



# Handbook for Introduction of Food Traceability Systems

(Guidelines for Food Traceability)

March 2003 (First edition)

March 2007 (Second edition)

Revision Committee on the Handbook for Introduction of  
Food Traceability Systems

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**Notes for English version**

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Second print (March 2008)

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## **Introduction**

### **0-1 Background history on the original handbook**

Historically the food industry has addressed the management of food hygiene, safety, and quality through the introduction of HACCP and ISO9001, etc. However, when issues such as false labeling and occurrences of BSE became public, the food industry lost consumer trust in commercial food products. More and more consumers were demanding a food supply at which every stage of production, processing, and distribution of a food item could be documented, and tracked. These demands included stricter solution of food safety compliance throughout the food industry. As a result, constructing a system for a reliable food traceability system became urgent task.

A food traceability system enables to follow the movement of any food product by documentation of each point of food handling. When an incident occurs, the food traceability system could efficiently assist in the recall of the food product(s) in question and assist in the investigation of the cause. Also transmitting and verifying the relevant information would contribute to increasing reliability on the information of the label and so on, and thus enables consumers to purchase food with a sense of security.

Moreover, it is important to fully be aware that the traceability system is simply a means for attaining that objective. And it is important not to fall into the excessive pursuit, such as making establishment of traceability system itself as an objective.

Thus, with this as a background, in order to promote the construction of a food traceability system and to set guidelines which would be a guide in introducing traceability system, the “Committee on the Handbook for Introduction of Food Traceability Systems” was established. A working group from within the Committee was formed to further study the available information on food traceability.

From an extensive review of the literature and the knowledge of actual experiments and outcomes from overseas, this “Handbook for the Introduction of Food Traceability Systems” (hereon, mentioned as “Handbook”) was completed and released on March of 2003.

### **0-2 Revision of the guidelines: Background and details**

With the release of this “Handbook”, the basic idea of “Food traceability” became widely recognized within this country. The “Handbook” became the primary reference for producers and food business operators (hereon also referred to as

“operators”), organizations and industrial associations (hereon also referred to as “organizations and associations”) made up of producers and food operators, and for information related business operators who support the introduction of the food traceability system. Furthermore, the “Handbook” provided the basic framework and core information utilized for writing guidelines for specific food products and specific industries.

The Beef Traceability Law went into effect in June of 2003 and relevant government ministerial and ordinance were enacted for domestic cattle and beef. In addition to the domestic beef traceability introduction handbook (general remarks version), handbooks for each stage of production were written. Other food products with written guidelines include fresh produce, eggs, shellfish (oysters and scallops), farmed fish, and laver. Guidelines for other food products are expected to be forthcoming.

“Requirements for Food Traceability Systems” was decided based on this “Handbook” as a standard to verify food traceability system and was released in October of 2006.

Internationally, the definition of food traceability was set at Codex Alimentarius Commission (June of 2004). Through the ISO, a draft on “Traceability in the feed and food chain-General principles and basic requirements for system design and implementation”(ISO/DIS 22005) is under discussion and close to completion. “Requirements for Food Traceability Systems” have been written to meet all the requirements of this ISO/DIS22005 (as of November, 2005).

After the “Handbook” was released, the food traceability system became compulsory for cattle and beef within the country by law. As a result of the introduction of this legislation and the “Handbook”, the food traceability system has made rapid progress. Accurate and effective monitoring and maintaining of the quality of this system is expected in the future.

For other food items, the introduction of the traceability system is not currently required but rather the responsibility of each food business operator. In this atmosphere of voluntary compliance, ensuring traceability within individual food businesses has steadily advanced. For example, keeping records of primary production stage during cultivation, breeding, and identification and linking of raw materials and products at the processing stage have become more common.

The primary objective of the “Handbook” has been to ensure food traceability throughout the food chain. Unfortunately, there are fewer participants than desired in the new food traceability systems through the food chain and dealing with this problem

remains a big task. In order to tackle this task, it will be necessary to maximize the consistency by having the participating food operators seek cooperation and adjustments among themselves. Also designing the systems considering the costs and effects is necessary to make the systems more appealing to prospective food operators.

Based on these accomplishments and tasks in mind, the “Handbook” was revised so that it would be a more effective reference for food operators and their organizations and industrial associations. Upon revision, the Committee on the Handbook for Introduction of Food Traceability Systems (hereon referred to as “committee”) was held and after the approval of the revision, the committee changed its name to Revision Committee on “the Handbook for Introduction of Food Traceability Systems” and began discussions on this matter.

### **0-3 Purpose of this handbook**

This handbook is directed toward producers of primary production, food processors, distributors, retailers, restaurant and take-out food operators, information related companies, organization and industrial associations of prospective companies and individuals who plan to introduce traceability system. The handbook supports the introduction of the traceability system by including fundamentals, procedures, and so forth. For food operators and their organizations and industrial associations which already have introduced traceability systems, this handbook provides guidelines that can help in conducting employee training, in reviewing the current system, in expanding the subject range of the traceability system, and in realizing the system connections with other food operators.

The introduction of a food traceability system by the food operator should be voluntary and their responsibility. And this “Handbook” should be a framework for designing and implementing a reliable system. In addition, the “Handbook” offer basic information when developing or revising guidelines according to specific items and/or for specific industries.

For some items and industries, there already is a sufficient food traceability in place and thus a traceability system need not be implemented from the beginning. In this case, a comparison review of their present state with the fundamentals listed for ensuring traceability in the “Handbook” would be helpful to ensure a common understanding among the food operators.

#### **0-4 Structure of this handbook**

In Part I, definitions of food traceability system related terms, objective of system introduction, important considerations and basic items when building a system are shown. And in Part II, actual procedures for introduction are shown.

The main revised points from the original “Guidelines” which was released in March of 2003 are as follows:

- i Identified the changes in definitions of “Food traceability”.
- ii Fulfilled the descriptive section on how to ensure traceability through the food chain by adjusting the system each operator has introduced.
- iii Revised Handbook to become a guide for introducing system covering all the requirements shown in “Requirements in Food Traceability System”.

Also, thorough review took place with accumulated information since March of 2003 and task in consideration.

#### **0-5 For the future**

Ensuring traceability through the food chain can be accomplished by careful planning, taking the time to gain consensus among the food operators and gaining the trust of the consumers. In order to gain consumer trust of the traceability system as a whole, the traceability system in place must meet the set standards.

To have a common understanding about food traceability among food business operators is imperative when agreeing to the introduction of system through the food chain, equally as important is ensuring the consistency of the food traceability system implemented by each food operator, and making effective connections amongst all the systems.

This first edition handbook laid the foundation for food traceability systems by setting a specific direction. It worked as a base for establishing various guidelines for specific items and determining “Guidelines” which is a standard for traceability system.

With this revision, we expect that this book will be read by the appropriate personnel and this book will contribute to ensuring traceability through food chain.

Furthermore, we think it is necessary to properly review this handbook according to the domestic and international social and business situation and also according to ongoing new developments in information technology. Therefore, we will review, revise, and expand this handbook even after this revision, by properly examining its effectiveness.



## **Part I. Fundamentals of food traceability systems**

In Part I. the fundamental matters of traceability systems are described as a reference for farmers, food processors, distributors, retailers, food service operators, take-out food suppliers and other related industries planning to introduce traceability systems.

### **1. Scope of this handbook**

The scope of foods and industries covered by this handbook are as follows:

#### **1-1 Type of foods covered**

- Scope of foods covered:

All kinds of food

#### **1-2 Type of industries covered**

- Scope of industries and others covered:

Business corporations, organization and individuals engaged in the production, preparation/processing, distribution and sales of foods.

## **2. Related laws and other rules**

### **2-1 Laws**

The Japanese laws concerning traceability systems are as follows<sup>1</sup>:

#### **i The Law Concerning Standardization and Proper Labeling of Agricultural and Forestry Products (JAS Law)**

In this law, standards for the agricultural and forestry products as well as the standards regarding proper labeling on the quality of the agricultural and forestry products are laid down.

It is obligatory to have foods and beverages sold directly to consumers labeled in accordance with the Quality Labeling Standard under the JAS Law. Specific contents are laid down in “The Quality Labeling Standard for Fresh Foods” and “The Quality Labeling Standard for Processed Foods” based on this law, and indication of the name, origin, and so forth (some processed foods are required to label the origin of the ingredients) is required.

In this law, in case of the disclosure of an incident such as false labeling of origin, prompt revelation of the name of the involved food business operator and the penalties, are laid down.

#### **ii Agricultural Products Inspection Law**

In this law, a system of “agricultural products inspection”(grade inspection and constituent inspection) is established in order to contribute to fair and smooth trade and to improve the quality of agricultural products such as rice.

According to “The Quality Labeling Standard of Brown Rice and Polished Rice” (Article 4-1-2), unless the brown rice is certified according to this law, place of origin, variety and harvested year shall not be labeled.

#### **iii Agricultural Chemicals Regulation Law**

In this law, registration system for agricultural chemicals and regulations on sales and usage of agricultural chemicals are established.

A person who uses agricultural chemicals shall not use them against the regulation determined by ministerial ordinances (Article 12).

The Minister of Agriculture, Forestry and Fisheries or the Minister of Environment has a right to require any person using agricultural chemicals to submit

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<sup>1</sup> When exporting, it is necessary to consider the laws and ordinances of the country and regions concerned. Refer to the references [1]~[5].

a report on the use of the agricultural chemicals, or to have the necessary materials such as agricultural chemicals and ledgers inspected (Article 13).

#### iv Fertilizer Control Law

In this law, standards, registration, restrictions on input/application, and labeling standards of fertilizers are established.

A person who uses fertilizers (such as producers) is prohibited from using “specific ordinary fertilizers” without guarantee labels. (specified ordinary fertilizers are designated by a government ordinance, to contain ingredient(s) that will remain as residues and may be harmful to human and animals) (Article 21-2). The Minister of Agriculture, Forestry and Fisheries or the governors of prefectures may require any person using fertilizer to submit a report, or to have the premises inspected when the necessity is recognized in accomplishing purposes of this law (Articles 29 and 30).

#### v Pharmaceutical Affairs Law

In this law, regulations regarding manufacturing, importing, sales and proper use of animal medicines are established.

In the ministerial ordinance concerning the regulation of the usage of animal medicines, which is based on Article 83 of the law, the prescribed usage, dosage, withdrawal period and so on are determined. Article 5 in the ministerial ordinance requires an effort to record of the following items in the ledger when medicines are used.

- Date medicine is used
- Location medicine is used
- Kind, number and other distinction of the animals on which medicine is used
- Name of medicine
- Usage and dosage of medicine
- Date to be slaughtered, to be unloaded or to be shipped in order to be served as food

#### vi Law Concerning Safety Assurance and Quality Improvement of Feed (Feed Safety Law)

This law prohibits the compounding of antibacterial products in animal feed, regulates feed additives, and establishes standards of toxic substances.

According to the revised ministerial ordinance concerning ingredient standards of feeds and feed additives issued in 2003, anyone who uses feeds must make an effort

to record the following and keep the record.

- Date when feeds are used
- Location where feeds are used
- Kinds of livestock feeds are given
- Name of feeds
- Amount of feeds given
- Date which feeds are received and name of the person or organization from which feeds were provided

**vii Slaughterhouse Law (Abattoir Law)**

This law determines regulations regarding the establishment of abattoirs, sanitation management in abattoirs, sanitation management of slaughter or dissection of livestock, and inspection of slaughter or dissection of livestock.

The governors of prefectures may, to the extent necessary for the enforcement of this Law, collect necessary reports from owners, managers, slaughterers or other parties concerned. Also they may have officials concerned to inspect facilities, ledgers, documents and other objects (Article 17).

**viii Law on Special Measures against Bovine Spongiform Encephalopathy**

To prevent the occurrence and spread of Bovine Spongiform Encephalopathy, this law establishes special measures such as prohibition of feed containing cattle meat and bone meal as well as regulations for report and inspections of dead cattle and inspections for BSE at abattoirs.

This law establishes that cattle owners or managers (in cases that cattle are managed by entities other than the owners) shall ensure that each of their cattle wears identification ear tags, shall record the specific information mentioned in the Article 8(1) (Date of birth, moving record and other information) and shall provide information necessary for managing.

**ix The Law for Special Measures concerning the Management and Relay of Information for Individual Identification of Cattle**

In this law, identification of cattle and beef, proper management and transmission of information are determined.

A person who manages cattle is required to notify the Minister of Agriculture, Forestry and Fisheries regarding its birth, import, transfers or receipts (Chapter 3). Also slaughterers, sellers and suppliers of specific cuisine are required to indicate

Individual Identification Number (or corresponding lot numbers) to the beef they handle, and to record the items stipulated by the government ordinance concerning transfer and selling (i.e. Individual Identification Numbers, date of transfer, name of purchaser, weight of beef and so on), and to record and store the record (Article 17).

**x Poultry Meat Inspection Law**

This law determines permission of poultry handling and processing, observance matters for processing managers such as sanitation, poultry inspection and so on.

Governors of prefectures may, to the extent necessary for the enforcement of this law, require processing managers to submit a report on their business situation or have officials concerned to inspect (inspections of facilities, ledgers, documents and other objects).

**xi Food Sanitation Law**

This law establishes necessary regulations and any other necessary measures in order to secure food safety from the viewpoint of public health.

Article 3-2 (duty of keeping and maintaining a record) were added in the 2003 revision of the law; it regulates the obligation to make an effort to keep records and disclose them to the public.

Based on the regulation, “the guideline on making and maintaining records by food business operators” is determined. The guideline indicates the items about which food business operators are generally required to record, as well as the number of years such records must be kept.

Article 11 enacts standards of labeling and Article 12 prohibits false labeling.

**xii Health Promotion Law**

In this law, the fundamentals on comprehensive promotion of the citizens' health are defined.

Regarding nutritional displays, such as nutritional ingredients, that are attached to food products, the law establishes mandatory criteria such as items and methods to be displayed (Article 31).

**xiii Act against Unjustifiable Premiums and Misleading Representations (Premiums and Representations Act)**

This law establishes regulations and prohibitions on unjustifiable premiums and misleading representations in connection with transactions of a commodity or

service.

This law prohibits any of the following indications: showing that the content of the product is remarkably better than that of the actual product in question, indicating that the product is far better than that of the competitors which is contrary to the fact (Article 4-1).

The law authorizes Japan Fair Trade Commission to require food business operators to submit materials which show reasonable evidence if that the commission needs to decide whether the claim is unfair or not. If the food business operator does not submit the materials, an exclusion order can be applied to the operator (Article 4-2).

#### xiv The Product Liability Act

This law determines liability of the manufacturer, etc. for damages when injury to life, body, or property is caused by a defect in the product.

It determines that the manufacturer, etc. shall be liable for damages caused by the injury, when it has injured someone's life or property by the defect in the delivered product (Article 3).

#### xv Measurement Law

This law designates standards for measurement.

According to the governmental ordinance for the measurement concerning sale of specific commodities, an allowable margin of error is established to display measurement of specific commodities.

#### xvi Unfair Competition Prevention Act

This law regulates the prevention of unfair competition and compensation for damages caused by unfair competition.

#### xvii The Food Safety Basic Law

The law determines the responsibilities of the government and local competent authorities, local governments and food business operators in order to comprehensively promote policies to ensure food safety.

In Article 8 (Responsibility of food business operators), food business operators shall recognize that they bear the primary responsibility for ensuring food safety and shall be responsible for taking appropriate and necessary measures to ensure food safety at each stage of the food supply process. In addition, food business operators shall make efforts to provide accurate and appropriate information concerning food and

other articles related to their own business activities.

## **2-2 Standards, guidelines, etc. on food traceability systems**

Voluntary standards or guidelines concerning food traceability systems are as follows;

### **(1) National standards**

#### **i “Requirements for Food Traceability Systems”**

This document is the standard for verification of food traceability systems. It was made by The Committee on the Third Party Certification of Food Traceability Systems and was released in October of 2006. The standards can be used for self verification (check by operators themselves), for verification by business partners (done by direct relevant people) and for the third party verification. In case of the third party verification, if all the requirements are met, then the operator could be basically considered as having the food traceability system in place.

### **(2) Guidelines by items and by stages**

- i Handbook for Introduction of Traceability of Domestic Beef**
- ii Guidelines for Information Tracing-back System of Receipt, Shipment and History of Ingredients**
- iii Guidelines for Food-Service Industry towards Food Traceability Construction**
- iv Guidelines for Introduction of Food Traceability of Fruits and Vegetables**
- v Guidelines for Traceability of Shellfish (Oyster, Scallop)**
- vi Guidelines for Introduction of Food Traceability of Egg**
- vii Guidelines for Traceability Systems of Farmed Fish**
- viii Guidelines for Introduction of Food Traceability Systems of Laver**

### **(3) International Standards and Rules**

- i Codex Alimentarius Committee “Principles for Traceability/Product Tracing as a Tool within a Food Inspection and Certification System”**
- ii ISO/DIS 22005 Traceability in the Feed and Food Chain—General Principles and Basic Requirements for System Design and Implementation**

## **2-3 Standards related to food traceability**

### **(1) National Standards**

- i Specific JAS with the Disclosed Production Information**

This is a standard regarding accurate transmission of food production information (producer name, the place of production, input/application information on agricultural chemicals and fertilizers) transmitted voluntarily by a food business operator to consumers. The Ministry of Agriculture, Forestry and Fisheries (MAFF) registered certifying bodies (The third-party organizations) conduct certification. As of March 2007, there are three standards of this kind; beef, pork and agricultural products (whole fresh agricultural products such as rice, vegetables, fruits, mushrooms, etc.).

## **(2) International Standards and Guidelines**

### **i ISO 9001:2000 (JIS Q 9001:2000)**

This is an International Standard model for quality management and quality assurance determined by ISO (International Organization for Standardization). Ensuring traceability could be added as one of the requirements.

### **ii ISO 22000:2005**

This is a standard for food safety management systems. The analyzing methods of food hazards are introduced from HACCP, the principles of which were determined by the Codex Alimentarius Committee. And the approach of the management system is introduced from ISO 9001. 7.9 is the requirements of traceability systems.



### 3. Definitions

#### **Food**

All substances and products that are intended for human consumption foods or beverages or are reasonably expected to be consumed by humans

#### **Food traceability**

The ability to follow the movement of food through specified stage(s) of production, processing and distribution

Notes:

1. This is the definition agreed at Codex Alimentarius held in June-July of 2004.
2. "Ability to follow the movement" in this definition refers to tracing both directions; trace forward and trace back.
3. "Movement" can relate to the origin of the materials, processing history, or distribution.

#### (References)

- The first edition of this "Handbook" released on March 2003 defined "food traceability" as the following:

"Foods and their information can be traced forward and back at each stage of the food chain, i.e., production, preparation, processing, distribution and sales

Notes:

1. "Tracking" or "tracing forward" refers to pursuing in the downstream direction, and "tracing" or "tracking back" refers to pursuing in the upstream direction.
2. The measures to track or trace that are taken at part of the stage of the food chain (production, preparation/processing, distribution or sale) are here referred to as the "measures aiming at constructing a traceability system."

This revised edition of the Handbook has adopted the definition of food traceability agreed upon at Codex Alimentarius. Thus, the term "traceability" will be used even when tracing is capable at only one part of a stage. And system for this will be called the traceability system.

However, the ultimate objective of this "Handbook" is to establish traceability throughout the food chain. This objective remains unchanged even prior to and after this revision.

- **Definitions of the traceability in ISO 9000:2005**  
 “Ability to trace the history, application or location of that which is under consideration.”  
 Note: When considering product, traceability can relate to
  - the origin of materials and parts
  - the processing history, and
  - the distribution and location of the product after delivery
- **Definitions in EU’s General Food Law**  
 ‘Traceability’ means the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be used for these products at all of the stages of production, processing and distribution.”
- **Definitions in “Agriculture et industrie alimentaire-Ligne directrices pour l’établissement d’une démarche de tracabilité dans les filières agricole et alimentaires” of Association française de normalization (AFNOR).**  
 “Traceability in agriculture and the food industry sector is applied mainly to two combinations, i.e., product/process(progress), and product/localization (location). Traceability can be described, as it were, as a combination of the flow of substances and that of information.”
- **Definitions in ISO/DIS 22005 (November 20, 2006, N36Rev1)**  
 ability to follow the movement of a feed or food through specified stage(s) of production, processing and distribution.  
 Notes:
  1. Adopted from Reference (3). (Note: Reference (3) is the minutes of the Codex Alimentarius)
  2. Movement can relate to the origin of the materials, processing history or distribution of the feed or food.
  3. Terms such as “document traceability”, “computer traceability” or “commercial traceability” should be avoided.

#### **Internal traceability**

Traceability between the received unit (or raw material unit) and the sold unit (or product unit) at the food operator level

#### **One-step-back traceability**

Ability to identify the supplier of the units they have received

If the material flow and the business flow differ, we will follow the material flow and call the one-step-back operator as “supplier” in this “Handbook”.

#### **One-step-forward traceability**

Ability to identify the buyer of the units they have sold

If the material flow and the business flow differ, we will follow the material flow and call the one-step-forward operator as “buyer” in this “Handbook”.

#### **Chain traceability**

Traceability throughout the food chain

#### **Traceability system**

A series of mechanisms for traceability, by which “identification”, “link”, “records of information”, “collection and storage of information”, and “verification” are performed.

The system is composed of rules (promises and agreement) and procedures, documented procedures, organizations/systems, and process and management resources (personnel, financial resources, machinery equipment, software, technologies and techniques), regulations and education / training.

A traceability system can also use information system technologies for electronic data entry and database management services. However, just having an information system would not be sufficient to establish a traceability system. Also it is possible to construct a traceability system without using electronic information system databases.

(For Reference)

- Definitions of traceability system in ISO/DIS 22005 (November 20, 2006, N36Rev1)

“Organization of data and operations that is capable of maintaining desired information about a product and its components through all or part of its production and utilization chain”

#### **Data**

Recorded information

#### **Primary production**

Cultivation and harvesting of farm produce, storage of harvested crops; animal breeding, milking, egg collection and fattening; culturing of marine products; catching of animals, fish, shellfish, and other marine products

#### **Preparation**

Work related to removing unnecessary or foreign substances to facilitate processing and cooking

#### **Processing**

Treating raw materials using artificial methods

#### **Manufacturing**

The process of making semi-finished and finished products from raw materials

#### **Distribution and sales**

Moving commodities in good condition from the producing location to the consuming location or from the supplier to the consumer, or storing and supplying them to consumers and other users

#### **Process**

Set of activities in production, preparation, processing, distribution and sales

(For Reference)

- Explanation of the term “process” in ISO9000-2005  
“Set of inter-related resources and activities which transform input into output”

#### **Identification**

To specify, lot, individual, individual product, food business operators and place

#### **Traceable unit**

The unit used for identification. This unit is used when tracing and tracking. In some cases, a lot works as a unit and in others, an individual and/or individual product works as a unit. At any stage of food production, processing and distribution, when the shape or the packaging style of the food product changes, the traceable unit may change.

## **Lot**

The unit of raw materials, in-process food products, and processed food products produced, processed or packaged in a similar condition

Deciding how to make a lot differs dependent on the products and the stage of production, processing, and distribution.

(For Reference)

### - Definitions of the lot in the JIS

A mass of articles of the same kind that are collected for a particular purpose. Depending on its purpose, a lot can be called an order lot, purchase lot, production lot, transportation lot, or inspection lot (JIS Z 8141 Production Management Terms).

A specified quantity of articles produced in the same condition or in a condition considered to be the same (JIS Z 9211 Energy Management Terms(1)).

### - Definitions of the lot in ISO/DIS 22005

Set of units of a product which have been produced and/or processed or packaged under similar circumstances

Notes:

1. The lot is determined by parameters established beforehand by the organization.
2. A set of units may be reduced to a single unit of product.

## **ID**

The mark used for identification

## **Link**

Establishing connections between products and information

Products and information may connect in the following patterns; i) product and product, ii) product and information, iii) information and information.

## **Nonconformity**

Non-fulfillment of a requirement

Requirement is a “need or expectation that is stated, generally implied or obligatory”.<sup>2</sup>

Requirements include internal rules within a food operator’s business, specifications promised to the clients, laws and regulations, standard, etc.

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<sup>2</sup> Definitions of “Non-conformity” and “Requirement” are based on ISO9000: 2005.

### **Risk from food**

The possibility of ill effects on health caused by a hazard in a food and the degree of ill effects (The probability of ill effects occurring on health and its influence level)<sup>3</sup>

< For Reference >

- Definition of risk in JIS

Combination of the probability for an injury and the degree of such injury (JIS B 0134 Industrial Manipulating Robot- Terms)

Hazard refers to “the state of substances in food or food that may have ill effects on health”. For example, biological, chemical or physical factors such as toxic microbes, agricultural chemicals, additives, and chemical substances in food itself that may cause ill effects on human health.

### **Risk management**

The process of examining the possibility of technical implementation and cost-effectiveness regarding policies and measures for reducing risks by consultation with all parties concerned and determining, implementing, verifying and reviewing the adequate policies and measures

### **Segregation management**

Sorting and handling products and raw materials by traceable units in order to prevent an unintended mix up

### **Food business operators**

Those engaged in food production, processing and distribution; such as food growers, food producers, food industries and food-related associations

### **Organization concerned**

Organization working on one food traceability system

“Organization” stated here stands for both an individual food business operator and a group consisting of several food business operators. The organization refers to two levels of implementing food traceability systems - the individual and the group.

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<sup>3</sup> Based on “Risk management standard manual regarding food safety by the Ministry of Agriculture, Forestry, and Fisheries (MAFF) and the Ministry of Health, Labor and Welfare (MHLW). Same up to “Risk management”.

## **4. Introduction of food traceability systems: Objectives and important considerations**

### **4-1 Objectives**

The traceability system is the system to prepare for accidents and nonconformity regarding food safety. This system also allows verifying correctness, in case the reliability of information carried in labels and the like, is at risk. It is not a direct measure to ensure food safety, but is useful in obtaining the trust of consumers and related food business operators.

In introducing and implementing the food traceability system, it is necessary to clarify the objectives to be achieved. The following are examples of general objectives for the food traceability system;

#### **(1) Contribution to secure food safety**

- i In the event of a food borne accident or food safety non-conformance, the traceability system enables the tracing back through the food chain process, promptly and easily, in searching for its cause. If monitoring data regarding food safety is in place, the investigation for the cause of the problem should become easier.
- ii Also, in order to withdraw and recall problem foods in an accurate and prompt way, the traceability system can narrow down the search for the said foods as well as identify their destination.
- iii Furthermore, if the food history information records are maintained, the system makes it easier to collect data about unexpected and long-term impacts on human health attributable to food history. It also helps in developing risk management measures.
- iv The system helps to clarify responsibilities of food business operators.

i and ii above enable the minimization of damages to the consumer, and economic loss for the entire food chain.

#### **(2) Greater reliability of information**

- i The traceability system secures distribution route transparency.
- ii The system can provide information to consumer and customer, and the government and local competent authorities, in a prompt and active manner.
- iii The system enables the verification of correctness in labeling by ensuring a comparison system between food and its record.

These factors help to eliminate incorrect labeling and information, as well as contribute to the further development of fair trade.

In particular, the consumer can get reliable food labeling, as well as information about food and its suppliers. Also, they can utilize this information in buying, storing and managing food products. And if appropriate information is provided, they can take steps to prevent risks by themselves. Government and local competent authorities can also obtain correct information. They can utilize it in taking actions in case of emergency and also use it in managing the risk. These allow food business operators to ensure reliability for their food products.

### **(3) Contribution to higher business efficiency**

The traceability system enables the management of inventory and quality efficiently, by managing food products with given IDs, and by storing and communicating information on the origins and characters of products. This will contribute to cost saving and improvement in quality.

In most cases, objectives listed in (1) to (3) above will be pursued at the same time, but their priority may be different according to product characteristics, state of the food chain, and consumer demand. When constructing a traceability system, the organization concerned should determine which objectives they place emphasis on considering these factors.

## **4-2 Scope of traceability system**

When introducing the traceability system, it is essential to set the scope covered by the system clearly. Specifically;

- Products to be covered by the system (Which raw materials and products should be covered among the product line?)
- Stage(s) in entire food chain to be covered by the system (Which stages among production, processing and distribution, does the food business operator(s) implement the traceability system?)

It is ideal that a broader scope is covered by the system. However, when taking the specified objectives or various technical and economic constraints into consideration, it would be realistic to ensure the traceability system partially. In that case, it is effective to start with a limited scope, and then gradually expand the scope to a broader one.



### **4-3 Important considerations**

#### **(1) Management commitment and continuous improvement**

The management of each food business operator should be involved in developing, implementing and making continuous improvement in the traceability system. Management should:

- i Familiarize their employees about the importance of the traceability system.
- ii Ensure a traceability plan (For details of a plan for implementation, see 7-2).
- iii Provide management resources (i.e. human resources, financial resources, machinery and equipments, software, technology and techniques).
- iv Direct continuous improvement (for details of improving and renewing system, see 8-2).

#### **(2) Constraints**

While the traceability system is an effective tool, it may have constraints and problems described below. Organizations should use due care in regard to these factors.

Technical constraints are listed as below;

- i Ease of application differs depending on specific characteristics of product, operation and sector.

And it is affected by various factors, such as the nature and state of raw materials, lot size, methods for cargo collection/division/and transportation, methods for production/manufacturing and packaging, number of stages to be followed from production to retail sales, and scale and numbers of food business operators in the food supply chain.

- ii In the following cases, traceability systems become less efficient, when ;
  - The process such as the ordering system differs between the food business operators involved.
  - The information reliability is low.
  - There are difficulties in information transmission between food business operators (i.e. there are interruption in communication).
  - Product lots are not uniform.

Some of these constraints are able to be overcome by improving operator proficiency levels, or by talks among operators. Or, some constraints are resolved by applying newly developed technology, production/distribution methods.

It is desirable to understand which constraints should be managed, and then to be

creative in strategies to handle them, or to have a future perspective.

As for economic constraints, when attempts are made to trace food forward or backward in a more accurate way, huge costs may result. It is important to consider costs and benefits when developing a traceability system.

### **(3) Costs and effects consideration**

When constructing a traceability system, organization should presuppose the objectives to be achieved, the effect to be obtained, and the costs needed, and should make a careful comparative review of them.

#### **<Effects for food business operators>**

The following effects are expected by food business operators who achieve the traceability system objectives mentioned in 4-1;

- i The minimization of the impact on human health or society induced by food safety accidents or nonconformance, as well as economic loss by facilitating prompt investigations and withdrawal/recall of problem foods from the supply chain.
- ii The elimination of misleading labeling or information through improvement of information reliability including the operator's product label.
- iii The facilitation in handling other parties' inquiries, such as complaints.
- iv The contribution to continued positive business relationships, by ensuring trust of consumers and customers.
- v The contribution to brand name protection through the same reason as above.
- vi The connection and combining each operator's existing systems (i.e. safety control system, purchasing/processing/sales management system, and inventory management system), it allows operators to improve operation, as well as save costs and increase employee awareness. Also this enables the improvement of efficiency in existing systems.
- vii The analysis on recorded history information contributes to technological improvement in production, processing and storing.

#### **<Introduction cost>**

Meanwhile, major costs for introducing the traceability system are as follows;

- i Costs for drafting the fundamental plan and procedures<sup>4</sup> necessary to establish the traceability system
- ii In the case of introducing electronic information systems, the costs for software

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<sup>4</sup> Refer to 6-3 for fundamental plan, and to 7-3 for procedure respectively.

development, and machinery maintenance (i.e. measuring equipments, information processing devices etc.).

### **iii Costs for education and training**

To save these introduction costs, the following schemes should be considered, especially for small-scaled business operators;

- Communicating with other operators in establishing the traceability system, as well as drafting a fundamental plan.
- Collaborating with other operators to draft a traceability system procedure
- In the case of introducing electronic information systems, co-develop a software network service and other required programs.
- Co-development of education and training, and co-hosting the running of the training program.

### **<Operational costs>**

Major costs for operating traceability system are as follows;

- i Labor costs for product identification, linking, and recording/ sorting/ storing information.**
- ii Expenses for consumables such as ID media (i.e. labels) and recording sheets.**
- iii In the case of the introduction of an electronic information system, maintenance and renewal costs for equipment and software.**
- iv Costs for audits and monitoring to guarantee the system's reliability.**

To save these operational costs, the following schemes should be considered generally.

- Narrow down objectives and scopes (i.e. products, stages to be covered) as appropriate.
- Narrow down information to be linked to products
- Avoid defining traceable units to be too small.
- Avoid duplication of operation, as well as consumables (i.e. labels, forms etc.)

Traceability implemented through the food chain can be more fully effective than the one addressed by the individual food business operator. However, benefits for participating operators may differ, depending on their stage in food chain. It is essential for each food business operator to give sufficient thought in drafting a fundamental plan, considering balance of introduction and implementation costs and

effects of the traceability system.

#### **(4) Relationship between food safety management and quality control systems**

The traceability system is the system to follow the movement of the foods, and does not directly perform food safety (hygiene) management, quality management and environmental management in the production process. Therefore, separate systems should be introduced to handle these management tasks. When a food business operator plans to provide information on food safety, food quality and environmental management, it is a prerequisite that these are managed appropriately. Thus the operator should also give careful consideration when possibly introducing the global standards of these management systems.

- HACCP: Identifying and monitoring of hazards and critical control points based on hazard analysis
- ISO9001: Quality management systems – requirements
- ISO14001: Environmental management systems - Requirements with guidance for use
- ISO22000: Food safety management systems - Requirements for any organization in the food chain

#### **(5) Compliance to related laws and regulations**

In implementing a food traceability system, the food business operator shall comply with relevant laws and regulations, as well as the appropriate social ethic.

## **5. Introduction of food traceability systems: Fundamentals**

### **5-1 Food identification and linkage**

Food business operators at each stage of food chain should at least set a rule to identify food (products and raw materials) and its suppliers and buyers, and to interlink in advance. Also as for food handling, it is necessary for them to identify the food, and keep and store the linking records according to the rule.

#### **5-1-1 Principles of identification and linkage**

Food (products and raw materials) identification and linkage<sup>5</sup> area are the fundamentals in ensuring traceability.

When constructing a traceability system, it is necessary to fulfill the following 9 principles regarding identification and linkage.

#### **< Identification >**

##### **Principle 1 Definition of traceable unit**

Setting the traceable unit of the products and raw materials at necessary point of each stage

##### **Principle 2 Rule on ID**

Setting a rule on ID

##### **Principle 3 Segregation management**

Setting the method to segregate and manage food products and raw materials for each identified unit (traceable unit)

#### **< Linkage >**

##### **Principle 4 Ensuring one step back traceability**

Setting the rule on linking the raw material's traceable unit and its supplier (the food business operator one step back) and setting the recording form

##### **Principle 5 Ensuring internal traceability**

Setting the rule to link a traceable unit of raw materials with that of in-process and finished products and setting the recording forms

If raw materials or products are combined or divided, set the rule on linking the traceable unit before the combination or division with that after such work, and set the forms to record it.

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<sup>5</sup> In the original handbook, identification and linkage as a whole was called "identification management". This has been changed and unified to "Identification and linkage" in this revision.

**Principle 6 Ensuring the one step forward traceability**

Setting the rule on linking the product's traceable unit and its buyer (the food business operator one step forward) and setting the recording form

**< Media for identification, records, and transmission >**

**Principle 7 Method of Attaching ID**

Setting the method to attach the ID on the traceable unit (such as stamping, printing, label, electronic tags, etc)

**Principle 8 Media for information recording and transmitting**

Determining the media to record, store and transmit the information which had been read for identification and linking (such as paper documents, electronic database, label, electronic tags)

**< Establishing a procedure >**

**Principle 9 Establishing a procedure**

Setting the procedure to actualize, following the methods and forms set above

In principle 5, setting the rule on linking any inadequate product that was taken out from the inventory or line is included.

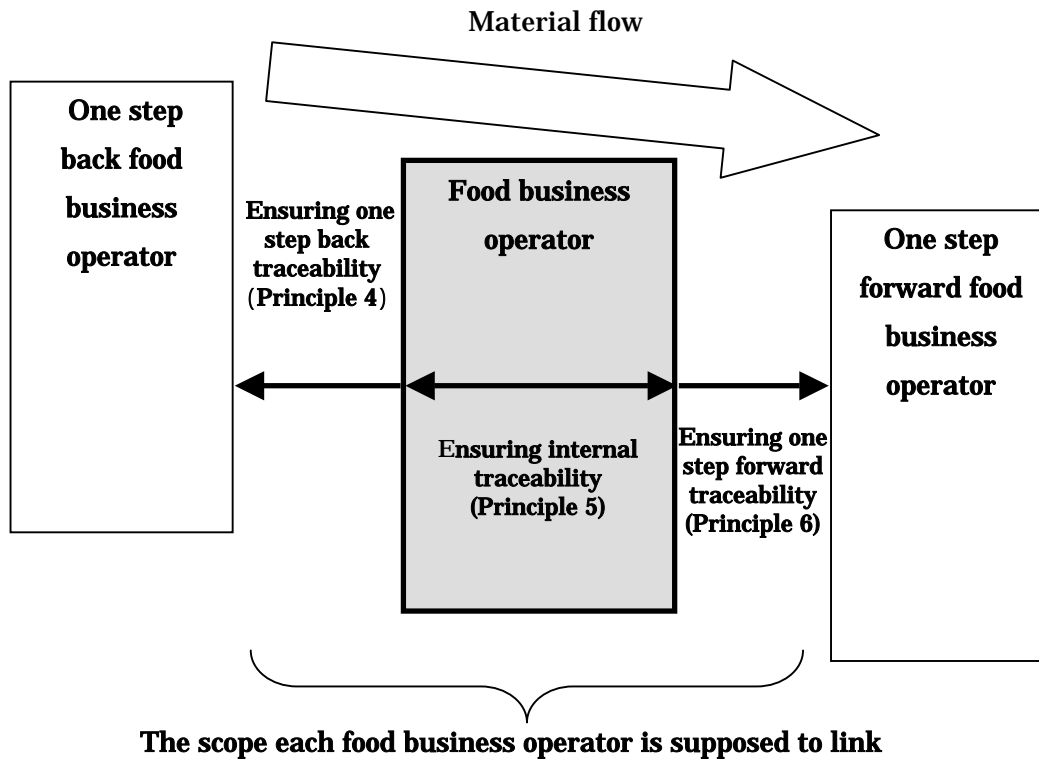
When food business operators, such as suppliers and buyers, which have multiple business premises and are going to link according to principles 4 and 6, it is necessary for them to establish the places where food goes through as the business premises.

For ensuring traceability, there are various levels. By making a lot bigger, then the accuracy of the tracing becomes lower but it would make it easier to realize the principle in identification and linking.

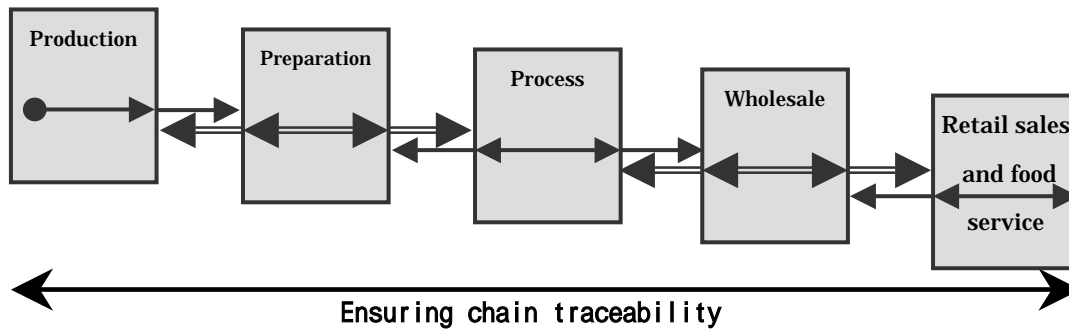
In 5-1-2 and 3 below, a more detailed explanation is given on the identification and linking mentioned above.

In Figures 1 and 2, the principle of linkage that each food business operator is supposed to fulfill and the food business operators' relation in the chain traceability are shown. An arrow in Figure 1 shows the principle of linkage that each food business operator is supposed to fulfill (4, 5 and 6). When each neighboring food business operator in the food chain fulfills these principles, chain traceability is ensured.

**Figure 1 Principle of linkage that each food business operator fulfills (Principles 4~6)**



**Figure 2 The principle of linkage that the food business operator at each stage is supposed to fulfill and chain traceability**



**5-1-2 Organizing the flows of materials and information, and rules on identification and linkage**

**(1) Summarizing the material flow (Principles 1, 3~6)**

Illustrate a material flow, from receiving to shipping, of the scope where traceability is to be established. By this procedure, the relations between the product that was input and the product that was output can be understood. Based on this, examine in what kind of unit the food should be identified at each stage, how the process should be controlled in order to link which units, and moreover check if the

recording of the linkage is easy to do.

In the process of preparation, processing and separate loading within the food business operator, mingling and separation may occur. There are also complicated cases such as situations when the raw materials, which had not been used completely in one process, are used in the next process after being placed in the inventory. Or the product, which was once separated from the line due to nonconformity is being placed back in the line after the correction was made to meet the specification required.

In these cases, it is important to figure out a practical linking method that meets the objectives of the traceability system. Improvements by making the material flow simpler could be considered.

## **(2) The important considerations of setting traceable unit and lot formation (Principles 1 and 5)**

Food business operators should set the traceable unit of food. The size of the traceable unit relates to the accuracy of the tracing. Properly setting traceable units helps make the tracing of products more efficient.

Food traceable units are lots or individual/separate products and should be specified using ID. When the lot is the traceable unit, deciding in what condition the lot is formed becomes an important principle.

The meaning of a lot and the perspective of a lot formation, should take the next 3 aspects into consideration.

### **i Coping with product nonconformity and food borne accidents, and addressing the improvement of food safety management**

When nonconformity of the product is found, the identified lot is used as the basis of withdrawal or recall of the product and of the investigation of the cause. Thus, whether or not the lot of the product is properly formed affects how effectively the product can be withdrawn or recalled and how effectively the cause can be investigated. Also when the lot is properly formed, it is easier to manage food safety and sanitation by managing the process with the identified lot as the basis.

Therefore, in production and processing process, it is necessary to organize the lot within the scope of products produced and processed in the same conditions; such as having the raw materials in the same state, and with the same date of production. In production stages of farm, livestock, and marine products, estimates of the scope that they were produced/grown under the same conditions can be made. The examples of these are shown in <References> below. In the shipping and storing process, when



there is a possibility of the products, including fresh, frozen and cold-storage goods, having accidents involving storing and transporting conditions, it is preferable to organize a lot with that taken into consideration.

If the lot is small, it is possible to narrow the scope of products to be recalled in the event of an accident, and it is easier to find the cause. Also the safety and sanitation management unit can be small. But the smaller the lot is made, the greater the costs of segregation will be.

#### < References >

##### Examples of lot forming of products with same condition at the production stage

- As for farm products, products cultivated in a cultivated field or lot in the same conditions, cultivated with the same standard or method by farmers or by the farming group, of the same variety, and being harvested on the same day or in the same period, could be identified as part of one lot.
- As for poultry, they should be grown in the same poultry house, given the same feed and water, with the same vaccinations and animal medicines applied. For other livestock products, the same conditions as above should be considered.

#### ii Coping with labeling

In order to ensure the correspondence between the content described on the label and the product itself, it is necessary to form a lot corresponding to the indicated information and to have a system to supply that in a segregated way.

Therefore, the items, such as product category variety and ingredients, shown on the label, should be able to be segregated by the lot. Obligatory labeling matters must be followed. However, for others, if the number of these items increases, it becomes necessary to make product classification more detailed and to make the lot size smaller, and so the segregation costs grow larger. There is the need to study a balance between consumer demand and business needs.

When there are divisions required for transactions, such as the standard for farm produce, consideration must be given to such divisions.

#### iii Addressing the issue of improving quality management efficiency

When a lot is formed appropriately, quality management such as freshness becomes easy.

At the production stage, by forming a lot by the date products are harvested or

marine products landed, quality management such as freshness becomes easy. In preparation and processing stages, forming a lot according to the product requirements, contributes to improving the quality management. But the smaller the lot is, the greater the costs of segregation.

In most cases, a lot is set at each stage.

- The lot formed at the production stage is sometimes called a production lot.
- The lot that is formed when processing a product is sometimes called a product lot.
- The lot that is formed when shipping is sometimes called a shipping lot.
- There are cases when a new lot is formed when receiving lots are rearranged at the distribution stage. This is sometimes called a distribution lot.

### **(3) Deciding the rule on assigning ID (Principle 2)**

It is necessary to set a rule to assign ID for a newly formed traceable unit. Also it is important not to have ID duplicated.

As for the food business operators receiving products from several suppliers, if the rule of each supplier's product ID is uniform, it is easier to record and manage received products' IDs. If it is possible to obtain the agreement of the parties involved, it is desirable to unify the ID rule.

### **(4) Deciding the traceable unit linking rule within food business operator's process (Principle 5)**

To have the product's traceable unit linkage before and after the movement and operation understandable, organization concerned should set an approach to handle traceable unit and construct process and operational systems. It is prerequisite to construct a system in which segregation management is properly handled in order not to have the unintended mingling and contamination.

IDs which need to be linked

- Received traceable unit and shipped traceable unit
- Traceable unit of raw materials and product's traceable unit
- When raw materials or products are combined or divided, traceable units before and after the operation.
- Traceable units of raw materials unused or in the inventory and of in-process products.

- Products taken out of the line due to nonconformity, and discarded raw materials and products

It is necessary to take into consideration conditions according to the operators' actual process and to consider important factors in lot formation such as, for example, which traceable units of raw materials to combine or not in making a product. Also it is necessary to set a way to guarantee the linking process (for example, having some space in the process line at the point where the traceable unit changes).

The way of linking changes depending on the production methods (continuous production, batch production, etc.). It is desirable not to make a big change from the present situation and figure out a way to follow the traceability principles just by making necessary improvements.

#### **(5) Deciding on the procedures to organize information flow and handling (Principles 7 and 8)**

At the same time as organizing the material flow, organization concerned should organize the flow of information, which is recorded, attached to the product or transmitted in paper document or data form. On top of that, methods and procedures should be set regarding reading and recording of the information attached to the product, recording of the newly produced information, and output and printing of labels and invoices. Also study the present situation in order to make use of the currently used labels, invoices and paper documents, and make improvements as need arises.

#### **5-1-3 Identification and linkage at each stage (Principles 3~6)**

Food business operator should handle the traceable units following the setting and linking rules of the traceability units at each stage. In order not to have any handling mistakes, attach a label and an invoice with ID, collate product with its information at each stage and record it, and segregate the product.

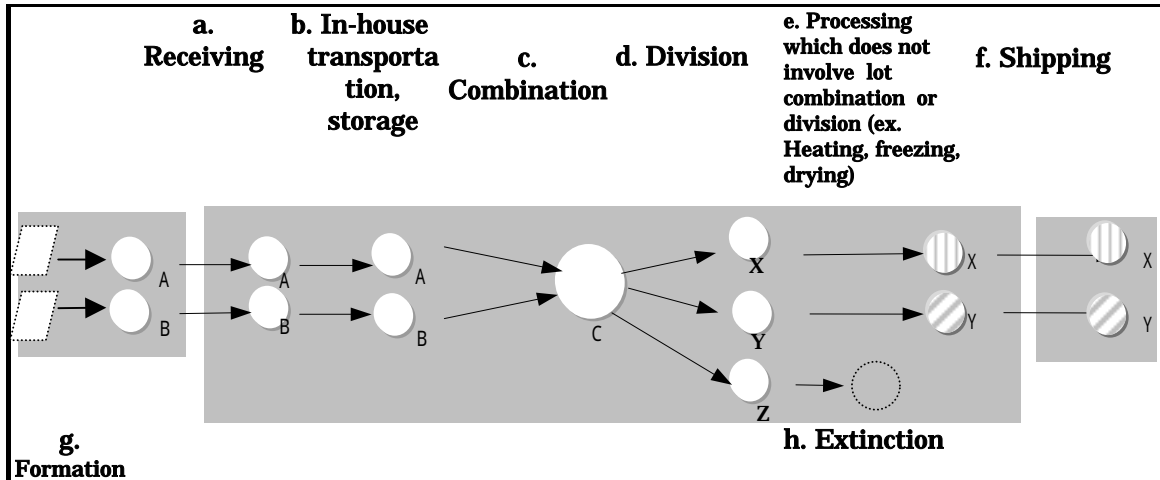
In the following, explanation is given with an assumption that the traceable unit is a lot. If the traceable unit is an individual or individual product, it is necessary to change the wording and content accordingly.

#### **(1) Work consequent on lot formation, movement, combination, and division**

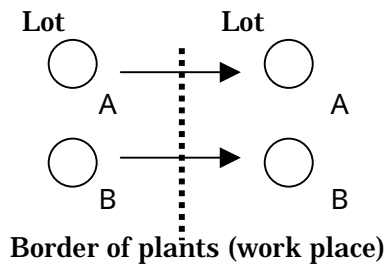
Handling of lots can be organized by any of the following 8 patterns in the process of any food business operators. For combination, division, and processing process, in order to understand this in pattern, it is illustrated simply and briefly below. Practically, it is important to think according to the handling method for lot linking

which was set beforehand in conformity with operators' actual process.

**Figure 3 Lot handling pattern**

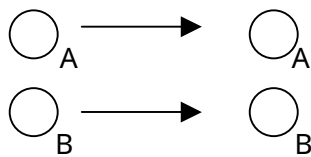


**a. Receiving the shipment lot**



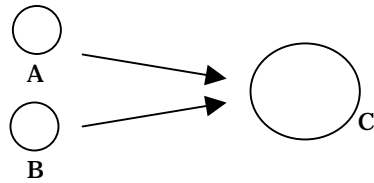
- Check the incoming shipment lot and its information (labels and invoice which include ID).
- Link the incoming shipment lot ID with the supplier and date and time information, and record them.
- Record the information on the label of the lot or in the invoice.
- In case the one step back operator has not implemented the traceability system, give ID on the incoming lot and record the necessary information. (Follow g . which is explained later).
- According to the type of work expected in the future, prepare an in-house invoice (in case of b. above) or a work instruction (c., d., e.) and attach it to the lot.

**b. In-house transportation and storage by lot (no change in the products composing the lot)**



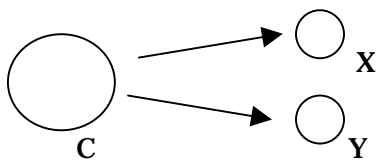
- Compare the lot and its information (label and invoice which include ID).
- Record the information such as the location and the date and time and so on.

c. **Combination of lots (For example, combination of 2 and more lots into a new lot)**



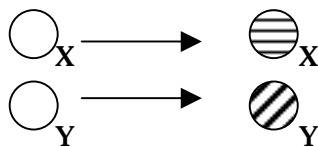
- Check the pre-combined lot and its information that has ID information (label and work instruction), and record the information.
- Assign a new ID on the newly combined lot.
- Link IDs of the lot before the combination with the lot after the combination and record the information.
- Record information about combination work needed for identification, if any.  
This information includes the date of combination, the weight of the lots prior to and after the combination, and other information about the state of combining work.
- Prepare the label and invoice with the new ID indication for the combined lot and attach them to the lot.

d. **Division of a lot (For example, division of a lot into 2 or more lots)**



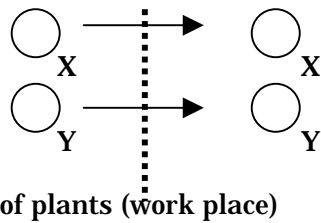
- Check the pre-divided lot and its information (label and work instruction with ID information), and record the information.
- Assign a new lot ID to the newly divided lot.
- Record the ID linkage so that the lot before the division and the lot after the division can be linked.
- Input or record information about division work needed for identification, if any.  
This information includes the date of division, the weight of the lots before the division and after the division, and other information about the state of division work.
- Prepare the label and invoice with the new ID indication for the divided lot and attach them to the lot.

e. **Processing which does not involve lot combination or division (ex. Heating, freezing, drying)**



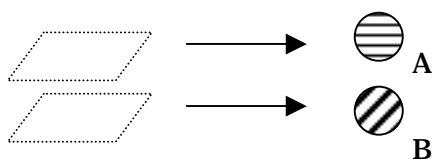
- Check the pre-processing lot and its information (content of label and work instruction ), and record the information.
- Record information about processing work needed for identification, if any.  
This information includes the date of processing, the weight of the lot before and after the processing, and other information about the state of processing work.
- Prepare the label and invoice with the ID indication of the processed lot and attach them to the lot.

**f. Shipment of a lot**



- Check the lot to be shipped and its information (label and invoice with ID indication), and record the information.
- Link the ID of the shipped lot and its buyer, date and time, and record them.

**g. Formation of a lot (For example, when producing or obtaining the farm, livestock and marine products or when receiving the non-identified products which are not covered by the system)**



- Decide on the product lot and assign ID.
- For each lot, record information necessary for identification (producer, field, date, time, etc.)

**h. Extinction of a lot (For example, when the product is disposed of)**



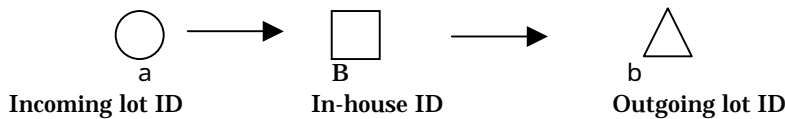
- Check the product lot itself prior to the disposition and its information (content on the label, invoice, or work instruction).
- For each lot, record the necessary information (extinct date and time, place, etc.)

Food business operators should establish a mechanism of proper segregation and management in any of the above mentioned cases in order to prevent an unintended mix up.

**(2) Work involved in handling other lots**

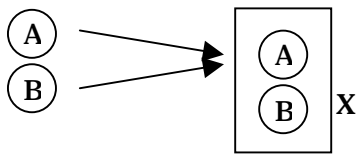
**i. Work involved when using in-house ID**

When in-house IDs are used by the operator, set a rule on the in-house ID. Also, at incoming and outgoing, incoming lot ID and outgoing lot ID and the in-house ID should be linked and recorded.



**j. Forming a group of lots (grouping several lots to make one lot)**

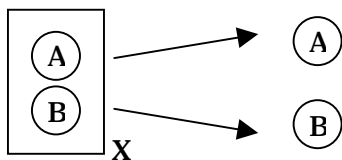
The multiple lots with IDs can be grouped together by placing them on one pallet or so and handled as one traceable unit. Also the products, each of which was identified as an individual product unit by assigning serial numbers and so on, can be grouped and handled as one traceable unit by placing them in a box or on a pallet and so on.



- Assign a new ID to the grouped lot.
  - Link the product ID of before the grouping with that of after the grouping, and record it.
  - Record information about grouping work needed for identification, if any.
- This information includes the date group was formed, the work place, and other information about the state of grouping work.

**k. Breaking up a group (breaking up the traceable unit which was a group)**

For example, there are cases when one traceable unit on a pallet is broken up. Also there are cases when one traceable unit made up of several individual products with serial numbers as identification is split into individual products.



- Link the product ID of before the split with that of after the split, and record it. (Or check the records of prior to grouping and after the grouping.)
  - Input or record information necessary for identification, if any.
- This information includes the date group was broken up, the date of split, the place the group was broken up, and other information about the state of splitting work.

Segregation management is necessary also in above work.

## **5-2 Recording information**

### **(1) Choosing the information to record**

As for the information recorded in the traceability system, there is essential information for ensuring traceability and supplementary information which becomes necessary depending on the objectives.

The essential information in ensuring traceability includes the linking record ensuring the one step back traceability, one step forward traceability, internal traceability (records regarding Principles 4, 5 and 6 in 5-1-1), the operator who handled the relevant food products, date and time the food products were handled, and the location where the food products were handled, etc. It is desirable to include the weight and/or quantity record necessary for verifying the total quantitative account.

Supplementary information is the information necessary depending on the objectives set and it is the process history of production, sanitation, quality management state that each food business operator records at production, processing, distribution process.

Supplementary information meeting these objectives is managed and could be retrieved using food ID in the traceability system. It enables linking supplementary information with the actual product and its handler. Also history information at each stage of the concerned food traceable unit can be verified. When considering what kind of information to record, the operator should make this decision in reference to the purpose of the traceability system and considering its effectiveness and the possible necessary cost. The decision whether to record information should be considered based on the necessities of each management system, especially in terms of the record on production, sanitation and quality management state.

For the above-mentioned information, there is information obtained from the upstream and downstream food business operators and from in-house information generated at the operator. For information obtained from other operators, it is desirable to set with the operators which information to receive and record.

### **(2) Recording media**

For keeping records, it is necessary to determine the media (paper ledger, electronic data base, etc.) to use beforehand.

## **5-3 Storing information**

Organization concerned should set the storing period and storing method of the recorded information.

When doing so, it should be done with the following points in mind; the



objectives set for introducing the traceability system, and the nature of the production, processing, and distribution of the food product concerned.

Data should be organized so that it can be easily taken out when transmitting information, disclosing information to the public institution, and doing internal auditing.

#### **5-4 Verifying the traceability system**

In many cases, one of the objectives of a traceability system is to improve the reliability of information. Therefore, it is extremely important to have a system to verify the existing traceability system.

As a standard to verify the whole system, “Requirements for Food Traceability Systems” (The Committee on the Third Party Certification of Food Traceability Systems, October of 2006) could be utilized.

##### **(1) Monitoring**

Monitoring is conducted daily to check if the work and so forth are conducted according to the procedures set when the traceability system was constructed. It is desirable to set a monitoring schedule when (what kind of interval), who, what, how checking is conducted.

##### **(2) Internal audit**

Internal auditing is conducted in securing the reliability of the traceability system and for evaluating if the traceability system is increasing its effectiveness toward the objective set. Monitoring is conducted daily, whereas the internal audit is conducted by setting a fixed time and interval. The outcome report of the monitoring will be utilized as material for the internal audit.

In an internal audit, it is desirable to:

- a Check whether the work is performed according to the predetermined procedures.
- b Check that food and its information can be tracked and traced.
- c Check changes in the weight and/or quantity of food before and after the work is conducted and check if there is any abnormal increase or decrease (quantitative account).

The tracing and tracking test means randomly choosing and checking on several traceable unit samples or actual products of specific raw materials and products, upstream and downstream where traceability is conducted. By conducting this test, it is possible to check if tracing and tracking was properly conducted (how

much time needed for this) and what kind of problems exists for tracing and tracking.

In order to conduct a quantitative account, it is necessary to keep records of the weight and/or quantity of each traceable unit before and after the work. The volume account is frequently used when monitoring<sup>6</sup>.

In addition to the internal audit, the food business operators with traceability systems may mutually audit their systems.

#### **i Drafting documented internal audit procedures**

For the audit methods a, b, c above, clarify the procedure to carry them out and draft an internal audit procedure manual.

##### **Audit according to the internal audit procedure manual**

For conducting an audit, organizations and systems should be established. The audit criteria should be created, audit plans and records as well as audit records should be developed and record storing methods should be decided. The audit should be carried out based on the audit execution schedule, and audit records should be kept.

Organization concerned should make good use of audit results when reviewing or making improvements on the traceability system.

In addition, to minimize the burden of an internal audit, it will be effective to compile manuals for traceability work, and to give periodical training to personnel and employees.

#### **(3) Third party audit**

For food business operators, receiving a third party audit by a proper third party organization specializing in audit and inspection, is an effective method for keeping the function of the traceability system on a high level. Also it is effective in identifying and solving the problems of an internal system by using external know-how, and moreover, it can result in gaining greater trust from consumers as well as other interested parties.

The third party audit will require a certain amount of cost, and so how to implement this audit should be studied with overall consideration for the service provided by the third party auditing organization.

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<sup>6</sup>As for the domestic beef, the operational regulations on “Beef Traceability Law” impose a duty to record the weight. Also in the domestic beef traceability introduction handbook (introduction version), it is described as “quantity management” and its procedure is explained.

## **5-5 Transmitting and disclosing information**

### **(1) Transmitting information among food business operators**

Organization concerned should establish a system to transmit information among food business operators.

The most basic transmitting information is ID of food which moves among operators, moved date, and names of supplier (origin of the movement) and buyer (destination of the movement). The above-mentioned information is necessary in tracing one step back and tracking one step forward. With labels or invoices, the information can be transmitted with the actual products.

For other supplementary information, the necessary information according to the objectives of the traceability system can be transmitted. Of all the data recorded and stored, organization concerned should decide in advance among operators which information to be transmitted, on what occasion (everyday, when requested by consumer, when food borne problems occurred, etc.), to what stage of operator, and with what media. It is not necessary to disclose all the information (information regarding sales and profit is not necessary for food traceability).

### **(2) Providing information to the government and local competent authorities**

When food borne accidents or labeling problems occur and the government and local competent authorities request the food business operator to provide information according to the law, the operator can provide information in a swift and efficient manner by referring to the records of food handling and movement. For these emergency situations, it would make it easier for the government and local competent authorities to take the necessary measures in the food chain.

### **(3) Providing information to consumers**

In general, there are two methods of providing information to the consumer: i by providing information about the fact that a traceability system exists, indicating ID on the product and the like for inquiry, and by establishing a system to cope with the consumer's inquiry; and ii by providing historical information meeting the objectives.

- i Cases where introduction of a traceability system is announced, ID is indicated on the product and the like, and a system to cope with inquiries is established:

The information provided should include the product's ID and points of contact. The scope where the traceability system is in place (food items covered by this system, which stage to which stage is covered in the food chain) should be

indicated. Care should be taken in regard to the expectation that consumers may have by the term “traceability” and it is necessary not to have consumers misunderstand that the traceability is ensured in wider scope than that actually covered.

When an inquiry is received from the consumer, if the historical information is owned by individual food business operators, such information must be collected from each of the enterprises. Thus, operators should agree in advance on the enterprise in charge of this task and on the method of the task.

When the historical information is stored in a commonly used center (that is managed by a group of food business operators), the operator receiving the inquiry can access the center and collect and organize the historical information and then provide it to the consumer. In any case, disclosing information should be determined among the operators.

ii Case where historical information is provided

In this case, the specific historical information is provided directly to the consumers or it is made possible for consumers to freely access the information. The historical information is provided mainly on the labels, at the store or on internet websites. A prior agreement should be made on common rules guaranteeing consumer convenience (information easy to understand, easy access), reliability of information and protection of private information.

When consumers make choices on the products at stores, the amount of information that consumers can read and use to make a decision is limited. Therefore, figuring out an efficient way to solve this problem is required, such as properly narrowing down the amount of information given to consumers by indicating the necessary information in priority order, informing consumers of the products meeting the specific standards and regulations known to them with the marks, and so on.

The food business operators should always provide the consumer with necessary information positively and in a consumer-friendly method. If a food borne accident occurs, more detailed information should be disclosed.

It is especially effective to promptly disclose facts and future action to the consumer. In this case, it is necessary to determine the principles of disclosure beforehand. If the traceability system covers two or more food business operators, the rules of disclosure, such as timing, content and method, should be agreed upon among

these operators. Because disclosing information via the mass media and on the internet is effective, it is desirable to decide the method of this disclosure in advance.

#### **5-6 Designating and preserving necessary documents**

It is important to determine necessary documents in implementing a food traceability system and to maintain the documents.

Specifically, rules and methods determined prior to the implementation of the food traceability system should be documented as a traceability plan (7-2) or as a procedural manual (7-3).

Creating these documents above, pay attention and be sure to include the following:

- The stage(s) in the food chain
- Work and process flow in ensuring traceability
- Results of verifications such as by internal audit
- Measures to take when non-conformity regarding the food traceability system was found
- Responsibility of data management
- Period documents are stored

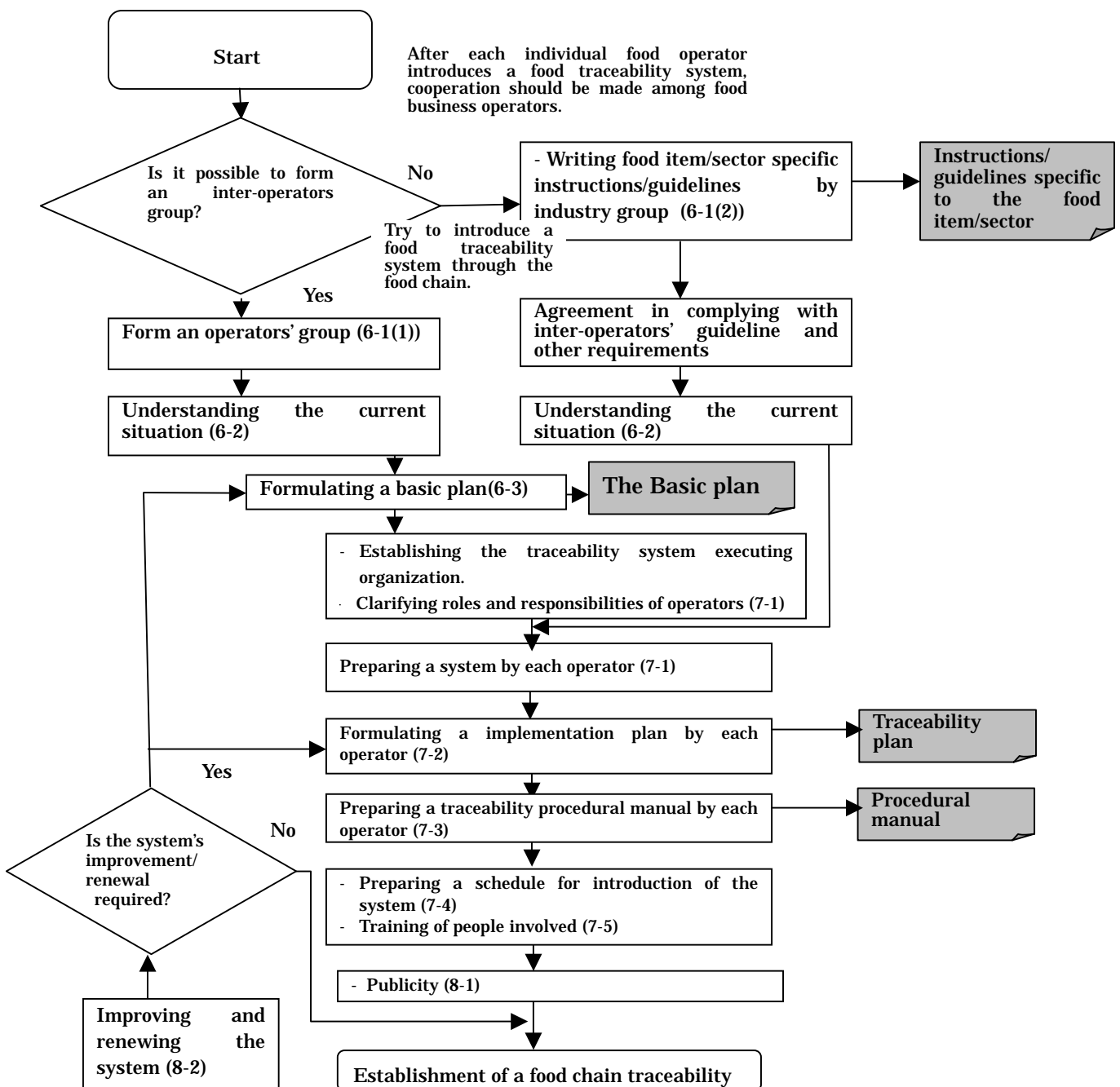
## Part II. How to introduce a food traceability system

Part II describes the methods of how to introduce a food traceability system. For individual food business operators who plan to introduce traceability systems, “Section 7 Introduction of a food traceability system: The second stage” and the following section might be helpful.

Indicated below is just an example of how to introduce a traceability system. Thus, the organizations planning to introduce a traceability system should choose a method appropriate for them by considering the degree of needs, products handled, trading situations and scales, and other relevant factors.

Figure 4 below shows an example flow chart of the actual introduction of a chain traceability system.

**Figure 4. Flow chart to establish a chain traceability**



## **6. Introduction of a food traceability system: The first stage**

### **6-1 Cooperation and coordination among operators, and ensuring consistency**

In order to establish food traceability among more than one food business operator, it is necessary to ensure consistency among them from upstream to downstream. Also, in order to ensure traceability in wide-range, it is desirable to ensure consistency among food business operators who are at the same stage of the food chain

For that, it is best for several food business operators to form an organization and aim at introducing traceability system. If that is difficult, it may be possible for each operator to coordinate to interoperate the food traceability systems that each food business operator has introduced.

#### **(1) Form an inter-operators group**

To ensure traceability through the food chain, it is important to form a group of food business operators anew or a special body in an existing group of food business operators for the purpose of building up the system. This is because unless related operators have an agreement in advance on the definition of identification units and lots, the format of identification numbers, the method of transmitting information (content of information to be transmitted, means to transmit, format of labels and invoices, and in case of using existing code systems, their forms) and other relevant matters, products and lots and their information cannot be transmitted efficiently from one operator to another.

As for the product items having many operators involved through the process from production to sale, and those with complex processing or distribution courses before reaching the consumer, it is especially important to secure the vertical cooperation between operators at the stages of production, processing, and distribution as well as the horizontal coordination at the same stage. In the case of small food business operators or in a sector having many small enterprises, joint efforts through a group of enterprises make information collection easier and help to save costs.

It is desirable for the entire business world for the food concerned, to create a body or process for laying down common rules about their policies for introducing a traceability, procedures in ensuring traceability, traceable unit and ID, and data transmitting method, and thus proceed as the business world to jointly create a basic plan necessary for constructing traceability system through the food chain.

In some cases, even after a group of food business operators has been formed, it requires a certain amount of time to reach an agreement on common rules, because

there are many operators involved in the process from production to sale. In such cases, it will be realistic to phase in a traceability system. For example, traceability can be established from processing to sale stages at first, and then can be extended to the production stage, securing continuity based on the outcome of the initial step.

## **(2) Coordinating the food traceability system between food business operators**

In some cases, a longer period of time is required in forming a food business operators group, or it is difficult to form a group among the existing traceability systems of operators, as some of them already have partial traceability systems which are already in place. For these cases, it may be effective for the respective operators to establish internal traceability systems, as well as one-step-forward tracing and one-step-back tracing system, and then to expand the systems to other operators, thus building up a link among them.

In the case mentioned above, it is required that the operators concerned disclose necessary information to other operators – i.e. about the scope of their traceability system, how they define a traceable unit and ID, and the information transmission method, to help them more easily connect their systems. However, at this stage, the operators shall not claim that they have traceability in place throughout the food chain.

To facilitate such connection between the systems run by respective operators, and to make these efforts develop into a traceability throughout the entire food chain, it is effective for the association, cooperative association or any other organization of the product concerned, to compile and distribute a handbook and guidelines for traceability of the product, which provide information on methods for identification and link, methods of information transmission, etc.

Then, if they decide to facilitate coordination between their systems along with the guidelines developed, they can make a major step towards ensuring chain traceability.

Likewise, in the case that some operators already have a traceability system through the food chain, and to coordinate it with another operator's own system, it is effective to do so in line with the guidelines.

## **6-2 Assessment of the current situation**

### **(1) Understanding social issues and consumer needs**

It is necessary to understand the social issues involved such as new risks, or the labeling requirements of the food concerned and consumer needs such as their expectations for the food product concerned, the product information they want, and



the way to get such information should be studied.

### **(2) Identify product/information flow**

The food business operators should grasp and clarify both product and information flows, and the corresponding operating procedures. Also, the food business operators should grasp the information that should be shared among themselves.

### **(3) Identify available resources**

The food business operators should clarify what types of available resources are owned by the food supply chain concerned, relevant operators and groups, in order to develop a traceability system.

- Awareness and understanding of the parties involved in traceability
- A policy for coping with the food borne risks, or food related accidents
- ISO and HACCP certifications obtained
- Commonly used processing machines and equipment and managing techniques
- An up to date state of information technology introduced (hardware, software) and information transmitting means
- Relevant external information (e.g., related guidelines, technical manuals, standards, and relevant legislation)

## **6-3 Formulation of a basic plan**

This part describes a method to introduce a food traceability system through a food chain by a newly established food business operators' group which consists of more than one food business operator. When coordinating the existing food traceability systems each food operator already has in place, this part could be skipped. However, to facilitate the coordination, it may be more effective to make an approach following the process mentioned in this section.

### **(1) System design**

In designing a food traceability system, the organizations should share and discuss the outcome obtained from the process mentioned in "6-2 Understanding the current situation" with the group members. The items to be designed are as follows:

- i Basic ideas: Background and need for the introduction of a food traceability system and the basic stance for constructing a system.
- ii Objectives: This should be defined by referring to the clause 4-1.
- iii Expected effects: This should be discussed in relation to the objectives, as well as referring to the clause 4-3.

- iv **Scope of the system:** The following scopes should be set by referring to the clause 4-2.
- Which item, variety, materials etc. should be covered by the system?
  - Which part of the food chain should be covered? (which stage of the food chain, from the upstream through downstream, should be considered in defining the scope?)
- v **Material and information flow, and rules for identification and linkage:** These should be set by referring to the clauses 5-1-1 and 5-1-2.
- Material flow in the entire food chain
  - Defining traceable units
  - Rules on ID
  - Method of Segregation management
  - Rules on linking of the raw material's traceable unit and its supplier (the food business operator one step back)
  - Rules on linking of traceable units within the production process of the operators at each stage
  - Rules on linking of the product's traceable unit and its buyer (the food business operator one step forward)
  - Information flow and handling
  - Method of attaching ID (i.e. stamp, print, label, electronic tag etc. In some cases, more than one media may be used.)
  - Information record/transmission media for the identification of products, as well as the linking of traceable units and ID (i.e. paper forms, electronic database, label, electronic tag, etc.)
- vi **Information to be recorded:** This should be defined by referring to the clause 5-2.
- What type of information should be recorded?
  - What level of accuracy is required in the information?
- vii **System verification method:** This should be defined by referring to the clause 5-4.
- Contents and method of monitoring (drafting a monitoring plan)
  - Contents and method of an internal audit
  - Decision on either to request an external audit or not
- viii **Information to be transmitted and disclosed:** This should be defined by referring to the clause 5-5.
- What type of information has to be transmitted/disclosed – in what cases, to which stages of operators, government/local authorities and consumers?
  - What type of media should be used (in some cases, more than one media

may be used)?

**(2) Checking into expandability of existing business methods and the possibility for coordination among food business operators**

This is to check whether the above-mentioned design can be feasible by only making minor changes in the current operation system. It is desirable to run the whole system by utilizing the current system as much as possible such as using the existing:

- Process condition including machinery and equipment, facility and working method
- Current documentation such as label, invoice and forms
- Computers and their performance and system

Also, it should be checked as to whether actual raw materials and products and information can be exchanged in a quick and efficient manner among the operators.

**(3) Review and final determination of the target**

In the case that the check on above (2) suggests that the original design should be modified, the design of the system should be reviewed.

Based on the above review, a basic plan should be developed and documented. This basic plan should be shared by the food business operators (responsible manager and the person in charge) who are in the same chain traceability, and thus the recognition of the food traceability is shared. If possible, the roles of the members should be clarified, and the cost sharing should be agreed upon at this point of time.

**(4) Introducing an electronic information system**

When introducing an electronic information system for information recording and its management, a basic plan for the electronic information system should be drafted considering the following issues:

i The basic direction of the electronic information system to establish traceability

Organization concerned should explore possibilities in utilizing and coordinating each others' existing electronic information systems, make efforts in ensuring consistencies of code systems and communication systems. The following should be determined:

- Methods for utilization and coordination of information systems in operation
- Needs for and possibilities of establishing a joint-use information center
- Code system to be applied
- Communication system to be applied

**ii Basic direction of the structure for promoting an information system**

Based on the basic direction of the electronic information system to ensure traceability, an ideal way of promoting the system should be examined from the aspects below:

- Framework in constructing the electronic information system
- Framework in operating the electronic information system
- In the case of providing information to the consumer, setting up an information provision scheme and a window where information is provided.

**iii Formulating a basic plan for an electronic information system**

Based on the results of the above examinations, a “basic plan for an electronic information system to establish a food traceability system” should be drafted, and an agreement should be obtained among the people involved. It is desirable to clarify, in the promotion schedule, the points with higher priority to be coped with as well as those to be addressed in future, and to set up the system by taking a step-by-step approach.

## **7. Introduction of a food traceability system: The second stage**

### **7-1 Preparing the system, clarifying roles and responsibilities**

In the case where food business operators establish a group and introduce a traceability system through the food chain (production, preparation/processing, distribution or sale) (6-1(1)), a group should be formed based on the agreed basic plan for the purpose of operating the system. The roles and responsibilities of each food business operator should be clearly defined according to the “basic plan”.

Secondly, each of the participating food business operators should make in-house preparation for implementation of the traceability system. In particular, the following matters are required:

- i Management should appoint a person in charge.
- ii Ensure necessary personnel for the system implementation
- iii Prepare necessary resources, such as equipment and materials, document preparation, etc.

Meanwhile, food business operators, who do not jointly establish such groups (6-1(2)), should review their own traceability plans to comply with the guidelines, etc.

### **7-2 Drafting a plan for implementation**

Each food business operator should draft an in-house traceability plan according to the basic plan or compliance guidelines. If such plans had been drafted previously, they should be revised as necessary.

It is recommended that the following matters are included in the traceability plan:

- i Implementing structure
- ii Objectives and expected effects
- iii Scope of foods and stages covered
- iv Flow of products and information, rules for identification and linkage
- v Type of information to be recorded and type of media how it should be recorded
- vi Storage of information
- vii Method of verification of the system
- viii Information to be transmitted / disclosed

Basically, the plan of implementation should comply with the basic plan. If a basic plan agreed between food business operators had already been compiled, a plan for implementation should be drafted along with the basic plan. In the case where a basic plan is not compiled, the current situation should be understood (6-2) prior to drafting a plan for implementation.

### **7-3 Writing a traceability procedural manual**

A manual for operating and managing the traceability system should be compiled on the basis of the basic plan and implementing plan.

The procedural manual should clearly define when and where the operation should be carried out, who should carry out the work and the type of work to be carried out. The description of work should include a series of work for product identification and linkage, information to be recorded, media to be used (format, database, etc.), recording and storing method, storing period, and other matters.

If the food business operator has already obtained certification of ISO9001, HACCP, ISO14001 and other certification systems (and plans to offer this management information by a traceability system), harmonization between them (the management information) and the traceability system should be coherent.

### **7-4 Establishing a schedule for introduction of the system**

After drafting the basic plan, operation plan and procedural manual, a timetable and other documents for introducing the system should be created.

More specifically, (1) a timetable and (2) a trial run plan should be drafted.

#### **(1) Timetable**

A timetable for the period of study and training, and that of trial runs should be drafted.

#### **(2) Drafting of a trial run plan**

To confirm the effectiveness of the system, it is desirable to conduct trial runs.

If any problems are found while proceeding with the trial run, it is effective to specify the items to be checked and then record the results and use them for system improvement purposes.

### **7-5 Training of relevant personnel**

In many cases, operation of the traceability system is conducted parallel with the existing operation. Therefore, as those in charge of food purchasing, production, shipment, and distribution will have to perform tasks for the system in addition to their usual duties, consideration should be given not merely to personnel assignment but also to work efficiency.

Traceability systems are not very familiar to most people. Therefore, to avoid

confusion at the initial stage, it is effective to give training to them so that they may acquire the ability to quickly and accurately input data and perform such other tasks as collation and recording.

Before trial runs, training programs should be given to those concerned with the traceability system so that they may be given explanations (i) about the aim of the introduction of the system and meaning of each task according to the basic plan and the traceability plan, and ( ) about the nature of the tasks of every person in charge according to the procedure manual in an attempt to ensure their understanding.

### **7-6 Important considerations in the creation of the electronic information systems**

In the case where an electronic information system is newly built up to ensure the reliability of the traceability system, the following matters should be studied and added to traceability plan.

#### **(1) Work analysis for carrying out the basic design of the electronic information system**

Work should be analyzed considering the following:

- Definition of identification units and IDs in the traceability plan
- Rules for identification/linkage in the traceability plan, form and method of information recording/communication
- Incoming product receiving work, processing work, shipment work
- Situation of computer use (e.g., database, input/output method, human resources)

#### **(2) Arrangement of specifications for basic design of information system**

- Database specifications
- Input/output specifications
- External communication specifications
- Hardware composition of the system (including the possibility of establishing a joint-use database center)

The methods of developing an information system include development by the food business operator itself, development by outsourcing, use of a package system, and use of an ASP (application service provider who rents application software to the customer on the internet). In determining which of these methods is desirable, their in-house situation of human resources and the precision of the electronic information system which is planned to be constructed should be considered, and the efficiency of the system to be developed by each method and its cost should be compared.

- i Case where the development of an electronic information system is outsourced:**
  - Preparations for outsourcing the development of the information system (including drafting of a traceability plan)
  - Determination of the subcontractor
  - Management of the subcontractor
- ii Case where the development of an information system is carried out by the food business operator itself:**
  - **Basic design of the electronic information systems**  
The systems should be designed according to the traceability plan.  
Attention should be paid to the data backup method and the security systems as well.
  - **Design for operating the electronic information system**  
Attention should be paid to compliance with existing information transmitting method.
  - **Development of the electronic information system**



## **8. Important considerations after the introduction of a traceability system**

### **8-1 Publicity**

This publicity aims or at informing the consumers and related food business operators of the fact that traceability has been realized in an attempt to have their understanding. It is more effective to create a structure for listening to the consumers' and related food business operators' opinions, instead of one-sided publicity.

In the case where food business operators publicize the introduction of a traceability system for commercial purposes via storefront notices and pamphlets etc., it is important to clarify the scope of the stages covered in the traceability system and give accurate information to consumers and related food business operators.

Specifically:

- Items of products and raw materials covered in the system
- The stages in the food chain of the food business operators coping with the system (from which stage to which stage, backward to forward)

### **8-2 Improving and renewing the system**

#### **(1) Periodical evaluation and improvement of the system**

A system evaluation plan (evaluation items, evaluation standards, evaluation period, evaluation structure) should be drawn up, and the system evaluation should be conducted according to the plan and improvements made as required.

If internal or third-party audits are conducted, the result of these audits should be evaluated.

#### **(2) Renewal of the system**

The renewal of the system will be effective in the following cases:

- If as a result of a periodical evaluation of the system, it is concluded that a renewal is necessary.
- If the process of production, processing and distribution is changed greatly.
- If related laws/regulations are amended greatly.
- If the related environment, such as trading terms or product items, have changed greatly.
- If a new applicable technology is developed.
- If there is a great change in consumption behavior.

For the system renewal, studies are required by going back to the basic plan drafting stage or to the traceability plan drafting stage.

If a system renewal results in a change in the actual products and the exchange of information, care should be taken by coordinating with the clients to avoid any inefficiency.

## **Appendix**

### **Appendix A: Indicating form of transmitting information and its storage media used in the food traceability system**

#### **A-1 Indicating methods of transmitting information and its storage media**

Listed below are some examples of indicating methods of information attached to food products in traceability system and media used for storing these data. (media for information transmission). In each case, the specific identifier or ID must either be described in the information communicated, or media which compiles it. This shows the linkage between the communicated information and traceable unit (which is the object to be identified). It should be noted that as a result of rapid changes in the field of information technology, new media for information transmission are developed daily.

Each of these media has their own technical limitations and related costs. Thus, the organization that is considering introducing a traceability system should select the type of media that is most practical and suited to their food products in developing and building their own traceability system.

##### **(1) Legible letters, figures written on paper documents**

This method uses letters and figures on paper as the form of transmitting information. It is directly written on paper and read by people to transfer information. There are 2 types of paper documents: “those used together with the product (i.e. labels and packaging materials)” and “those attached to the product (i.e. certificates, invoices, bills and delivery slips)”.

Data transcription from one recording media to another requires to be done by hand. Paper documents may be managed by, for example, manual writing in a ledger or typing on a computer. When a ledger is the method for recording information, all documentation is written by hand from a paper document to ledger when a product is received, or from ledger to paper document when a product is packaged and shipped. When records are managed by computer, data input is done by hand or OCR (Optical Character Reader), then the data output to paper document is done by printer.

##### **(2) Bar code printed on paper media**

A bar code is printed on a food label or packaging label to transfer machine-readable information by using a group of parallel lines printed in different widths and spacing. Bar codes can be read by an automatic reading device called a bar code reader, and can be written into storage media by a computer-controlled printer. The computer is the information recording media identifying and interpreting the bar code.

(Characteristics)

- High scanning efficiency by using automatic reading device
- Automatic scanning is possible without touching the product.
- Inexpensive because the material is paper.

### **(3) Two-dimensional codes printed on paper media**

Two-dimensional code is printed on food label or packaging to transfer machine-readable information, represented by multiple black and white dots and lines arranged in a matrix on one plane.

By having vertical and horizontal ways of recoding information, a two-dimensional code has more data information capability in a smaller area than a bar code.

Two-dimensional codes have two types: the stack type in which bar codes of reduced sizes are arranged vertically in many stacks, and the matrix type in which black and white dots and lines are arranged in a grid pattern.

The information recording media for reading and writing are the same as bar codes.

(Characteristics)

- Can contain a large volume of information.
- High scanning efficiency by automatic reading device
- Automatic scanning is possible without touching the product.
- Inexpensive due to the material being paper.
- Automatic reading device (“reader”) is more expensive than a bar code reader.

### **(4) Electronic information compiled in electronic tag (IC tag)**

This is a communication method using electronic data compiled in a microelectronic circuit (IC: integrated circuit) built into a tag (card or label). Information can be exchanged via an electronic wave in a specific frequency. By using an automatic recognition device, reading and writing can be made with no human contact.

Otherwise known as RFID (Radio Frequency Identification).

(Characteristics)

- Can contain a large volume of information.
- High scanning efficiency using automatic reading device
- Scanning is possible without touching the product.
- Can also read through transparent materials.
- Rewriting is possible.
- High security
- Expensive due to the media being a electronic storage device

**Table 1 Indicating methods of transmitting information and its storage media**

|   | <b>Letters, figures/paper documents</b>         | <b>Bar codes/paper media</b>                             | <b>Two dimensional codes/paper media</b>             | <b>Electronic information/ electronic tag</b>                     |
|---|---|--|--|---|
| <b>Input and reading errors</b>                                       | Depends on operator's capability                | Low  | Low  | Low   |
| <b>Legibility by human eyes</b>                                       | High  | None   | None   | None  |
| <b>Information storage capacity</b>                                   | Some limitations                                | Some limitations (maximum of about scores of characters) | Some limitations (maximum of 2,000-3,000 characters) | Some limitations  |
| <b>Information storage and management (i.e. volume, period, etc.)</b> | Apt to be damaged                               | Only a few restrictions                                  | Only a few restrictions                              | Only a few restrictions   |
| <b>Information processing/retrieval</b>                               | Slow  | Speedy   | Speedy   | Speedy  |
| <b>System maintenance</b>   | Not much needed                                 | Necessary  | Necessary  | Necessary   |
| <b>Security</b>   | Depends on how documents are stored and managed | Great  | Great  | Great   |
| <b>Training on operation</b>  | Not much needed                                 | Necessary  | Necessary  | Necessary   |
| <b>Data rewriting</b>   | Rewritable                                      | Non-rewritable   | Non-rewritable                                       | Rewritable  |
| <b>Reading through transparent materials</b>                          | Not possible                                    | Not possible   | Not possible   | Possible  |
| <b>Creating cost</b>  | Inexpensive                                     | Inexpensive  | Inexpensive  | Expensive   |
| <b>Cost for writing and reading devices</b>                           | -   | Less expensive compared with an electronic tag           | Less expensive compared with an electronic tag       | More expensive compared with bar codes and two dimensional codes  |
| <b>Data replication</b>   | Easy  | Easy   | Easy   | Difficult   |
| <b>Durability</b>   | Low   | Low  | Low  | High (but requires processing according to utilizing environment) |

## **A-2 Code systems**

### **(1) Role of code systems**

Code systems can be used to recognize and to transmit ID in traceability system, as well as exchange necessary information. It is important to use a common code system to improve data processing efficiency. However, care should be taken to coordinate new code systems with existing code systems currently used by each food business operator.

Roles of food-related code systems include:

- i To identify each material
- ii To indicate attribute information
- iii To identify individual food business operator and its location

Existing types of standard code systems are the one which mainly work for one of the above roles i, ii or iii, and another which has several roles.

An example of i is a “cattle ID number”. This cattle ID number is a 10-digit number, which is used for individual livestock identification.

There is no need to give any special meaning to the ID code, as long as its corresponding attribute information is stored in a database.

To facilitate identification for traceability requires having a unique ID, which can separately identify a food product’s traceable unit (either given to specific product lot or to an individual product). For an ID code to be useful in the identification required in traceability, the unique characteristics of ID code must be ensured. Following 2 methods are considered to achieve this:

- (a) Using symbols whose specific characteristics are guaranteed
- (b) Using combination of code which can identify food business operator and products, and lot number or serial number

Typical examples for (a) are an u-code (ubiquitous code) and a GID. These symbols are focused on unique identification, and their user can give ID to individual products and product lots without duplication. Basically, a traceable unit’s attribute information is recorded in a database. Using larger digit numbers allows for the addition of any other code systems (including codes to represent attribute information).

SGTIN is an example to allow application of the method mentioned in (b). This consists of GTIN, which is the code to identify food business operator and food product, added with serial number in order to identify individual products.

In the above mentioned code systems (a) and (b), the specific characteristic as an ID is secured globally, and semi-permanently. However, in actual cases, it is enough to secure the specific characteristic of the traceable unit only within the period when,

and the place where it is handled. If the traceable unit is only handled in a specific area or by a specific group, then its code system can be determined by following method (a) and (b) listed above.

Meanwhile, the cattle ID number corresponds to method (a), but its specific characteristic is only guaranteed for domestic livestock. In a case of an international transaction, the ID code can have a specific characteristic which is internationally accepted, and complies with ISO, by adding the country code of Japan, and the cattle code.

Examples for ii include: the standard commodity code for fresh products, and the standard commodity attribute code, etc. The standard commodity code for fresh products, meat products, product attributes such as species and parts are classified using pre-designated numbers that are attached to a specific regulation.

By reading the numbers attached to that regulation, a user can obtain the species and parts information on the livestock products. Unlike ID codes, the purpose of these numbers is to indicate meaningful information on the commodity. In this case, similar kinds of products have the same number indicated for the same part of the same species.

Examples for iii are Global Location Number ( GLN ) and so on. GLN is an international standard code which identifies a company and a business facility using 13 digits.

## **(2) Examples of code systems to identify each commodity**

### **i GS1-128 standard**

GS1-128 is an application standard for bar codes, which uses a series of Application Identifiers to include multiple data such as GLN, product quantities, production and expiration dates or time, lot numbers, and serial numbers, which are regarded as attributes for commodity code (GTIN). The type of the labeling information is given by placing the Application Identifier (AI), which is standardized by ISO, at the front of the code. The ID for food traceability can be determined by combining the batch or lot numbers (AI:10) and/or serial number (AI:21) with GTIN(AI:01). The individual ID number of a domestic bull, bullock or cow can be indicated by using AI (251).

On January 2006, the naming of the UCC/EAN-128 changed to GS1-128.

(Note) Global Trade Item Number ( GTIN )

GTIN is a general term for ID codes such as JAN and ITF (Interleaved Two of Five) which are put on general consumption items. This is an integrated

system to include several different codes such as 13-digit JAN (EAN) code, 12-digit Universal Product Code (UPC), and 14-digit ITF code. According to the rule set by GS1, GTIN is managed as a unified style, a 14-digit code.

#### **ii Serialized Global Trade Item Number(SGTIN)**

Serial numbers are combined with the commodity code GTIN to make the SGTIN in order to manage each commodity individually. This is one of the Electronic Product Code (EPC) systems.

(Note) Electronic Product Code (EPC)

The EPC is a commodity code identification to be printed on an electronic tag. It is managed by EPC global which is an organization established by GS1.

#### **iii General Identifier(GID)**

GID is a type of EPC code which use is not limited. It can also be used for general purposes.

#### **iv Serialized Shipping Container Code(SSCC)**

SSCC is an 18 digit serial number used to identify and manage logistics units (i.e. individual cardboard box, or group of cardboard boxes loaded on a palette).

The SSCC is comprised of a packaging type, a company code (such as JAN company prefix, etc.), and a shipping package number.

This code system is used to identify groups of packaged products, which are comprised of code-identified foods (food in lots or individual foods).

#### **v U-code**

The U-code is an ID code system designed by the Ubiquitous ID Center. This code system with a 128 bit memory is used to identify individual objects as well as their location. Standard technology<sup>7</sup> developed by Ubiquitous ID Center, avoids code duplication that allows assigning a unique code to every lot or location. A prerequisite for the U-code is the use of an existing communication network since the ID code itself provides its own unique characteristic.

Various kinds of ID codes which are being used at present can be used by including them in the U-code.

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<sup>7</sup> Based on the proposal made by Ubiquitous ID Center, standardization of following 4 aspects are now under discussion by International Telecommunication Union (ITU); "Recommendation on further application of ID code", "Standard for ID code (for commodity and location)", "Standard for protocol to retrieve information from ID code".

**(3) Examples of code systems to indicate material's attributes**

**i Standard Product Name Code**

The Organization of Food-Marketing Structure Improvement manages codes for vegetables and fruits, meat and marine products.

Standard Product Name Code: Standard Product names are expressed by 13-digit code starts with 4922.

| <b>Item</b>            | <b>Outline</b>   | <b>Basic code and standard</b>  |
|------------------------|--|---|
| Fruits and vegetables  | The merchandise type of fruits and vegetables is identified by variety (seeds and seedlings) or other factors.   | Uniform fruits and vegetables name code ("Vegefru" code)  |
| <b>Meat</b>            | The commodity types of meat are identified by a combination of livestock species, parts and dressed meat.<br>Livestock species code: information required for all commodity forms.<br>Parts code: Basic information item as the name of dressed carcasses, cut meat and dressed meat.<br>Dressed meat code: items showing the use and portion name (cutting specifications) of dressed meat. | Beef: Japan Meat Trading Centre's commercial standards<br>Pork: Japan Meat Grading Association's pork dressed carcass trading standards<br>Chicken: Japan Chicken Association's chicken retail standards<br>Variety meat: Japan Livestock By-product Association's classification standards |
| <b>Marine products</b> | The commodity types of marine products are identified by biological species, commercial value and other factors.   | Standard Product Name Code for marine products<br>Japan Fisheries Association manages a committee which maintains and manages the code.   |

Standard commodity attribute code items: code items for specifying commodity, in addition to product names,

| <b>Item</b>                  | <b>Attributes</b>  |
|------------------------------|--|
| <b>Fruits and vegetables</b> | Quality standard (grade), size standard (class), place of origin, production method, biological classification, sugar content  |
| <b>Meat</b>                  | Condition, product type, sex, age in month, grade, breeding method, place of origin  |
| <b>Marine products</b>       | Condition, shape and parts, processing method, sex, etc., catching method, slaughtering method, size standard, place of origin |



## **ii Japanese Article Number ( JAN )**

JAN code is a common commodity code that is assigned and leased to users by the Distribution Systems Research Institute. JAN is compatible with the UPC used in United States and Canada, as well as EAN (European Article Number) used in Europe.

This code is indicated on commodities and other articles in the form of a bar code, and is used in Point of Sales (POS) systems, order receiving and placement systems, incoming stock systems and inventory control systems.

The JAN code has two types; standard 13-digit type and short 8-digit type. For the standard type, the first 7 digits (or 9 digits) is the “company prefix” given to food business operators by the Distribution Systems Research Institute, and the following 5 digits (or 3 digits) is the “item code” assigned by each food business operator. The last digit is a check digit. A commodity’s specific code is comprised of a combination of these digits.

## **iii Catalogue number of SEICA**

The fruit and vegetables on-line catalogue called “SEICA” is a catalogue publication system owned by Organization of Food-Marketing Structure Improvement and supported by National Agriculture and Food Research Organization under the National Food Research Institute and Computer Center for Agriculture, Forestry and Fisheries Research MAFF.

This system allows the user to register and read information about products, producers and shipment for each product item via the website.

For the producer and shipper who had registered for SEICA, the system issues an 8-digit “catalogue number” for each commodity. Once the producer and any other relevant party gives this catalogue number to their product, the distributor and consumer can view production information of the product on the SEICA website by using the assigned number.

## **(4) Example of code system to indicate food business operator and its location**

### **i Global Location Number ( GLN )**

GLN is the international standard business code established by GS1, which is utilized for EDI (Electronic Data Interchange) and other data communications.

Similar to the EAN code and JAN code (standard type), the GLN is comprised of 13-digit number. This 13-digit number is a combination of the “GLN company code” which is assigned by GS1’s code centre in each country, and “location code” given by each company. This enables businesses and food business operators all over the world to identify each other by the unique number.

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## **Work Progress**

### **< Revision in the 2006 fiscal year >**

Revision committee meetings on the Handbook for Introduction of Food Traceability Systems

1<sup>st</sup> meeting October 5, 2006 (Thursday)

2<sup>nd</sup> meeting January 19, 2007 (Friday)

3<sup>rd</sup> meeting March 12, 2007 (Monday)

Working group meetings of Revision committee on the Handbook for Introduction of Food Traceability Systems

1<sup>st</sup> meeting November 10, 2006 (Friday)

2<sup>nd</sup> meeting December 13, 2006 (Wednesday)

3<sup>rd</sup> meeting December 27, 2006 (Wednesday)

4<sup>th</sup> meeting January 19, 2007 (Friday)

### **< Development in the 2002 fiscal year >**

Committee meetings on the Development of Food Production and Distribution Information Providing System

1<sup>st</sup> meeting May 23, 2002 (Thursday)

2<sup>nd</sup> meeting June 13, 2002 (Thursday)

3<sup>rd</sup> meeting November 6, 2002 (Wednesday)

4<sup>th</sup> meeting January 24, 2003 (Friday)

5<sup>th</sup> meeting March 28, 2003 (Friday)

Committee meetings on Guidelines for introducing Food Traceability

1<sup>st</sup> meeting November 6, 2002 (Wednesday)

2<sup>nd</sup> meeting January 15, 2003 (Wednesday)

3<sup>rd</sup> meeting February 24, 2003 (Monday)

Working group meetings of Committee meetings on Guidelines for introducing Food Traceability

1<sup>st</sup> meeting November 13, 2002 (Wednesday)

2<sup>nd</sup> meeting December 11, 2002 (Wednesday)

3<sup>rd</sup> meeting December 20, 2002 (Friday)

4<sup>th</sup> meeting January 10, 2003 (Friday)

5<sup>th</sup> meeting January 15, 2003 (Wednesday)

6<sup>th</sup> meeting February 12, 2003 (Wednesday)

7<sup>th</sup> meeting February 24, 2003 (Monday)