

Summary of Candidate Project (Project Code: C-6)

1. Name of Candidate Project

Strengthening and Improvement of Cold Chain System of Shrimp and Human Resource Development

2. Implementing Agency

Fishery Technological Development Division

Bureau of Coastal Aquaculture Research and Development and Fish Inspection and Quality Control Division

Department of Fisheries (DOF)

Ministry of Agriculture and Cooperatives (MOAC)

3. Type of Scheme

Technical Cooperation

4. Project Area

Regional (Specific project area is to be determined before or at the beginning of the Project)

5. Project Period

3 Years

6. Rationale

(1) Present situation

Aquaculture has been developed in Thailand, especially shrimp since mid 1980s. The production of shrimp from aquaculture has increased dramatically from 45,000 tons in 1983 to 300,000 tons in 1993. Estimated figure for production of aquaculture shrimp in 2000 and 2001 were 309,862 tons and 280,007 tons respectively (Fisheries Economics Division 2002). Shrimp has become a major export commodity. The export of frozen shrimp have risen from 20,000 metric tons in 1983 to 121,000 metric tons in 1991 and became 119,435 metric tons in 2003 at a value of 35,951 million baht from export (Fishery Foreign Affairs Division, 2004).

(2) Problems / Constraints

As described in Appendix C-6-1, in shrimp cultivation farms, after 4 months cultivation, shrimp harvesting is carried out by farmers or collectors. Generally collector play an important role on shrimp catching, follow by sizing of shrimp , packaging with ice and loading into un-refrigerated truck before transport directly to manufacturer or through central market. The quality of shrimp are involved with many parameters such as time of sizing, washing condition, water and ice quality, sanitary of loading place especially personnel hygiene of operator. Besides these, the most important parameter is the temperature during transportation which generally using ice in the truck for cooling shrimp during distribution to manufacture or central market. Transportation time and cooling temperature have large impact of shrimp quality.

As mentioned above decompose of shrimp and contamination by pathogenic microorganisms, especially *Salmonella* sp. and *Vibrio* spp. which resulting in product detention by some importing regulatory authorities, for instance, Japanese Government.

(3) Improvement of Cold Chain System Project

Therefore strengthening and improvement of cold chain system of shrimp and human resource development will be one of the way to improve and increase the quality and safety of shrimp. Furthermore human resource development especially the awareness of operator is the most important thing that should be done first.

7. Overall Goal

Good quality and safety shrimp supply in food chain.

8. Project Purpose

To increase the quality and safety of shrimp through collector facilities including quality system management.

9. Outputs

- a. Four model collecting places
- b. Cold chain storage
- c. Department of Fisheries (DOF) staffs are trained to be trainer 50 persons.
- d. Two hundred persons from private sector (Farmer, collector, central market and factory) will be trained.

10. Activities

- a-1. Committee will be established.
- a-2. Long term expert and committee organized Working group (DOF, Farm, Collector, Factory)
- a-3. Training in Japan for working group for one week
- a-4. Setting up project plan
- a-5. Situation survey of quality and safety of shrimp
- a-6. Cold chain management Technology Training for project
 - 1. GAP of harvesting
 - 2. GMP of farm, collector and central market
 - 3. Improve quality and safety of handling raw material
- a-7. Implementing and collecting data
- a-8. Comparison the system before and after implementation
- a-9. Establish operation Manual for farm, collector and central market
- a-10. DOF organize Seminar for technology transfer.

11. Inputs

(1) Input from the Thai Government

- 1) Office for project
- 2) DOF staffs of 50 persons as trainee
- 3) Operation cost of program committee and working group
- 4) Necessary equipment
- 5) Other necessary cost for in-country training course

(2) Input from the Japanese Government

- 1) Two long-term experts :
 - Cold chain storage technology
 - Distribution management
- 2) Two short-term experts
 - Post harvest technology in aquatic animal handling
 - System analysis
- 3) Necessary Equipment
 - Data loggers for temperature record
- 4) Training course in Japan for working group 15 persons for 1 week on aquatic animal handling
- 5) Seminar in Thailand

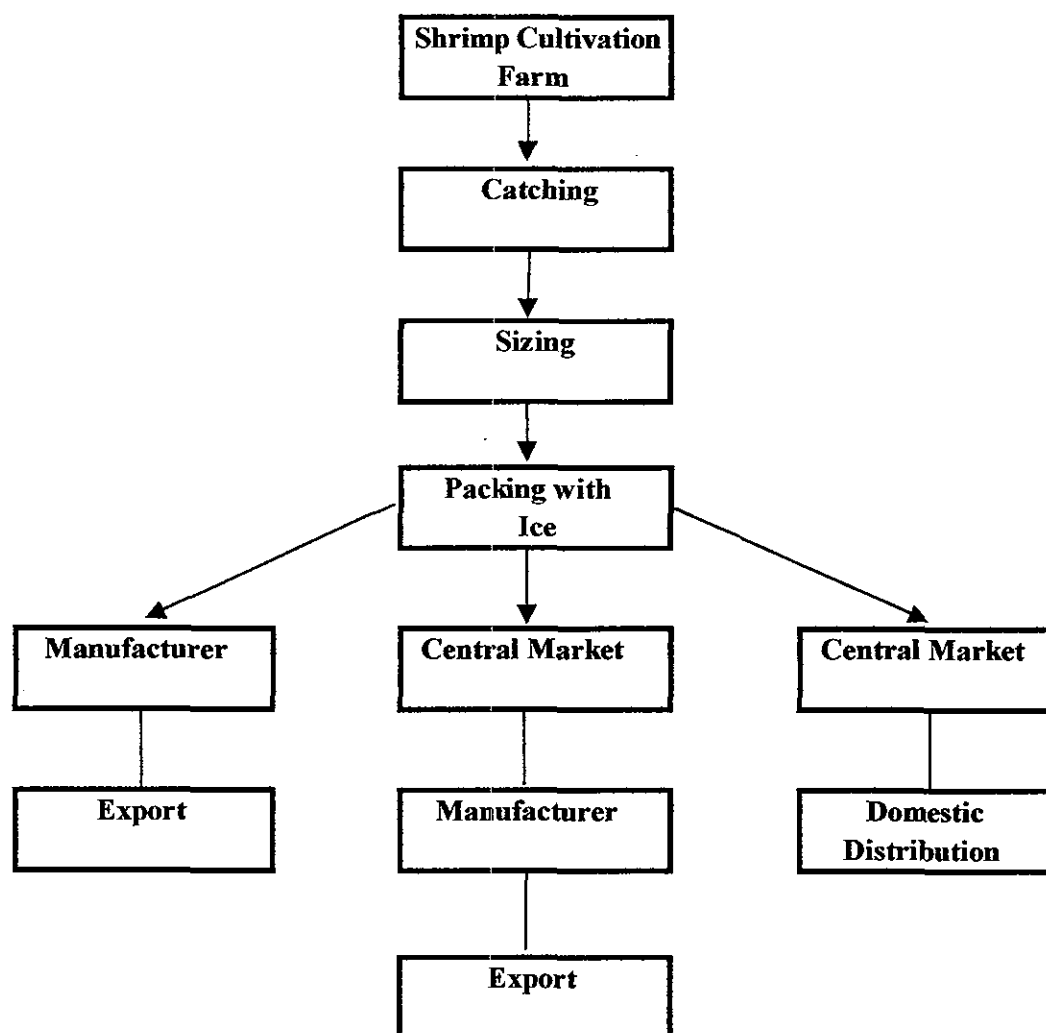
12. Expected Benefits

Improvement of aquatic animal handling technology will be gained.

1,000 cultivation farms, 80 collectors, central market 20 places and 50 factories

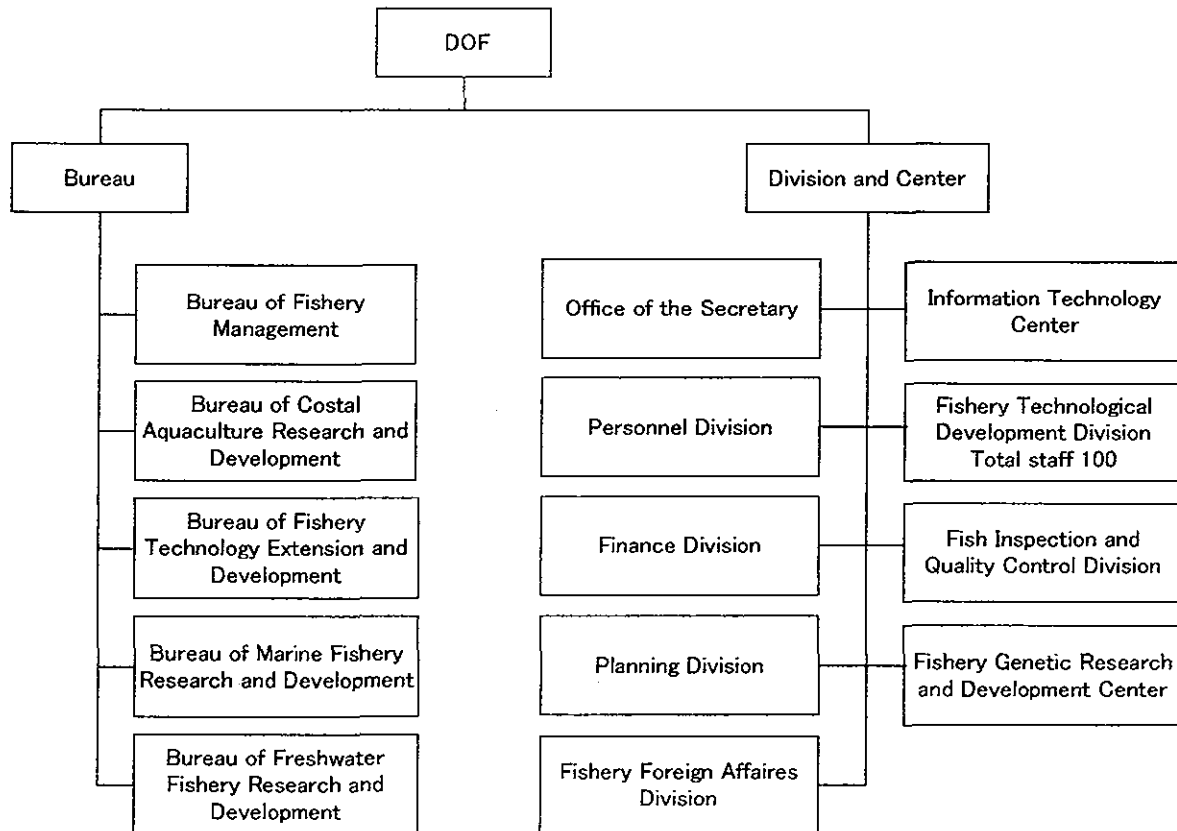
Appendix C-6-1

Distribution of shrimp from farm to manufacturer



Appendix C-6-2

DOF Organization Chart Bureau, Division and Center



Summary of Candidate Project (Project Code: C-7)

1. Name of Candidate Project

Strengthening and Improvement of Cold Chain System of
Poultry Product and Human Resource Development

2. Implementing Agency

Bureau of Livestock Standard and Certification
The Department of Livestock Development (DLD)
Ministry of Agriculture and Cooperatives (MOAC)

3. Type of Scheme

Technical Cooperation Project

4. Project Area

Bangkok

5. Project Period

3 Years

6. Rationale

(1) Present situation

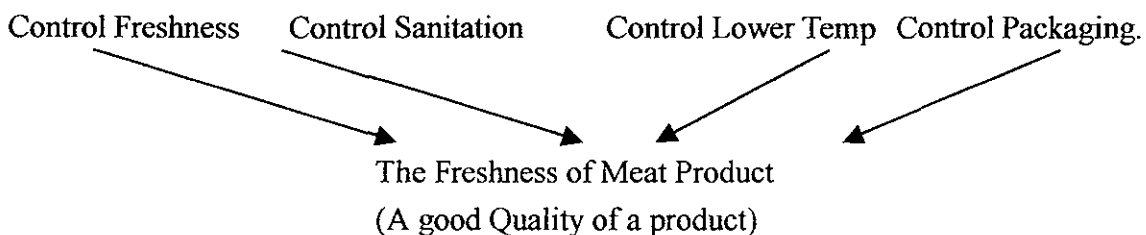
Transportation of product is one of the important to furnish the safety guard to consumer. However time and temperature abuses to product during transportation often happen. In addition, other filthy and contaminants also implicate. Therefore while transporting product, extensive precautions and preventive measures should be designed to handle the said mistreats and improved the cold chain system.

In the field of world market poultry meat and poultry product of Thai's food industry are grows extensively. Modern facilities producing poultry products for export usefully demand the refrigerated lorry during their product transportation domestically and internationally to distributing center or the market. But this application is not carried out by all plant. Because of they consider meat as fresh when it is warm and regard meat as not fresh when it is chilled. This opinion also stands in consumer up to the present. This misunderstanding mind needs technology knowledge input.

The DLD office is responsible for meat hygiene and science carried out the trails to inform about the cold chain system and encourage consumer to consider the chilled treatment as the normal choice for fresh product. In order to strengthen and improve cold chain system, therefore, modern technology in cold chain system and good distribution management can provide the strong in pulse to consumer that chilled product make safety and quality.

(2) Problems and Constraint

The concept of Cold Chain System is not only meaning of the storage system but it can related to the freshness, sanitation and packaging of that product



DLD has a cold chain rule requirement writing inside of a standard slaughter house and the processing standard of each commodity but it a widely general detail not specific of what kinds of livestock product is suitable for what temperature, for example slaughter house standard explain of how to storage of carcass, meat and organs which, the temperature in the middle of the meat should be 4-10 C. But DLD must to specific of what kinds of product and exactly the temperature that suitable for that commodity. It's sometime make of the person in charge misunderstood what is the right temperature to control. The important problems which affect to the exporting of poultry product are decomposing poultry meat and contamination by pathogenic *Campylobacter*, *Listeria*, *Salmonella* which, resulting in product detention by importing regulatory. DLD need more information technique to improvement of human resource development in cold chain system to increase the quality and safety of exporting of Thai's poultry product to the world market.

7. Overall Goal

Improve of quality and safety of poultry product during transportation from slaughterhouse, processing plant, storage until distributor.

8. Project Purpose

Upgrade quality and safety of poultry product through transportation practices, storage facilities including distributor facility and practices.

9. Outputs

- a. Model of Cold Chain facilities and practices is established.
- b. 100 trainers of trainer from Government Officer and 100 of Private Sector will be trained.

10. Activities

Training Course of Technical facility and practices also including management of Cold Chain System for poultry product related to Slaughterhouse, Processing Plants and Distributor Standard System (GMP/HACCP) to the Government Officer and Private Sector.

11. Inputs

(1) Input from the Thai Government

- a. Assignment full-time counterpart staff
- b. Project Office with necessary equipment.
- c. Building and facilities required for the project.
- d. Expenses related with the counterpart staff.
- e. Technology transfer center by DLD

(2) Input from the Japanese Government

- a. 2 long-term experts in cold chain technology system and cold chain supply management distribution.
- b. Expenses necessary for the above.

12. Expected Benefits

Directly poultry farmers and indirectly supply chain.

Appendix C-7-1

Training program for the Cold Chain System & Good Quality of Poultry Meat Product

Purpose

Human resource development of Good Quality System for Poultry Products

Target group

- Slaughter House
- Processing Plant
- Distribution Center

Contents of training program

- Control of Freshness
- Control of Sanitation
- Control of Low temperature
- Control of Packaging

Summary of Candidate Project (Project Code: C-8)

1. Name of Candidate Project

Improvement of Packaging Systems in Fruit and Vegetables

2. Implementing Agency

Postharvest and processing Research and Development of Office (PPRDO)

Department of Agriculture (DOA)

Department of Agriculture, Ministry of Agriculture and Cooperatives (MOAC)

3. Type of Scheme

Technical Cooperation Project

4. Project Area

Bangkok

5. Project Period

3 Years

6. Rationale

(1) The view of the actual situation

Packaging, not only plays a vital role in protecting the products, but also maintains the quality of the products and helps in preventing recontamination to the product from improper handling along the supply chain. However, recently some researches showed that packaging material itself can also contaminate into the food and cause undesirable characteristics to the products. Migration of some compounds from packaging materials may also contribute to health problem, especially in ready to use or ready to eat products, which include fresh fruit and vegetables.

Thus, developing safe packaging is a major policy of Thai Government. In fruit and vegetable sectors, training and education is a major concern to urge all sector of the safety issue awareness. The development of safe and sanitary packaging for fresh fruit and vegetables and/or technology transfer from Japanese experience will be beneficial to Thai people and industries.

Thailand is the natural treasury country with many vegetables and fruits products.

Packaging plays an important role as a means for maintaining delicacy and delivering this products safely and fresh to our table.

(2) Problems and constraints

As for the present distribution form of the vegetables and fruits products, transpiration packaging is restricted to the carton box, bamboo basket, plastic container and plastics bag, EPS (Expanding Polystyrene) carton, etc.

The consumer package is restricted to polyethylene, polypropylene bag, and polystyrene paper, oriented polystyrene tray and polyethylene stretching film packaging etc., and has not satisfied with protecting, convenience, and display function in food packaging.

The vegetable and fruits market and packaging style in Thailand is shown on Table C-8-1 (Consumer Packaging), Table C-8-2 (Wholesale Market)

**Table C-8-1 The vegetables and fruits market and packaging style in Thailand
(Consumer Packaging)**

No.	Item	Packaging Material	Remarks
1	Dry Fruit	OPP/CPP	Normal Package
2	Pumpkin	Stretch PE	With Label
3	Potato	CPP Pouch	With Label
4	Chinese Cabbage	Stretch PE	With Label
5	Spinach	Printing CPP	
6	Salad	OPS CUP	With Label
7	Water Melon	Stretch PE	With Label
8	Mushroom	PSP Tray	
		Stretch PE	With Label
9	Orange	PP Net	
10	Apple	Pin Hole PE	With Label
11	Pineapple	PSP Net	With Label

Note: OPP: Oriented Polypropylene CPP: Casting Polypropylene
 PE: Polyethylene OPC: Oriented Polystyrene
 PSP: Polystyrene paper PP: Polypropylene

**Table C-8-2 The vegetables and fruits market and packaing style in Thailand
(Wholesale Market)**

No.	Item	Packaging Material	Remarks
1	Onion	PE bag	Domestic
2	Pumpkin	Bamboo basket	Domestic
3	Carrot	Corrugated paper	Domestic
4	Broccoli	Expanding PSP	Domestic
5	Poteto	Corrugated paper	Domestic
6	Kidney bean	PE bag	Domestic
7	Apple	Corrugated paper	China (Import)
8	Lemon	Corrugated paper	Import
9	Banana	PE basket	Domestic
10	Pear	Corrugated paper	Import
11	Melon	Corrugated paper	Import
12	Mangosteen	PE Container	Domestic

Note: PE: Polyethylene PSP: Polystyrene paper

There are some constraints for food packaging in Thailand as follows;

- Difficulty to protect fruit and vegetables from damage during transportation with existing packaging materials as above mentioned
- Difficulty with purchasing packaging materials and equipment
- Insufficient research and development for packaging system
- Lack of awareness and information for packaging system

But packaging cannot be ignored, because this is important factor that gives much impression and trust regarding safety and quality not only for domestic market but also for international market.

(3) Project Idea

As the method of sending a vegetables and fruits products to under a consumer, especially deliciously, safely in the fresh state.

- 1) Introduction of the packaging technology combined with corrugated paper and shock absorbing material. (Buffer function)
- 2) Fixing of the keeping temperature control packing system that enables low-temperature distribution.
- 3) Ready-to-Eat (Control Atmosphere Packaging) which hammered out simple nature on the assumption that export is needed from now on.

Concept Figure of Food Packaging System is shown Fig.C-8-2 in each category.

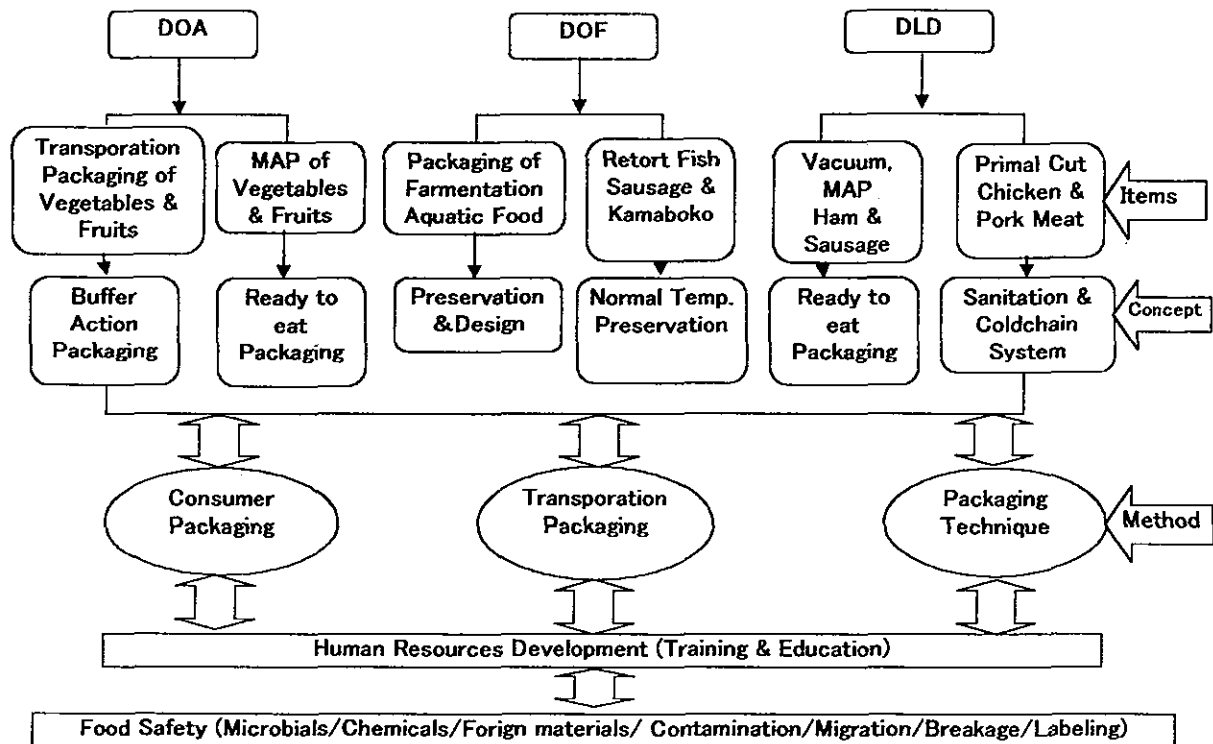


Fig. C-8-2 Concept Figure of Food Packaging System for Project Formation

Based on these problems, improvement in consciousness, and education and training of people engaged in vegetables and fruits products distribution system can be it the subject left behind from now on.

Through introduction of packaging consultant education and license system in Japan, the packaging technology for fruit and vegetables products distribution system can will be improved with establishment of necessary association for human resource development of food packaging. The curriculm of Packaging Consultant Training Course in Japan is shown in Appendix C-8-1.

7. Overall Goal

- Improvement of packaging technology for fresh fruit and vegetables including design and testing.
- Establishment of education program for packaging expert.
- Establishment of packaging testing center.

8. Project Purpose

- To educate and develop the awareness of packaging role contributes in food safety

and quality for fruit and vegetable industries and supply chain.

- To apply the safe packaging to some tropical fruit and vegetables.

9. Outputs

- Thai researchers are trained in packaging in Japan
- Safe packaging systems for fresh horticultural produces.

10. Activities

- Training course on role of packaging in food safety.
- Training course on consumer packaging and modified atmosphere packaging.
- Training course on packaging test.
- Application of Japanese packaging system to fruit and vegetables.
- Technology transfer of new Japanese packaging technology for fresh horticulture produces.
- Develop safe packaging for fresh fruits and vegetables.

11. Inputs

(1) Input from the Thai Government

- 1) Research team (10).
- 2) Supporting staffs (15)
- 3) Existing Postharvest Laboratory
- 4) Office for the experts
- 5) Training facilities
- 6) Other necessary cost

(2) Input from the Japanese Government

- 1) One long-term experts in safe packaging system development
- 2) One long-term expert in flexible film packaging and modified atmosphere packaging.
- 3) Short-term experts in package testing and analysis.
- 4) Food packaging training in Japan (3-6 months)
- 5) Packaging test training program in Japan
- 6) Packaging and packaging testing equipment
- 7) Other necessary cost

12. Expected Benefits

This project has direct impact on Thai people' health and safety. It will help promoting using safe food packaging in all sectors from grass root level to the industrial level along the supply chain.

This will also help promoting export of Thai products. This project will benefit more than 100 exporters, 1,000 of small and medium enterprise (SME) that dealing with fresh fruit and vegetable industries, including primary operators and growers.

Appendix C-8-1 Curriculum of Packaging Consultant Training Course

Packaging CONSULTANT Training Course is organized by Japan Packaging Institute and opened according to a schedule as shown below. This is 3 months packaging course. Training participants are requested to select either of the courses marked with (*).

General Information

Concept of Packaging, Packaging Management, Logistics Management, Packaging Functions, Standardization, Packaging Systems & Line, Packaging & Environment, Universal Design.



Materials

Paper Containers, Corrugated Paper Board, Plastic Film and Containers, Metal Box, Glass Box, Sealing & Tying materials, Adhesives, Quality Evaluation of Packaging Materials.

(*) Transportation Packaging Course

(*) Consumer Packaging Course

Distribution Channel

Market Research & Product planing

Exporting Packaging

Display & Indication

Assembly Packaging Design

Printing & Packaging

Testing Methords of Freight & Containers

Food Packaging Technology

Cushioning Packaging Design

Pharmaceutical Packaging Design

Wooden Box Packaging Design

Safe & Sanitation of Packaging

Corrugated paperboard Packaging Design

Food Preservation

Systematization of Logistics

Keeping Freshness

Standardization of Transport Packaging

Quality Control of Packaging Line

Systematization of Packaging Line

Various Kind of Laws on Packaging



Submissino of Assigned Reports



Practical Training

Practical Training

Practical Training

Practical Training

Packaging Design

Packaging Design

Packaging Design

Packaging Design

for

for

for

(Graphics)

Heavy Products

Light Products

Food & Pharmaceuticals



Examination (Written Exam. & Interview)



Packaging Consultant

Summary of Candidate Project (Project Code: C-9)

1. Name of Candidate Project

Improvement of Packaging Systems in Fishery products

2. Implementing Agency

Fisheries Technological Development Division, Department of Fisheries (FTDD)

Department of Fisheries (DOF)

Ministry of Agriculture and Cooperatives (MOAC)

3. Type of Scheme

Technical Cooperation Project

4. Project Area

Bangkok and related area (Specific project area is to be determined before or at the beginning of the Project)

5. Project Period

3 Years

6. Rationale

(1) Present situation

Fishery Technological Development Division (FTDD) is one of Division in Department of Fisheries, which is responsibility in developing post-harvest technology, improvement of quality control and management system also providing technological solution for Fishery products in tend for both domestic consumption and export. In 2004, the Government of Thailand launch of “Food Safety Policy” to promoting Thailand food safety policy. It needs more technology to establish of education program from food package expert to improve the food packaging technology, design and testing. Moreover, the developing of awareness and how packaging can contribute food safety and quality of fishery and fishery product must comply with the international trade.

The organization of Fishery Technological development Division (FTDD) is shown in C-9-1.

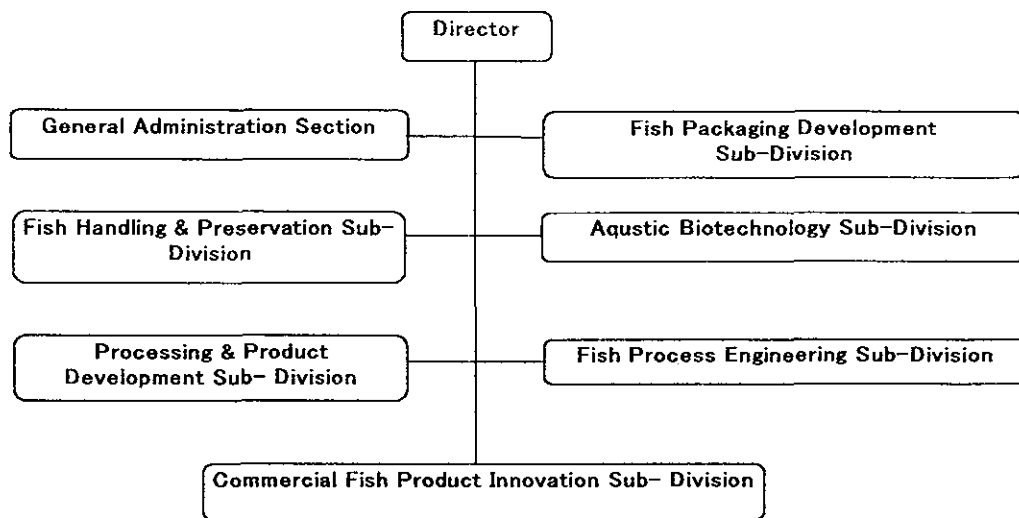


Fig. C-9-1 Organization of Fishery Technological Development Division (FTDD)

The production amount of Fishery Products in value in 2003 shows US\$3,912million and the growth of 1.06% compared with last year. And 34.05% is occupied by the whole percentage.

As items, Frozen shrimp, Shrimp processed product, Tuna canned food, Cuttlefish, Octopus products, Kamaboko and Surimi and so on.

The import countries of the frozen shrimp and processed product which are trade occupies ranking with U.S.A., Japan, and Singapore.

The marine product market of Thailand is divided into three types such as: the unpacked products in a stall, a consumer package and export packaging. Domestic market has the simple packaging, such as processed products (dried fish, preserved fish in salt) by using water activity control, boiled fish paste (Kamaboko), and fresh fish and shellfishes.

And vacuum packaging boiled fish paste (Kanikama), frozen shrimp, and canning tuna etc. have been used for export packaging products.

The consumer packaging in the market in Thailand is shown in Fig.C-9-1.

Table -2 Consumer packaging of Fish and Shellfishes (Supermarket)

No.	Item	Packaging Material	Remark
1	Dry Fish	OPP/LDPE	Normal Package
2	Cut Fish	A-PET/LDPE	Vacuum Pack
		OPP/LDPE	Vacuum Pack
3	Steam Mackerel	Glass Bottle	With Label
4	Whole Fish	PSP Tray	
		Stretch LDPE	With Label
5	Cut Fish	OPP/LDPE Pouch	Normal Package
6	Fish Sausage	LDPE Pouch	Normal Package
7	Ball Kamaboko	OPP/LDPE Pouch	Vacuum Pack
8	Cattle Fish	PSP Tray	
		Stretch LDPE	With Label

The actual condition of the food packaging in Thailand does not progress compared with other industrial countries, but it is in use of mainly general purpose packaging material, i.e. simple packaging for dry foods.

Moreover, it is difficult to expect long-term preservability and to hold the freshness of food because of insufficient the cold chain transportation system. Therefore, export manufacturer mainly use frozen foods and canned foods.

Presently packaging industry of Thailand mostly produce can and glass bottle as packaging materials. But in Japan plastic and paper material are produced by many packaging industry because they are light, easy to open, variable shaping and more cheaper than can or glass with consideration of improvement food quality and food safety.

The comparison of the percentage of the packaging material of Thailand and Japanese market was shown in C-9-2.

Table C-9-2 Comparison of the production quantity for packaging materials of Thailand and Japan

No.	Item	Thailand(%)	Japan(%)
1	Metal	20	11
2	Paper	40	59
3	Glass	15	8
4	Plastic	25	18
5	Wood		4
	Total	100	100

Year: 2002, Based on production quantity

Fisheries Technological Development Division, Department of Fisheries (FTDD) of Department of Fisheries (DOF) is now considering to develop new packaging system for

long-term preservation and transportation in normal temperature without cold chain system to utilize fishery products such as Retortable processing products to replace canned food.

The Concept Figure of Retortable Packaging system for Fishery Products was shown in C-9-3.

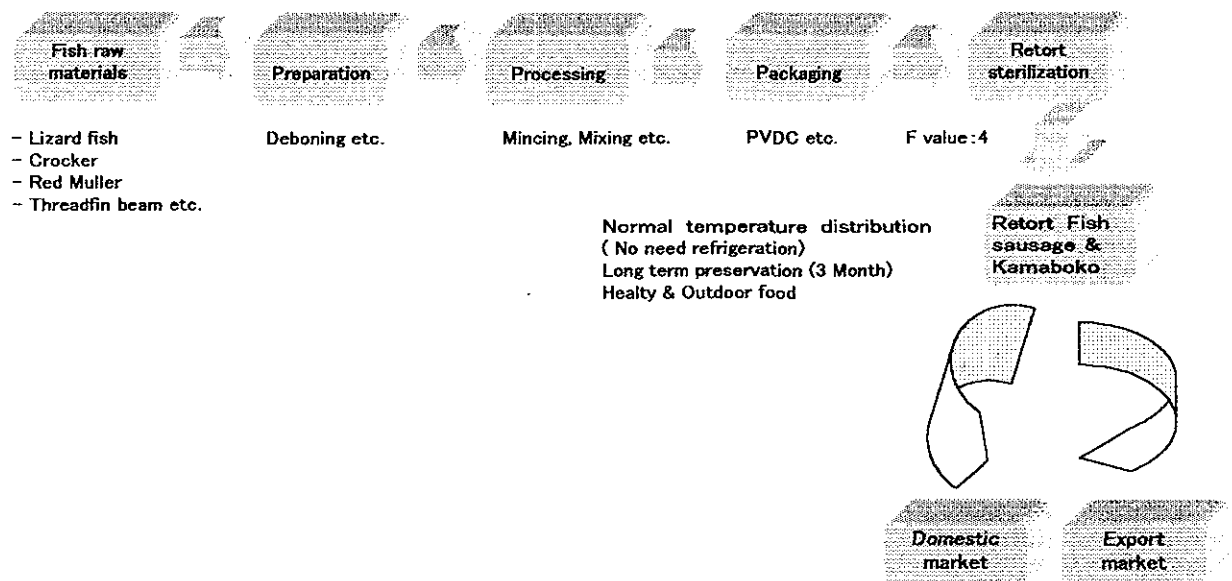


Fig. C-9-3 Retortable packaging system for fishery products

7. Overall Goal

Food packaging technology, design and will be improved and established.

8. Project Purpose

To acquire the knowledge of packaging for food in order to improve the quality in term of food safety and value of exporting.

9. Outputs

New/Modern and appropriate method of Thai food packaging technology will be introduced.

10. Activities

- Coordination management committee will be established

- Training courses of packaging technology for food safety will be carried out.
- Training of the trainers will be conducted.
- New packaging technology for food will be introduced.
- Booklets of fish and fishery products packaging will be published.
- R & D activities of new packaging for fish and fisheries products will be conducted.
- Market research will be carried out.
- Fish packaging in term of food safety and environmental friendly campaigns will be promoted.
- Fish and fishery products in an appropriated package and well designed will be launched in the domestic and international market.

11. Inputs

(1) Input from the Thai Government

- 1) Counterpart (Fish Packaging Development Sub-Division)
- 2) Staff, (3-5 persons)
- 3) Office space (FTDD)
- 4) Trainees (30-50 persons)

(2) Input from the Japanese Government

- 1) Three long-term experts on Improvement of packaging : Consumer packaging (Flexible packaging for non-heat treatment and retort sterilization processed food), Transpiration packaging (exporting packaging) and Packaging technology training (Packaging design, processing, evaluating and marketing, etc.)
- 2) Training course in Japan 2-3 persons per year for 2 months on
 - Flexible packaging technology
 - Packaging for distribution of fresh and processed fish
 - Packaging technology for traditional fishery products as salted fish, dried and smoked fish, fermented fish, marinated fish as well as fish sausage and chilled fresh fish.
- 3) Necessary equipment and samples of packaging material for R & D
 - Retort pouch system
 - Flexible packaging and plastic container (cup and tray include scaling machine)

12. Expected Benefits

The 500 fishery product's factories will be gained including 10,000 farmers.

The safety of the aquatic food products from Thailand can be improved using the three major functions which packaging technology has protection, convenience, display effect.

By using marine resources effectively, packaging and processing technology are fixed in Thailand and promotion of the export and activation of the domestic market can be expected.

Summary of Candidate Project (Project Code:C-10)

1. Name of Candidate Project

Improvement of Packaging System in Livestock Products

2. Implementing Agency

Department of Livestock Development

Ministry of Agriculture and Cooperatives

3. Type of Scheme

Technical Cooperation Project

4. Project Area

Bangkok and related area (Specific project area is to be determined before or at the beginning of the project)

5. Project Period

3 years

6. Rationale

(1) Actual situation and hurdle

Packaging system functions according to market force. The purposes packaging are securing food safety, preservation of product, quality control, and information distribution to consumer.

Introduction of recent idea for food safety to food package and packaging system in Thailand is very slowly because of following constraints;

- Difficulty with purchasing packaging materials and equipment
- Insufficient research and development for packaging system
- Lack of awareness and information for packaging system

But packaging cannot be ignored, because this is crucial factor that gives much impression and trust regarding safety and quality not only for domestic but also for international market.

According to the statistics in 2003, the shipment value of Meat and Meat Product is US\$1,110 million, and the pace of expansion of 110% compared with last year is shown.

Recent meat production figures was shown in Table C-10-1.

Table C-10-1 Recent meat production figures in Thailand (Thousand Heads)

Year	Production of Chicken	Production of Pork	Production of Beef
1999	853,564	9019	938
2000	890965	9233	870
2001	952043	9968	845
2002	986404	9876	—

In Thailand, there are two kinds of distribution of meat and meat products;

- consumer packaging in supermarket
- unpackaged meat selling in wholesale market and meat shop

The consumer packaging of meat by supermarket was shown in Table C-10-1.

Table C-10-1 Consumer packaging of meat (Supermarket)

No.	Item	Packaging Material	Remark
1	Pork Meat	Stretch PE/PSP Tray	With Label
2	Chicken Meat	Stretch PE/PSP Tray	With Label
3	Sausage	PET/LDPE Pouch	Vacuum Pack
4	Ham	A-PET/LDPE Tray	Vacuum Pack
		OPP/LDPE Lid	Vacuum Pack
5	Sausage	LDPE Pouch	Normal Package
6	Sausage	PVDC	Aluminum Clip

In case of distribution system of meat tends to receive contamination of a microbe and such as transpiring of moisture, flesh colored change, and mixing of a foreign substance, needs to ensure the safety of food.

In case of meat packaging and cold chain system, the packaging personnel training of a related section is very important for good maintenance of facilities, improvement in packaging material processing technology to secure meat safety.

It is necessary to improve the contents of each work and to reconstruct a packaging system for export promotion and stimulation of domestic demand.

In the present time, Thai packaging organization was shown in Fig. C-10-2.

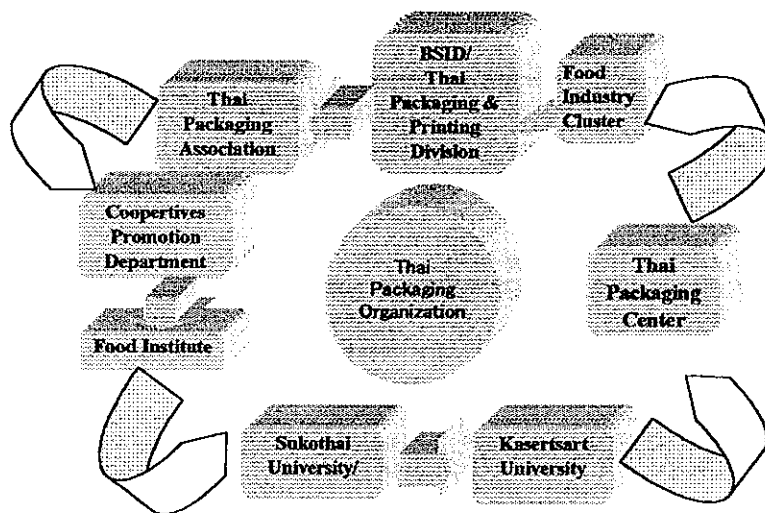


Fig. C-10-2 Various Packaging Organization of Thailand

7. Overall Goal

- Improved of food packaging technology, design and testing
- Establishment of education program of food packaging by expert

8. Project Purpose

- A proper packaging technology for livestock product can be available
- Development of awareness which are important role in food safety and improved of quality of livestock product with packaging technology

9. Outputs

Know how in packaging technology from primary until end of livestock product

10. Activities

- Study and training of food safety packaging technology in Thailand and Japan
- Technology transfer of new packaging to Government Officer
- Training Course for consumer and private sector regarding on packaging of food safety

11. Inputs

(1) Input from the Thai Government

- 1) Assignment full-time counterpart staff and trainee
- 2) Project Office

- 3) Building and facilities required for the project
- 4) Expenses related with the counterpart staff
- 5) Technology transfer center by DLD

(2) Input from the Japanese Government

- 1) 3 long-term experts in packaging technology, consumer, transpiration packaging and training expert
- 2) Express necessary for the above

12. Expected Benefits

Pork meat and chicken products industry of supply chain and relative person was improved and the safety of meat can be assured while the export promotion of meat and stimulation of domestic demand are expected.

Summary of Candidate Project (Project Code: C-11)

1. Name of Candidate Project

Improvement of Supply Chain Management for Fruit and Vegetables: Postharvest Handling and Cold Chain Management

2. Implementing Agency

Processing and Postharvest Research and Development Office (PPRDO),
Department of Agriculture (DOA),
Ministry of Agriculture and Cooperatives (MOAC)

3. Type of Scheme

Technical Cooperation Project

4. Project Area

Production and distribution area of Fruit & Vegetables (Specific project area is to be determined before or at the beginning of the Project)

5. Project Period

3 Years

6. Rationale

(1) Food Safety

Food safety has become one of the most important issues over the world. In Thailand, the recent outbreak of avian influenza and detection of antibiotic residues in shrimps and pesticide residues in vegetables exported from Thailand have forced the government and private sectors to strongly recognize the necessity of strengthening the food safety system. Food safety is becoming a new trade barrier in international market. On the other hand, food sector is one of the most important areas in Thailand. Export of Thai food ranked fifth in the world in value during the year 2000 to 2002. The government has a policy to promote Thailand as “the kitchen of the world”.

(2) Importance of Fruit and Vegetables in Thailand

Production of fruit and vegetables is a growing industry in Thailand. The survey report in the year 1999 shows that the area of 10.5 million acres contributes to the production of fruit and vegetables. Thailand's export statistical data for 2003 indicate that fruit and

vegetables share a significant proportion of the total Thailand food export values, with 11.22% (52,788 Million Baht). The export value for the year 2003 significantly increased from the year 2002 due to an aggressive trade promotion launched by the Thai government, and the development for products meeting markets' requirements. The key commodities include pineapple, longan, durian, mangosteen, longkong, asparagus, baby corn, sweet corn, beans, okra, etc. Main destination countries are USA, Japan, Netherlands, European countries, Taiwan, etc.

Vegetables are exported in the form of fresh and processed (dried, pickled, canned, and frozen). During the period from the year 1999 to 2002, an average export volume of 351,417 metric tons, valued at 12,606 million baht, a year was achieved.

Thailand is also recognized as the land of tropical fruits. More than 30 fruit commodities are produced for export. The products of export are also in many forms i.e., frozen, dried, sugared, vacuum-packed, in jam or syrup. In the year 2003, during the first four months, pineapple was the leading fruit export, in different forms, such as fresh, frozen, dried, sugared, and processed, as well as juice. Also, mangosteen, said to be the Queen of Tropical Fruit, is promoted for export. Its unique taste is favored around the world, increasing the demand.

(3) Distinguished Features of Fruit and Vegetables in terms of Food Safety

Fruit and vegetables have several distinguished features unlike other foods.

First, it is generally perishable which makes it difficult to maintain the safety and quality of these products, unless any appropriate measures have been taken.

Secondly, many commodities (varieties), having different physical and physiological property, are produced for export and domestic market, i.e. 73 for vegetables and 30 for fruit. This diversity also makes it difficult to handle each commodity properly, since measures to maintain the quality differs much by commodity.

Thirdly, its supply chain (market channels) is usually so complicated with many stages, which gives it more chance to cause some damage in quality than other foods.

Fourthly, its losses are in many cases related to "invisible damages". Namely, damages do not appear immediately when its causes arise, but come to appear only after some days. For instance, even when fruit is dropped directly to the ground in picking or strongly pressured by hand, the damage may not be visible at once in many cases until a number of

days after it has occurred, which makes it difficult to identify causes of the damages. This justifies necessity of handling each commodity carefully and in proper way at all stages of the food supply chain.

And lastly, production areas of fruit and vegetables in Thailand spread over the country, i.e. northern, western, eastern and central western regions. Farming system for fruit & vegetables is mostly based on a small plot farming. This leads to covering geographical areas, which may cause difficulty in management.

In order to ensure Food Safety for fruit and vegetables, it is in urgent need to develop and disseminate any practical technology and system, which should be the most appropriate in Thailand from technical and economical points of view.

(4) Problems / Constraints

<Significant Postharvest Losses>

Fruit and vegetables can be easily deteriorated after harvest and lose their marketability within a few days on shelf causing huge losses in economy, unless appropriate measures have been taken. Statistical data show that in developed country, post-harvest losses for plantation crops reach 10%, while horticultural products range from 5 to 25 %. In Thailand, the losses are mainly caused by high moisture content of produce, high respiration rate, and the infection from fungus and bacteria due to improper handling, storage, transportation and packaging. Such losses lead to less productivity, and also lower the nutrition value, taste and product price.

The perishable produces like fruit and vegetables are intrinsically damaged by its high metabolism rates. The study report in USA estimates that the yield losses of iceberg (vegetable) at wholesale market, retail market and consumer in each stage of supplied chain are 4.1, 4.6 and 7.1 respectively. Another study in the Royal Project in Thailand shows that the weight losses of produces (cabbage, iceberg and bell pepper) during transportation from the hill station to Chiangmai station are 4, 13 and 11 % respectively, while from Chiangmai station to Bangkok, the loss of three fresh produces are 54, 71 and 34 %, respectively. Also, several reports suggest that due to the lack of knowledge of the people involved and poor supply chain management, the loss may possible reach even to 100%. Education and dissemination of proper handling of these crops to the people involved in the supply chain is indispensable for reduction of postharvest losses, especially qualitative losses in terms of Food Safety.

For reduction of postharvest losses, the report under consortium of stakeholders concerned raises the following issues as the key objectives:

- (1) To develop highly qualified manpower in the field of postharvest technology
- (2) To conduct high quality and well coordinated research
- (3) To establish effective and interactive means for technology transfer

For postharvest losses of various commodities, many studies have been conducted in many countries and by many relevant bodies including international organizations for improvement, since long ago. However, in most cases, definition and method of the assessment of the losses are not made clear. For instance, there can be several definitions on losses of fruit and vegetables, such as: (a) Waste (throw away) only; (b) All unmarketable products including waste, animal feed, etc.; (c) “b” plus low grade marketable ones (Low grade marketable products can be considered as a kind of losses, because it can usually be sold only at lower prices than higher grades). Also, losses are classified into two (2) types; quantitative and qualitative, the latter being directly related to Food Safety. In the beginning of the project, the baseline study should be conducted to clarify the situation of the postharvest losses in Thailand, taking above-mentioned points into account.

<Improper Postharvest Handling>

Post-harvest handling with safe treatment and good hygiene are an important issue to ensure that the produces reach the consumer in safe condition for consumption. The contamination by *Salmonella* and *Escherichia coli* in fresh produces may cause food poisoning in human. The survey under National Research Council of Thailand reports some comparative study of the post-harvest handling at the collecting sites. It is found that the cleanliness of the place and the sanitary of the worker have direct correlation with the number of microbial population. It is also noted that the training and benchmarking between collecting sites apparently accelerate the development of the sanitary in place. Currently, the importing countries have set the criteria of acceptable number of the mentioned microorganisms in fresh produce. So, it is important for Thailand as the exporting country to establish the strategy to prevent the hazard contamination at all stages in food supply chain based on scientific information.

Temperature management is one of the most important issues for fruit and vegetables through the food supply chain including post-harvest treatment, storage, transport and packaging in order to maintain the produces in good conditions in terms of food safety

and quality. It should be noted that each commodity (variety) of fruit and vegetables has the most appropriate range (the lowest and highest) of temperature and humidity for storage and transportation, which differs by commodity. The hygiene and HACCP is also a major areas to be strengthened.

This project also aims at using organic chemicals for postharvest cleaning and preparation of the produces. In Thailand the general cleaning reagent is chlorine compound such as chlorine gas or salt of hypochlorite. The concentration of the cleaning reagent differs by the items of produces i.e., for cleaning asparagus, carrot, and chili pepper, the appropriate concentration of chlorinated water are 50-100, 5-10 and 300 ppm, respectively. However, there is high potential of using organic acid as alternative cleaning methods, for instance, citric acid and malic acid.

Major constraint among others is reported to be a lack of some scientific based information and dissemination of general knowledge to the relevant stakeholder at all levels. The training program for the post-harvest technology and the mechanism to extend the knowledge to the right people should be established. Implementation of this project will benefit all sectors involved in the food supply chain including consumers.

<Postharvest Handling in Thailand>

Improper postharvest handling methods are often observed in Thailand, that lead to an adverse impact on Food Safety from the aforesaid viewpoints, such as:

- (1) Harvesting in rough (careless) way
- (2) Temporary storage under sunshine on the farm without covering
- (3) Transportation by open truck or incomplete covering for long distances
- (4) Improper handling in collection, sorting, loading/ unloading
- (5) Storage under inappropriate temperature/ humidity
- (6) Mixture handling of different commodities in storage and transportation
- (7) Improper handling at wholesale/ retail markets
- (8) Improper packaging of the products for storage, transportation and marketing

In the beginning of the project, the baseline study should be conducted to find the present situation of the postharvest handling methods in Thailand, and identify the areas to be improved, taking above-mentioned points into account.

Sharing knowledge and experience of Japan in this area under Japan's Technical

Cooperation will greatly contribute to improvement of food supply chain management for fruit and vegetables, particularly postharvest handling and cold chain management.

(5) Model Commodities for the Project

Each commodity has its own characteristics. Therefore, specific technology is required by commodity to reduce losses in both quality and quantities. It is advisable for this project to take up the commodities of Okra, pineapple, mangosteen and leafy vegetables as a model for the following reasons:

Okra is one of the popular vegetables, which is mainly exported. Some leafy vegetables are reported to be microbe-contaminated so much due to improper and unhygienic handling. Pineapples contribute to the export, being a leading commodity of Thai fruit export to the world market. Mangosteen fruit has a relatively thick and strong peel that is not easily injured by strength. However, some environmental strike against the fruit, such as dropping downward to the ground, may cause any physiological change at the inner layer of the peel and probably damage the property of flesh. Research and development need to be done in order to reach an appropriate solution for the handling problem related to physiological change of mangosteen.

7. Overall Goal

Food safety and quality is ensured in supply chain of fruit and vegetables.

8. Project Purpose

Practical technology for management of the food safety and quality is disseminated in the area of post-harvest treatment and cold chain of the target commodity (fruit and vegetables).

9. Outputs

- a. Practical technology intended for improvement of food safety and quality (mainly shelf life) is developed for post-harvest treatment and temperature management of the target commodity (fruit and vegetables).
- b. System to disseminate relevant information on the technology development is established.

10. Activities

- a-1. To conduct the baseline study to find, analyze and evaluate the present situation

(problems / needs) in depth for the target commodities

- a-2. To identify and prioritize the technology areas to be improved for food safety
- a-3. To develop a group training program to be conducted in Japan, for Controlled Atmosphere (CA) Storage / transportation system, fruit/vegetables supply chain management and HACCP
- a-4. To select trainees and arrange training organizations, places, facility, equipment and trainers
- a-5. To develop and produce training materials
- a-6. To implement the group training in Japan
- a-7. To develop a practical improved technology (with higher performance at economically feasible cost) on post-harvest treatment and temperature management along supply chain of the target commodities
- a-8. To develop operation manual
- a-9. To conduct a pilot program (trial application of the developed technology), feedback to the original design and finalize it

- b-1. To publicize relevant information on the technology development through the Website, the Project Newsletter, Seminars and various media
- b-2. To establish a mechanism to exchange information among organizations / personnel concerned.

- c-1. To conduct monitoring / evaluation study, based on the Logframe and the Monitoring Schedule, and feedback for modification as required

- * The Logframe, the Monitoring Schedule and the Project Activity Schedule (Detail) are to be prepared before the project commences.
- * The Monitoring of the project will be conducted by the project member(s), while the Evaluation of the project will be made by an external task force.

11. Inputs

(3) Input from the Thai Government

- 1) Assignment of Counterpart Staffs
 - 1 -Project Manager (PPRDO)
 - 10 -Full time Supporting Staffs (PPRDO)
 - 20 -Supporting Staffs (PPRDO)
- 2) Project office
- 3) Existing Postharvest Laboratory

- 4) Buildings and facilities required for the project
- 5) Local expenses related with the counterpart staffs
- 6) Local cost required for implementation of the project

(4) Input from the Japanese Government

- 1) Dispatch of long-term experts (2)
 - Supply Chain Management
 - CA Storage System
- 2) Dispatch of short-term experts (3)
 - Postharvest treatment (Cleaning, Cooling, etc.)
 - Postharvest Physiology
 - Baseline Study / Project Monitoring
- 3) Group Training Programs in Japan
 - On the Job Training for Thai Researchers:
 - CA Storage / Transportation
 - Supply Chain Management of Fruit & Vegetables
 - HACCP
- 4) Expenses necessary for the above

12. Expected Benefits

Benefit

By implementing the project, the following benefit can be expected:

Practical technology for management of the food safety and quality is disseminated in the area of post-harvest treatment and cold chain of the target commodity (fruit and vegetables).

Eventually, Food Safety is ensured in supply chain of fruit and vegetables.

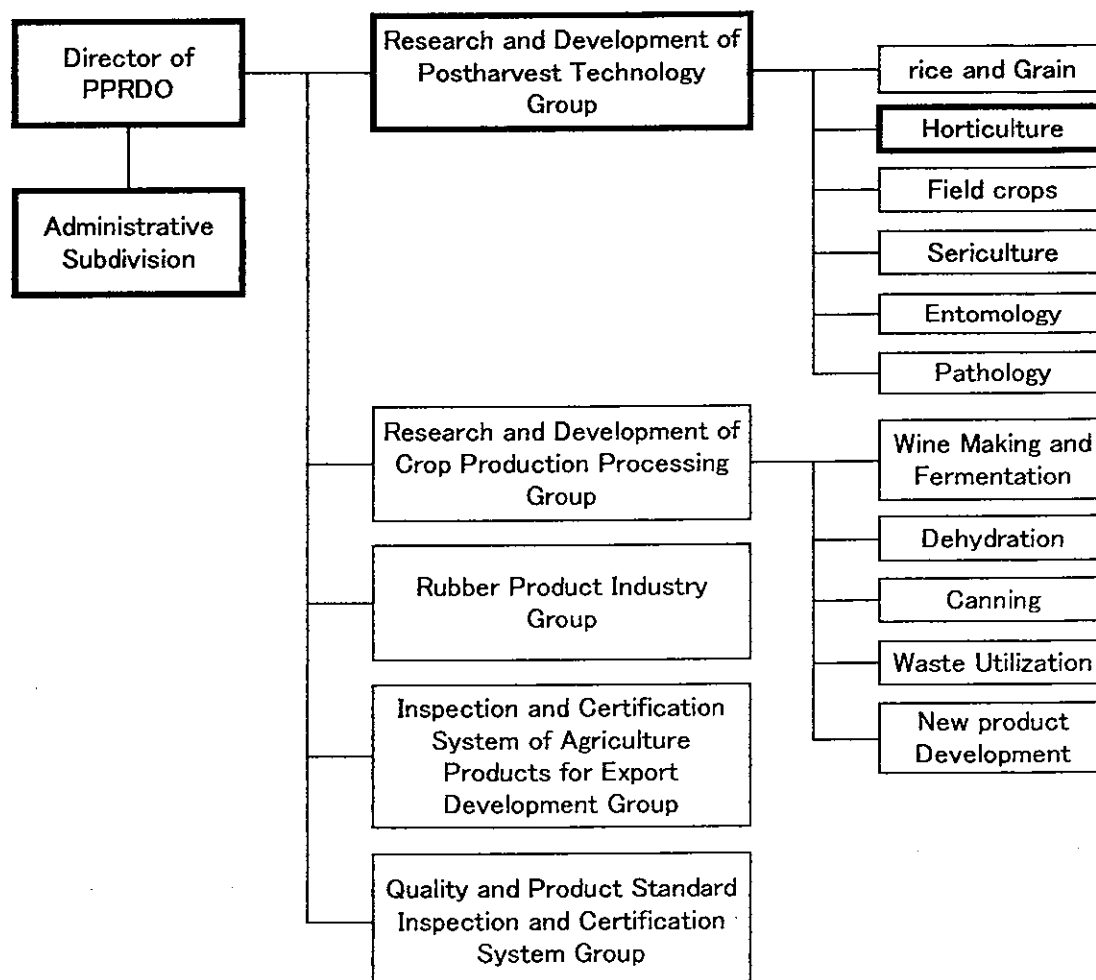
Beneficiaries

Beneficiaries to whom positive changes are intended directly or indirectly by implementing the project will be:

- (1) Primary and secondary producers of fruit and vegetables,
- (2) Fruit/ vegetables exporters and importers in Thailand and other food trade partner countries
- (3) Consumers

Appendix C-11-1

Postharvest and Processing Research and Development Office (PPRDO)
(August 2004)



Appendix

- 1. List of Members of the Study Team**
- 2. Main Events and Activities in the Study**
- 3. Workshop and Seminar**
- 4. Positive List for Pesticide Residues (Japan)**
- 5. Okra Case**
- 6. List Organizations and Individuals visited**
- 7. Organization Chart of each Government Body related to Food Safety**
- 8. Production, Export and Import of Foods**
- 9. Export and Import of Foods between Thailand and Japan**
- 10. List of Existing QA Standards / Schemes relating the Food Safety**
- 11. Form of Questionnaire in the Field Survey**

Appendix 1

List of Members of the Study Team

Name	Assignment
Mr. Kazumi Ueno	Project Manager
Mr. Yoshio Tanaka	Food Quality Management (1)
Mr. Pitak Supanantakarn	Food Quality management (2)
Dr. Werasit Kanlayakrit	Food Safety System (1)
Dr. Chantaree Jarupanthu	Food Safety System (2)
Mr. Toshio Watanabe	Food Safety System (3)

Appendix 2

Main Events and Activities in the Study (From March to October 2004)

March 24	: Agreement made effective for implementation of the Study between JICA (Thailand Office) and the Consultant
March 30	: Presentation to ACFS
April 8	: Submit the Inception Report
April 11 - 18	: Overseas Study (Japan)
April 19	: FTI Meeting
April - May	: Field Survey (Case Study by commodity for facts finding)
June 1	: Hold the 1st Workshop on Food Safety at Royal Princess Hotel, Bangkok
June 28	: Submit the Interim Report
July (first half)	: A series of meetings for project formulation with departments concerned
July - August	: Field Survey (Visit government / private organizations for further clarification)
July 31- Aug 7	: Overseas Study (Japan)
September 10	: Submit the Progress Report
September 10	: JCC/TCC Joint Working Group Meeting
September 17	: Presentation on Positive List System at Rama Gardens Hotel, Bangkok
September 21	: Hold 2nd Seminar on Food Safety at Rama Gardens Hotel, Bangkok
October 1	: Submit the Draft Final Report
October 12 - 14	: Attend The Second FAO/WHO Global Forum of Food Safety Regulators at United Nations, Bangkok
October 15	: Presentation on Food Safety System in Japan at Emerald Hotel, Bangkok
October 18	: Submit the Final Report

Appendix 3

Contents of Workshop and Seminar

1. 1st Workshop on The Study for Strengthening the Food Safety Policy in Thailand (JICA Study)

(1) Opening and Keynote Speech

Dr. Ampon Kittiampon (Deputy Permanent Secretary, Ministry of Agriculture and Cooperatives)

There are two reasons for setting up this workshop.

1. Food Safety Policy is considered as most important issues by this government. Thailand has established Food safety roadmap, which was responsible by the Ministry of Agriculture and Cooperatives, Ministry of Public Health and Ministry of Industry. The attempts of the government are the establishment of Laboratory Center for Food and Agricultural Products Co., Ltd. (LCFA) on food safety analysis and the food safety planning and action. The food safety agenda are not only the quality of food but also the control system, it is more important to assure the safe food for local consumption and for people in the world. In addition, Thailand must work for the preventive action and system on the bird flu cases in Thailand.
2. According to the international market *i.e.* EU, USA, China and Japan, three relevant issues concerned are: 1) the food safety standard, for example, the pesticide or chemical residues in food 2) the preventive system and control measure for the outbreak or dissemination of key pest, disease, etc. and 3) the reliability and assurance of inspection and certification of the export country.

With regards to technical negotiation with Japanese government for cooperation, under JTEPA (Japan-Thailand Economic Partnership Agreement) at Fukuoka last October, the core issue relevant to agriculture was that the cooperation would focus on the development of food safety system.

The study team is finding for the most appropriate way for the establishment of food safety system under the scope of JTEPA. Thailand and Japan had established some technical approval for safe chicken meat, while Thailand had the crisis situation of bird-flu, which caused chicken meat unable to export. In that technical cooperation, so quick action was taken that Thailand could export the heat-processed chicken meat within a short time. Therefore, the technical cooperation under scientific information basis will be very important among the two countries. In this workshop, it is necessary to discuss mainly on the linkage system, which can be divided into two parts:

- 1) The quarantine procedure in Japan

- 2) The acceptance for the Thai standard of the commodities, especially for the pesticide contamination. The equivalent procedures for export and import of commodities.

These issues can be discussed for three processes as follows;

1. The development for Farm Standard to the level of acceptance, how to cooperate, how to function?
2. The development for Processing in both small enterprise and industrial sectors.
3. The acceptance of the process and system of inspection and certification. The capability of government sectors, how to cooperate technically to achieve that goal?

The negotiation under JTEPA will be done at the middle of the month, which is a key point to decide for the future cooperation. However, the cooperation should be based on the pest risk assessment, the problem analysis of the disease outbreak, etc.

(2) The Study for Strengthening the Food Safety Policy in Thailand (JICA Study)

(3) Case Study – Livestocks

(4) Case Study – Seafood Products

(5) Case Study – Fruit and Vegetables

(6) What problem Thailand is facing in term of food safety?

Presented by JICA Study Team

(7) Question & Answers

During Question & Answer, followings are discussed.

Association of chicken exporter: There is the request to Japan side for provision of support and cooperation. The study on livestock should cover supply chain system.

Thai Shrimp Association: The shrimp industry had developed to the great extent. However, some problems still exist in the sector of production at farm level. The subsidy and the development from government are still not sufficient. However, there are some farmers or farmer groups who are self-reliance and they can make improvement and export their products to Japan. The organic production for shrimp cultivation is on process. This requires technical assistance.

Answer from team; The study team classified the industry size as small, medium and large size and cover food safety system of GAP, COC etc. we found that Thai fishery industry has been developed and has a good potential in fishery production. However, It is considered to identify what is our weak point and try to develop that point. 80% of farmers are said to be

not well trained on production procedure and food safety awareness. From our study at farm level, we found problems are pricing which is not stable. Therefore, government or another relevant authority should concern for promotion and development.

Processed food association: Regards to fruit and vegetable, problems are more complicate. First, most farmers do not practice following GAP. In the case of food safety, traceability is also considered as problems. We can not inspect at primary level because collectors collect those from small farmers then the products will be sent to the industry.

Answer from team; It is quite a big problem regarding traceability on food safety system for fruit and vegetable. At farmer practice, the management and process is already difficult. At the collector level, there is no official system to control effectively. This will cause traceability difficult to manage. So, the traceability has to be managed at this stage of food chain. Some exporters have good system to manage quality at this stage because they have their own group of farmers. But for the traceability, we have to check the input material. It will be useful if we can find the system or mechanism to distinguish the input and product.

Moderator; It is necessary to classify the problem processes by priority, how to prioritize the projects. Organic farming has been set up for standard, we should have some program and set up project for the implementation.

Private company (Japan): There are problems that now farmers received the GAP certification from DOA. But the procedures of food safety are not clear, there are too much inspection at the farm. In our case, we have our own system to control the pesticide. We hope the government can accredit the food safety system of our company. The systems of the government still emphasize only checking pesticide residue of the end product. Actually, the exporter at the same level have a good system to control pesticide contamination in their produces.

Moderator; The government should develop and cooperate with the company.

Department of Agriculture: DOA certify farmer for GAP not only finished product. Therefore, it covers the food safety system. For the Q mark issued by DOA, it is including bar code, which can be identified where those products are from.

Federal of Thai Industry: In case of the exchange of information, implementation should have some connection with promotion of risk assessment. The FTI would like to participate for the risk assessment facilitation.

Japanese Chamber of Commerce: Customers in Japan strongly need information in order to make sure “An-Shin” (reliability, peaceful mind). However, the future of Thai food industry and food processing should focus on risk assessment, management and communication. It is remarked that communication is very important to provide sufficient information.

International Agriculture cooperation division: It is appreciated for the study, which cover

many things. But please point out and make a priority list for the most appropriate project.

Ministry of Public Health, Bureau of committee of Food and Drug/Food and Drug Division: How will ACFS proceed the activity after this project finish?

Answer from team: The comments from the relevant sectors and organization will be collected, formulated and prioritized. Then the project will be proposed to JICA.

Moderator: ACFS will set up the meeting and discuss with DOA, DOF and DLD for the next procedure.

Thai Chamber of Commerce: At final stage, Thai commodities and production system will be promoted for food safety system, which will have impact to the trade.

Moderator: Yes, this led us for improving food safety system and for trade as well. It is clear that this project will be beneficial to consumers in many countries.

Department of Agriculture: MOAC is now implementing the GAP system. Will Japanese accept the product that is certified by Thai regulation or not? The technical cooperation will be useful for reduction the process of quarantine in Japan. It will be useful to set up a case study.

Thai Camber of Commerce: The accreditation and certification systems in Japan are operated under independent organization. Japan gives the responsibility to the private sector. The question is in the case of certification system of the laboratory of Thai government, does it mean that private sector from Japan will come to accredit the Thai laboratory or not. The next question is for Pre-certification, the pre-certification can be extended to cover other product or not?

Answer from team: The answer on accreditation and certification system will be put in the report.

2. 2nd Seminar on Food Safety System

(1) Opening and Keynote Speech

Dr. Ampon Kittiampon (Deputy Permanent Secretary, Ministry of Agriculture and Cooperatives)

This is an honor for the joint effort between JICA and MOAC to bring key experts to disseminate the knowledge of food safety. Dr. Susumu Kumagai, Tokyo University, will present risk assessment. Professor Yutaka Shinohara from Chiba University will present the key area of GAP system in Japan. Mr. Jun Sakai, the representative system from Food Marketing Research and Information Center, will present the traceability system in Japan.

It is remarkable to re-emphasize the key policy of MOAC. Food safety policy is undertaken as the key strengthening of our comparative advantage, as the key competitiveness. The first food safety means the safety of consumers of both domestic and out-country. This may approach to single standard with no different in term of producing good quality of product. The case of vaccine prohibition to eradicate Avian flu is a good example as the evidence that Thailand take food safety as the key factor. The 2nd part of food safety scope to the processors who deal with SPS agreement under WTO with the concept of harmonization and equivalency to the member countries. It is agreed that technical based and common understanding are key issues, as a consequence, the seminar is being held to meet objectives.

The three key area of information dissemination on Food Safety by this cooperation way bring Japanese government, in particular MAFF and MHLW, come closer in the area of Food and Agriculture. We are not trying to expand market in Japan but this may reflect the better chance to take more market share, competing with United State, Australia or China. This is an opportunity for private sector in Thailand to gain knowledge and build competitiveness.

(2) Japanese Technical Cooperation Under JICA Scheme

Mr. Shoichi Okumura (Deputy Resident Representative, Japan International Cooperation Agency (JICA) Thailand Office)

JICA: Japan International Cooperation Agency is an independent organization under ODA (Official development Assistance). ODA is the funds and technology that Governments provide to developing countries as economic cooperation to support socioeconomic development. The basic philosophy of Japan's ODA is: 1. Humanitarian consideration. 2. Recognition of interdependence. 3. Environmental conservation. 4. Support for Self-reliance Efforts. JICA supported Thailand under the Technical Cooperation, that includes invitation of trainees in Japan, dispatch of experts, provision of equipment and also development study,

dispatch of volunteer and disaster relief in case of emergency. Total expenses of JICA Technical Cooperation in Thailand last year is 5,677 Million Yen (16% involved in agricultural sector, this is not including loan budget from JBIC (Japan Bank for International Cooperation) to Thai's Government.

The request of the project is to be done by the both two governments Japan and Thailand. The DTEC, Department of Technical Cooperation, Ministry of Foreign Affairs will submit the requests to Embassy of Japan. The Embassy of Japan and JICA (Thailand) will evaluate and select the project before submission to Japan, Ministry of Foreign Affairs and JICA H.Q.

The project will be implemented based on the agreement on technical cooperation between Thailand and Japan. The input from Thai side are counter part staffs, facilities, local cost and the Japanese side are dispatch of experts (long term or short term), invitation of trainees to Japan, provision of equipment (Grant). And project evaluations to judge scientifically and objectively the appropriateness and value of a project should be publicize.

(3) The Result of the Study (Strengthening the Food Safety Policy in Thailand)

Mr. Kazumi Ueno (Project Manager, JICA Study Team)

The Study for Strengthening the Food Safety Policy in The Kingdom of Thailand is one of the projects in scheme of technical cooperation of JICA with MOAC. The project is to study the current situation and analyze the problem in Food Safety System in Thailand to make a draft idea of the necessary projects, which can solve the problem including dissemination of the information of food safety for food industries and consumers. The key project areas of the study are in three (3) cases studies: Livestock, Sea Food and Fruit and Vegetable. Six (6) members of three (3) teams were studying by surveying in Bangkok and regional areas and also in Japan from April 2004, and the team disclosed the results of the fact finding study and the idea of the future project to solve the problem in the 1st seminar on June 2004.

In phase 2, the team is concerning study about candidate projects, which are necessary at the present situation in Thailand. Three (3) key categories with their candidate projects are identified under the Umbrella Program for strengthening the Food Safety Policy as follows;

Category A: Projects for Strengthening the Accreditation/ Certification/ Inspection Capacity.

Category B: Projects for Strengthening the GAP Implementation

Category C: Project for Improvement of the Whole Food Supply Chain

(4) Risk Assessment

Dr. Susumu Kumagai (Department of Veterinary Public Health, Graduate School of Agricultural and Life Science, Faculty of Agriculture, The University of Tokyo, Japan)

From 1980s the outbreaks of E-coli 0157H7, Salmonella and Campylobacter infection happened in Japan and the HACCP system are introduced. But it cannot complete to control all problems, and the diseases are still concerned. It can be recognized that to control from farm to the consumer is very important. The microbiological Risk Assessment at this moment is used in all around the world, and A framework of Risk Analysis was assigned in 1995 by FAO/WTO consultation and explains about three cores of risk: 1. Risk Assessment, 2. Risk Management and 3. Risk Communication.

Presently Risk Analysis is considered as follows;

Risk Assessment is the evaluation procedures based on scientific data by instruction of Risk Manager. And Risk Management is conducted by Administration based on the Risk Assessment. But the responsibility of Risk Assessment and Risk Management are independent. And it is also very important to exchange information and opinions among relevant stakeholders as Risk Communication.

In present time, Risk Assessment means to evaluate the human health risk from intake of foods with scientific data. By using risk assessment, we can understand the quantity and frequency that human can have risks from contamination and proliferation of pathogenic microorganisms in each steps such as production, processing, distribution and intake of foods.

The evaluation procedures of risk assessment are in four (4) steps

1. Hazard Identification: To decide the combination of agents (pathogen) and food
2. Exposure Assessment: Probability of Intake of Contaminated Foods?

Data used in Exposure Assessment

- Intake data: frequency and quantity, condition
 - Natural inhabit of microorganism in environment
 - Natural contamination data in foods
 - Quantitative changes under different temperature (Predictive microbiology)
3. Hazard Characterization (Dose-Response): To explain severity of adverse health effect in symptoms and to show the dose-response relationship by epidemiological investigation of food poisoning outbreaks
 4. Risk Characterization: To explain characteristics of severity of adverse health effect and to show the effects of control measures on risk.

Utilization of Microbiological Risk Assessment

- Establishment of microbiological standard
- Comparison of efficacy of control measures
- Setting ALOP (Appropriate level of production) and FSO (Food safety objective)
- HACCP planning (critical limit, microbial criteria)
- Transparent science-based explanation

Food safety objective (FSO) is the maximum frequency and /or concentration of a microbiological hazard in a food at the time of consumption that provides the appropriate level of health protection e.g. 100 *Listeria monocytogenes* per gram of ready-to-eat food.

FSO is prepared by administrative decision using ALOP data of dose-response curve.

The conclusion of General Principles of Microbiological Risk Assessment

1. Should be based upon science.
2. Functional separation between Risk Assessment and Risk Management.
3. Hazard Identification, Hazard Characterization, Exposure Assessment, and Risk Characterization.
4. Clearly state the purpose of the exercise, including the form of Risk Estimate that will be output.
5. Should be transparent
6. Any constraints such as cost, resources or time, should be identified and their possible consequences described.
7. The Risk Estimate should contain a description of uncertainty and where the uncertainty arose.
8. Data should, as far as possible, be of sufficient quality and precision that uncertainty in the Risk Estimate is minimized.
9. Consider the dynamics of microbiological growth, survival, and death in foods and the interaction between human and agent following consumption as well as the potential for future spread.
10. Wherever possible, Risk Estimates should be reassessed over time by comparison with independent human illness data.
11. Re-evaluation, as new relevant information becomes available.

(5) GAP System in Japan

Dr. Yutaka Shinohara (Professor, Faculty of Horticulture, Chiba University, Japan)

Trend on the Hygiene Control in Vegetable Production

Japanese Government registered the "Food Safety Law" of Japan in July, 2003, aiming the health of the peoples by introducing the risk analysis. Also in the same period the "Food Safety Commission", which directly governed by National Cabinet, was settled on July 1,

2003. These organizations were governed separated from the Ministry of Agriculture, Forestry and Fishery or Ministry of Welfare.

The world recognition of the food safety was started in 1998, while the United State initiated FDA in October 1998 for "Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables". Thereafter, in 2001 a simplified guide for "Food Safety Begins from Farm" and "Food Safety is everyone's Responsibility" was released. In August 2003, Food Hygiene Committee or Codex Committee (WHO & FAO) was adopted a simplified guide on "Hygiene Practices Related with Fruits and Vegetables". Later on EUREP-GAP, Each European Country and some Asian countries was established. From now on, hygiene control of agricultural products (GAP) will be the common condition, when they are internationally trades.

GAP (Good Agricultural Practices) in Japan was started by the "Japan Greenhouse Association" and later the Manual for Hygiene Control in Radish Sprout Production and Hydroponics Leafy Vegetable Production were released. And the HACCP principal and the microbial risk management in fresh vegetable production was introduced. In March 2003, "Guide for Hygiene Control in Fresh Vegetable Production" was initiated as same as GAP, A practice for clarify the risk causes and safety measure in Agriculture Production such as microbial risk, harmful content and foreign objects.

There are many kinds of risks, namely Food borne illness (*E. coli* 0157, *Salmonella* sp etc.), Natural poison (mushroom etc.), Heavy metal (Cd, Hg. Pb etc.), Nitrate contents in leafy vegetables, Residual pesticides and Foreign objects (Glass, chips, bolt etc), can be contaminated in the produces. Therefore GAP shows and declares the consciousness on these points, while Sanitary can see and can't see in some case. The important thing is the member should be compliance and honesty, and members should be able to make decision by their own in GAP.

Basic Concept of Hygiene Control

GMP is the basic concept of hygiene control. Therefore, HACCP are considered to be a system for food safety. Three factors i.e., material (seed, fertilizer) , environment (water, temperature), handling (sanitary, cleanliness). This basic is setting for GAP consideration. The chain from farm to table should be considered. The control of GAP cannot be 100% of safety, but the prevention can minimize the hazards. Previously, the final check was sufficient but not in current status. The process check becomes more necessary. The tractability is becoming important. The recording should be carefully carried out. The additional merit of the hygiene control are as follows; 1) Consequently improve the quality of the products 2) Reduce carelessness 3) Improve management and hygiene control. The repeatedly remind cause the better improvement.

Actual Condition of Food Borne Risks

The comparative study of soil grown and hydroponic leafy vegetable from supermarket were collected and checked for microbial contamination. The common bacteria were found at the 10^4 - 10^5 , which is normal. The number of fecal bacteria was found at 10^5 cells per gram. The significant bacteria should be traced for their possibility, and should be handled to decrease the contamination. The compost process, which the temperature reached 70 C, but thereafter there is a case of colon bacillus could increase after post-fermentation of compost. So there is possibility that the compost can cause contamination. It is suggested that the compost should be under roof to prevent shedding and run off by rainwater. There is occurrence of foreign materials, which can be handled by man.

Some Points of Hygiene Control in the Farm

There are two sources of microbial hazard in the farm. First one is pre-harvest sources including manure, soil, irrigation water, immature compost, dust, waste, animals, insects, livestock and workers. The second is post-harvest sources including manure, human being, harvesting machines, containers, animals, insects, livestock, dusts, wastes wrapping machines, water, vehicles, unsuitable storage, unsuitable wrapping, cross contamination and displayed temperature. There are the important points for hygiene control in the farm and also grasp each point and take every precaution. Four points against microbial risks comprise 1) Block entrance into the farm. 2) Sanitary culture management 3) Storage and transportation under low temperature 4) keep the record documents. Location of farm and farm history for example livestock manure incorporation, culture rotation and the location of stock farm and all buildings are also needed before culture. Compost should be fully matured, keep inside shading and places for compost making and culture should be apart enough. Organic fertilizer should be heat-treated. Water source should be checked and analyzed the quality, while Japanese law allowed microbes contained less than 100 cells per ml, except no Coliform bacteria. Water quality for washing vegetables, harvesting container and tools should be drinkable quality. Overhead irrigation increase the risk of pollution by splashing with soil, then drip irrigation and mulching should be better and effective. Machine should be washed after use. Try to be away from rodent, birds and insects, and toilet. Workers sanitation is important such as clean cloth, short nails, frequent hand washing and prohibited eating snacks during working. Visitors should follow sanitation scheme as same as workers.

The compost or organic fertilizer should be processed completely. Floor should be cemented with concrete with roof. In case of bogashi, which processed under low temperature technique to do compost, it is suggested to check microbes if the manure is used as raw material. Water quality and source of water use for washing vegetables, harvesting container and tools should be potable and drinkable.

Irrigation during cultivation is one factor of risk. It is not suggested for sprinkler, dripping method is preferred. Also, machine using during cultivation should be washed soon after use. The small animal also has to prevent. The worker should follow sanitary scheme, especially after toilet. The most important is to clean hand. Container should has sheet on base, not direct contact to floor surface

The packing and shipping, the place for packing is very important to keep sanitary. Air-conditioned room is required. The place should be regulated as a sanitary place.

At the collecting, grading and shipping facility, Japan has some association to take care at this stage. Workers should follow sanitary scheme i.e., hand washing, boots washing, put the hair net and wear apron. Sanitary of the facility, design this point as the sanitary zone, farmers should not enter this zone. Keep away small animals, check the water quality and drainage.

The Record Keeping

Practice of GAP will be meaningless if there is no record to show evidence. Therefore it is necessary to keep record. In the example of tomato cultivation, the control of cultural processed has made a flow chart. Each step of procedure, the control program is set and implemented

There is sub-conclusion that a) the hygiene management in vegetable production are burden to farmers. b) Government should assist the GAP procedure, 50% of subsidy should come from government to perform GAP trial. c) Shipping with GAP (JA mark) were done by producer themselves d) Compliance to Guideline and honesty is important e) Record is the system for evidence f) Reliance between consumer and farmer will be established.

Ten Steps in GAP

1) Sharing the roles 2) analyze the vegetable status 3) check the location of farm and facilities 4) make flow chart of culture 5) do risk analysis 6) set the hygiene management method 7) set Table for critical control point 8) set the countermeasure against any occurrence (including recall system) 9) follow inspection method as regular 10) Keep record routinely.

It is concluded that food safety is everyone's responsibility. A whole chain of safety through delivery are also required the safety system to ensure safe of the product. Farmers can show their responsibility of produce safely and their concern to food safety.

(6) Food Traceability Systems in Japan

Mr. Jun Sakai (Food Marketing Research and Information Center of Japan)

Food traceability has been defined as their information can be traced forward and backward at each stage of food chain. There are mechanisms to support system *i.e.*; identification, data preparation, data collection and storage and data verification. This system composed of a) organization b) documented procedures c) a process and management resources d) rules e) education and training. Traceability systems can achieve many purposes *i.e.*; 1) increase reliability of information 2) be able to improve the food safety during the process and 3) contribute to increase business efficiency. According to food identification, the identification unit of the products and raw materials can be traced and managed by assigning ID number. The correlation of raw material and semi-finished and finished products should be established with record of information.

It is important to provide fact of information (of traceability system) and history to consumers. There are cases for traceability system *i.e.*; 1) domestic beef; each cow is identified by ear tag with identification number, wholesalers and retailers can also provide traceability information by lot number 2) fresh produce "SEICA system"; this system issues a catalogue number for each registration. 3) farmed fish; due to cultivation system with medication and feed, producers initiated farm record system. Each fish shipping box will be attached by the curriculum vitae. 4) processed food; food processor must keep record to control quality. Most of raw material are imported, therefore the information of origin of the material are required and 5) oyster case;

The case study of oyster produced in Miyagi prefecture is a model of chain-traceability system. The stakeholders are the Miyagi Prefecture Federation of Fisheries Cooperatives and the brokers/packers and their customers. The nursery of oysters in Miyagi prefecture is divided into 32 areas (blocks) for risk management of Norovirus. This sea-borne virus can be accumulated in flesh cause fever in human. The prevention measure is to check water quality and check virus in seawater. If virus is detected, no harvest will be carried out.

Process flows of oyster are as follows; langing oyster, shelling and cleaning, shipping to factory of oyster packer to weighing and packing. There were problems by the oyster business as follows; 1) some brokers and packers illegally sold from South Korean or no producing area are shown in the labeling. 2) there is a need for risk prevention measures supplementary to sanitary inspection. The sampling methods are conducted followed by the suspension of shipment if required. However, the inspection is only random sampling so no one can assure that the products are totally safe. If sickness occur, traceability system will be helpful to 1) be able to investigate cause of origin 2) be able to recall the causal products 3) to be able to prevent the outbreak of damage and recurrence of similar accident.

Traceability system have some purposes *i.e.*; 1) improving public trust in labeling (producing

area, quality, date of production) 2) contribution to prompt and efficient recall of products in the event of risk 3) providing information about food poisoning 4) increasing the attraction of the product through providing information to consumers.

Whole processes of the oyster business consist of 1) Producers and cooperatives dealing at the shucking station and collecting point. At this point the data will be collected and recorded for each shipment case, at this point the data will link to database system. 2) At packers; when oysters arrive, there is a system of recording, consumer packing while recording the link of identification. The recorder will print the "pack number" on each consumer pack. (This point the data will link to database system) 3) After packers the oyster will be shipped to retailers; the retailer will retrieve the record of history for production and processing from the database system 4) When consumers buy oyster, they can retrieve the production from database system. The database system is centralized which receive and provide information. The Miyagi Prefecture Federation of Fisheries Cooperatives is a core that plays role as input sanitary inspection results as well as check consistency between raw materials and finished products. For example; the recording the link of identification can be categorized as Shipping box (A1...An), Processing lot (B1) and consumer pack (C1-Cn). Then, the system to check consistency should be established. It is important to verify that there is no fraud in each step. The Cooperative of Miyagi Prefecture set the record of quantity of processing lot number by checking the total quantity of shipping box and processing lot number (the quantity should be equal). If some false figure is found, the inspection of the quantity of materials will be established. In addition, the pack number will be printed in each consumer pack. It means that every pack has its own identification number to prevent fraud. The web page for consumers can be searched by date and pack number. The history of production is simple because of its natural cultivation in the sea. However, the list of producers will be shown as well as sanitary and hygiene.

The test result of demonstration was presented to stakeholder for evaluation. The purposes are 1) to estimate operation cost 2) to get evaluation by consumer. It is found that producers and fisheries cooperative were satisfied with this system, no additional cost and time. While packers step informed that the cost increased 0.8 yen in each product. By using database system, it is estimated that the cost is 0.15 Yen per product. From the questionnaire, it is concluded that 1) About 26% of the oyster consumer will access to data base 2) Most of consumer (91%) expected that this traceability system should be continued 3) Sixty-five percent of consumers select oyster product under the traceability system although cost would be increased. In this case, 44% of the consumer prefer to pay 10 yens or less per pack. However, actual information showed the number of accessible is only 0.35% of product purchasers.

There are some problems to implement traceability system in Japan *i.e.*; a) cost-effective for

food business sectors b) the standardization for identification numbering and for data formatting c) Certification system should be established.

Customers requested 3 items *i.e.*; 1) record the history information at each stage. The inquiry should be answered at anytime. 2) keep accessibility 3) provide history information for appealing value of the products. It is noted that Japanese consumers appreciate the attitude to present history information.

Appendix 4

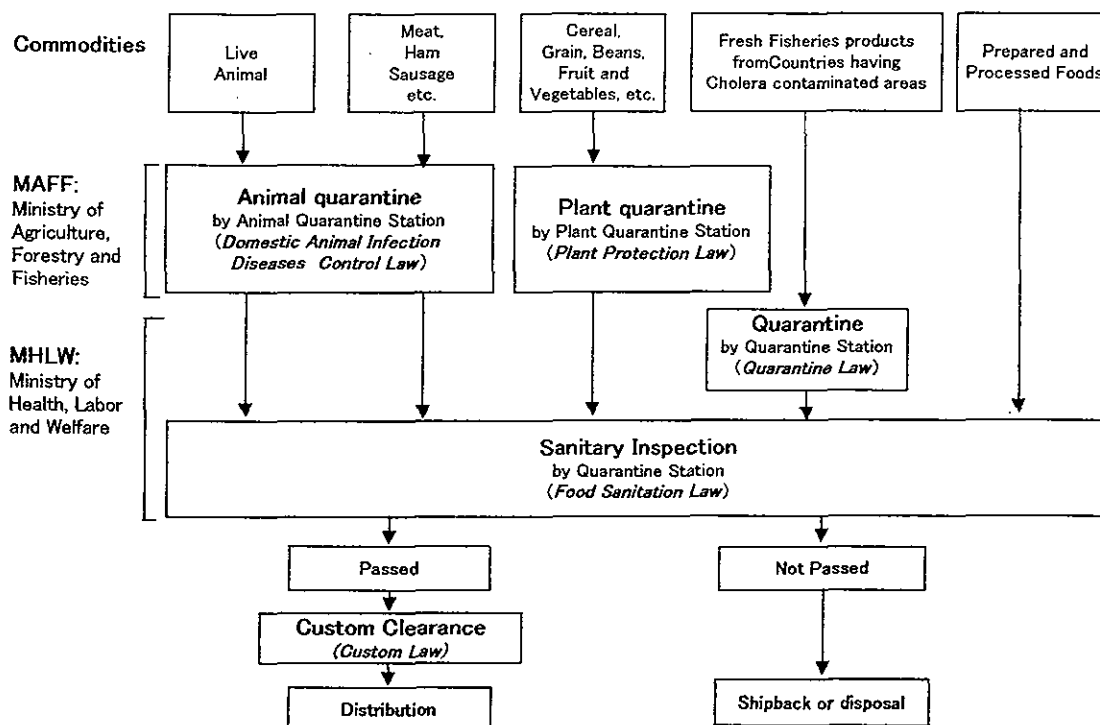
Imported Food Inspection System in Japan

Legislation related to imported food, agricultural and fisheries products

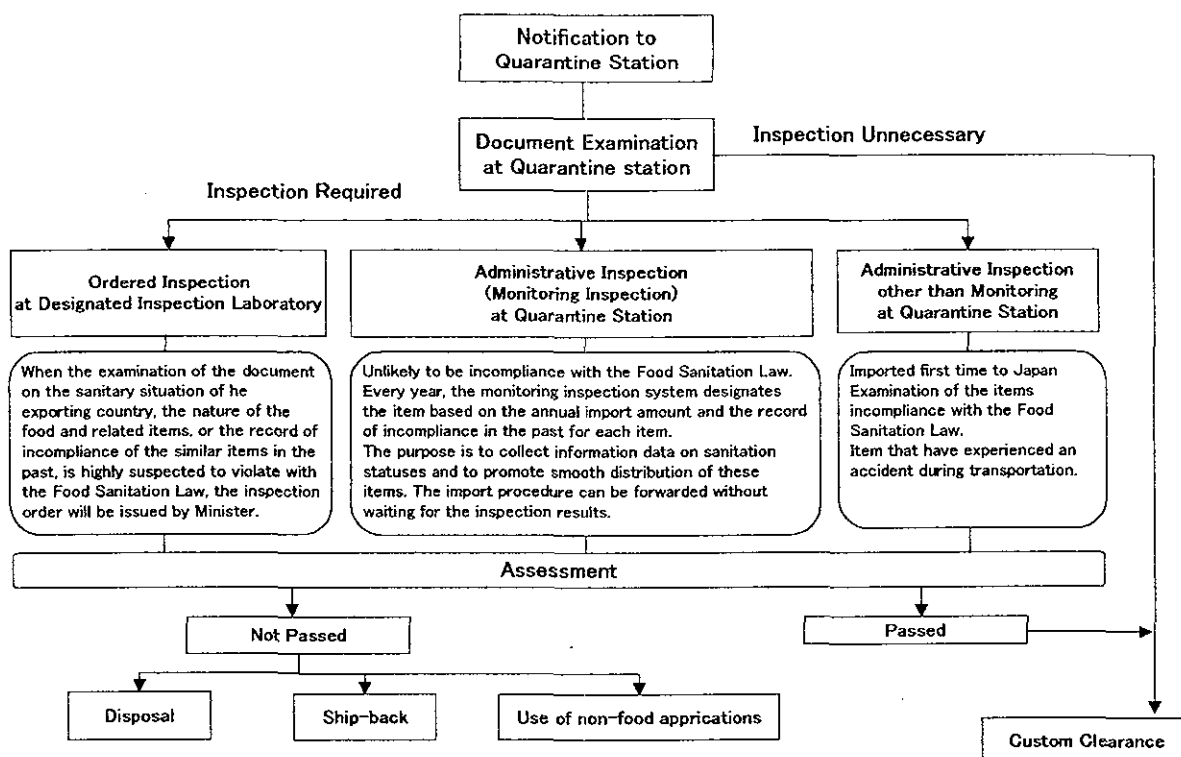
Legislation	Function	Agency
Plant Protection Law	- To quarantine export/import plant including domestic plant by destroying flora and fauna which will affect to other domestic plants	Plant Protection Division, MAFF
Domestic Animal Infection Disease Control Law	- To prevent the spread of disease To animals in Japan - To enhance livestock industry in the country by preventing epidemic/outbreak	Animal Health Division, Livestock Industry Department, Agricultural Production Bureau, MHLW
Food Sanitation Law	- To protect the health of the public through prevention of the occurrence of sanitary health hazards caused by food - All food products have to inspected for chemical residue	Standard Division, Department of Food Sanitation, Pharmaceutical and Medical Safety Bureau, MHLW
Quarantine Law	- To prevent any diseases from foreign countries that might infect to human such as: Cholera, Yellow fever, Ebola virus, Lassa fever etc.	Office of Quarantine Station Administration, Department of Food Sanitation, Pharmaceutical and Medical Safety Bureau, MHLW

(Resource: MHLW of Japan website)

Flow of Examination and Inspection for Imported Food, Agricultural and Fisheries Products in Japan (2 steps)



Import Notification Procedure by Food Sanitation Law in Japan



Simplified and Expedited Systems of Import Procedures of Food and Related item

Name	System
Advance Notification System	For all food and related products, the import notification form can be submitted starting 7 days before the estimated date of cargo's arrival. Except for the cargo that needs an inspection, a copy of certificate of notification is issued immediately, either before the arrival of cargo or after the cargo is unloaded to the bonded area.
Planned Import system	If a certain food or related item is planned to be imported repeatedly, an import plan can be submitted at the time of the first import. When the plan is found satisfactory, the submission of import notification is exempted for a certain period.
Inspection Results by Public Inspection Organizations in Other Countries	When a cargo is inspected by a public inspection organization in the exporting country prior to the export, and a report of the result from the inspection is attached to the cargo, the inspection at the quarantine station for the cargo may be exempted. Inspection items whose results are subject to change during transportation (bacteria, mycotoxin, etc.) are excluded. (To Specifications and Standards for Food, Food Additives, etc. of JETRO Home Page(JETRO's Home Page on Information of Food and Additive Regulations and Standards: http://www.jetro.go.jp/se/e/standards_regulation/index.html)
Continuous Import of Same Items	When certain foods and related products are imported repeatedly and inspection results are attached to the import notification form at the initial import, if document examination finds no problem, inspection can be exempted in the upcoming occasions of import for a certain period.
Advance Approval of Imported Foods and related Products	When the imported foods, etc. is confirmed to be compliance with the Food Sanitation Law, the items and the manufacturers may be registered. Inspection at the upcoming import is exempted for these items for a certain period of time and the certificate of notification is issued immediately after the submission of import notification.

(Resource: MHLW of Japan website)

Appendix 5

Positive list for pesticide residue in Japan

(1) What is positive list

Positive list system is a system to prohibit the distribution of foods that contain agricultural chemicals above a certain level if maximum residue limits (MRL) have not been established. The agricultural chemicals include pesticides, veterinary drugs and feed additives. This activity is based on the revised Food Sanitation Law published in May 2003 in Japan. The system will take effect within three years after the publication of the revised law.

The introduction of this system in the current situation could result in unnecessary disruption in international food trade, because the number of chemicals with MRLs is small in Japan, compared with that of globally distributed chemicals. Therefore MRLs will be established for chemicals that are domestically authorized under the Agricultural Chemical Control Law, and chemicals for which Codex or other MRLs are established based on scientific evaluations.

(2) Points for consideration in the establishment of provisional MRLs

Some points for consideration in the establishment of provisional MRLs are as follows:

- The current established MRLs will remain unchanged and continue to apply.
- When an ADI cannot be established due to carcinogenicity or other reasons, the provisional MRLs should be established as “Not Detected (ND),” according to the manner that has so far been used.
- To establish provisional MRL, at first it refer Codex standards, secondly Registration Withdraw Limits under the Agricultural Chemical Control Law, thirdly foreign MRL.

(3) Reference MRLs for Agricultural Chemicals (Pesticides)

The following table shows information on MRLs that were referenced in the development of draft provisional MRLs in 2003.

Source Country (Organization)	Number of Substances	Remarks
Japan	231 as of June 2003	
Codex Alimentarius Commission	129 as of June 2003	
USA	326 as of April 2003	
Canada	151 as of June 2003	
EU	158 as of February 2003	
Australia	418 as of March 2003	MRLs are not distinguished between agricultural chemicals and veterinary drugs.
New Zealand	161 as of December 2003	

(4) Food Categories for MRL setting

The new food categories will be implemented at the enforcement of the positive list system. The following are examples of separated categories:

New Food Categories	Current Categories
Qing-geng-cai ("pak-choi"-type Chinese cabbage)	Other cruciferous vegetables
Nira (Chinese chive)	Other liliaceous vegetables
Bamboo shoots	Other vegetables

(5) Provisional MRLs on Processed Foods

Provisional MRLs for processed foods will be established only when Codex MRLs are established for them. Individual MRLs will not be established for other processed foods: processed foods can be distributed as long as they are made of ingredients that meet standards under the Food Sanitation Law.



(6) Image of positive list

Existing System

	Pesticide	A	B	C	D	E	F
M R L	Rice	0.5ppm	5.0ppm		3.0ppm	Not yet set- ting	Not yet set- ting
	Wheat	1.0ppm					
	Potato	1.0ppm	5.0ppm	2.0ppm			
	Cabbage	0.5ppm	2.0ppm				
	Orange	0.5ppm		1.0ppm			
	Apple	0.5ppm		2.0ppm			
	Grape	1.0ppm					

After positive list

	Pesticide	A	B	C	D	E	F
M R L	Rice	0.5ppm	5.0ppm	1.0ppm	3.0ppm		
	Wheat	1.0ppm		1.5ppm	2.5ppm	1.0ppm	
	Potato	1.0ppm	5.0ppm	2.0ppm			
	Cabbage	0.5ppm	2.0ppm	0.5ppm		3.0ppm	
	Orange	0.5ppm		1.0ppm		3.0ppm	
	Apple	0.5ppm		2.0ppm		2.0ppm	
	Grape	1.0ppm	3.0ppm	0.5ppm		2.0ppm	

 Setting provisional MRLs
 Setting a certain level of value

(7) Suggestions

- Countermeasures for pesticide drift in the field
e.g. Contamination by wind from neighbor fields producing other crops
- Establishment of Information system to update MRL and relevant data
- Education of pesticide usage for farmers and improvement pesticide control system
- Development of multi-residue analysis for pesticides

Appendix 6

Okura Case as food safety study case

Pesticide residues exceeding the MRL were reported for vegetables from Thailand to Japan until the year 2002. In January of 2003, an excessive pesticide residue (“Chlorpyrifos”) over the MRL has been detected in Fresh Okra. It’s also included Cypermethrin, which is not allow to used in some commodities of vegetables in Japan and found in Okra exported from Thailand under the monitoring inspection at the quarantine station of the Narita airport. The Ministry of Health, Labor and Welfare of Japan (MHLW) instructed the importer to ship it back or dispose and issued the inspection instruction of imported okra from Thailand shall undergo 100% inspection before custom clearance at the importers’ cost.

This is a big problem for both two countries because 80% of Okra in Japan market imported from Thailand. The Government of Thailand (MOAC/DOA) and the Government of Japan (MAFF& MHLW) has tried to solve this problem. Especially, Ministry of Agriculture and Cooperatives (MOAC) in Thailand has been established a new agricultural management system called “Good Agricultural Practice System (GAP)” Good Manufacturing System (GMP for Packing House) including the guarantee inspection system by used “Q Marks” logo. The “Safe Vegetables Development Pilot Project” has been launch by Thai’s Government (MOAC/DOA), which mainly control limits of agricultural chemicals in vegetables products from primary producer until to the end producer not only for Okra under this project but also 21 commodities of vegetables which are sent to Japan market.

GAP/GMP practice systems mention the detail of name of crop commodities and kinds of chemicals to control, time to use, ratio, a safe period for harvesting after used of chemicals and also mention sanitation in farm and packing house. At the present time every registered farm member and exporter in “SAFE Project” will follows as

- DOA will check soil and water in farm and pack house whether or not include the chemicals residue in Japanese prohibited list and the contamination of chlorpyrifos.
- Production process of raw material and the finished product must be practiced to follow GAP(farm)/ GMP (Pack House/ Collector)/ HACCP (Processing Plant)
- In case of finding agricultural chemicals over the limitation in farm or packing house, the registered member of SAFE Project will be extinguished.
- DOA will control system and inspect farms 2-4 times a month depend on crop commodities. The inspection period of chemicals residue will be in 3-7 days before harvest by 10% sampling from products in packing house.
- DOA will control every procedure of the agricultural chemicals including checking a practice of record keeping.

- The monitoring and inspection system will be done by DOA (Bangkok & Regional Laboratories (1-8))
- DOA will check the residue of agricultural chemicals on the Japanese MRL list, and he will use the MRL of CODEX if he cannot find chemicals in Japanese MRL.
- The member who passes SAFE Project will be received a member code and Q Mark Logo.
- The certification period of Q Marks logo can be used in 1 year and can be extension before expiry date.
- The original document of Phytosanitary (analysis pesticide residue) will be attached with a shipment when exporting.
- Carton box will show Logo and Registered Code Number (number of registered member of “SAFE Project”)
- DOA will inform MHLW in advance name of exporter/ producer/export commodities/ or the additional commodities before export.
- DOA will send a data information record of sanitation inspection e.g. check list of data information of analysis pesticide residue of exporter to inform MHLW (if available)
- Packing for export should show a code of farm and code of farmer in each box for traceability system in each exporting lot.

It's a serious action that Government of Thailand tried to realize and response of the problem that happened. At the present time under the new system controlled by DOA the member of “SAFE Project” can export Okra to Japan. The result of the field survey suggests that some permanent structure for much closer communication between the Government of Thailand and Japan is needed in order to respond and take action quickly to any incident that may possible happen in future, just like the above- mention case.

Appendix 7

List of Organization Visited for Field Surveys

Type of Organization		Number of visits (based on functional activity)		
Government organization	Regulatory authority	6	Key government authorities: FDA, DMS, DLD, DOF, DOA, ACFS,	
	Accreditation body	4		
	Laboratory	4		
	Others: university, institutes	3		
Private Sector	Type of activity	Livestock	Fisheries	Fruit & Vegetables
	Primary producers	2	13	3
	Collectors	-	2	5
	Primary processors	5 (15*)	13	8 (2*)
	Secondary processors	6 (15*)	16	10
	Exporters/ traders	6 (15*)	16	10
	Food packaging producers	2	6	4
	Others: Catering operations, logistics	2	2	3
Industry Associations		2	5	2
Independent Third Parties (Government & Private)		Production system	Laboratories	Remarks
		4 (2*)	3 (5*)	Independent lab. includes LCFA and other independent private labs

Remark: (*) Filling questionnaire

Appendix 8

Production, Export and Import of Foods

Table 1 Statistics of Export Commodities from Thailand during 1999-2003

Value: Million Baht

Commodities	1999	2000	2001	2002	2003	Change (%)		
						2000	2001	2002
1. Food and Beverage	376,814.00	399,169.00	444,706.00	427,793.00	470,617.00	5.93	11.41	-3.80
2. Agricultural Product and Other Products	60,989.00	80,474.00	81,313.00	97,915.00	144,809.00	31.95	1.04	20.42
3. Principal Manufacturing Product	1,665,039.00	2,115,414.00	2,171,481.00	2,256,556.00	2,549,099.50	27.05	2.65	3.92
4. Mineral & Fuel Products	47,948.00	97,399.00	90,700.00	85,994.00	95,629.10	103.13	-6.88	-5.19
5. Other products	63,411.00	75,597.00	96,503.00	87,458.00	73,773.80	19.22	27.65	-9.37
Total Export	2,214,249.00	2,768,053.00	2,884,703.00	2,955,716.00	3,333,928.60	25.01	4.21	2.46
GDP	4,637,100.00	4,923,300.00	5,133,800.00	5,451,900.00	-	6.17	4.28	6.20
<i>Ratio of Food commodity/ Total export</i>	<i>17.02</i>	<i>14.42</i>	<i>15.42</i>	<i>14.47</i>	<i>14.12</i>	<i>-15.26</i>	<i>6.90</i>	<i>-6.11</i>
<i>Ratio of Total export/ GDP</i>	<i>8.13</i>	<i>8.11</i>	<i>8.66</i>	<i>7.85</i>	<i>-</i>	<i>-0.23</i>	<i>6.84</i>	<i>-9.42</i>

Source : National Food Institute

Table 2 Export Growth Rate of Thai Food Commodities

Year	1999	2000	2001	2002	2003	Growth Rate (%)				Average Growth Rate (%)
						2000	2001	2002	2003	
Value : Million Baht	376,813.66	399,169.53	444,706.02	427,793.25	470,617.17	5.93	11.41	-3.80	10.01	5.89
Value : Million Dollar	10,005.68	9,912.34	9,975.47	9,923.29	11,304.76	-0.93	0.64	-0.52	13.92	3.28
Quantity : Million Ton	20.02	20.28	27.96	21.84	24.64	1.33	37.87	-21.88	12.80	7.53

Source : National Food Institute

Table 3 Main Market and Ratio of Export Value of Thai Food Commodities during 1999-2003

No.	Country	Value (Million Baht)					Change (%)				Ratio (%)				
		1999	2000	2001	2002	2003	2000	2001	2002	2003	1999	2000	2001	2002	2003
1	JAPAN	78,398.32	88,112.58	98,916.12	96,284.21	97,629.97	12.39	12.26	-2.66	1.40	20.81	22.07	22.24	22.51	20.75
2	U.S.A.	71,846.88	84,519.99	85,018.76	75,319.10	81,923.60	17.64	0.59	-11.41	8.77	19.07	21.17	19.12	17.61	17.41
3	EU	52,799.71	47,633.00	55,751.49	48,260.00	57,574.50	-9.79	17.04	-13.44	19.30	14.01	11.93	12.54	11.28	12.23
4	INDONESIA	16,567.09	12,862.90	13,600.10	16,020.84	20,097.54	-22.36	5.73	17.80	25.45	4.40	3.22	3.06	3.74	4.27
5	MALAYSIA	11,101.52	12,135.29	17,573.87	16,550.80	19,998.21	9.31	44.82	-5.82	20.83	2.95	3.04	3.95	3.87	4.25
6	CHINA PEOPLE'S REPUBLIC	11,076.06	10,886.34	17,472.91	15,062.91	17,389.97	-1.71	60.50	-13.79	15.45	2.94	2.73	3.93	3.52	3.70
7	HONG KONG	13,124.68	15,635.48	16,144.38	15,269.43	14,507.96	19.13	3.25	-5.42	-4.99	3.48	3.92	3.63	3.57	3.08
8	SINGAPORE	16,262.09	18,731.99	16,213.54	14,185.16	12,651.79	15.19	-13.44	-12.51	-10.81	4.32	4.69	3.65	3.32	2.69
9	AUSTRALIA	10,253.05	9,594.73	10,124.20	10,048.79	11,832.17	-6.42	5.52	-0.74	17.75	2.72	2.40	2.28	2.35	2.51
10	TAIWAN	9,792.52	10,522.67	10,979.68	11,503.60	11,648.98	7.46	4.34	4.77	1.26	2.60	2.64	2.47	2.69	2.48
	OTHER COUNTRIES	85,591.74	88,534.56	102,910.97	109,288.41	125,362.47	3.44	16.24	6.20	14.71	22.71	22.18	23.14	25.55	26.64
	TOTAL	376,813.66	399,169.53	444,706.02	427,793.25	470,617.17	5.93	11.41	-3.80	10.01	100.00	100.00	100.00	100.00	100.00

Source : National Food Institute

Table 4 Export Statistics of Food Commodities from Thailand during 1999-2003

No	Commodity	Export Value (Million Baht)					Change (%)				Ratio (%)				
		1999	2000	2001	2002	2003	2000	2001	2002	2003	1999	2000	2001	2002	2003
1	Fishery Products	154,257.8	173,273.5	178,223.8	155,665.6	160,247.5	12.33	2.86	-12.66	2.94	40.94	43.41	40.08	36.39	34.05
2	Meat and Poultry Products	27,303.82	31,593.80	44,337.37	46,495.16	49,389.85	15.71	40.34	4.87	6.23	7.25	7.91	9.97	10.87	10.49
3	Animal Feed	9,257.44	11,089.52	10,668.85	12,972.88	14,910.60	19.79	-3.79	21.60	14.94	2.46	2.78	2.40	3.03	3.17
4	Vegetable	9,508.10	9,916.48	11,364.55	11,780.02	13,006.56	4.30	14.60	3.66	10.41	2.52	2.48	2.56	2.75	2.76
5	Sugar Honey	21,277.19	26,197.29	31,147.11	29,939.35	39,107.51	23.12	18.89	-3.88	30.62	5.65	6.56	7.00	7.00	8.31
6	Unspecified Food	8,203.02	8,985.85	11,174.09	12,143.38	16,668.57	9.54	24.35	8.67	37.26	2.18	2.25	2.51	2.84	3.54
7	Fruits	30,086.09	28,585.11	30,739.11	34,584.78	39,782.17	-4.99	7.54	12.51	15.03	7.98	7.16	6.91	8.08	8.45
8	Alcoholic Beverage	1,624.81	1,931.81	2,716.20	2,684.83	4,348.88	18.89	40.60	-1.15	61.98	0.43	0.48	0.61	0.63	0.92
9	Starch Product	4,844.33	5,501.06	6,348.49	6,588.95	6,563.97	13.56	15.40	3.79	-0.38	1.29	1.38	1.43	1.54	1.39
10	Rice and Cereal	74,254.41	65,899.21	72,682.56	71,060.55	77,510.73	-11.25	10.29	-2.23	9.08	19.71	16.51	16.34	16.61	16.47
11	Flour and Starch	6,703.84	8,401.79	8,508.79	8,903.31	9,782.16	25.33	1.27	4.64	9.87	1.78	2.10	1.91	2.08	2.08
12	Seasoning	3,316.59	3,744.28	4,119.04	4,604.02	4,938.40	12.90	10.01	11.77	7.26	0.88	0.94	0.93	1.08	1.05
13	Tea, Coffee, Cocoa and Product	2,362.51	2,549.63	2,233.17	1,723.66	2,914.21	7.92	-12.41	-22.82	69.07	0.63	0.64	0.50	0.40	0.62
14	Fat and Oil	2,590.79	2,902.99	4,024.66	4,220.50	6,486.19	12.05	38.64	4.87	53.68	0.69	0.73	0.91	0.99	1.38
15	Confectionery	1,153.36	1,638.17	1,655.41	1,877.05	2,556.20	42.03	1.05	13.39	36.18	0.31	0.41	0.37	0.44	0.54
16	Miscellaneous	20,069.51	16,959.04	24,762.80	22,549.12	22,403.64	-15.50	46.02	-8.94	-0.65	5.32	4.25	5.56	5.27	4.76
	Total	376,813.6	399,169.5	444,706.0	427,793.2	470,617.1	5.93	11.41	-3.80	10.01	100.0	100.0	100.0	100.0	100.0

Source : National Food Institute

Appendix 9

Export and Import of Foods between Thailand and Japan

Export Statistics of Food Commodities from Thailand to Japan

No.	Commodity	Year			Year			Year 2000			Year		
		Quantity (Kg)	Value (Baht 1,000's)	Quantity (Kg)	Value (Baht 1,000's)	Quantity (Kg)	Value (Baht)	Quantity (Kg)	Value (Baht 1,000's)	Quantity (Kg)	Value (Baht 1,000's)	Quantity (Kg)	Value (Baht 1,000's)
1	Fishery Products	252,052,671	42,467,456	264,471,621	44,778,488	242,551,529	47,649,852	233,374,678	45,537,563	213,651,785	39,544,003		
2	Meat and Poultry Products	273,972,776	24,998,721	267,492,218	26,009,634	225,633,713	20,896,554	186,967,188	15,634,240	181,377,796	15,253,188		
3	Animal Feed	172,754,255	7,447,901	154,487,753	6,816,428	83,518,318	6,176,846	97,322,243	6,321,937	84,658,695	5,686,777		
4	Vegetable	100,767,885	5,033,661	92,119,215	4,563,500	86,724,054	4,671,259	96,436,751	4,699,660	100,365,085	4,480,657		
5	Sugar Honey	545,177,100	3,972,244	391,271,317	2,506,935	707,424,554	6,552,395	783,136,596	4,706,644	559,965,156	2,851,283		
6	Unspecified Food	86,175,827	2,343,929	69,905,108	2,281,168	85,107,831	2,039,271	96,253,691	1,729,154	79,608,205	1,782,397		
7	Fruits	56,376,477	2,201,163	58,046,703	1,829,836	58,587,188	2,181,498	54,458,247	1,846,503	56,762,751	1,936,510		
8	Alcoholic Beverage	67,182,193	2,121,461	60,400,639	732,592	108,824,441	1,494,133	92,268,267	860,037	48,254,773	613,079		
9	Starch Product	16,613,437	1,534,410	17,431,652	1,751,467	17,076,061	1,990,638	14,176,815	1,710,388	31,267,889	1,447,169		
10	Rice and Cereal	177,273,050	1,527,084	111,700,852	974,650	144,245,912	1,252,722	129,648,022	1,137,977	149,030,065	1,419,404		
11	Flour and Starch	121,100,937	1,401,965	142,137,381	1,826,290	167,545,130	1,688,216	179,249,635	1,546,620	106,133,435	1,182,511		
12	Seasoning	13,943,542	929,161	13,934,778	1,004,217	13,240,442	889,441	13,985,589	976,531	38,704,440	972,689		
13	Tea, Coffee, Cocoa and Product	3,307,968	329,253	2,612,257	179,770	4,620,815	255,503	4,620,003	220,972	6,039,065	296,147		
14	Fat and Oil	15,975,296	319,785	13,826,836	202,122	10,116,889	125,653	8,134,485	118,871	2,590,111	44,420		
15	Confectionery	1,877,602	208,825	1,641,670	122,542	1,284,547	106,051	417,133	31,662	76,653	3,897		
16	Miscellaneous	147,158,070	792,952	152,625,304	704,571	195,813,359	946,092	215,682,556	1,033,821	218,399,004	884,193		
Total		2,051,709,086	97,629,971	1,814,105,304	96,284,210	2,152,314,783	98,916,124	2,206,131,899	88,112,580	1,876,884,908	78,398,324		

Source : National Food Institute

Appendix 10

List of Existing QA Standards/Schemes relating to the Food Safety

	Scheme	Description
Primary Production	Organic standard	An approach to agriculture where the aim is to integrated, humane, environmentally friendly and economically sustainable agricultural production system.
	EUREPGAP	Technical and minimum standard for fresh produce acceptable by leading European retailers.
	GAP (Thailand)	GAP: Good Agricultural Practice, standard developed by ACFS/ DOA.
	Food Hygiene	
	Private Scheme	The scheme/ requirement developed and used by processors/ retailers.
Processors/ Manufactures	Food Hygiene	
	Organic	An approach to agriculture where the aim is to integrated, humane, environmentally friendly and economically sustainable agricultural production system.
	GMP	GMP: Good Manufacturing Practice, basic guidelines for food production
	HACCP	HACCP: Hazard Analysis Critical Control Point
	BRC	BRC: British Retail Consortium, the technical standard for companies supplying retailers' branded products.
	EFSIS	The BRC equivalent technical standard developed by EFSIS (certification body in UK)
	IFS	Technical Standard, initiated by French and German's retailers
	SQF2000	SQF2000: Safe Quality Food 2000 Quality Code, specially developed for Agri-food industry.
	Halal	Food production requirements for Muslim consumers according to Shariah laws.
Retailers	Food Hygiene	
	Supplier Assessment	The program/ scheme
	Nonconformity Management	The system/ procedures that clearly defined the process of handling nonconformities.

Appendix 11

Form of Questionnaire in the Field Survey

(1) Questionnaire on Food Safety

แบบสอบถาม

การศึกษาเพื่อเพิ่มความเข้มแข็งด้านนโยบายความปลอดภัยของอาหาร แห่งราชอาณาจักรไทย

Study for Strengthening the Food Safety Policy, Kingdom of Thailand

Japan International Cooperation Agency Thailand Office, and Ministry of Agriculture and Cooperatives

A) ข้อมูลทั่วไป General Information

A1. ข้อมูลเกี่ยวกับบริษัท COMPANY PROFILE:

ชื่อบริษัท Name of organization:	
ที่อยู่ Address:	เป็นบริษัทในเครือ Affiliate company of:
	ทุนจดทะเบียน Capital (THB):
บุคคลที่ติดต่อ Contact person:	ปีที่จดทะเบียน Year established:
ตำแหน่ง Position:	
โทรศัพท์ Telephone:	โทรสาร Facsimile:
อีเมล E-mail:	เว็บไซต์ Website:

A2. ข้อมูลเกี่ยวกับสถานประกอบการผลิต

DETAIL OF ESTABLISHMENT:

ที่ตั้งโรงงาน Plant Address:	จำนวนสายการผลิต No. of production lines:
ที่อยู่ Address:	1.
	2.
	3.
บุคคลที่ติดต่อ Contact person:	จำนวนพนักงานทั้งหมด No. of employees:
	คน
ตำแหน่ง Position:	ประจำ Permanent: ชั่วคราว Temporary:
โทรศัพท์ Telephone:	โทรสาร Facsimile:
	จำนวนกะการผลิต
	กะ
อีเมล E-mail:	

A3. ประเภทธุรกิจ TYPE OF BUSINESS:

กรุณาเลือกตอบโดยกาเครื่องหมาย (✓) ในช่องสี่เหลี่ยม <input type="checkbox"/> เลือกได้มากกว่า 1 ข้อ	
Please select one or more as applicable to your organization and tick a mark (✓) on the box	
<input type="checkbox"/> ผู้ผลิตขั้นต้น/ ผู้เพาะปลูก Primary Producer/ Grower	<input type="checkbox"/> ผู้ผลิต Processor/ โรงฆ่า-ชำแหละ Slaughterhouse
<input type="checkbox"/> ผู้ส่งมอบ Supplier/ ผู้รวบรวม Collector	<input type="checkbox"/> ผู้แปรรูป Manufacturer
<input type="checkbox"/> ผู้กระจายสินค้า Distributor	<input type="checkbox"/> ผู้ซื้อ Trading /Buying Agent
<input type="checkbox"/> ผู้ค้าปลีก Retailer	<input type="checkbox"/> อื่น ๆ (โปรดระบุ) Others

A4. กลุ่มอุตสาหกรรมด้านอาหาร

FOOD INDUSTRY CATEGORIES:

กรุณาเลือกตอบโดยกาเครื่องหมาย (✓) ในช่องสี่เหลี่ยม □ เลือกได้มากกว่า 1 ข้อ Please tick ✓ one or more in the box □ for food industry categories that relevant to your business	
<input type="checkbox"/> อาหารสัตว์ Animal Feeds	<input type="checkbox"/> การผลิตทางพืชสวน Intensive Horticulture Operations
<input type="checkbox"/> ฟาร์มเลี้ยงไก่ Chicken Farms	<input type="checkbox"/> แปรรูปผักและผลไม้ Fruit and Vegetable Processing
<input type="checkbox"/> โรงฆ่า - ซาหะละ Slaughterhouse and Butchery Operations	<input type="checkbox"/> อาหารแปรรูป Preserved Foods
<input type="checkbox"/> แปรรูปเนื้อไก่ Manufactured Meats	<input type="checkbox"/> ผลิตภัณฑ์ทะเล Seafood Processing
<input type="checkbox"/> การเพาะเลี้ยงกุ้ง- ปลา Intensive Aquaculture Operations (Shrimp/Fish)	<input type="checkbox"/> อื่นๆ Others (please specify)

A5. กลุ่มลูกค้า

MARKETS SUPPLIED:

<input type="checkbox"/> ตลาดส่งออก Export Market: % of total sales Please specify country	ประเทศปลายทาง Country of destination	คิดเป็นสัดส่วน %
	1.	
	2.	
	3.	
	4.	
<input type="checkbox"/> ตลาดภายในประเทศ Domestic Market:	ช่องทางการจำหน่าย Destination supplied	คิดเป็นสัดส่วน %
	1.	
	2.	
	3.	
อื่นๆ Others (please specify)		

A6. ผลิตภัณฑ์หรือกลุ่มผลิตภัณฑ์

PRODUCT OR GROUP OF PRODUCTS:

ผลิตภัณฑ์หรือกลุ่มผลิตภัณฑ์ and/or Group of Products	ชื่อการค้า Trade Name
1.	
2.	
3.	
4.	
5.	

B. ระบบด้านความปลอดภัยของอาหาร FOOD SAFETY SYSTEMS

B1. การบริหารความเสี่ยง RISK MANAGEMENT

B1.1 ระบบบริหารคุณภาพ (มาตรฐาน)

QUALITY MANAGEMENT SYSTEM (STANDARD)

กรุณาทำเครื่องหมาย ☒ ในกล่อง ☐ ที่ตรงกับข้อมูลสถานะของระบบบริหารคุณภาพของบริษัทท่าน
สามารถเลือกได้มากกว่า 1 รายการ

Please tick ☒ in the box ☐ one or more items of the Quality Management Standard which relevant to current status of the company

มาตรฐานคุณภาพ Quality System Standard	สถานะการจัดทำระบบ Implementation Status					หมายเหตุ Remarks
	ยังไม่ได้ จัดทำระบบ Not in place	อยู่ระหว่างกา ร จัดทำระบบ On process	ได้รับการรับรองระบบแล้ว System already certified			
			ได้รับการรับรองแล ว Certified system	โดยหน่วยงา น Certified body	ปี Year	
1.Organic Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
2.GAP (EUREPGAP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
3. GMP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
4. HACCP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
5. SQF2000 ^{CM}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
6. BRC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
7. ISO 9000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
8. ISO14000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
9. SA 8000	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
10. อื่นๆ Others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

B1.2 ระบบจัดการด้านความปลอดภัยของอาหาร

FOOD SAFETY MANAGEMENT SYSTEMS

กรุณาทำเครื่องหมาย ☒ ในกล่อง ☐
ที่ตรงกับข้อมูลสถานะของระบบการจัดการด้านความปลอดภัยของอาหารขององค์กรของท่าน
Please tick ☒ in the box ☐ to indicate the implementation of Food Safety
Management System in your organization

ระบบบริหารจัดการด้านคุณภาพ Quality Management Systems	มี Yes	ไม่มี No	หมายเหตุ Remarks
1. นโยบายด้านความปลอดภัยของอาหาร Policy on Food Safety	<input type="checkbox"/>	<input type="checkbox"/>	
2. คู่มือคุณภาพ Quality manual	<input type="checkbox"/>	<input type="checkbox"/>	
3. โครงสร้างองค์กรและอำนาจการจัดการ Organizational structure & Authority	<input type="checkbox"/>	<input type="checkbox"/>	
4. เอกสารวิธีปฏิบัติงาน (โดยเฉพาะขั้นตอนที่วิกฤตต่อความ ปลอดภัย) Standard operation procedures	<input type="checkbox"/>	<input type="checkbox"/>	
5. ข้อกำหนดของลูกค้า Specification	<input type="checkbox"/>	<input type="checkbox"/>	
6. การทบทวนโดยฝ่ายบริหาร Management review	<input type="checkbox"/>	<input type="checkbox"/>	
7. การตรวจประเมินภายในองค์กร Internal audits	<input type="checkbox"/>	<input type="checkbox"/>	

8. การจัดซื้อ-จัดหา Purchasing-procurement	<input type="checkbox"/>	<input type="checkbox"/>	
9. โปรแกรมการรับรองผู้ส่งมอบ Supplier approval program	<input type="checkbox"/>	<input type="checkbox"/>	
10. การควบคุมเอกสาร Document control	<input type="checkbox"/>	<input type="checkbox"/>	
11. การปฏิบัติการแก้ไข Corrective action	<input type="checkbox"/>	<input type="checkbox"/>	
12. การขึ้น/สอบกลับได้ traceability/identification	<input type="checkbox"/>	<input type="checkbox"/>	
13. การจัดการของรอนเรียน Compliant handling	<input type="checkbox"/>	<input type="checkbox"/>	
14. การเรียกคืนผลิตภัณฑ์ Product recall	<input type="checkbox"/>	<input type="checkbox"/>	
15. การจัดการกับอุบัติเหตุ Management of incidents	<input type="checkbox"/>	<input type="checkbox"/>	
16. การบำรุงรักษาอาคารผลิตและเครื่องมือ Building and equipment maintenance program	<input type="checkbox"/>	<input type="checkbox"/>	
17. การสอบเทียบเครื่องมือวัด Equipment calibration	<input type="checkbox"/>	<input type="checkbox"/>	
18. โปรแกรมการทำความสะอาด Cleaning program	<input type="checkbox"/>	<input type="checkbox"/>	
19. โปรแกรมการควบคุมแก้วและกระจก Glass control program	<input type="checkbox"/>	<input type="checkbox"/>	
20. โปรแกรมการควบคุมโลหะและสิ่งแปลกปลอม Metal and foreign material control	<input type="checkbox"/>	<input type="checkbox"/>	

ระบบบริหารจัดการด้านคุณภาพ Quality Management Systems	มี Yes	ไม่มี No	หมายเหตุ Remarks
21. โปรแกรมการป้องกันกำจัดแมลงและสัตว์นำโรค Pest control program	<input type="checkbox"/>	<input type="checkbox"/>	
22. การพัฒนาผลิตภัณฑ์ใหม่ๆ New product development	<input type="checkbox"/>	<input type="checkbox"/>	
23. การควบคุมผลิตภัณฑ์ที่ไม่สอดคล้องตามข้อกำหนด Control of nonconforming products	<input type="checkbox"/>	<input type="checkbox"/>	
24. การจัดเก็บและหมุนเวียนสินค้า Storage & stock rotation	<input type="checkbox"/>	<input type="checkbox"/>	
25. การแบ่งแยกกิจกรรมที่เข้ากันไม่ได้ Segregation of incompatible activity & process	<input type="checkbox"/>	<input type="checkbox"/>	
26. การควบคุมดูแลสุขภาพพนักงาน Control of employee health	<input type="checkbox"/>	<input type="checkbox"/>	
27. การฝึกอบรมพนักงาน Training program	<input type="checkbox"/>	<input type="checkbox"/>	
28. อื่นๆ (โปรดระบุ) Others	<input type="checkbox"/>	<input type="checkbox"/>	

B.2 ระบบด้านการประเมินความเสี่ยง RISK ASSESSMENT

1. Does your company equip with laboratory analysis capabilities ?

☐ Yes

☐ No

ถ้ามี กรุณากรอกข้อมูลเพิ่มเติมในตารางข้างล่าง

If Yes, please provide more details in the table below

1.1 ความสามารถในการวิเคราะห์และทดสอบ Analysis and testing capabilities			
<input type="checkbox"/> การวิเคราะห์ทางจุลชีววิทยา Microbiology analysis	<input type="checkbox"/> การวิเคราะห์ทางเคมี Chemical analysis	<input type="checkbox"/> การวิเคราะห์ทางกายภาพ Physical analysis	
<input type="checkbox"/> การวิเคราะห์ทางประสาทสัมผัส Sensory test	อื่นๆ (โปรดระบุ) Others		
1.2 จำนวนพนักงาน No. of employees: คน		1.3 การรับรองมาตรฐาน Lab accreditation: ใช่ <input type="checkbox"/> Yes ไม่ใช่ <input type="checkbox"/> No ถ้ามีโปรดระบุ If yes, please specify	
ประจำ Permanent: คน	ชั่วคราว Temporary: คน	1.	2.
1.4 การร่วมโปรแกรมทดสอบความสามารถทางห้องปฏิบัติการ Participation of external proficiency test		มี <input type="checkbox"/> Yes ไม่มี <input type="checkbox"/> No ถ้ามีโปรดระบุ If yes, please specify	

2. การควบคุมผลิตภัณฑ์และวัตถุดิบที่ส่งมอบจากผู้ขาย Inspection and testing of supplied products & materials

ประเภทวัสดุ Type of Materials	มาตรการควบคุมด้านความปลอดภัย Mechanism of Food Safety Controls	จำนวนรายการ No. of items	
		ปฏิบัติ Yes	ไม่ได้ปฏิบัติ No
วัตถุดิบหลัก Main raw materials	<input type="checkbox"/> ประเมินผู้ขาย ณ สถานที่ผลิต On-site assessment		
	<input type="checkbox"/> ตรวจสอบทดสอบขณะรับเข้า Inspection upon receiving		
	<input type="checkbox"/> ตรวจวิเคราะห์ทางห้องปฏิบัติการ Laboratory analysis		
	<input type="checkbox"/> ทวนสอบผลวิเคราะห์ที่ส่งจากผู้ส่งมอบ Verify suppliers' COA		
	<input type="checkbox"/> ไม่แน่นอนแล้วแต่กรณีไป Adhoc inspection/testing program		
	<input type="checkbox"/> อื่นๆ โปรดระบุ Others:		
ส่วนผสม/เครื่องปรุง Ingredients	<input type="checkbox"/> ประเมินผู้ขาย ณ สถานที่ผลิต On-site assessment		
	<input type="checkbox"/> ตรวจสอบทดสอบขณะรับเข้า Inspection upon receiving		
	<input type="checkbox"/> ตรวจวิเคราะห์ทางห้องปฏิบัติการ Laboratory analysis		
	<input type="checkbox"/> ทวนสอบผลวิเคราะห์ที่ส่งจากผู้ส่งมอบ Verify suppliers' COA		
	<input type="checkbox"/> ไม่แน่นอนแล้วแต่กรณีไป Adhoc inspection/testing program		
	<input type="checkbox"/> อื่นๆ โปรดระบุ Others:		
บรรจุภัณฑ์ Packaging	<input type="checkbox"/> ประเมินผู้ขาย ณ สถานที่ผลิต On-site assessment		
	<input type="checkbox"/> ตรวจสอบทดสอบขณะรับเข้า Inspection upon receiving		
	<input type="checkbox"/> ตรวจวิเคราะห์ทางห้องปฏิบัติการ Laboratory analysis		

		<input type="checkbox"/> ทวนสอบผลวิเคราะห์ที่ส่งจากผู้ส่งมอบ Verify suppliers' COA		
		<input type="checkbox"/> ไม่นานจนแล้วแต่กรณีไป Adhoc inspection/testing program		
		<input type="checkbox"/> อื่นๆ โปรดระบุ Others:		
เครื่องมือ เครื่องใช้ Equipment & utensils	-	<input type="checkbox"/> ประเมินผู้ขาย ณ สถานที่ผลิต On-site assessment		
		<input type="checkbox"/> ตรวจสอบทดสอบขณะรับเข้า Inspection upon receiving		
		<input type="checkbox"/> ตรวจวิเคราะห์ทางห้องปฏิบัติการ Laboratory analysis		
		<input type="checkbox"/> ทวนสอบผลวิเคราะห์ที่ส่งจากผู้ส่งมอบ Verify suppliers' COA		
		<input type="checkbox"/> ไม่นานจนแล้วแต่กรณีไป Adhoc inspection/testing program		
		<input type="checkbox"/> อื่นๆ โปรดระบุ Others:		
สารเคมี Chemicals		<input type="checkbox"/> ประเมินผู้ขาย ณ สถานที่ผลิต On-site assessment		
		<input type="checkbox"/> ตรวจสอบทดสอบขณะรับเข้า Inspection upon receiving		
		<input type="checkbox"/> ตรวจวิเคราะห์ทางห้องปฏิบัติการ Laboratory analysis		
		<input type="checkbox"/> ทวนสอบผลวิเคราะห์ที่ส่งจากผู้ส่งมอบ Verify suppliers' COA		
		<input type="checkbox"/> ไม่นานจนแล้วแต่กรณีไป Adhoc inspection/testing program		
		<input type="checkbox"/> อื่นๆ โปรดระบุ Others:		

ประเภทวัสดุ Type of Materials	มาตรการควบคุมด้านความปลอดภัย Mechanism of Food Safety Controls	จำนวนรายการ No. of items	
		ปฏิบัติ Yes	ไม่ได้ปฏิบัติ No
การบริการอื่นๆ จาก ภายนอก Other external services	<input type="checkbox"/> ประเมินผู้ขาย ณ สถานที่ผลิต On-site assessment		
	<input type="checkbox"/> ตรวจสอบทดสอบขณะรับเข้า Inspection upon receiving		
	<input type="checkbox"/> ตรวจวิเคราะห์ทางห้องปฏิบัติการ Laboratory analysis		
	<input type="checkbox"/> ทวนสอบผลวิเคราะห์ที่ส่งจากผู้ส่งมอบ Verify suppliers' COA		
	<input type="checkbox"/> ไม่นานจนแล้วแต่กรณีไป Adhoc inspection/testing program		
	<input type="checkbox"/> อื่นๆ โปรดระบุ Others:		
อื่นๆ โปรดระบุ Others please specify			

ข้อเสนอแนะของท่าน Your comments:

3. การควบคุมความปลอดภัยของอาหารในกระบวนการผลิตในสถานประกอบการ Mechanism of Food safety control in processing/ production lines

กรุณาทำเครื่องหมาย✓ในกรอบสี่เหลี่ยม ☐

เกี่ยวกับระบบบริหารจัดการของท่านว่ามีระเบียบปฏิบัติที่กำหนดเป็นมาตรฐานและนำไปใช้งาน

Please tick ✓ in the box ☐ to indicate your existing QMS if a formal procedure available in place and well implemented.

ระบบบริหารจัดการด้านคุณภาพ Quality Management Systems	มี Yes	ไม่มี No	หมายเหตุ Remarks
1. ระบบวิเคราะห์อันตรายและจุดควบคุมวิกฤต Hazard Analysis Critical Control Point: HACCP	<input type="checkbox"/>	<input type="checkbox"/>	
2. แผนงาน HACCP สำหรับทุกผลิตภัณฑ์ HACCP Plan for all products exist	<input type="checkbox"/>	<input type="checkbox"/>	
3. การตรวจประเมินคุณภาพภายใน Internal audits	<input type="checkbox"/>	<input type="checkbox"/>	
4. เจ้าหน้าที่ QC ในสายการผลิต QC inspection in production lines	<input type="checkbox"/>	<input type="checkbox"/>	
5. การตรวจสอบผลิตภัณฑ์สำเร็จรูปในแต่ละชุดผลิตภัณฑ์ Testing of finished products for each batch	<input type="checkbox"/>	<input type="checkbox"/>	
6. การตรวจสอบทั่วไปด้านระบบสุขอนามัย General sanitation checks	<input type="checkbox"/>	<input type="checkbox"/>	
7. การเฝ้าระวังโปรแกรมการทำความสะอาด Monitoring program for cleaning schedule	<input type="checkbox"/>	<input type="checkbox"/>	
8. การตรวจสอบทางห้องปฏิบัติการพื้นผิวสัมผัสอาหาร Swabbing test on food- contact surface	<input type="checkbox"/>	<input type="checkbox"/>	
9. ส่งผลิตภัณฑ์ไปตรวจหาห้องปฏิบัติการภายนอก Product tested at external lab for verification	<input type="checkbox"/>	<input type="checkbox"/>	
10. โปรแกรมทดสอบอายุผลิตภัณฑ์ Shelf-life testing program	<input type="checkbox"/>	<input type="checkbox"/>	
11. ระบบการตรวจสอบปล่อยผลิตภัณฑ์ Product release procedure	<input type="checkbox"/>	<input type="checkbox"/>	
12. มีโปรแกรมในการตรวจสอบน้ำและน้ำแข็ง Water, ice testing program	<input type="checkbox"/>	<input type="checkbox"/>	
13. โปรแกรมตรวจสอบการเจ็บป่วยพนักงาน ผู้เยี่ยมชม Medical screening program	<input type="checkbox"/>	<input type="checkbox"/>	
14. โปรแกรมตรวจสอบด้านสุขอนามัยส่วนบุคคล Personal hygiene monitoring program	<input type="checkbox"/>	<input type="checkbox"/>	
15. การทวนสอบกระบวนการและเครื่องมือที่เกี่ยวข้อง ด้านความปลอดภัยของอาหาร Process & equipment validation	<input type="checkbox"/>	<input type="checkbox"/>	
16. โปรแกรมการรับรองผู้ส่งมอบ Suppliers' performance monitoring	<input type="checkbox"/>	<input type="checkbox"/>	
17. โปรแกรมการตรวจจับโลหะและสิ่งแปลกปลอม Metal & foreign mater detection program	<input type="checkbox"/>	<input type="checkbox"/>	
18. อื่นๆ Others	<input type="checkbox"/>	<input type="checkbox"/>	

B3. ระบบการสื่อสารด้านความเสี่ยง

RISK COMMUNICATION

B3.1 ระบบการบริหารจัดการด้านความปลอดภัยของอาหาร MANAGEMENT SYSTEMS

FOOD SAFETY

กรุณาทำเครื่องหมาย✓ในกรอบสี่เหลี่ยม

☐ เกี่ยวกับระบบบริหารจัดการของท่านว่ามีระเบียบปฏิบัติที่กำหนดเป็นมาตรฐานและนำไปใช้งาน

Please tick ✓ in the box ☐ to indicate your existing QMS if a formal procedures available in place and well implemented.

ระบบบริหารจัดการด้านคุณภาพ Quality Management Systems	มี Yes	ไม่มี No	หมายเหตุ Remarks
1. การจัดการข้อร้องเรียน Complaint handling	<input type="checkbox"/>	<input type="checkbox"/>	
2. การระบุฉลากผลิตภัณฑ์ Product labeling	<input type="checkbox"/>	<input type="checkbox"/>	
3. การขึ้นและสอบกลับได้ Product traceability and identification	<input type="checkbox"/>	<input type="checkbox"/>	
4. ข้อกำหนดของลูกค้าด้านความปลอดภัย Specification	<input type="checkbox"/>	<input type="checkbox"/>	
5. การเรียกคืนผลิตภัณฑ์ Product recall	<input type="checkbox"/>	<input type="checkbox"/>	
6. การเข้าถึงข้อมูลใหม่ด้านความปลอดภัยของอาหาร Access to new information	<input type="checkbox"/>	<input type="checkbox"/>	
7. การจัดการกับอุบัติเหตุหรือเหตุฉุกเฉิน Management of incidents	<input type="checkbox"/>	<input type="checkbox"/>	
8. โปรแกรมการฝึกอบรมพนักงาน Training program	<input type="checkbox"/>	<input type="checkbox"/>	
9. อื่นๆ (โปรดระบุ) Others (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	

ข้อคิดเห็นของท่าน Your comments:

C. ข้อจำกัดและปัญหาต่างๆ KEY CONSTRAINTS AND PROBLEMS

ท่านเห็นอย่างไรเกี่ยวกับปัญหาและข้อจำกัดหลักๆในการจัดทำระบบจัดการด้านความปลอดภัยของอาหาร
ในบริษัทของท่าน กรุณาให้ระดับความสำคัญ จาก 1 – 5, 1= สำคัญน้อย 5= สำคัญมากที่สุด
How would you see the key constraints and problems of implementing food safety
management systems in your company. Please give rating from 1 to 5, 1= less important 5
= Very important

ข้อจำกัดและปัญหา Key Constraints & Problems	ระดับความ สำคัญ Rating	แนวทางแก้ไข Suggested Actions
1. โครงสร้างอาคาร การจัดวางและออกแบบ สายการผลิต Building structure & design		
2. การบำรุงรักษา-ซ่อมบำรุง Maintenance		
3. ระบบน้ำและมาตรฐานคุณภาพน้ำ Water quality and facilities		
4. ขาดแคลนทรัพยากรบุคคล Lack of human resource		
5. เทคโนโลยีและวิทยาการใหม่ ๆ Insufficient technology		
6. ความตระหนักเกี่ยวกับความปลอดภัยอาหาร Staff training & awareness on food safety		
7. เงินทุนและการลงทุน Financial and capital investment		
8. คุณภาพวัตถุดิบการผลิตไม่สม่ำเสมอ Inconsistency in quality of raw material supplied		
9. การไม่มีระบบหัดเทียมกันในแต่มาตรฐานที่ใช้ No harmonization of existing food safety standard and regulations		
10. ระบบจัดการเอกสาร Documentation systems		
11. ความซ้ำซ้อนจากการถูกตรวจประเมินโดยองค์กรจ ากภายนอก Duplication of assessments by external body		
12. ระบบสอบกลับได้ของผลิตภัณฑ์ Product traceability		
13. ขาดระบบในการเข้าถึงข้อมูลข้อกำหนดต่าง ๆ Lack of system to access required information		
14. ขาดแคลนด้านความสามารถในการทดสอบ Lack of capability on testing		
15. นโยบายและกฎระเบียบของภาครัฐ Government policy & current regulations		
16. อื่นๆ (โปรดระบุ) Others		

D. ความต้องการการสนับสนุน-ช่วยเหลือจากภาครัฐ

SUPPORTS NEEDED FROM GOVERNMENT

1-10, 1= สำคัญน้อย 10= สำคัญมาก Please list the key priority of supports NEEDED from government, please give ranging degree of important in your opinion. 1 = less important , 10 = most important

D1. สนับสนุนในเชิงนโยบาย Government Policy

- 1.
- 2.
- 3.
- 4.
- 5.

D2. สนับสนุนในด้านการเงิน Financial Mechanism Support

- 1.
- 2.
- 3.
- 4.
- 5.

D3. สนับสนุนทางเทคนิควิชาการ Technical Assistance

- 1.
- 2.
- 3.
- 4.

D4. การตลาดและประชาสัมพันธ์ Marketing and Promotion

- 1.
- 2.
- 3.
- 4.
- 5.

D5. อื่นๆ Others

- 1.
- 2.
- 3.

(2) Questionnaire for Livestock Sector

Please file and sent by Fax: to JICA STUDY TEAM Fax: 02-281-8843

Name of Organization		
Address/Tel/Fax/e-mail		
	Tel:	Fax:
	E-mail:	
Type of Business	Chicken Boiler/Layer/Feed Mill/Slaughter/Processing Plants/Cold Storage/Distributor	
	Exporter	Importer
		local
Contact Person		Position

Please answer the following questions:

1. Please explain in which stage do you think it is necessary to improve a present status in food safety of chicken food chain?

2. How do you do to secure food safety in chicken farm?

3. How do you do to secure food safety in chicken processing?

4. Please explain about your traceability system?

5. Do you have any verification system in case of food accident?

- 6. Do you have any idea of Government inspection system for veterinary drug?**
- 7. Please describe your request idea to the policy of the Government on food safety?**
- 8. Please describe of what kind of measure do you think is suitable for Bird Flu?**
- 9. 'What kind of problem that you find on food export?**
- 10. What kind of problem that you find in food packaging in primary processor?**
- 11. What is a problem that you find in packaging when deliver chicken to slaughterhouse?**
- 12. What is a problem that you find in packaging in processing stage?**
- 13. What is a problem that you find in packaging in food distribution stage?**
- 14. Are you satisfied with the present packaging?**
- 15. What is a problem that you find in chicken meat Cold Chain system for export?**

- 16. What is a problem that you find in Cold Chain system in slaughterhouse?**
- 17. What is a problem that you find in Cold Chain system in Processing Plants?**
- 18. What is a problem that you find in Cold Chain system at Cold Storage?**
- 19. What is a problem that you find in Cold Chain system at distribution?**
- 20. What is your idea to improve a Cold Chain system of Government policy?**
- 21. Are you interesting in Japanese Cold Chain System, Packaging System, Traceability System? If so, please mention below.**
- 22. Do you recommend us about the Organization or Company that Study Team can study about food safety situation in Thailand.**
 - 1. Organization**
 - 2. Association relative**
 - 3. Animal Feed Mill**
 - 4. Slaughterhouse**
 - 5. Processing Plant**
 - 6. Transportation Contractor**
 - 7. Exporter**
 - 8. Other**

(3) Questionnaire for Pre-Certification System

แบบสอบถาม

**โครงการศึกษาเพื่อเพิ่มความเข้มแข็งด้านนโยบายความปลอดภัยของอาหาร
แห่งราชอาณาจักรไทย**

**Study for Strengthening the Food Safety Policy, Kingdom of Thailand
Japan International Cooperation Agency Thailand Office, and Ministry of
Agriculture and Cooperatives**

เรื่อง Pre-certification System _____

1. ข้อมูลเกี่ยวกับบริษัท COMPANY PROFILE:

ชื่อบริษัท Name of organization : (ไทย) (อังกฤษ)	
ที่อยู่ Address :	
บุคคลที่ติดต่อ Contact person :	
ตำแหน่ง Position :	
โทรศัพท์ Telephone:	โทรสาร Facsimile:
อีเมล E-mail:	เว็บไซต์ Website:

2. ข้อมูลเกี่ยวกับผลิตภัณฑ์ หรือกลุ่มผลิตภัณฑ์ PRODUCT or GROUP of PRODUCTS:

2.1 รายชื่อผลิตภัณฑ์ของบริษัท Company Products:
(กรุณารอกเป็นภาษาอังกฤษ)

**2.2 ผลิตภัณฑ์ที่ได้รับการรับรองใน Pre-certification
(Pre-certification Registered Item)**
(กรุณารอกเป็นภาษาอังกฤษ)

3. เหตุผลที่ขอรับรอง Pre-certification

4. ประโยชน์ที่ได้รับจากโครงการ Pre-certification

**5. ปัญหาและอุปสรรคที่พบในการดำเนินการ/หรือปัญหาและอุปสรรคที่พบในโครงการ
(Problems and Constraint during process / Problems and Constraint in
the projects)**

**6. ต้องการการสนับสนุนจากภาครัฐในเรื่องอะไรบ้าง (Support Needed from
government)**

6.1 นโยบาย (Policy)

6.2 การตลาด (Marketing)

6.3 เทคโนโลยี (Technology)

6.4 อื่น ๆ (Others)

กรุณาส่งแบบสอบถามกลับคืนทางโทรสารหมายเลข 02-2818843 ติดต่อคุณลักขณา

Please return this questionnaire by fax no. 02-281 8843 (Ms. Lakhana)

