CHAPTER 17
Identification and Traceability

Overview

Produce is legally required to be identifiable and traceable throughout the supply chain, from grower to retailer and preferably consumer and in reverse. Traceability enables potentially contaminated (unsafe or unsuitable) produce to be efficiently removed and the source of the issue identified.

Traceability systems are based on the process of identifying all inputs (e.g. production site, water, seed/plant material, fertiliser, agrichemicals, labour, equipment, packaging) and being able to confirm the origin and journey of the inputs that were used to produce the final product. This process enables verification of the product's history.

Fruit and vegetables need to be traceable to remove produce from the supply chain that is either unsafe or potentially unsafe. To achieve this, produce needs to be identifiable, with information documented using a lot or batch identification system.

Beyond food safety, effective traceability systems can also serve as a value driver for the business. Clear identification and documentation of inputs and production practices help demonstrate product provenance, reinforce authenticity claims and support market access requirements. This can strengthen brand reputation, build consumer trust and create opportunities to differentiate in premium or export markets.

17.1 Product identification

To conduct an effective trace-back, businesses across the supply chain need to record essential product identification information including:

- growing location, crop type and variety
- inputs such as fertilisers, composts and chemicals
- operational records such as harvest date, picker or picking team, harvesting equipment, packaging and product labelling
- name, address and other contact details of suppliers and a description of products or inputs supplied
- name, address and other contact details of customers and a description of the product supplied to them
- date of transaction or delivery
- lot identification including date, batch number or other markings
- distribution records such as carton/crate labels and purchase/sales orders, ideally discrepancy between lot/batch/line quantity produced and the quantity supplied should be recorded
- produce identification systems may be paper based, electronic or online. Whatever system is used, stored data should be clear and easily retrieved if needed, such as during a recall.

A lot (batch/line) describes produce that has grouped characteristics and will be treated the same way in the event of a food safety issue. For example, a lot/batch may be:

- seeds/seedlings planted on a certain date in a specific location
- produce harvested on a certain date from a growing location that has had the same water, fertiliser and chemicals applied
- produce from a supplier that is treated with the same postharvest materials, exposed to the same packing line conditions and packed on a single date
- a consignment of produce assigned a lot number on arrival at a distribution facility.

Lot identification systems should be scaled to quantities of produce relevant to food safety risks and product characteristics. For example, the decision on the size of the lot is a commercial one because the lot size may depend on the size of the producer. For a smaller producer, an entire day's production could be considered a lot. For a large-scale producer, a lot could be equivalent to one hour's production.

17.1.1 Growing

A system for identification of growing sites should be established. Production data should include location and all crop input records (spray, fertiliser, water, soil tests, labour records) and all output records (picking team members, harvest time, product quality and quantity).

These records of the history of inputs, activities, team members and crop harvested at the site can then be linked to records of the purchase and management of farm inputs.

17.1.2 Harvest

The growing site and harvest date should be recorded for each batch, lot or line of harvested produce. Details of harvest labour should also be linked to the harvested produce. This allows traceability in the event of infectious diseases or other hygiene issues. This information can be recorded in a diary, harvest record or on a delivery docket.

Harvesting containers used to transport bulk quantities of product for packing should be part of the traceability system. This enables receival records of these bulk containers to be linked from the growing site to the packing site traceability system.

It is also considered good practice to record key details of mechanical harvesters used, especially where equipment is shared between different growers or sites. This includes identifying the harvester unit, operator and cleaning or sanitising history.

Recording this information can support investigations into physical or microbiological contamination and strengthen overall traceability.

17.1.3 Packing

The Australia New Zealand Food Standards Code Standard 1.2.1 [refer Appendix 2] requires all food packages to be labelled as a minimum with:

- name of the food
- lot identification including date, batch number or other markings
- name and physical address of the supplier
- advisory statements, warning statements and declarations
- storage conditions and directions for use (where applicable).

All packed produce should be labelled with a lot identification system on each pack (saleable or orderable unit). During distribution, packages may be separated from pallets and traceability lost if identification is only at the pallet level.

Data carriers such as barcoding systems are widely used by major retailers to support traceability. Traditional linear (1D) barcodes are used for fixed-weight items, while two-dimensional (2D) barcodes such as the GS1 DataMatrix are increasingly used for variable-weight or pre-packed fresh produce. The use of these systems improves accuracy and reduces the time required to conduct a recall or withdrawal. In some cases, this allows traceability down to individual units of produce.

Radio Frequency Identification (RFID) is used in some logistics and distribution applications but is not yet in widespread use for individual item identification at the retail level in fresh produce supply chains. For more information, refer to GS1 Australia or New Zealand.

Where a central packhouse consolidates product from multiple growers, each package should be traceable back to the individual grower. If grower-level traceability is not maintained, the aggregated product is treated as a single lot for the purposes of recall or withdrawal. This increases the business risk, as a recall may affect all produce from all contributing growers within that lot or batch. Choosing not to invest in systems that maintain grower-level identification is a risk-based decision. While it may reduce operational complexity, it significantly widens the potential scope and cost of a recall.

Depending on the destination of the packed produce, there may be additional regulatory and customer specific product identification and labelling requirements. If exporting goods, then the importing country requirements should be considered when designing labels.

A documented procedure should be established to verify that all packaging and labelling materials comply with the Australia New Zealand Food Standards Code (Standard 1.2.1) and customer requirements. Packaging, labelling and date coding should be checked for accuracy and legibility at the start and end of each production run, as well as whenever packaging is replenished. Checks should be undertaken when packing resumes after downtime on the product line. Records of packaging and labelling checks should be maintained, including a copy of the actual label being applied. Only the packaging and labelling specific to the product being packed should be made available for use at the time of packing and should be clearly identified. At the end of a production run, the production line should be fully cleared of label and packaging material. Unused packaging should be fully covered when returned to the storage location.

Vision inspection systems, such as cameras, may be installed on packaging lines to verify that labels, barcodes and date codes are correct, legible and aligned with product specifications. These systems are designed to detect incorrect, missing or illegible labels and can trigger a rejection mechanism when required. Verification checks should be routinely monitored and maintained to ensure ongoing accuracy and compliance.

17.1.4 Distribution

Distribution businesses may use a variety of systems to identify and track fresh produce. Produce is usually tracked by applying system-generated lot/item numbers and labels to pallets on first arrival into the business. Produce identification and traceability systems used by distribution businesses should record:

- name, address and other contact details of suppliers and a description of products or inputs supplied by them
- name, address and other contact details of customers and a description of the product supplied to them
- date of transaction or delivery
- lot identification (e.g. item number or other markings)
- volume or quantity of product supplied or received
- other relevant distribution records.

New, increasingly sophisticated, systems are now available. These will allow increased amounts of information to be recorded and tracked for individual products as they continue through distribution. Where systems differ between supply chain partners, GS1 standards support consistent data exchange to maintain traceability integrity.

The use of GS1 global data standards allows for greater integration along the supply chain with the information flowing alongside the product. It also allows for interoperability between system and external traceability.

Produce should be identifiable and traceable through the supply chain from grower to retailer.

17.2 Traceability

Traceability enables product history to be verified from retail back to growing location and from growing location forward to retail. Traceability requires that each business in the supply chain to record sufficient and accurate product identification information (Figure C17:1). At a minimum the Australian New Zealand Food Standards Code requires each business in the supply chain should be able to trace food sold one step forward and one step backward in the supply chain. Good practice is increasingly shifting towards full-chain traceability for example from seed to shelf.

Fast and accurate traceability systems allow the business to determine the size of the issue they are facing and help reduce the number of people affected by an outbreak of foodborne illness or other food safety hazard. This reduces risk to public health and minimises disruption of trade and the commercial impact of a recall.

A system for quickly retrieving product and location identification records, should be developed by each business. These records will also help investigators identify the cause of the food safety incident and the corrective actions needed to prevent it continuing or recurring [refer Appendix 1].

Appendix 2 Food safety regulations and assurance programmes further outlines traceability requirements in the Food Standards Code. Good agricultural practice also includes traceability of potentially hazardous inputs to production for example agrichemicals and soil amendments, to a lot/batch/line of produce.

Traceability systems used by growers, packers and distributors range from paper-based records and receipts through to advanced business control software (e.g. Enterprise Resource Planning (ERP) software). Such systems are increasingly utilised by packers and distributors in the fresh produce industry, making product traceability increasingly fast and accurate.

Speed is essential in the event of a product recall, as consumer safety is at stake [refer Chapter 19]. Major retailers require their suppliers to provide identification of all products affected by a recall within two hours of the supplier becoming aware their product is affected by the recall.

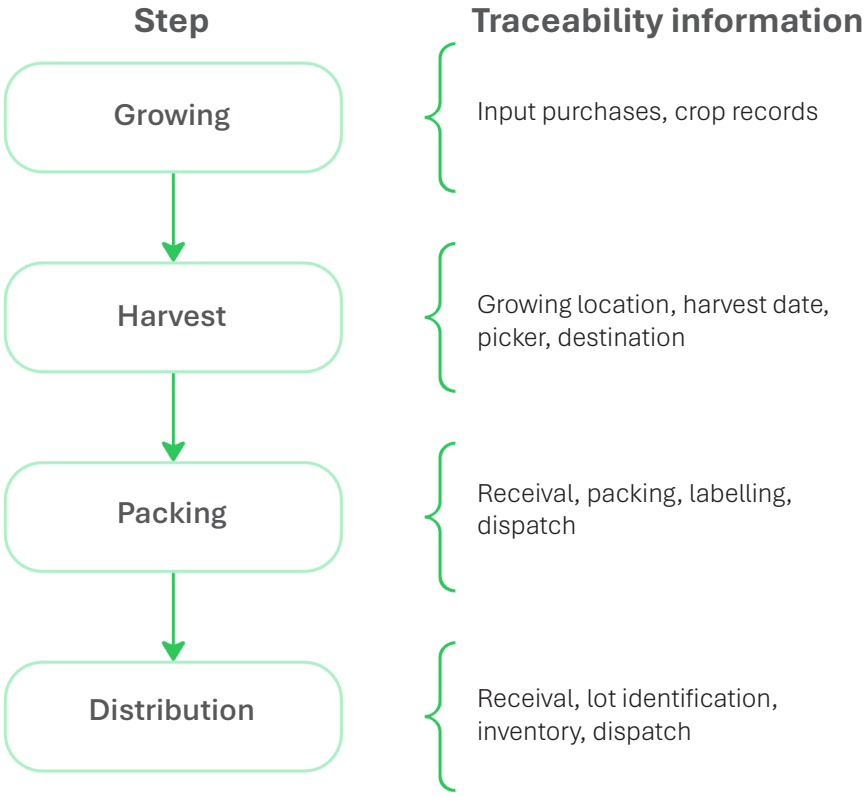

Figure C17:1 | Traceability information needed at different steps in the supply chain.

Other innovations in produce labelling that are assisting with the speed of recall include:

- global trade item number (GTIN) – a unique product identifier assigned to all items traded in the supply chain: it links to master data such as variety, pack size, unit of measure, brand and/or origin and the GTIN forms the foundation for barcode labelling and traceability
- GS1 Databar – a barcode format used on individual loose produce, applied via 'price look up' (PLU) stickers: it encodes the GTIN and enables item-level traceability even when no packaging is present.
- GS1 DataMatrix – a two-dimensional barcode used on pre-packaged produce: it can carry additional information such as lot numbers and use-by dates alongside the GTIN; supporting faster and more precise recalls and the DataMatrix can be printed directly on packaging or on applied labels.

Example:

- a loose apple sold by weight at retail may have a small PLU sticker with a GS1 DataBar encoding the GTIN
- a bag of salad leaves may have a printed GS1 DataMatrix on the label or pack, including the GTIN, lot number, and use-by date.

These formats help identify specific items during a product recall and enable more efficient traceability across the supply chain.

Image C17.1 | Individual loose apples sold by weight or quantity may carry a small PLU sticker containing a GS1 DataBar, enabling identification through the Global Trade Item Number (GTIN) for improved traceability at retail.

Image C17.2 | A bag of salad leaves may have a printed GS1 DataMatrix on the label or pack, including the GTIN, lot number and use-by date.

Image C17.3 | Crate labels often include a GS1-128 barcode that encodes the GTIN, enabling product identification and traceability through the supply chain from packhouse to retail.

Image C17.4 | An RFID chip embedded beneath the label allows wireless tracking of the bin through harvest, transport and packing, enhancing efficiency and traceability across the supply chain.

17.3 Good practice for identification and traceability

Table C17:1 | Summary of good practices for identification and traceability.

Management area	Good practices
Crop production and harvest	The location of growing sites is identified on a property map or equivalent. A record of all harvested produce is kept which includes: • business name • crop/variety • growing site • harvest date • harvest labour • destination. Harvested produce sent to another business for packing or further processing is clearly identified with supplier name and harvest/delivery date.
Post-harvest	All packed produce sent to a customer is marked with: • business name and physical address of supplier/packer • packing date and/or batch identification code • any other legal requirements. A record of all distributed produce is kept which includes: • name, address and other contact details of suppliers and a description of products or inputs supplied • name, address and other contact details of customers and a description of the produce supplied to them • date of transaction or delivery • lot identification (e.g. item number or other markings) • volume or quantity of product supplied or received • other relevant distribution records and legal requirements.

Resources

Food Standards Australia New Zealand (FSANZ) (2024). *Safe Horticulture Australia: A guide to the Primary Production and Processing for Horticulture*, 1st ed. Canberra: FSANZ.

Food Standards Australia New Zealand (FSANZ) (2015). *Australia New Zealand Food Standards Code – Standard 1.2.1: Requirements to have labels or otherwise provide information*.

GS1 (2024). *Fresh Fruit and Vegetable Traceability Guideline*.