technology transfer
Step 2	Entering ODA countries	Research of current status and business possibilities by need assessment survey	Establish industry such as Technology transfer
Step 3	Forming producing area in developing countries by south-south cooperation	Research the possibilities of concrete technical transfer as a result of the need assessment survey	Create new distribution channel



The process and items of research

● Steps we will take...

STEP-1

- Visit Japanese organizations such as JICA, local governmental organizations (counterpart), food makers (model partner) to collect information regarding to needs and problems in order to select location of research.
- Research area is Dacca.
- Select working members in Dacca area.

➔ This time we will research..

● Major research points and details are as follows

STEP-2

- Visit research area to do needs assessment survey.
- Area for research are Chittagong and North Bangladesh.
- Establish partner network in Chittagong area.
- Select working member in Chittagong area.
- Have working group in Dhaka

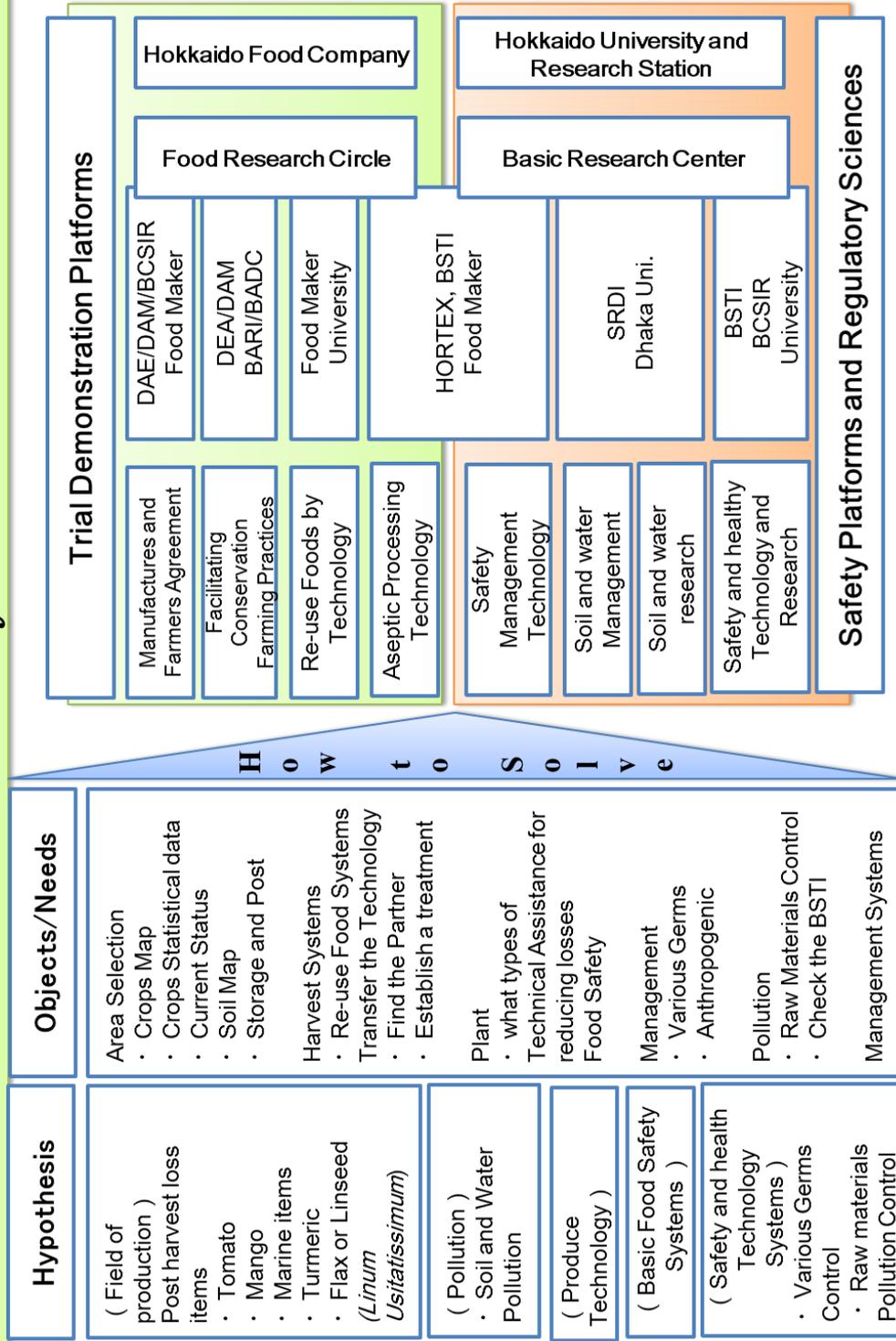
STEP-3

- Exam suggestions for concrete ODA projects. Select counterpart and work on agreement for concrete project.
- Business matching between companies in Hokkaido and Bangladesh.
- Find liaison in Bangladesh side.
- Select model production area.

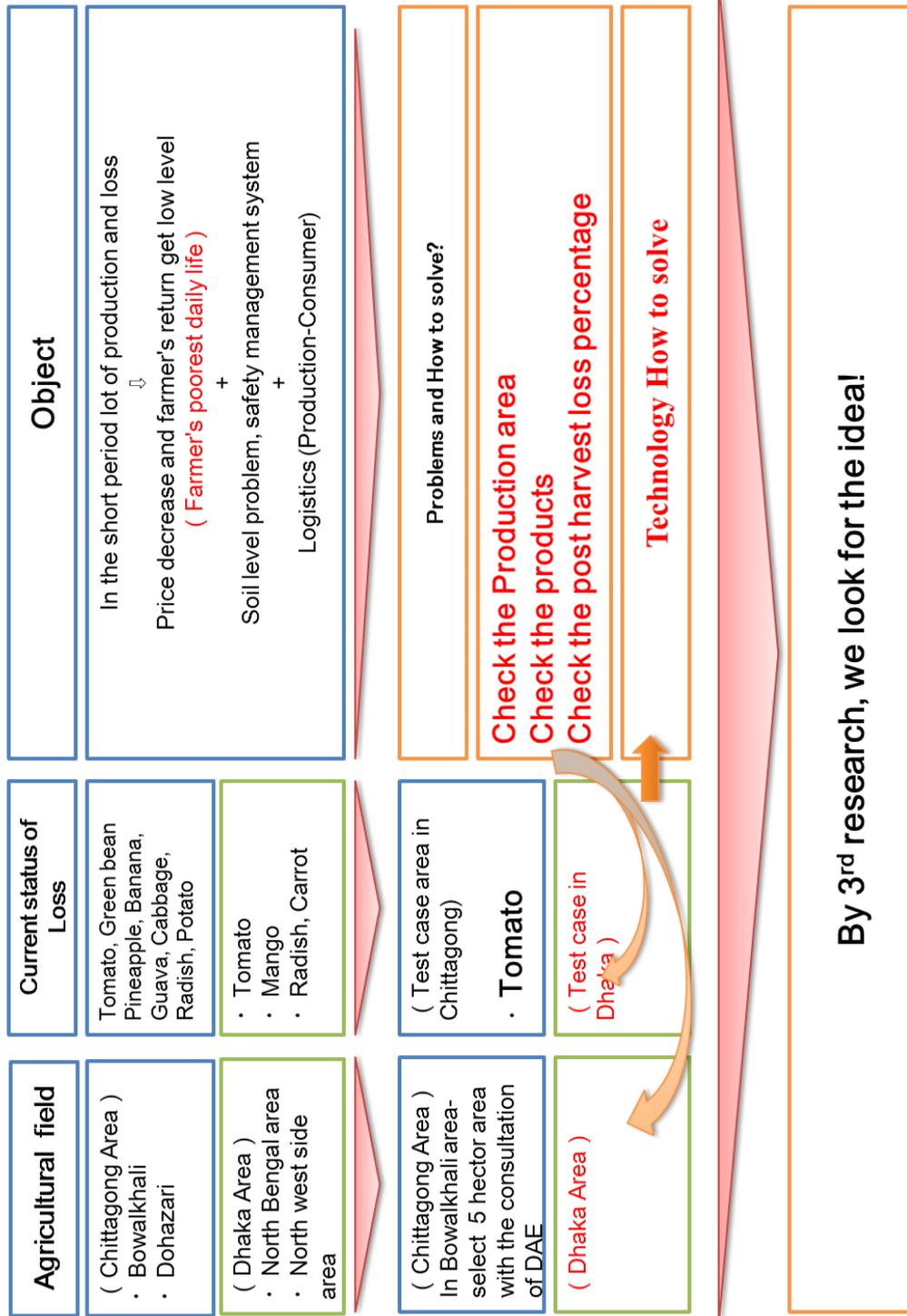
- Harvest status of major agricultural and fishery products (kind, amount, production area, harvest period)
- Select model area base on the information above.
- Problems in production of agricultural and fishery products caused by climate and environment.
- Problems in current production method in details such as hybrid seed, post harvest losses.
- Any agricultural and fishery products to be increased in production or new products to be grown.
- Current status of process food and its market.
- Current food supply chain and its problems.
- Current status of post harvest losses in the process of production, processing, distributing.
- Problems with regards to management system for safety and hygiene. (At production ~ soil pollution and water pollution, at processing ~ contamination etc.
- Problems with packaging and canning, and material procurement.
- Problems with infrastructure such as water, power, vehicle and others in processing facility.

Working group meetings 1st Meeting (23th Dec. 2013)

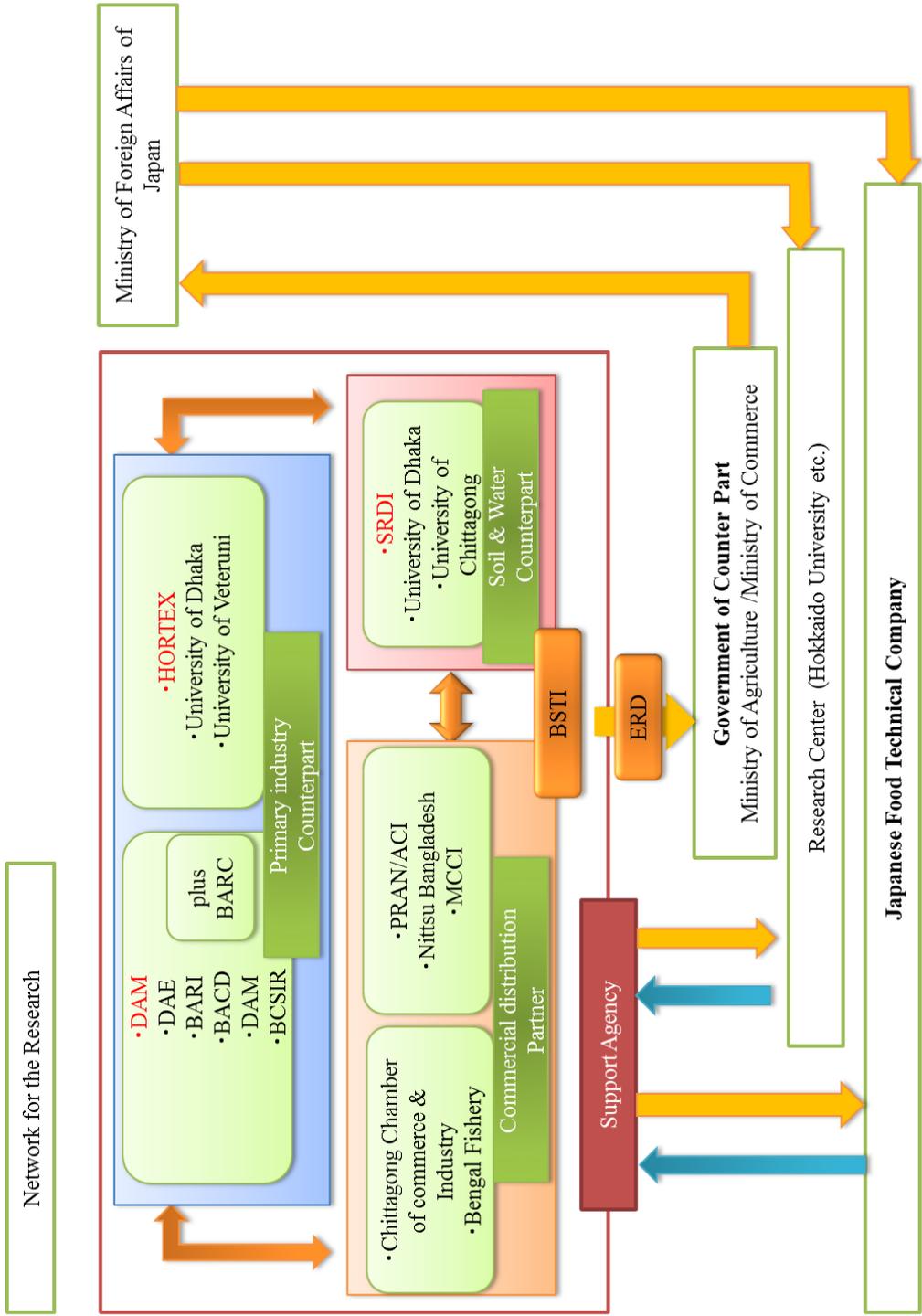
Feasibility Study of Bangladeshi Food Problems and how to Solve the Systems?



How to go to the next step with this research work?



Network for post harvest loss research in Bangladesh





Working group meeting 2nd Meeting

(27th Jan.2014)

Post harvest losses (PHL) of some fruits and vegetables in Bangladesh

Items	Post harvest losses (%) as per BAR study in 2006	Post harvest losses (PHL) at different levels of supply chain (%) as per study of NFPCCSP in 2010					Total PHL
		Growers	Bepari (large-scale trader)	Wholesalers	Retailers		
Fruits							
Pineapple	18	10.4	11.6	14.1	7.0	43.1	
Mango	33	4.4	8.1	8.1	6.8	27.4	
Banana	20	7.7	5.1	8.6	3.2	24.6	
Papaya	35	6.1	13.7	12.2	7.9	39.9	
Jackfruit	-	16.1	11.4	9.2	6.8	43.5	
Litchi	-	8.5	5.1	6.1	5.1	24.8	
Orange	-	5.2	5.7	4.0	8.7	23.6	
Guava	About 10-15% (national), but 4% in Gazipur	-	-	-	-	-	
Vegetables							
Tomato	37	6.9	9.1	8.0	8.9	32.9	
Bitter gourd	27	-	-	-	-	-	
Okra	34	9.4	9.8	4.9	8.3	32.4	
Brinjal	20	6.9	7.4	8.4	6.6	29.3	
Potato	25	-	-	-	-	-	
Cabbage	25	-	-	-	-	-	
Carrot	25	-	-	-	-	-	
Beans	28	-	-	-	-	-	
Cauliflower	-	4.2	9.2	10.3	10.7	34.4	
Cucumber	-	7.2	4.5	10.7	4.7	27.1	
Red amaranth	-	5.5	9.2	7.8	6.1	28.6	

Product Cereal in Bangladesh

Estimate of Major Cereals	2006-2007		2007-2008		2008-2009		2009-2010		2010-2011	
	Area	Prod.								
Name of crops										
Aus Rice	2,238,805	1,512,325	2,270,045	1,506,852	2,632,965	1,894,557	2,431,692	1,709,127	2,750,015	2,132,821
Aman Rice	13,381,773	10,840,870	12,473,780	9,662,191	13,584,625	11,613,169	13,992,863	12,207,162	13,950,933	12,791,500
Boro Rice	10,521,630	14,965,055	11,385,915	17,761,781	11,654,317	17,809,051	11,631,160	18,058,962	11,787,978	18,616,780
Total Main Rice	26,142,208	27,318,250	26,129,740	28,930,824	27,871,907	31,316,777	28,055,715	31,975,251	28,488,926	33,541,101
Wheat	987,960	736,893	958,347	844,145	975,125	849,046	929,766	901,490	923,470	972,085
Potato	852,325	5,166,672	993,005	6,647,778	977,540	5,268,327	1,073,846	7,930,240	1,137,192	8,326,389
Total of Major Cereals	27,982,493	33,221,815	28,081,092	36,422,747	29,824,572	37,434,150	30,059,327	40,806,981	30,549,588	42,839,575
Jute (Bales)	1,034,360	4,884,069	1,088,500	4,622,443	1,039,030	4,677,740	1,028,832	5,089,728	17,751,325	8,395,840

(Area in acres and production in metric tons)

Production (Bangladesh)		FAO(2011)	
Rank	Commodity	Production (MT)	Production (Int.\$1000)
1	Rice, paddy	50,627,000	13,358,226
2	Potatoes	8,326,389	1,315,207
3	Sugar cane	4,671,348	153,393
4	Milk, whole fresh goat	2,496,000	837,608
5	Jute	1,523,315	431,413
6	Vegetables, fresh nes	1,319,000	248,554
7	Onions, dry	1,051,523	220,855
8	Fruit, tropical fresh nes	1,009,646	412,614
9	Wheat	972,085	147,066
10	Mangoes, mangoosteens, guavas	889,176	532,765
11	Milk, whole fresh cow	832,000	259,635
12	Bananas	800,840	225,541
13	Fruit, fresh nes	494,325	172,536
14	Pumpkins, squash and gourds	355,468	62,327
15	Sugar crops, nes	322,135	9,501
16	Sweet potatoes	297,539	22,473
17	Tomatoes	232,459	85,908
18	Rapeseed	230,000	63,088
19	Pineapples	218,582	62,306
20	Garlic	209,153	110,086

Import(Bangladesh)

Rank	Commodity	Quantity
1	Wheat	3,112,314
2	Sugar Raw Centrifugal	1,253,474
3	Palm oil	946,000
4	Cotton lint	560,311
5	Maize	529,259
6	Soybean oil	424,000
7	Onions, dry	268,109
8	Sugar Refined	246,104
9	Cake of Soybeans	239,500
10	Peas, dry	211,784

Export(Bangladesh)

Rank	Commodity	Quantity
1	Jute	420,441
2	Potatoes	53,717
3	Cotton Waste	25,260
4	Tobacco, unmanufactured	19,864
5	Beverage Non-Alc	14,305
6	Oil of vegetable origin, nes	12,656
7	Sesame seed	12,000
8	Fruit Juice Nes	6,506
9	Vegetables fresh nes	5,753
10	Frozen Potatoes	5,144

High Rank of Cereal Products in Bangladesh

Estimates of Wheat 2009-2010 to 2010-2011

Zilla/Region	2010-2011		Production
	Area Acres	Hectares	
total	923,470	373,707	972,085
1 Dinajpur Region	219,950	89,009	241,090
2 Rajshahi Region	198,468	80,316	222,162
3 Faridpur Region	131,575	53,246	143,618
4 Pabna Region	85,627	34,651	91,801
5 Kustia Region	75,988	30,751	91,106
6 Jessore Region	52,919	21,415	53,758
7 Rangpur Region	51,736	20,936	45,626
8 Comilla Region	26,291	10,639	19,117
9 Tangail Region	15,842	6,411	12,678
10 Jamalpur Region	12,924	5,230	11,048

But !

Import(Bangladesh)		
Rank	Commodity	Quantity
1	Wheat	3,112,314
2	Sugar Raw Centrifugal	1,253,474
3	Palm oil	946,000

Product target
Wheat

Estimates of Total Potato by Region 2010-2011

No.	Zila/Region		Production(M. Ton)
	Region	Area(Hectares)	
	total	460,197	8,326,389
1	Rangpur Region	99,168	1,741,299
2	Bogra Region	91,460	1,674,798
3	Dhaka Region	47,168	1,262,407
4	DinajpurRegion	72,382	1,118,484
5	Rajshahi Region	57,839	1,056,697
6	Comilla Region	32,890	631,470
7	Jamalpur Region	9,941	149,354
8	Kustia Region	5,790	110,590
9	Barisal Region	4,589	83,146
10	Jessore Region	4,104	80,820

potato harvest in Japan (Mt)	
total	2,237,000
1 Hokkaido	1,753,000

If Post harvest losses (PHL) of Potato is 25%

8,300,000mt × 25% = 2,000,000mt
 ≙ **Japan product**

Product fruits and vegetables in Bangladesh

Production of Fruits, 2010-2011

2010-2011		
Name of Crops	Area	Prod.
total	348,871	4,383,905
1 Jack fruit	26,310	961,821
2 Mango	67,842	889,176
3 Banana	130,589	800,840
4 Green Coconut	4,923	375,845
5 Guava	12,061	271,309
6 Pineapple	37,037	218,582
7 Water Melon	29,848	204,514
8 Ripe Papaya	3,052	124,764
9 Ber	2,746	78,205
10 Litchi	4,602	66,510

Area and Production of Banana by Region, 2010-2011

REGION	Area	Prod.
Total	26,310	961,821
1 Dhaka	5,489	131,359
2 Kushtia	3,217	94,640
3 Dinejpur	1,512	87,302
4 Mymensingh	614	70,880
5 Rajshahi	1,280	57,490

Area and Production of Jack Fruit by Region 2010-2011

Region	Area	Prod.
total	130,589	800,840
1 Tangail	16,863	135,829
2 Kushtia	8,262	103,166
3 Rangpur	7,747	71,389
4 Jessore	11,375	55,098
5 Rajshahi	5,702	47,131

Area and Production of Mango by Region 2010-2011

Region	Area under garden	Prod.
total	67,842	889,176
1 Rajshahi	46,602	370,513
2 Dinejpur	2,769	56,163
3 Pabna	1,824	47,982
4 Rangpur	997	45,186
5 Kushtia	6,410	43,112

Prod. of summer & winter Vegetable up 20M.ton by year(2010-2011)

2010-2011			
Name of Crops	Area	Prod.	season
1 Radish	65,384	256,711	Winter
2 Arum	59,402	238,645	Summer
3 Tomato	61,213	232,459	Winter
4 Rabi Brinjal	70,750	215,490	Winter
5 Cabbage	39,015	206,851	Winter
6 Katcha Papaya	192,949	204,221	Summer

Area and Production of Tomato by Region, 2006-07 to 2010-2011

2010-2011		
Region	Area	Prod.
Total	61,213	232,459
1 Rajshahi	10,883	56,674
2 Dinejpur	7,620	33,280
3 Comilla	5,236	16,798
4 Faridpur	4,065	15,847
5 Dhaka	4,518	15,773

How to Solve the Post harvest Loss

Fish Catch / EEZ

順位	country	Fish catches	EEZ (km ²)	1km ² /M.ton	海岸線 (km)
1	China	66,219,255	1,004,185	65.9	14,500
2	Indonesia	13,651,379	5,416,905	2.5	54,716
3	India	8,879,499	868,188	10.2	7,600
4	Peru	8,346,483	787,826	10.6	2,414
5	USA	5,559,997	7,630,992	0.7	19,924
6	Vietnam	5,555,000	819,421	6.8	3,444
7	Philippines	4,975,351	1,893,667	2.6	36,289
8	Japan	4,755,478	4,479,358	1.1	29,751
9	Chile	4,436,484	2,291,701	1.9	6,435
10	Russian	4,391,154	4,497,202	1.0	37,653
14	Bangladesh	3,124,677	76,928	40.6	580

Sea farm

	Country	sea farm(t)	%
	World	59,872,600	100%
1	China	36,734,215	61.4%
2	India	4,648,851	7.8%
3	Vietnam	2,671,800	4.5%
4	Indonesia	2,304,828	3.8%
5	Bangladesh	1,308,515	2.2%
6	Tai	1,286,122	2.1%
7	Norway	1,008,010	1.7%
8	Egypt	919,585	1.5%
9	myanmar	850,697	1.4%
10	Philippin	744,695	1.2%
11	Japan	718,284	1.2%

Another Key Products 1

Put in Please!

Need Sea farm High Technology



Need Good Feed
(feed by non fish meal)

How to Solve the Post harvest Loss

Another Key Products 2

Product oil material

Name of Crops	2010-2011	
	Area	Prod.
Til (Rabi & Kharif)	85,810	31,363
Rape & Mustard	623,294	246,494
Groundnut	78,470	53,664
Sub-Total	787,574	331,521
Linseed	25,331	6,705
Castor	0	0
Other oil seed	973	403
Coconut	7,283	325,949
Soybean	102,403	65,883
Sub-Total	135,990	398,940
Grand Total :	923,564	730,461

Import oil & the material

Rank	Commodity	Quantity (tonnes)
3	Palm oil	946,000
6	Soybean oil	424,000
11	Rapeseed	159,000
13	Soybeans	129,100
	total	1,658,100

Put in Please!

Oil → Import/Product=Double
Wheat → Import/Product=Triple

Product Wheat

2010-2011 (M. t)	
Wheat	Production
total	972,085

Import Wheat

Import (2011.1~12)	
Rank	Commodity
1	Wheat
	Quantity
	3,112,314

Test case to solve post harvest loss

Product

FIVE Products

2010-2011					
Name of Crops	Area	Prod.	loss (%)	loss (mt)	
1 Jack fruit	26,310	961,821	43.50%	418,392	
2 Mango	67,842	889,176	27.40%	243,634	
3 Banana	130,589	800,840	24.60%	197,007	
4 Potato	1,137,192	8,326,389	25%	2,081,597	
5 Tomato	61,213	232,459	32.90%	76,479	

Area

Rajshahi

Product name	Rank	Region	Product(mt)
Wheat	2	Rajshahi	222,162
potato	5	Rajshahi	1,056,697
Banana	5	Rajshahi	47,131
Manago	1	Rajshahi	370,513
Jack Fruit	5	Rajshahi	57,490
Tomato	1	Rajshahi	56,674

How to Technology to Solve

1. Powder products by Instantaneous high Temperature high pressure technology(machine) – fruit, vegetable
2. Starch powder product technology – Potato, Wheat, Corn
3. Crop Rotation by Ecological Chain – Wheat, Bean, Corn,
4. Fish Feeds using by-product (the residue) -
5. Research to solve soil and water problem
6. Research to produce the health food(supplement) using by-product(the residue)

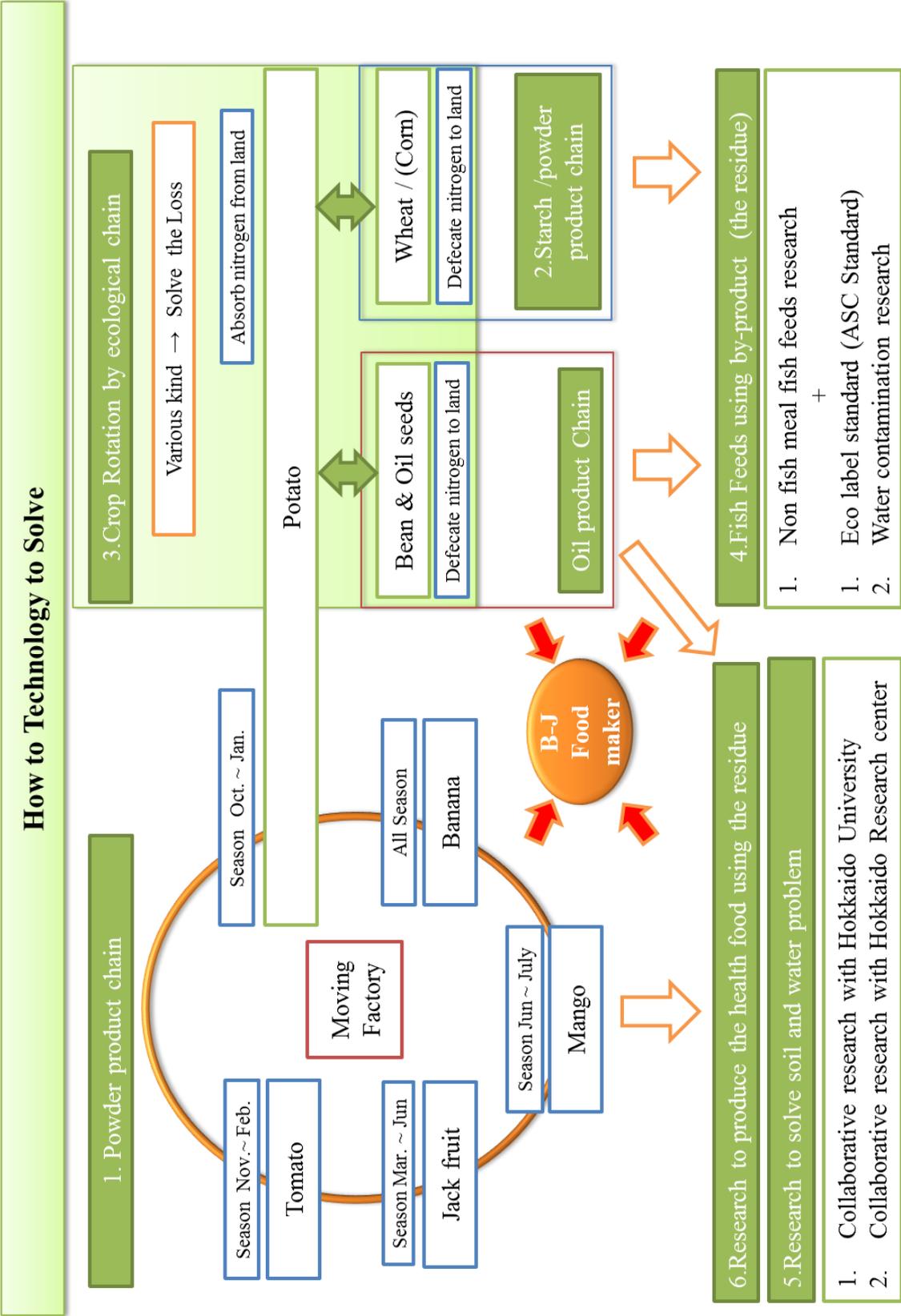
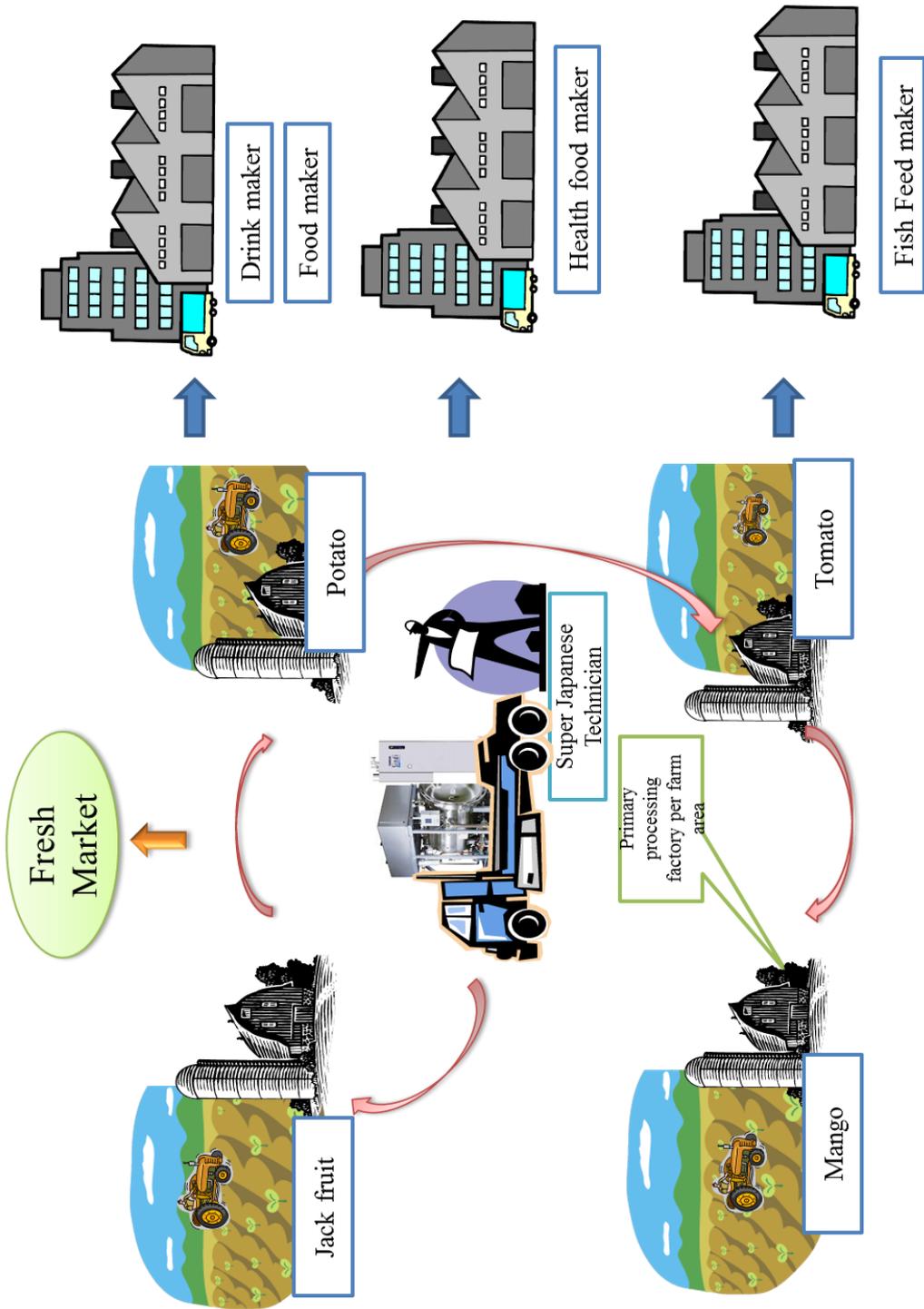
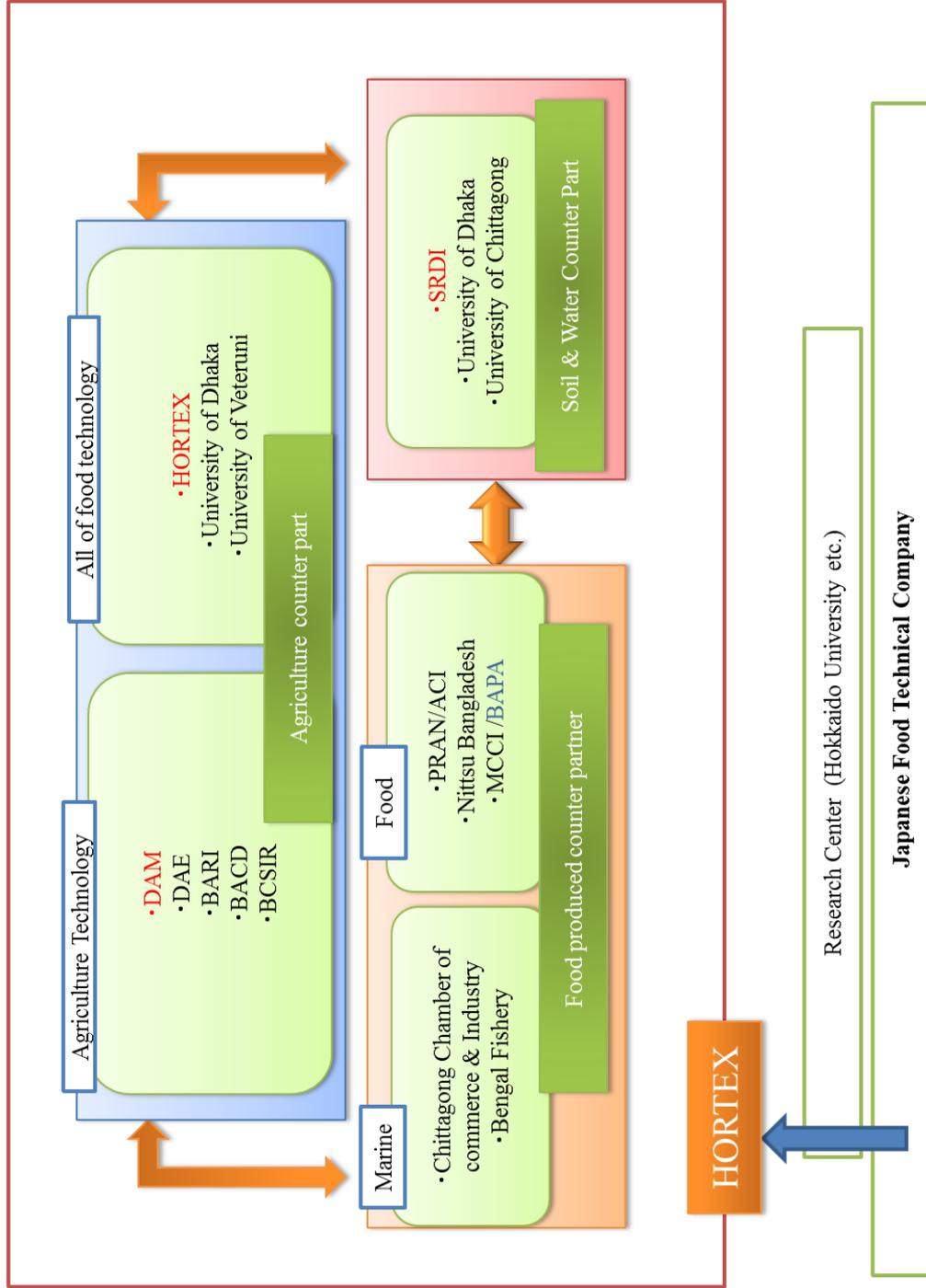


Image of Moving factory for Powder products



Net work Image



1. The reasons which we suggest to carry out these researches

● Development issues in Indonesia, Bangladesh, Morocco and Jordan

- 9.25 million people are suffering nutritional deficiency in the world. On the other hand from 20% to 50% of food produced in developing countries are lost because of harvest losses, shortage of storage facilities, and distribution infrastructure.
- It takes time and money to develop farmland, fishery ground and distribution.
- In troubled area, it is difficult for people to reside permanently even the land has been developed.
- High youth unemployment rate is causing social unrest.



Carrying milk on pushcart...no cold chain

● Utilizing Hokkaido products and technologies

Technology transfer from Hokkaido: Autoclaving Food Processing Technology (e.g. Canning)

- ✓ Normal-Temperature Storage, especially canning has been established technology.
- ✓ No need for huge initial investment.
- ✓ Since Hokkaido is far from consumption area, technology of processing food to be stored and distributed in normal temperature has been developed. Canned food was important industry in early time of Hokkaido. (Exporting canned salmon to England.)



The first Japanese canning factory established in 1877.

● ODA projects suggested and expected effects

● Projects suggested

Making a process and supply base by transferring Autoclaving Food Processing Technology

● Direct effects

Able to supply food stably to prevent starvation

- Increase food supply by reducing post-harvest losses
- Enlarging distribution area
- Improving in nutrition domestically and in surrounding countries.

● For independent and continuous development

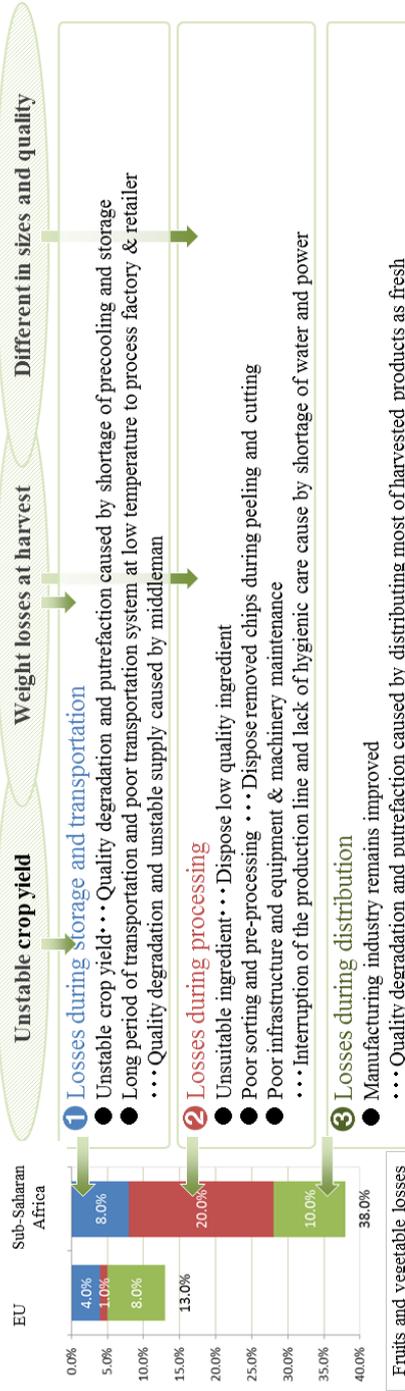
- Become independent from relying on importing food.
- Stop starvation of the poor
- Create jobs for local youth by growing food industry

Expected Effects by country

- Indonesia.....Dissolve nutritional deficiency of 21 million domestic people and creating a South-south cooperation base toward Southeast Asian countries by cutting losses of rich agricultural & fishery resources.
- Bangladesh.....Dissolve nutritional deficiency of 25 million domestic people and creating a low-cost food supply base for neighboring countries by cutting losses of rich agricultural & fishery resources.
- Morocco.....Create a South-south cooperation base toward Sub-Saharan Africa by cutting losses of rich agricultural & fishery resources.
- Jordan.....Dissolve Social unrest by becoming food processing trade country and make a stable food supplying system to neighboring countries.

2. Tentative Plan of researches

● Problems: Any losses on the process of food production to distribution?



● Solutions: Transfer Japanese technology to new factories and facilities

① Introduce movable factory such as canned food

- Improve low operation rate and poor distribution infrastructure by making "movable process facilities"

Reducing losses during transportation and distribution by making local-based process facilities

② Have one pre-process facility per one producing area

- Have pre-process facility close to producing area.
- Properly pre-process and utilize unused part of the products by sorting ingredient

Reducing losses by properly pre-processing and sorting ingredient

③ Introduce contract farming led by food process maker

- Management of planting and cropping by food process maker
- Transfer technology to make crop rotation system
- Promote to mechanize agriculture. Use rental agricultural machinery to keep low cost with speed

Reducing losses during storage and transportation by planting and harvesting as planned.

Prevent food shortage
Job creation
Stop relying on import

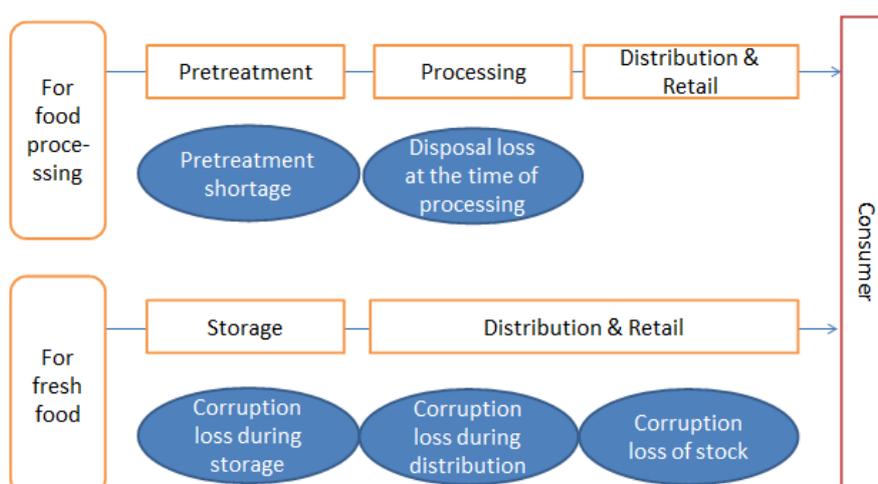
High productivity

5 「イ」国第1回調査時の当方提示資料

To reduce post-harvest loss in Indonesia by using a long-term storage technology

DOGIN REGIONAL RESEARCH INSTITUTE Co., Ltd.
Tomonori YORITA
tomonori.yorita@doginsoken.jp

Background Occurrence of post-harvest loss



(example) Machine for pretreatment



It can take the dirt that lead to corruption of the fish in the high-pressure water.



(example) Machine for preserve freshness



It can make the ice that does not damage the fish from seawater.



Food products that can be long-term storage
at room temperature



canned food



boil-in-the-bag food

By processing the long-term storable foods near the fishing port, It is possible to reduce post-harvest loss.

study site (tentative)



Reason to select the study site (tentative)

- Far from consumption areas like Jakarta
→The need for collaboration is high?
- Income level is low in the country
→We can expect an improvement in income by the processing?
- High probability of aquatic resources development
→Priority areas of marine resources development in Indonesia
- Track record of international cooperation of Japan in the past



Fish processing facilities

Feasibility study plan(1)

- 1st visit to Indonesia
- From 21st Oct. to 25th Oct. @Jakarta
- In interviews with the parties concerned, I want to make sure of the following points:
 - geographical conditions (Land, weather, traffic, political, etc.)
 - the status of infrastructure (Presence or absence of processing water resources, the presence or absence of sufficient labor and human resources (unemployment rate), power supply, etc.)
 - status of fishery resources (Yield, catch time, variations in the catches)
 - Current state of the local food processing industry, the status of the processing facilities
 - market trend of food products in Indonesia
 - condition of distribution in Indonesia
 - advice on the study site decision
- Building a coalition in study site
- Installation of council

Feasibility study plan(2)

- 2nd visit to Indonesia
- Mid-late November @study site
- We will held a meeting of local experts to participate, and we want to discuss about following points:
 - Selection of available local catches
 - Selection and examination of processing method that matches the catches
 - Creating a catches map
 - Examination of the solution and extraction of the issues of project site
 - Distribution channels (Market, logistics)

Feasibility study plan(2)

■ 2nd visit to Indonesia

- Mid-late November @study site
- We will held a meeting of local experts to participate, and we want to discuss about following points:
 - Selection of available local catches
 - Selection and examination of processing method that matches the catches
 - Creating a catches map
 - Examination of the solution and extraction of the issues of project site
 - Distribution channels (Market, logistics)

Feasibility study plan(2)

■ 2nd visit to Indonesia

- Mid-late November @study site
- We will held a meeting of local experts to participate, and we want to discuss about following points:
 - Selection of available local catches
 - Selection and examination of processing method that matches the catches
 - Creating a catches map
 - Examination of the solution and extraction of the issues of project site
 - Distribution channels (Market, logistics)

6 「ヨ」 国第2回調査時の当方提示資料（活用できる技術・ノウハウ）

Utilizable Technology and Know-how

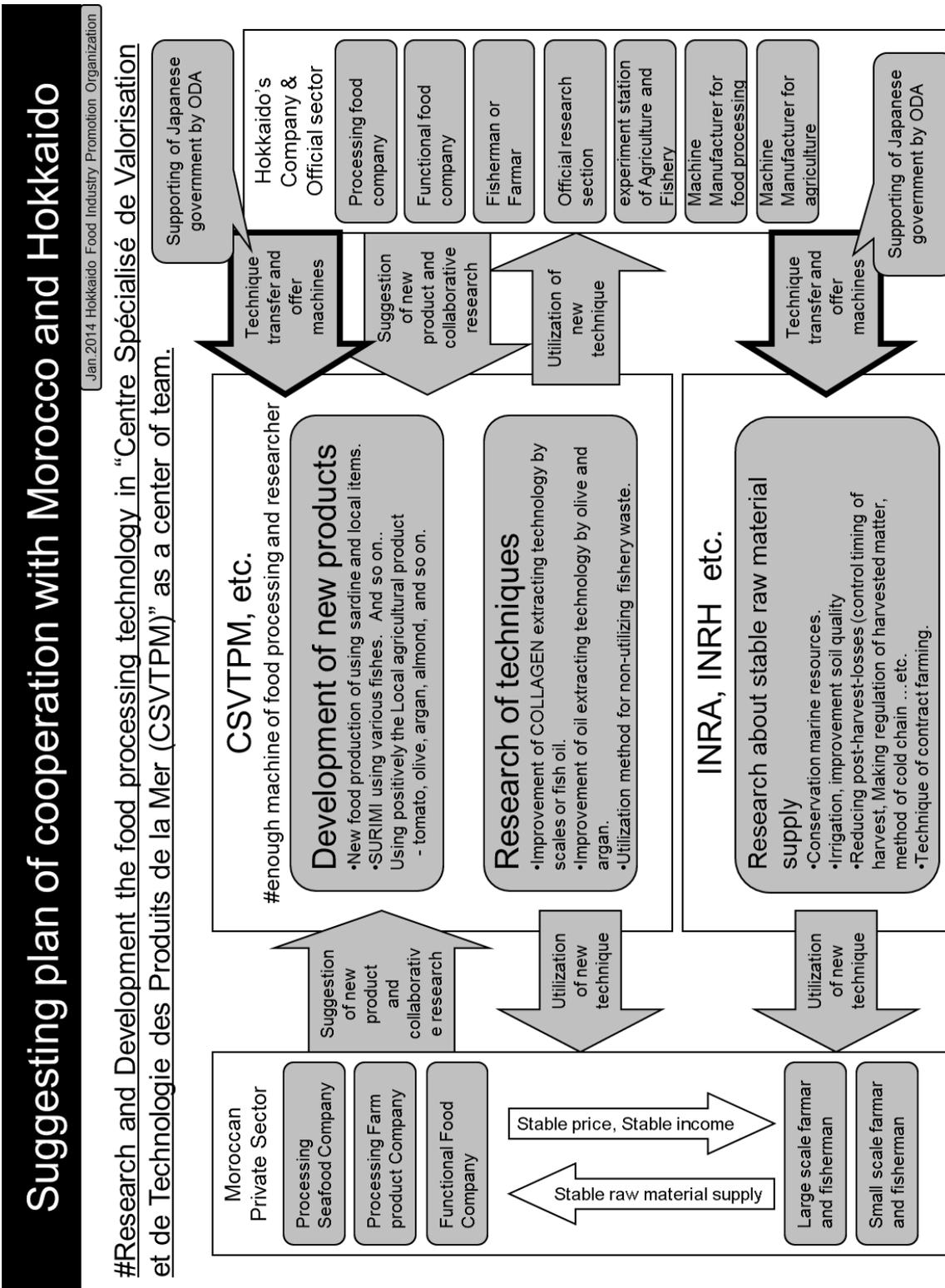
	Agricultural Production (Contract farming led by maker)	Primary production (1 pre-processing facility in 1 producing area)	Secondary production (Movable factory)	Others
Tomato	<p>① variety for processing</p> <ul style="list-style-type: none"> • high % of solid content, hard, adichogamy • short-term crop • kind to extend harvest period <p>② Technology to extend harvest season and average sunshine</p> <ul style="list-style-type: none"> • Technology to utilize differences in south and north and in elevation along with combining varieties • Planting seedling • Technology to irrigate in the ground <p>③ Harvest led by maker</p> <ul style="list-style-type: none"> • Introducing harvesting machine • Awarding late harvesting farm <p>④ Plant factory</p> <ul style="list-style-type: none"> • Planned production of growing many kinds of products year around 	<p>① Location technique</p> <p>The best size is processing 200,000 ton per 1 facility per 2000 ha</p> <p>↓</p> <p>Developing trailer factory</p> <p>② Screening technique</p> <p>③ Dice cut technique</p> <p>④ Paste technique</p> <ul style="list-style-type: none"> • Straining technique • Condensing technique <p>④ Deactivate enzyme technology</p> <p>⑤ Sterilization technology</p> <p>⑥ Utilizing non-edible portion technique</p> <ul style="list-style-type: none"> • Experienced. For example Azuki beans powder 	<p>Production technique to adapt to food culture</p> <p>① Ketchup</p> <p>② Tomato Juice</p> <p>③ Can of whole tomatoes or cut tomatoes</p> <p>④ Puree</p> <p>⑤ Tomato hot-pot (adaptable for Jordan food culture)</p> <p>⑥ Pizza sauce</p> <p>⑦ Pasta sauce</p> <p>⑧ Supplement</p> <p>⑨ soup (powder, retort pouch food, canned food)</p> <p>⑩ stew</p> <p>⑪ Curry, hashed beef rice (retort, roux)</p>	<p>① The highest level of study of tomato functionality</p> <p>② Achievements of Sextiary Sector</p> <ul style="list-style-type: none"> • Options opposed the style led by maker <p>③ Joint and cooperation achievements with local companies</p> <p>④ Japanese style Western food culture</p> <ul style="list-style-type: none"> • Omelet, pasta and etc. <p>⑤ Freshness retaining technology</p> <ul style="list-style-type: none"> • Testing "freshness retaining film" made in Israel <p>⑥ Packaging technology</p>

Utilizable Technology and Know-how

	Agricultural Production (Contract farming leaded by maker)	Primary production (1 pre-processing facility in 1 producing area)	Secondary production (Movable factory)	Others
Pomegranate	<p>① Breeding seeds and screening varieties</p> <ul style="list-style-type: none"> • Not many experiences with growing pomegranate, but having high level technology to grow fruits <p>② After riping technique</p> <ul style="list-style-type: none"> • Controlling shipping period by managing light and temperature 	<p>① Screening technique to select edible portion</p> <ul style="list-style-type: none"> • Improving by using melon and ect. <p>② Utilizing non-edible portion technique</p> <ul style="list-style-type: none"> • Experienced. For example Azuki beans powder <p>③ Preserved technique</p> <ul style="list-style-type: none"> • Process into any shape to be able to add food <p>④ Condensing fruit juice technique</p>	<p>① Canning technology</p> <p>② Beverage technology</p> <ul style="list-style-type: none"> • POKKA SAPPORO sells pomegranate food <p>③ Making jam and marmalade technique</p> <ul style="list-style-type: none"> • Experienced <p>④ Supplement technology</p> <ul style="list-style-type: none"> • ave many experienced in functional food project. Technology to do screening materials through human intervened test 	<p>① Study of functional fruit</p> <p>② Achievements of Sextiary Sector</p> <ul style="list-style-type: none"> • Options opposed the style leaded by maker <p>③ Hokkaido sweets</p> <ul style="list-style-type: none"> • Using many fruits <p>④ Freshness retaining technology</p> <ul style="list-style-type: none"> • Testing "freshness retaining film" made in Israel <p>⑤ Packaging technology</p>

7 「モ」国第3回調査時当方提示資料

(CSVTPM を中心とした協力関係の構築について提案)



8 「毛」国 CSVTPM 備品一覧 (CSVTPM 提供資料)

(1) Raw Material Treatment Room

No.	Item	Qty	Maker	Model
(1)-1	Meat separator	1	Yanagiya Machinery Co., Ltd.	SY-100S
(1)-2	Grinder for frozen materials	1	Masuko Sangyo Co.,Ltd.	MKZA10-15
	Bone cutter	1	Masuko Sangyo Co.,Ltd.	MKBFC-3
	Meat chopper	1	Masuko Sangyo Co.,Ltd.	MKTB-32
	Mixer	1	Masuko Sangyo Co.,Ltd.	MK-06
(1)-3	Automatic ice-making machine	1	Hoshizaki Electric Co.,Ltd.	FM-250AF
(1)-4	Dehydration centrifuge	1	Yanagiya Machinery Co., Ltd.	DT-2-18
(1)-5	Electric fork lifter	1	Okudaya Giken Co., Ltd.	PL-S1000 K
(1)-6	Freezer	1	Dairei Co., Ltd	NPA-396
	Deep freezer	1	Dairei Co., Ltd	F-30L
	Ultra-low temperature freezer	1	Sanyo Electric Trading Co.,Ltd.	MDF-392
(1)-7	Electronic balance	4	A&D Company Ltd.,	FS-15KA
(1)-8	Jet Cleaner with spray gun and hose	1	KARCHER Japan	HDS698C
(1)-9	Meat chopper	1	Yanagiya Machinery Co., Ltd.	32-M1

(2) Treatment and Processing Room

No.	Item	Qty	Maker	Model
(2)-1	Freeze dryer	1	Kumeta Manufacturing Co., Ltd.	FD-024
(2)-2	Grill with conveyer	1	Fujimak Co.,Ltd.	FGJOA5
(2)-3	Compression and decompression mixer	1	Shinagawa Co., Ltd	60NQVP
(2)-4	Jacketed steam kettle	1	Shinagawa Co., Ltd	SRB-80
(2)-5	Retort sterilizer (for boiled food in the bag)	1	Hisaka Works, Ltd.	RCS-60/10RTG

No.	Item	Qty	Maker	Model
(2)-6	Smoking chamber (both for heat and cold smoking)	1	IDEY Giken Co., Ltd.	ESH-20HC
(2)-7	Low temp. dryer	1	Naganuma (Kucho Shouji)	KD-21A
(2)-8	Spray dryer	1	Ohkawara Kakohki Co., Ltd.	L-8
(2)-9	Micro-wave oven	1	Sanyo Electric Trading Co.,Ltd.	EMO-SRT10
(2)-10	Silent cutter	1	Yanagiya Machinery Co., Ltd.	SC20-N
(2)-11	Boiler	1	Miura Co., Ltd.	EX-500H
(2)-12	Fryer	1	Yanagiya Machinery Co., Ltd.	DF-015E
(2)-13	Steamer	1	Yanagiya Machinery Co., Ltd.	2-B
(2)-14	Canning seamer	1	Tokyodo Machine Co., ltd.	FCH
(2)-15	Belt conveyer	1	Thames Co., Ltd.	240-400-5000-R
(2)-16	Oil separator	1	Sasakura Engineering Co.,Ltd.	OWS-2
(2)-17	Tunnel freezer	1	Mayekawa Mfg., Co., Ltd.	MMF-1003TJ
(2)-18	Stainless steel working table	3	Tanico Co., Ltd	1800 x 750
(2)-19	Stainless steel working table	2	Tanico Co., Ltd	900 x 600

(3) Packing Room

No.	Item	Qty	Maker	Model
(3)-1	Multi type cutting machine	1	CBM Co., Ltd.	MS 84.21
(3)-2	Heat sealer	1	Fuji Impulse Co., Ltd.	FI-WA-300-10D
(3)-3	Vacuum packing machine	1	Furukawa Mfg, Co., Ltd.	FVSII-400IIG
(3)-4-1	Hand clipper	1	Yanagiya Machinery Co., Ltd.	MKH
(3)-4-2	Hand stuffer	1	Yanagiya Machinery Co., Ltd.	DIC-9L

(4) Fish Products Quality Checking Room

No.	Item	Qty	Maker	Model
(4)-1	Temperature and Humidity test chamber	1	Advantec Toyo	AGX-226
(4)-2	Low temperature test chamber	1	Advantec Toyo	PG-327
(4)-3	Thermo-hygrometer (portable type)	1	Chino	HN-AKT
(4)-4	Water activity tester	1	Rotronic	AW pro1
(4)-5	Stereoscopic microscope	1	Olympus	SZ4045-SET
(4)-6	Electrophoresis apparatus	1	Biorad	Protean II xi 2-D cell
(4)-7	Freezer and refrigerator	1	Daiwa	441YS2

(5) Additional Equipments for Sea Products and Treatment

(5)-1	FRP tank	1	Tachibana Container	550GP
(5)-2	FRP tank	2	Tachibana Container	360GP
(5)-3	Plastic Basket	5	Sanko Co.,Ltd.	#200
(5)-4	Plastic Tray	10	Sanko Co.,Ltd.	TORO BAKO B-2
(5)-5	Plastic Basket	10	Sanko Co.,Ltd.	C#30
(5)-6	Plastic Basket	10	Sanko Co.,Ltd.	Hokkai Kago
(5)-7	Fish cutting board	10	Hasegawa Chemical Industrial Co.,Lrd	SDK
(5)-8	Filet Knife	10	Mitsuboshi	Hi-Cut
(5)-9	Apron	20	Sumisho	5-451
(5)-10	Glove	20	Showa	Vinylove 413
(5)-11	Thin Glove	100	Sanko Chemical	Sansoft L
(5)-12	Rubber Boot	20	Koshin Rubber Co.Ltd.	ZONA GL&G-3
(5)-13	White cap	20	Sumisho	9-621
(5)-14	Hair Net	100	Sumisho	HN-5
(5)-15	Wagon	5	Erecta International	SLS-107PS 1390

(A) Bacteriological Laboratory

No.	Item	Qty	Maker	Model
A-1	Low temperature incubator	1	Sanyo	MIR-153
A-2	Gas (CO ₂) Incubator	1	Sanyo	MCO-175
A-3	Freeze-drying unit	1	TAITEC	VD-400F
A-4	Autoclave	2	ALP	MC-23
A-5	Hot air sterilizer, 100L	1	Advantec Toyo	SP-650
	Hot air sterilizer, 160L	1	Advantec Toyo	SP-450
A-6	Pure water supply unit	1	Tokyo Rikakikai	SA-2100E
A-7	Water bath (Thermo stable water bath), 30L	1	Advantec Toyo	LT-381
	Water bath (Thermo stable water bath), 40L	1	Advantec Toyo	LT-481
A-8	Water bath (Shaking type)	1	Advantec Toyo	TS-200
A-9	Stereoscopic microscope with photo system	1	Olympus	SZ4045TR-PT-SET
A-10	Biological microscope	1	Olympus	BX41-32H02
A-11	Incubator	2	Isuzu	EPFR-115S
A-12	Magnetic stirrer	1	Sibata	MGP-301

No.	Item	Qty	Maker	Model
A-13	Magnetic stirrer (with heater)	1	Sibata	MGH-320
A-14	Analytical electric balance	1	A&D	GR-202
A-15	Electric balance	1	A&D	GF-3000
A-16	Electric balance	1	A&D	GF-300
A-17	Homogenizer	1	Sibata	8051-51/-5110
A-18	Hot plate	1	Sibata	EC-7050
A-19	pH meter	2	TOA	HM-20J
A-20	Table top cooling centrifuge	1	Kokusan	H-3R
A-21	Test tube mixer	1	Sibata	TTM-1
A-22	Colony counter	1	Sibata	CL-560
A-23	Ultrasonic pipette cleaner	1	Sibata	PU-100
A-24	Automatic washer	1	Asahi lifescience (Lancer)	810LX
A-25	Clean bench	1	Sibata	CCB-1300M
A-26	Refrigerator for culture media	1	Sanyo	MPR-311D
A-27	Freezer for reagent	1	Sanyo	MDF-436
A-28	Refrigerator for sample	1	Daiwa	201CD
A-29	Freezer for sample	1	Sanyo	MDF-436
A-30	Laboratory chair	4	OGAWA	CTL-5
A-31	Cabinet for apparatus	2	OGAWA	LHA-900S
A-32	Laboratory center table (Flat type)	1	OGAWA	QCA-I-3600SP
A-33	Incubator	1	Isuzu	EPFR-114S
A-34	Homogenizer	1	OMNI	GLH-220

(B)Physical-Chemical Analysis Laboratory Instruments

No.	Item	Qty	Maker	Model
B-1	Atomic absorption spectrophotometer	1	Shimadzu	AA-6800
B-2	Fluorescent spectrophotometer	1	Shimadzu	RF-5301PC
B-3	Gas chromatography	1	Shimadzu	GC-2010
B-4	High performance liquid chromatography	1	Shimadzu	LC-10Avp
B-5	Ultra violet spectrophotometer	1	Shimadzu	UV-1601PC
B-6	UPS, 3KVA - for AAS and GC	2	Shimadzu	UPS 3kVA
B-6	UPS, 5KVA - for HPLC	1	Shimadzu	UPS 5kVA
B-7	Ultra pure water supply unit (Water for HPLC and AAS)	1	Advantec Toyo	CPW-101
B-8	Color meter (Spectrophotometer)	1	Nippon Denshoku	NF333
B-9	Electric balance	1	A&D	GF-300
B-10	Fish length measuring unit	1	Nippon Kaiyo	362
B-11	Parasite detector (Candling unit)	1	Nichimo	CWT-7-2W
B-12	Stereoscopic microscope	1	Olympus	SZ6045-SET
B-13	Electric drill	1	Makita	8406C
B-14	Rheometer	1	Sun Scientific	CR-500DX-S
B-15	Food thermometer	2	Chino	MF-1000
B-16	Incubator	1	Isuzu	EPFR-115S
B-17	Tapping test bar	1	Sun Food Machinery	None
B-18	Vacuum can tester	1	Sun Food Machinery	None
B-19	Can inner pressure tester	1	Sun Food Machinery	None
B-20	Electric can opener	1	Shinkousha	EC-1
B-21	Fret saw / Fret saw blade	1	Futaba	TN-05/17
B-22	Vernier caliper	1	Mitutoyo	500-152

No.	Item	Qty	Maker	Model
B-23	Can seaming micrometer	2	Mitutoyo	147-103
B-24	Center thermometer (Low temperature type)	1	Sun Food Machinery	None
	Center thermometer (High temperature type)	1	Sun Food Machinery	None
B-25	Refract meter	1	ATAGO	N-1 α
	Refract meter	1	ATAGO	N-2E
	Refract meter	1	ATAGO	S-10E
B-26	Vacuum packing machine	1	Nishihara	TVS-6000
B-27	Laboratory chair	3	OGAWA	CTL-5
B-28	Cabinet for reagent	1	OGAWA	LHA-1200S
B-29	Cabinet for apparatus	1	OGAWA	LHA-1200S1
B-30	Mortar (Electrical powered)	1	Nitto kagaku	ANM-150
B-31	Automatic potentiometric titration unit	1	Metrohm	716/2-20
B-32	Blender	1	Waring	58985-012
B-33	Aspirator	1	Sibata	WJ-20
B-34	Cool water circulator	1	Tokyo Rikakikai	CA-1111
B-35	Submergible (dip-type) cooler	1	Sibata	IC-131F
B-36	Homogenizer	1	OMNI	TH-220
B-37	Electric balance, 0.01mg - 42g and 0.1mg - 210g	2	A&D	GR-202
	Electric balance, 0.01g - 3000g	2	A&D	GF-3000
	Electric balance, 0.001g - 310g	1	A&D	GF-300
B-38	Heating mantle, 500ml flask	1	Sibata	SAFS-5
	Heating mantle, 1000ml flask	1	Sibata	SAFS-10
	Heating mantle, 1000ml beaker	1	Sibata	SGBS-10
B-39	High-speed refrigerated centrifuge	1	Tomy Kogyo	GRX-220

No.	Item	Qty	Maker	Model
B-40	Dryer	1	Sibata	SSKS-12S
B-41	Kjeldahl nitrogen analyzer	1	BUCHI	K-424
B-42	Magnetic stirrer	1	Sibata	MGP-301
B-43	Magnetic stirrer (with heater)	1	Sibata	MGH-320
B-44	Meat chopper electrically powered	1	OHMACHI	OMC-22
B-45	Small pulverizer	1	Sibata	SCM-40A
B-46	Electric furnace (Muffle furnace)	1	Sibata	ETR-17K
B-47	Oil bath	1	Advantec Toyo	OC-220
B-48	pH meter	1	TOA	HM-20J
B-49	Rotary evaporator with cool water circulator	2	BUCHI	R-205V-O
B-50	Salt analyzer	1	TOA	SAT-210
B-51	Test tube mixer	1	Sibata	TTM-1
B-52	Shaker	1	IWAKI SANGYO	V-SX
B-53	Soxhlet fat extractor	1	BUCHI	B-811
B-54	Stirrer (propeller type), 4 - 6kg.cm	1	Shinto kagaku	BL600
	Stirrer (propeller type), 1.5 - 3kg.cm	1	Shinto kagaku	BL1200
B-55	Water activity measuring unit	1	Rotronic	AW pro1
B-56	Moisture meter	1	A&D	AD-4714A
B-57	Water bath, 3.7L	1	Sibata	WB-23
	Water bath, 7L	1	Sibata	WB-10E
B-58	Hot plate	1	Sibata	EC-7050
B-59	Pure water supply unit	1	Advantec Toyo	GS-990
B-60	Ultrasonic cleaner	1	Sibata	SU-6TH
B-61	Ultrasonic pipette cleaner	1	Sibata	PU-100

No.	Item	Qty	Maker	Model
B-62	Automatic washer	1	Asahi Lifescience (Lancer)	810LX
B-63	Hume hood (Draft chamber)	1	Sibata	DSA-157C
B-64	Heavy metal eliminator	1	Shimadzu Rika	DP-50
B-65	Neutralization system for drain water	1	Tohkemy	TPC-03
B-66	Refrigerator for reagent	1	Daiwa	221LCD
B-67	Freezer for reagent	1	Sanyo	MDF-436
B-68	Refrigerator for sample	1	Daiwa	201CD
B-69	Freezer for sample	1	Sanyo	MDF-436
B-70	Balance table	2	OGAWA	BLC-900S
B-71	Laboratory center table (Flat type)	1	OGAWA	QCA-I- 2400PS
B-72	Laboratory chair	4	OGAWA	CTL-5
B-73	Cabinet for apparatus	2	OGAWA	LHA-900S1

(C) Sensorial Analysis Laboratory

No.	Item	Qty	Maker	Model
C-1	Electric balance, 0.01g - 310g	1	A&D	GF-300
	Electric balance, 0.01g - 3000g	1	A&D	GF-3000
C-2	Food thermometer	2	Chino	MF1000
C-3	Microwave-oven	1	Sanyo	EM-A1700
C-4	Cooking range	1	Tanico	None
C-5	Refrigerator for sample	1	Daiwa	201CD
C-6	Freezer for sample	1	Sanyo	MDF-436
C-7	Laboratory work table (Stainless steel)	1	OGAWA	SCT-1800S
C-8	Laboratory chair	3	OGAWA	CTL-5
C-9	Cabinet for apparatus	1	OGAWA	LHA-900S