UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Economic Affairs SECO

GLOBAL QUALITY AND STANDARDS PROGRAMME

SIAEP

STANDARD OPERATING PROCEDURES

For Traceability For Horticulture Operators

Acknowledgements

This document was prepared by Mr Peter Johnson and Mr Ian Goulding. We appreciate the valuable inputs received during the preparation of this document from the following experts and organizations: Mr Le Minh Hung, Mr. Nguyen Duy Duc, Mr Tran Nguyen Cac, Mr Ngo Van Binh, Agro Processing and Market Development Authority (AGROTRADE), Plant Protection Department (PPD), Department of Crop Production, Vietnam Institute of Agricultural and Post-Harvest Technology (VIAEP), Sub-Institute of Agricultural Engineering and Post-Harvest Technology (SIAEP), Southern Horticultural Research Institute (SOFRI), Vietnam Fruit & Vegetable Association (VINAFRUIT).

This document was prepared under the framework of the project “Increasing quality and standards compliance capacity of Mango value chain in the Mekong River Delta”, which is jointly implemented by the Ministry of Agriculture and Rural Development (MARD) and the United Nations Industrial Development Organization (UNIDO) and funded by Switzerland, through its State Secretariat of Economic Affairs (SECO).

Disclaimer

Contents

Acronyms

CCP	Critical Control Points
EU	European Union
GS1	Global Standard 1
HACCP	Hazard Analysis and Critical Control Points
ISO	International Organization for Standardization
ISPM 15	International Standards For Phytosanitary Measures No. 15
MARD	Ministry of Agriculture and Rural Development
MRL	Maximum Residue Limits
PHC	Packhouse code
PUC	Production Unit Code Number
QA	Quality Assurance
QC	Quality Control
SOP	Standard Operating Procedures
SSOP	Sanitary Standard Operating Procedures
TCVN	Viet Nam Standards
VHT	Vapor Heat Treatment
STAMEQ	Directorate for Standards, Metrology and Quality

1. General Information

Traceability has become a core requirement for all suppliers of agricultural input materials, food processors, and food distributors, including plant or animal-based foods. Traceability of horticultural products is particularly important because these products have the following characteristics:

- Requires a high degree of intervention (including pesticides in some cases) to ensure acceptable quality.
- Products are sensitive to changes in storage conditions.

Traceability is becoming increasingly important, especially for those that trade internationally, and need to meet increasingly strict regulatory requirements. The installation of a traceability system ensures that horticultural operators at all stages of the supply chain can meet their legal obligations, as well as reducing the risk that unsafe products are placed on the market.

Traceability helps ensure consumer protection. In addition, it can also reduce costs for production businesses in limiting market disruptions due to possible non-compliance cases.

This standard operating procedure provides guidance for farmers, distributors, packers, and exporters in designing and implementing their product traceability systems, focused on those participating in high-value supply chains and export supply chains. It defines the concept of traceability and explains why traceability is used as an effective tool for ensuring food safety in business operations.

The document describes the basic principles guiding the design of traceability systems and provides instructions on how to apply the system in agricultural production businesses to ensure the most effective implementation. It includes data for traceability related to the input and output of products (external traceability of the unit) and provides recommendations on how the production unit can trace the product through its own management processes (internal traceability within the unit). Traceability systems are applied when a product

recall and withdrawal procedure is implemented, to remove unsafe products from the market, these systems are also described.

In the mango export industry, traceability information is used in relation to:

a) Sanitary and phytosanitary safety: ensuring that exported products come from origins that meet food safety and plant health conditions (including use of pre- and post-harvest applications of agro-chemicals)

b) Application of tariffs and quota tariffs, to ensure that appropriate origin-linked rates of duty are applied

c) Ensuring that exported products are derived from sustainable origins, that comply with social, conservation and environmental standards. (e.g., in labor condition certification programs, organic production).

This document is intended to be read with in conjunction with the following SOP documents:

- SOP No.1 Standard Operating Procedures for exported mangoes field practices
- SOP No.2 Standard Operating Procedures for export mangoes packing house
- SOP No.3 Standard Operating Procedures for disease management of exported mangoes
- SOP No.4 Standard Operating Procedures for cool chain management of exported mangoes
- SOP No.5 Standard Operating Procedures for transportation of exported mangoes
- SOP No.7 Standard Operating Procedures for mangoes export market requirements manual

2. Scope of SOP Document

This set of Standard Operating Procedures (SOPs) provides guidance for the design and implementation of a traceability system in the horticulture supply chain. It is primarily directed at operators wishing to export their products.

It will assist operators at all levels of the distribution chain to develop, install and operate data collection and storage systems, which will allow them to identify the suppliers and buyers of any batch of products which they have handled in the past, and thus meet the requirements of their regulators and international clients. Operators adopting the SOPs set out in this document can expect to meet international food safety (and other origin control) requirements for traceability.

Furthermore, the manual also provides useful guidance for inspectors from Competent Authorities (CA's) responsible for undertaking inspections of horticulture sector operations against traceability requirements.

For this reason, it includes outline checklists that can be applied to assess whether essential elements of a traceability system are in place and functioning effectively.

This document can be used as training and reference resources for Agricultural Extension Centers, Vietnam Fruit and Vegetable Association, or agricultural students at Universities and Colleges.

3. Key Definitions

Supply Chain: The system of organizations and business processes involved in the production, distribution, and maintenance of products or assets.

Control Chain: The sequence of parties over time that have physical control over an object or a set of objects moving through the supply chain network.

Ownership Chain: The sequence of parties over time that have legitimate ownership rights over an object or a set of objects moving through the supply chain.

Traceability: is defined by the Codex Alimentarius Commission1 as "the ability to follow the movement of a food through specified stage(s) of production, processing, and distribution".

Traceability System: The system includes product identification,

[1] The Procedural Manual of the Codex Alimentarius Commission, 17th Edition, Joint FAO/WHO Food Standards Programme

collecting and storing information on the product's status over time and location to manage information on product quality and safety.

Traceability Location: The physical area selected within the traceability system.

Internal Traceability: The business processes and data of an organization used within its scope of operations to carry out traceability.

External Traceability: Traceability between trading partners and the information/data exchange for traceability.

Traceability Data: Any information about the lineage, application, or location of an item that can be traced, which may be owner data or transaction data.

Critical Tracking Event (CTE): A record of the completion of a step in the production or business process within the supply chain, which is essential to record and share to ensure traceability from beginning to end.

Key Data Element: The data required within a CTE to accurately reflect what happened in a step of the production or business process, to ensure traceability. Key data elements must reflect information on product quality and safety.

Product Life Cycle: The entire process from when the product is created until it is disposed of.

Batch: A group of products produced under identical conditions and subject to the same treatments. Other than natural variation, a batch of products should have homogeneous characteristics.

Product Recall: is the procedure applied when, in addition to withdrawal of product in the distribution chain, it becomes necessary to inform final consumers that a batch of products which has been sold to them should not be consumed due to food safety risks or compliance reasons. A recall procedure is initiated when the product has already been placed on the market and offered for sale to consumers.

Product Withdrawal action taken to remove a food product from sale even if there is no public health and safety issue.

GS1 System: Technical regulations, standards, and guidelines of GS1.

Data carrier: A medium that represents data in a machine-readable form, capable of anti-counterfeiting.

Code: A sequence of numbers or letters used to identify objects, products, services, locations, organizations, and individuals.

Barcode: Linear bar code symbol (one-dimensional barcode), a set of points (Data Matrix, QR code, Databar, and other two-dimensional barcodes), radio frequency identification (RFID) chips, and other identification technologies used to store and transmit information of the code.

Global Company Prefix (GCP) code: A unique global number assigned by the GS1 national agency to an organization.

Global Location Number (GLN) code: A sequence of numbers consisting of the company prefix code and the location identifier code according to the GS1 standard.

Global Trade Item Number (GTIN) code: A sequence of numbers consisting of the company prefix code and the product identifier code according to the GS1 standard.

Serial Shipping Container Code (SSCC): A sequence of numbers consisting of an extension digit, the company prefix code, the reference number according to the serial, and the check digit according to the GS1 standard.

4. Relevant Publication

The following reference documents are essential for implementing this Standard Operating Procedure (SOP). For reference documents that indicate the publication year, apply the version specified. For reference documents without a publication year, apply the latest version, including any modifications or additions (if applicable).

- TCVN 12850:2019 "Traceability - General requirements for traceability systems"
- TCVN 12827:2019 "Traceability - Requirements for the fresh fruit and vegetable supply chain"

- TCVN 12851:2019 "Traceability - Requirements for organizations evaluating and certifying traceability systems"
- Technical regulations, standards, and guidelines from GS1.

5. Principles of Traceability

5.1. Overview

The SOP also specifies export requirements for parties involved in the mango supply chain, as detailed in Table 1

Table 1: Stakeholders and activities in mango export chain.

Stakeholders	Activity	Example
Primary Role		
Farm	Growing, harvesting, storing, selling, transporting Farmers	Farm/ Cooperative
Packhouse/ Repackaging facility	Gathering, packaging, sales, transportation	Cooperative/ Packhouse
Distributor/Wholesaler	Storage, sales, transportation	Distributor/Import-export warehouse/Wholesaler/Marketplace /Auction market
Retailer	Storage, sales to end consumers	
Food service business	Storage, processing, sales to end consumers	

Exporting Markets		
Secondary Role		
Third-party logistics service provider	Transportation, storage	Truck/train/ship/aircraft
Supplier of packaging material,		Packaging material supplier (baskets, bags, boxes, labels, containers...)
Supplier of input material		Plant protection product distributor, fertilizer, water, energy
Supplier of planting material,		Plant seedling
Government regulatory agency	Inspection	Customs, inspection organization

5.2. Key factors to ensure the implementation of the traceability system meets the principles.

The key elements of a traceability system are:

1. Identification of operators
2. Identification of products
3. Maintaining the integrity of batches

However, on its own a traceability system does not deliver added value unless the data is applied to the management of critical business conditions.

Additional key tools are required to ensure that the traceability system delivers meaningful improvements in product safety and quality:

4. Compliance data to be collected for each batch
5. Withdrawal and recall procedures

Finally, the traceability system involves collecting and managing data, which can provide logistical challenges as operators grow. As a result, there are significant advantages in using modern and standardised approaches to traceability data acquisition and management. Additional principles to be considered are therefore:

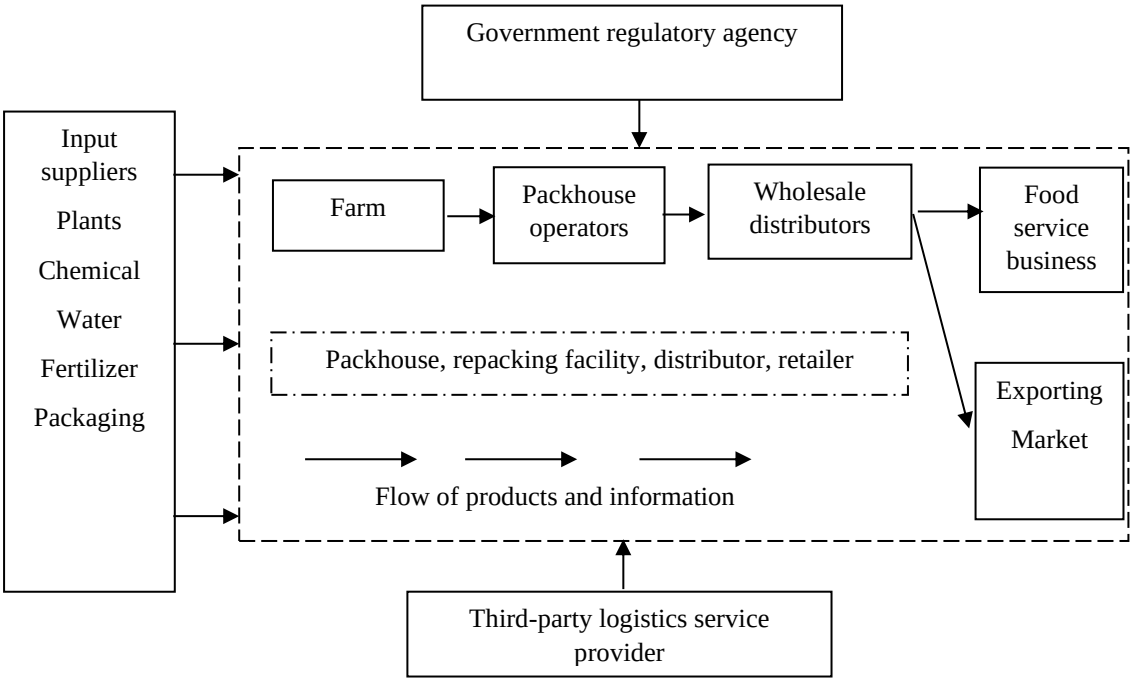
6. Use of international data standards for traceability

5.3. Details of the key factors of the traceability system

5.3.1. Principle 1: Identification of Operators

The stakeholders involve in the supply chain that require traceability system include:

- Primary roles: Crop producers (Farmers, Agricultural Cooperatives), Purchasing traders, Packhouse /Repackaging facilities, Distributors, Wholesalers/Exporters, Export markets.
- Secondary roles: Third-party logistic service providers, Packaging material suppliers, Input material suppliers for production facilities, Seed suppliers, State management agencies.



Operators, their suppliers, and customers should individually be identifiable by a unique code. Ideally the code applied should be officially recognisable and be standardised across all operators in a supply system. This may be allocated by different means:

- If the operator is registered with the National GS1 Agency, then the GS1 Company Prefix should be used as the identifier.
- Otherwise, the operator may use a registration number with a National Competent Authority (e.g. packhouse code)

In the case of producers, larger scale farms may be divided into different production locations (plots) for traceability purposes. This is essential if different plots are expected to receive different treatments. In this case there should be one identifier for each plot. e.g. if several unconnected plots are operated by a single operator, each one should be registered as a separate entry. If a single farm has more than one product, then details for each should be recorded.

Small farms may be clustered together for traceability purposes where they receive treatments in common. For example, a cluster of small producers working under a cooperative could share an identity.

The description of a traceability system for producers should define the spatial limits of the farm on a map.

5.3.2. Principle 2: Identification of products

Species and variety identification

Each species/variety should be identified by a code. If a GS1 Global Trade Item Number (GTIN) has been allocated, this should be used as the product identifier.

Date Codes

A date code should be recorded, corresponding to the date of reception within each year. There are different coding protocols which can be used e.g. DD/MM/YYYY or DDD/YY. Day numbers can be obtained quickly from:

https://www.calendar-365.co.uk/day-numbers/2021.html

Batch Coding for Farmers

All products produced by a farmer should be allocated a batch code to identify the batch.

Each batch code should allow identification of:

a. Production location (farm/fields/plantation etc.)
b. Product produced (species/variety in the case of horticultural products)
c. Date of harvest

Products within a single batch code should be homogeneous. Different batch codes should be allocated where:

- part of the production has received a different intervention (e.g. fertilizer, pesticides etc.)
- products from the same plantation are harvested on different days

A product record sheet should be generated for each batch code allocated, which shows contains the relevant production information applicable to the code (see Principle 4).

Batch Coding for Distributors

All products received by a distributor, packer or exporter should be allocated a batch code on reception to identify the batch.

Each batch code should allow identification of:

a. Supplier
b. Product (species/variety in the case of horticultural products)
c. Date of reception

Products within a single batch code should, as far as possible, be homogeneous, notwithstanding the commercial need to split and combine batches.

Suppliers may deliver a mixed batch of product comprising several species or varieties. On reception, a mixed batch of products from a single supplier must be separated into different species and varieties before the allocation of batch codes.

Different batch codes should also be allocated where part of the production receives a different treatment whilst in the ownership of the operator (e.g. graded on the basis of quality, for different processes/markets)

A product reception sheet should be completed at each reception event. The sheet indicates the batch code allocated and provides a record of the associated information.

(A model raw material reception record sheet is shown in Annex 1).

5.3.3. Principle 3: Maintaining the integrity of batches and batch data

Recording transactions between operators

The central aim of a traceability system is to ensure that there is a permanent and retrievable record of the transfer of identifiable batches between identifiable operators.

A secondary aim is to ensure that, as far possible, the integrity of data relating to a batch received by a distributor is preserved.

Thus, where a consignment containing several batches is transferred between two operators, the consignor should inform the consignee of the batch codes which have been applied during his operations. For example, a collection agent might gather products from several different farms and deliver them to a packhouse. The Collection agent should allocate a separate batch code to each batch of product from different farms, and transfer this information to the packhouse, linked to each physical batch of product delivered.

The codes should be recorded by the consignee, who should seek to preserve the integrity of these batches throughout his operations.

A model transaction record form which captures the relevant information is shown in Annex 1.

All transactions must be documented. Traceability information would normally be included in an invoice or delivery note. If these are not used, then separate forms should be printed and used.

Managing Batch Separation and Mixing

As far as possible, products which are allocated different batch codes should be kept separate throughout the time it is possession of the operator, to allow the final product to be marked with the code which identifies the supplier.

Therefore, as far as possible, product from different batch codes should not be mixed. Separation may be in space and/or time.

During raw material handling and intermediate storage and processing and packing, boxes of products with different batch codes should be labelled with a temporary label to distinguish them from each other. Temporary labelling can apply colour coding e.g. different coloured plastic boxes or tags inserted into boxes to ensure batches can be distinguished from each other.

Where a consignment from a single supplier contains several batches identifiable by codes, then each of these batches could be provided with the receivers' batch codes. Where this would result in too many batches to allow efficient handling and batch separation, then batches from a single supplier may be combined. Where this is the case, it is recommended that:

a) the number of batches mixed is kept to a minimum
b) if batch mixing in necessary, then the priority should be to mix product from a single supplier.
c) when batches are mixed, the records for both batches record:
    i. The batch number of the product with which the product is mixed
    ii. The quantity of the of the product which is mixed

The introduction of batch separation in product handling requires additional space for sorting and storage of batches, as well as physical means of separation. Installation of traceability systems can present challenges in terms of investment and upgrading of physical facilities, as well as direct system costs.

Identification of Batches in The Final Product

The final product should be physically labelled with relevant information, including batch code, to ensure that:

- the batch can be distinguished from other batches which may have the same appearance and with which they may be confused
- the supplier of the product in the box or crate is identifiable

Where products are packaged individually, each package should be marked on the label with the batch code applicable to the product which it contains.

Outer boxes should not be packed with product with different batch codes.

The outer carton/box should be marked with the batch code applicable to the product which it contains, as well meeting additional labelling requirements of the destination market and client (for example exporter's address, country of origin etc).

A running record should be kept of each batch code and quantity held in the raw material. Intermediate and final product stores.

Additions and subtractions of identifiable products from the storage should be recorded and the balance in storage adjusted accordingly.

Batch codes and customer codes should be indicated on the sales documentation (invoice, packing list etc).

5.3.4. Principle 4: Generate and record relevant compliance data

Data Recording for Producers

The farmer should generate a batch code for each batch of production. Note that products which are harvested from the same trees, plantation, growing area but on a different date, or by a different harvest team, or which experience different treatments during harvest should be allocated different batch codes. For example, where an orchard is picked several times over a period of days or weeks, the fruit collected each time would be allocated a different batch code.

At the level of the farm the producer should ensure that the farm diary records all relevant farm data pertaining production to a batch, against the batch code(s) allocated to that batch.

The farmer should meet regulatory requirements for data collection and transmission. In particular, any requirements to maintain a farm diary to record relevant data should be observed.

The data to be recorded by farmers should include:

Fixed Farm Data

- Locations (GPS coordinates)
- Operator identifier (e.g. GS1 Enterprise Code)
- GLN Global Locator Number (GS1 + Location Reference)
- Producer Unit Code (although this could be the same as GLN)
- Cooperative name
- Province/ District/commune/village
- Operator details (name, address, ID no.)
- Dimensions of farm (area/no of trees etc):

- Irrigation system type
- Inter-planting with other crops

Seasonal Farm Data

- Phytosanitary conditions (observations of pest/disease conditions)
- Chemical and fertiliser treatment record (active product, brand, supplier, date and volume/concentration applied, identification of area/plants treated, name of sprayer
- Harvest date and quantity
- Identifiers of operators to whom the crop is sold/transferred

Data Recording for Distributors

An operator receiving product from a producer, or a distributor should allocate a batch code for each batch of products, which identifies and characterises the batch.

All the relevant data concerning the treatment of that batch whilst in the possession of the operator should be recorded against the batch number.

The batch number is also used for stock control (intermediate and final product storage), as well for the recording of important process variables during product reception, intermediate storage, processing, and dispatch.

Product Reception

The product reception sheet should provide a record of:

1) Weight of the batch
2) Quality grading
3) Temperature
4) Observations regarding condition of crop/cleanliness of boxes, vehicle etc.
5) Any subsequent mixing of batches.

A model product reception form is shown in Annex 1.

Intermediate Processing and Despatch

All products and process records (including Hazard Analysis and Critical Control Points data) will be recorded and allowed the identification of the batches to which these conditions were applied. This includes:

1) Times/temperature of raw material, intermediate and final storage
2) Duration/temperature/concentrations of any heat or chemical sanitary or phytosanitary treatments applied to the batch
3) Any other data/observations/test results (e.g. defects identified)

It is important to note that should any part of the batch be treated differently from another part this should be considered as a splitting of the batch and a new batch code allocated.

5.3.5. Principle 5: Withdrawal and recall procedures

Conditions under Which a Withdrawal or Recall Procedure Should Be Initiated

An operator will initiate the procedure under the following circumstances in respect of a batch of products which have already been consigned from the operator:

1) When instructed by the CA
2) When results from official controls or internal controls indicate that there is a significant risk that the products consigned are either a) unsafe for human consumption; or b) do not comply with regulatory conditions
3) When results of internal controls communicated by customers indicate that the products consigned are either a) unsafe for human consumption; or b) do not comply with regulatory conditions

Communication with Consignees

All consignees to which affected batches (defined by batch codes) have been consigned should be notified in writing.

The operator will notify consignees which have received the affected batches of products with the following information.

1) Description of the affected products
2) Batch number: the identification of affected batches via their codes ensures that the extent of the withdrawal/recall action is limited to only those parts of the production (defined by suppliers and products) which are affected by the food safety or compliance risk.

3) Date of consignment
4) Nature of the problem identified
5) Withdrawal actions to be taken (see below)

A copy of the notification should be communicated to the Competent Authority.

Withdrawal and Recall Action to Be Taken by the Receiver

The withdrawal/recall notice should clearly state the actions to be taken. The actions to be taken should be selected on the basis of ensuring that unsafe or non-compliant products are not placed on the market.

The action(s) may be one or more of the following:

a) Return to the consignor for re-processing or re-packing to render the product safe/compliant
b) Undertake testing
c) Undertake sorting
d) Undertake processing/ re-processing
e) Undertake re-packing/re-labelling
f) Destruction
g) Use for non-human food uses (to be specified e.g., animal feed, fertilizer)
h) Other action
i) No action (for information only)

In cases where the batch or items from it have been sold onto other commercial operators, those operators should also be informed in the same way.

Recall Procedure

Notwithstanding that any operator may voluntarily launch a recall, the responsibility for the decision to launch a product recall will be with the Competent Authority.

The Competent Authority will specify the conditions of the recall, including naming the operator responsible for implementing and coordinating the recall, including funding its costs.

The recall procedure will include one or more of the following actions:

a) Informing national, local and export country Competent Authorities of the recall, and requesting them to publish it
b) Publishing notices in targeted print and electronic media in the affected region
c) Informing customers to distribute information
d) Supporting customers who provide refunds or replacements to consumers returning products
e) Indicating how the costs sustained by operators of implementing the recall will be refunded

5.3.6. Principle 6: Use of international traceability data standards

Application of the GS1 Global Standard

In some countries operators are free to choose any system they wish to generate, store, and retrieve traceability data. This includes paper-based systems, and any means of allocating codes and identifiers which suits the operator.

In Vietnam the traceability requirements for fruit and vegetable crops are set by TCVN 12827:2019 “Traceability - Requirements for supply chain of fresh fruits and vegetables”. This requires the application of the GS1 Global Standard. This standard must therefore be applied in the design of the database and application.

Since it is extremely tedious to run a paper-based data system to the GS1 standard, the application of this standard also implies that operators should install an electronic system.

Operators should therefore apply coding systems under GS1 according to the (yet to be decided) requirements of applicable national regulations and standards. These will inter alia, specify requirements for allocations of codes for:

- GS1 Company prefix
- Global Location No. (GLN)
- Global Trade Item No. (GTIN)
- Serial Shipping Container Code (SSCC)

GS1 Company Prefix

The GS1 Company prefix will be allocated by Ministry of Agriculture and Rural Development (MARD).

Note that at the time writing the MARD is considering the precise coding to be used in the agricultural sector. MARD will inform the operator of the correct GS1 Company Prefix to be applied.

The GS1 Company prefix may not be operator specific (i.e. it may be applied to all agricultural operators within a geographic area, or to all within a specific sectors).

For existing operators the GS1 Company prefix will be allocated on the launch of the system by MARD.

For new operators this will be issued by MARD on approval of applications for registration

Global Location No.

Each operator will also be allocated a unique Global Location Number (GLN) which defines the location. GLN will be a unique identifier for the farm (numbered sequentially in each province/district/commune)

The Producer Unit Code and the Packhouse Code may form the GLN (or at least will reference to the GLN in the MARD database).

Each operator will also be allocated a unique Global Location Number (GLN) which defines the location. GLN will be a unique identifier for the farm (numbered sequentially in each province/district/commune)

The Producer Unit Code and the Packhouse Code may form the GLN (or at least will reference to the GLN in the MARD database).

Global Trade Item No.

- Each product/crop combination will be allocated a Global Trade Item No. (GTIN) by the MARD. This will be variety specific (e.g. there will be several codes for mango, depending on the variety).
- The GTIN for each species/variety is made up by GS1 Prefix plus crop/variety codes.

- The GTIN codes should be used to identify the type of products concerned.

Serial Shipping Container Code

The Serial Shipping Container Code (SSCC) identifies the batch number of the specific consignment.

It incorporates the GS1 Enterprise code with a sequentially allocated batch nos. to identify the batch.

Use of Standardised Traceability Software Packages

The operator may use any traceability software package which meets the requirements of the legislation.

At present operators have the choice of several different packages, all of which apply the GS1 data standards. A list of potential service providers is shown in Annex 2.

However, operators should also bear in mind that the MARD and the Numbering and Barcode Centre of the Directorate for Standards, Metrology and Quality (STAMEQ) are also developing software packages (e.g. farm diary) for agricultural operators.

These combine the capture of vital production and distribution data required for compliance checks and eventual certification, with traceability to ensure that the batch being certified is the same as the batch to which the production data applies.

Operators should be aware that due to this level of specificity, the use of such official packages may be mandatory in future.

Labelling and Reading Traceability Data

A major challenge is the linking of traceability data (metadata, codes, associated variables) to physical products. It implies the need for a system which makes labelling of physical products, and subsequent reading of the data. An operator may choose to apply and transmit codes in plain text (as a series of

numbers and letters printed on the packaging). Standardised data tools have been developed to meet this need.

EAN Bar Coding Standard

An alternative approach is to use variable optical or electronic systems for writing and reading traceability data. These include:

- Bar coding
- Quick Response (QR) Coding
- Radio frequency identification (RFID)

Operators should use the International Article Number (also known as European Article Number or EAN) standard for the barcode and numbering system. This is subsumed in the GS1 Global Trade Item Number standard. Other symbologies such as QR codes and RFID codes can represent additional characters. They are also standardised.

Operators should therefore consider the efficiency of recording, transmitting, and reading traceability data, by investing in the appropriate printing and reading equipment.

XML Data Transmission Standards

XML is a computer language designed for information exchange over the internet. The GS1 XML Standards uses XML to create a set of standardised traceability messages for the Electronic Data Interchange (EDI). GS1 XML messages can be exchanged using any technical solution or internet transport protocol. Typical applications are for data transmission between commercial operators for actions such as Orders, Order Response. Issue of Invoice and Despatch Advice. The system automates the collation and transmission of traceability data between the parties, is more accurate and saves time.

Where an operator invests in a traceability software from a commercial service supplier, they should confirm that data transmission system is compliant with the GS1 XML standard.

For more information see: GS1 XML (Electronic Data Interchange) Standards 3.5

https://www.gs1.org/standards/gs1-xml/3-5

6. Regulatory Compliance

Traceability is well established as an important food safety requirement encapsulated in the legal systems of many countries. This means that inspectors have a responsibility in their official controls of food business operators, to check that the traceability obligations are being met.

Operators should expect that checks on the existence of a traceability system and its implementation, as well as the presence of withdrawal and recall plans where required, will therefore be made as part of the routine formal inspections by Competent Authorities of supply chain operators and their establishment. A typical checklist for this purpose is shown in Annex 3.

Operators should be aware that typically, if revealed by an inspection, the following would be considered actionable offences, leading to launch of a non-compliance procedure by the Competent Authority:

- failure to keep traceability records; make false records
- failure to disclose information when lawfully requested
- failure to keep a recall or withdrawal plan;
- failure to implement a notice to implement a recall or withdrawal when instructed

Operators may wish to recruit an audit and certification service in relation to traceability, to be able to demonstrate compliance with traceability standards to third parties. The provision of these services is subject to TCVN 12851:2019: Traceability: Requirements for bodies providing audit and certification of traceability systems.

7. Records and Documentation

- Traceability records and associated data concerning the characteristics of batches should be held at the operator's production site.
- Data should be held on site for a period of at least 2 years.
- Additionally, operators should comply with any regulatory

requirements for the transmission of data (for example to a centralized database of MARD)

- Traceability records and associated data should be available for inspection at all reasonable hours by officials of relevant CAs.
- Where data is held in electronic format operators should provide onsite facilities for accessing and interpreting the data.

8. SOP Training Requirements

The setting up and operation of a traceability system is a demanding task which requires good knowledge of:

a) the production and distribution environment and

b) concepts of database management and data transmission.

In all cases therefore, the system should be developed and implemented by persons who are suitably trained for the tasks concerned.

Wherever feasible, the stakeholder should also be concerned recruiting suitable personnel who have experience in operating the appropriate traceability system to take on this job at the base.

When external software system service providers are required, they may provide all the necessary specialized knowledge to set up, maintain, and troubleshoot the system regularly. Such service providers often provide operator training to implement the system (data collection and retrieval). The implementation of operational training also needs to be fully documented as evidence of this training activity.

In cases where the business does not have the resources to purchase and operate such systems, then there are significant advantages to collaborating with other operators in the locality, for example via a cooperative, with data management for traceability and compliance being one of the services performed by the cooperative.

9. Regular Evaluation of Effectiveness During the Implementation of SOP

Internal audit is an carried out by the organization to provide objective information on the operation of the traceability system ad compliance. Internal audits must be provided independently, unbiased assessments of the system and processes.

Internal audits should be conducted annually with all stakeholders participating in the chain, in some special cases, the organization's leadership may require emergency internal evaluations.

The evaluation must be carried out based on a checklist built by the evaluation expert.

At the end of the evaluation activity, the relevant personnel are responsible for summarizing the results of the internal evaluation. If any non-compliant points corrective actions need to be issued to rectify the problem, this must be documented. The time to implement corrective actions before delivery should be within one month, depending on the nature of the non-compliant points.

10. References

[1]. Prime Minister No: 100/QĐ-TTg “Approving the Project on Implementation, Application and Management of Traceability System”.

[2]. TCVN 12827:2019 “Traceability - Requirements for supply chain of fresh fruits and vegetables”

[3]. TCVN 12851:2019: Traceability: Requirements for bodies providing audit and certification of Traceability systems.

Annex 1: Record keeping forms

Raw Material Reception Record Sheet

Date	
Date Code	
Time of reception	
Name of supplier	
Supplier code	

Instructions:

- One sheet for each supplier for each day
- Use continuation sheet if necessary

Variable	Product 1	Product 2	Product 3	Product 4	Product 5
Common name					
Species and variety code					
Grade breakdown (kg)					
A					
B					
C					
Rejected					
Total quantity received					

(kg)																
Temperature (3 readings)																
Operator Batch Code No.																
Plant health conditions																
Observations (supplier batch codes, cleanliness/packaging conditions/ foreign matter, physical damage etc)																

Model Transaction Record Form

Supplier name	Supplier Identification Code
Supplier address	

Supplier batch Identification no.	Description	Quantity

Receiver name	Receiver Identification Code
Receiver address	

Supplier/representative signature	Receiver/representative signature
Date	**Date**

Annex 2: List of National Suppliers of Traceability Software Services

It should be noted that the listing of a service provider in this Annex does not provide any guarantee of the relevance or the quality of the services delivered. Operators seeking to recruit service provider should exercise due diligence in their selection.

The following operators provide technical services and software solutions for traceability systems. Their services are subject to TCVN 12827:2019 “Traceability - Requirements for supply chain of fresh fruits and vegetables”.

No.	Name of partners	Address	Contact person	Tel/email
1	Inspection and Certification JSC (VinaCert)	Main office: 130 Nguyen Duc Canh Str, Hoang Mai Dist, Ha Noi and also 4 company branches in HCMC, Da Nang, Can Tho, Hai Phong)	Mr. Nguyen Huu Dung General Director	Tel: +(84) 243 634 1933; Fax: +(84) 243 634 1137 Email: sale@vinacer.vn, Website: http://www.en.vinacert.vn/

2	TE-FOOD	Vietnam 121/40 Nguyen Van Huong, Thao Dien Ward, District 2, Ho Chi Minh City.	Dr. Dao Ha Trung, TE-Food Vietnam Director	Tel: + (84) 904 434 711 Email: trung.dao@te-food.com Website: http://www.te-food.com
3	Information Technology Application Center (INTEC)	7th floor, Ministry of Industry and Trade Building, 655 Pham Van Dong street, Dong Da district, Ha Noi	Ms. Nguyen Thi Minh Thuy, Director	Tel: +(84) 432 121 312 / 212.1310/6686.6815 Email: minhthuy035@gmail.com; thuyntm@intec.gov.vn Website: www.intec.gov.vn
4	Traceabilty Solution and Services JSC (Traceverified)	32, Street 18, Group 54, An Phu-An Khanh Urban Area, An Phu Ward, District 2, Ho Chi Minh City. Representative office: 12 Vo Van Kiet, District 1, Ho Chi Minh City.	Mr. Bui Huy Binh, Director	Tel: +(84) 28 3823 4179 Email: binhbh@traceverified.com info@traceverified.com Website: www.traceverified.com
5	National Numbering and Barcodes Center	8 Hoang Quoc Viet Street, Nghia Do Ward, Cau Giay District, Ha Noi.	Dr. Bui Ba Chinh – Director	Tel: (+84) 946 484 082 Email: chinhbb@nbc.gov.vn

	(NBC)			
6	Block Chain Global JSC	8th Sannam Building, Duy Tan street, Ha Noi	Mr. Tran Phuc Quynh, Director	Tel: + (84) 886431888 Email: tranphucquynh@gmail.com
7	VNPT Information Technology Company	57 Huynh Thuc Khang street, Dong Da District, Ha Noi.	Mr. Dong - Technical team manager.	Tel: +(84) 243 553 3388 Fax: +(84)243.385.5588 Email: vnptit@vnpt.vn
8	My Lan JSC	Long Duc industry area, Tra Vinh City.	Mrs. Duong Ngọc Cam Tu, "Director of Management, Market Development	Tel + (84) 919253952 Email: tu.duong@mylangroup.com
9	Koltiva Company	23rd A&B Building, 76 Le Lai street, Ben Thanh ward, district 1, Ho Chi Minh City.	Mrs. Tran Nhung, Customer Service Representative in Vietnam	Tel: (+84) 378115608 Email: tran.nhung@koltiva.com Website: https://www.koltiva.com
10	Digital Fidelity	393 Truong Dinh, Ha Noi	Mrs. Khuat Phuong	Tel: +(84) 326 109 099

	Vietnam JSC		Loan, Operation Manager	Email: contact@qrlabel.net Website: https://qrlabel.net
11	Smartcheck Technology Company	15 Le Van Thiem street, Thanh Xuan district, Ha Noi.		Tel: +(84) 395 313 019 Email: contact@smartcheck.vn
12	ICheck JSC	12nd Diamond Flower Building, 48 Le Van Luong street, Nhan Chinh ward, Thanh Xuan district, Ha Noi.		Tel: +(84) 981 793 089 Email: cskh@icheckcorporation.com
13	VN TRACE Co., Ltd	101A1 Lac Chinh street, Truc Bach ward, Ba Dinh district, Ha Noi.	Mr. Le Dai Duong, Director	Tel: +(84) 985 771 133 Email: tranhoa0975@gmail.com

Annex 3: Model checklist for traceability compliance checks

Criteria	Satisfactory	Non satisfactory	Comments
Supplier/origin clearly identified			
Receiving raw material identified by code nº			
Lots separated during transport			
Lots separated/identified during process			
The codes allow identification of all essential information			
Separation/or addition of lots recorded			
Label codes permits tracing back the product			
Data on suppliers and clients available			
Product distribution plans available			
Withdrawal/recall plan formalised and operational			
Recall plan verifications recorded			

Conclusions:			
Non satisfactory aspects	Correction requested	Date Limit	Done or not
Comments:			
Conclusion: compliant / non-compliant			
Inspector/s Signature:		Company responsible person Signature:	

+84-4 3850 1802
www.unido.org
GQSP.Vietnam@unido.org

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION