

Fruit or vegetable postharvest value chain assessment method

from harvest until packing



Introduction

In order to find gaps and develop improved operational procedures focussed on food loss reduction or quality improvement, current harvest- and handling procedures must be observed and described (audited)

There are several steps in the process of product handling and several points of attention that include temperature- and RH management, material use, time management and others.

Next a guideline is presented on how to conduct such an assessment as a basis and what issues need attention. Depending on the product or production method, additional observations are likely to occur and complete the basis format.

Focus issues farm / collection

1. Harvest
2. Field crates
3. Pre-sorting
4. MRLs / food safety
5. Collection Centre handling and registration
6. Pallets
7. Quality inspection
8. Loading trucks

Focus issues packhouse

- 8. Unloading trucks
- 9. Cardboard boxes
- 10. Presentation
- 11. RH management
- 12. Temperature management
- 13. Knowledge
- 14. Company Policy/ export

Farm and Collection

Harvest observations Describe and make photographs!

- How is fruit/ vegetable picked? (hand, knife, cutter, picking pole, other) + hour of the day (register harvest start- and end time) and weather conditions (T, RH, rain, fog). Hygiene! Toilet and hand washing facilities.
- Place a T/RH data logger with the harvested produce in a field crate to retrieve later (Mark it with a ribbon to be able to find it back)
- Is desapping- or any other specific product handling (e.g., packing in the field) done right after harvest? How?
- Is all product harvested or specific maturity stage only? Describe the maturity indices used for harvest! pickers aware? Have they been trained or instructed on this?
- What means are used for bringing harvested products to the field edge? (bucket, bag, harvest sack, trolley, rail, wheelbarrow, other)
- Is harvest efficient in terms of walking distance, field crate availability, size of trees/ plants, use of ladders etc.?
- Is fruit being thrown? Do pickers wear gloves or protective clothing?
- How many staff participates in harvest? How many kg is harvested in how much time?



Pre-sorting

Describe and make photographs!

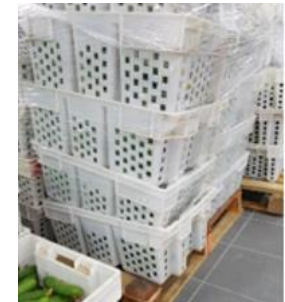
- Does pre-sorting take place during or directly after harvest? During the picking or at field edge?
- Is being (re)packed in field crates, cardboard boxes, other?
- Is pre-sorting done in the shade? (register ambient T and RH and register fruit pulp T)
- Are products poured on a heap? Do (skin/ abrasive) damages occur due to this?
- On soil? Cloth? Table? Other?
- How many staff participates in pre-sorting? How many kg is harvested in how much time?



Field crates or bins

Describe and make photographs!

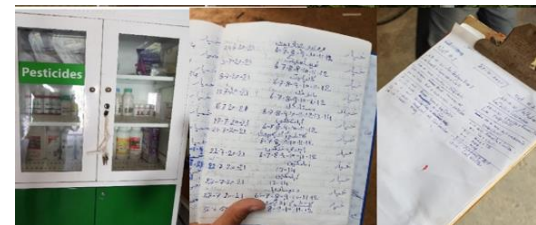
- Is product packed in field crates or bins, bags or other at field edge? Size in cm or litre/kg!
- Are crates of correct type (smooth inner edges)?
- Are crates/bins damaged? Estimated % and type of damage!
- Are crates/bins clean?
- Are crates/bins overfilled? (produce touching next crate)
- Is cushioning material used at the bottom or during filling?
- Are crates/bins well stackable? Strong edges
- Are bags thrown or even stepped on?



MRLs / food safety

Describe and make photographs!

- Is the farm certified? (with certificate?)
- Is a registration of agrochemical use per crop, field, date available? And can it be shown?
- How are pesticides stored? Locked?
- Is manure on top of the soil visible (in field)
- Is manure spoilage present (from bags of manure heap?)
- Are fruits that fell to the ground put back in crates?
- Worker hygiene, toilet and hand washing facilities and use



Collection Centre handling and registration

- Describe and make photographs!

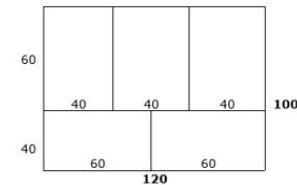
- Does the product pass through a collection centre?
- Describe the handling process, type of trucks, quantities per farmer
- Register waiting times for unloading? Is there shade for waiting trucks? Are time-slots for delivery in place?
- Weighing of supplied produce! Per pallet? Per crate? Efficiency? Register time needed for unloading, weighing and registration!
- Cooling or not? Ambient- and cold store temperature and RH registration!
- How are weight, quality types per farmer registered? On paper? Digital?
- Traceability: Electronically? QR- or bar code? Marking of crates/ bins or pallets?
- Register time of product arrival (range from until..) and dispatch?
- Drawing of building + product flow + crates/pallets flow



Pallets

- Describe and make photographs!

- Are pallets being used?
- One size pallets or different types? How many types and the dimensions of different pallet types!
- Do broken pallets occur? Are pallets being repaired?



Quality inspection

■ Describe and make photographs!

- Where does ownership of the produce change? (Does cooperative or trader buy from the farmer according to quantity and quality or does the farmer remain owner and is a logistical service being provided for a fee?)
- Where is product quality inspection being done? (size, damages, uniformity? Other) (Note that there are likely 2 quality inspections; 1 raw material receipt and 1 after packing, before dispatch)
- What Classification or parameters is quality inspection based on? Is a quality manual in writing available? Are farmers present to witness or are they allowed to check on inspection? (both, raw material as well as result of the grading and sorting?)
- MRL sampling and/or testing? When is this done? Before harvest? Prior to dispatch? By whom? Official laboratory? Private or state?
- What equipment is used for the quality inspection?

Loading trucks

- Describe and make photographs!

- Is cooled transport being used for transport from CC to packhouse? Or ambient temperature transport?
- Is product pre-cooled at CC or kept at ambient T? Measure product pulp temperature before loading.
- If from cold storage? Is loaded directly from cold store or via ambient loading platform?
- Status of the truck (damages)
- Register time of loading!
- Loading crate by crate by hand or using pallets? Any damage? (Throwing? walking on products? Using bags as stairs?)

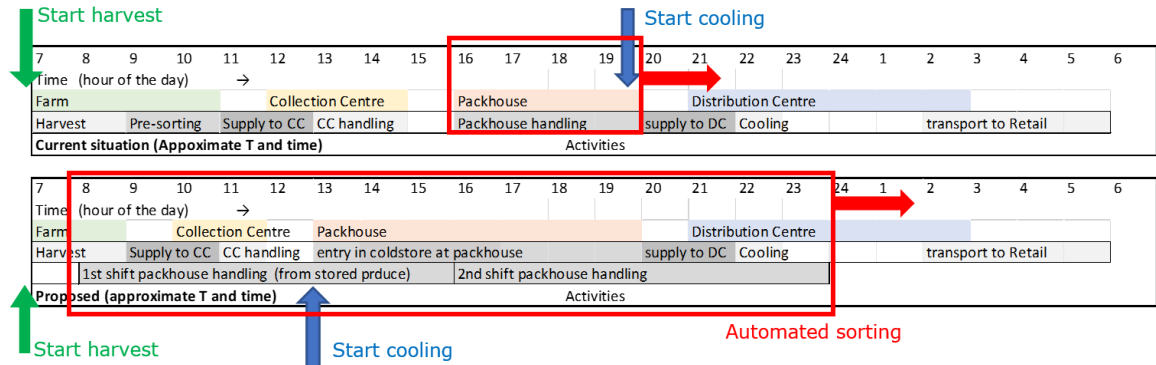


Packhouse

Unloading trucks

■ Describe and make photographs!

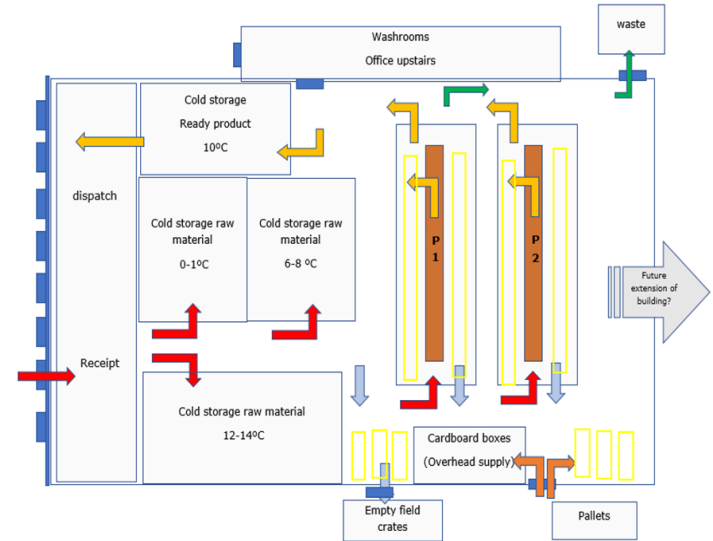
- Register waiting times for unloading? Is there shade for waiting trucks? Are time-slots for delivery in place
- Arrival time of produce at packhouse.
- Is packing done from stock or upon arrival? In other words, is produce being placed in cold storage upon arrival at the packhouse and being graded and packed after having cooled down? Or does produce move directly to grading and packing lines and is it being cooled after being packed?
- (start- and finish hour of workers' shift?)



General Packhouse

■ Describe and make photographs!

- Certification (HACCP, ISO22000, Other?)
- Drawing of the building and premises
- Product flow drawing
- Waste flow drawing
- Crates and boxes flow drawing
- Sanitary facilities
- Is grading and packing done manually or by machines or combined?
- Equipment and lines used. Capacity and all steps included in the line (grading, waxing etc.) and state of it (clean, broken)



Cardboard boxes

- Describe and make photographs!

- Type of box? All new boxes or also re-used?
- Strength? Stackability
- Location of ventilation holes. Top/bottom or sides or both?
- Does colour remain? Or contaminates products? (use wet finger to test!)



Presentation

- Describe and make photographs!

- How is presentation of the product that is ready to be shipped?
- Uniformity! (size, colour, stem length)
- Fitting in the box?



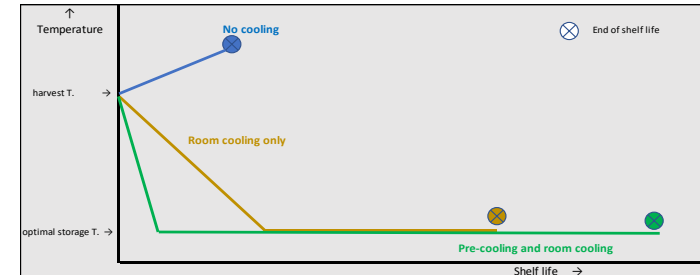
RH management

- Describe and make photographs!

- Measure Relative Humidity (RH) ambient already during harvest. Use RH data loggers to add to the field crate at harvest and to be retrieved just prior to dispatch. (It produces a chart indicating the RH in the product environment in time during the day (harvest, collection, packing, storage))
- Measure RH in cold storage
- Is a list available at the company indicating the required RH (for example on the cold storage door)
- Is there awareness with staff/ management regarding optimal RH requirement? Is it being measured?
- Are measures being taken to keep RH levels high? (e.g., use plastic cover sheets, wet cloth, moisturizers)?

Temperature management

- Measure Ambient Temperature
 - Register cold storage temperature
 - Use T-data loggers to add to the field crate at harvest and to be retrieved just prior to dispatch. (It produces a chart indicating the T in the product environment in time during the day (harvest, collection, pacing, storage) (This can be a combi-logger T and RH)
 - Is a list available at the company indicating the optimum storage T per product
 - What is the time between harvest and entering cold storage?
 - Time to reach optimal pulp temperature after entering cold storage?
 - Is pre-cooling being applied? (hydro?, forced air?, other?)
- Describe and make photographs!



Source: R. Oostewechel, WFR

Knowledge

- Are farmers and/or farm workers trained?
 - In product harvest moment (ripeness stage?)
 - In harvest method
 - In product handling after harvest
 - In food safety?
 - Other?
 - Is Packhouse staff trained? In what?
 - Are Hygienic protocols available and enforced?

Company Policy and marketing

- Is the packhouse/ exporter a trader or service provider or Cooperative?
- Is all produce from farmers taken or only export quality?
- Is product exported? If so, is there a long-term relation with foreign importer? (short value chain) or marketing via ad hoc sales?
- Is communication with importer or other buyers focussed on performance improvements and meeting expectations?
- Are there harvest peaks of the product leading to oversupply at times including low prices and unsold produce? When and how often? Estimated loss percentage.
- Are fields not harvested sometimes due to bad market perspectives (low prices) or lack of workers? How often?

Company Policy and marketing

- Describe and make photographs!

- Does medium-term storage (2 weeks to 3 months) take place of produce to avoid being forced to market during harvest season and spread supply
- What kind of storage facility? Describe type, dimensions and capacity
- Loss percentage per period of ... weeks?
- Are any measures applied to prolong the season (e.g. irrigation, plastic cover?)
- Are varieties planted according to different market requirements (e.g. industry, export, local market)?

Additional issues / export

If product is currently exported:

- Current export destinations (sea, air) and transit times
- Current transit settings (T, RH, Ventilation)
- Fobbing handling time in harbour
- Current level of complaints and their causes

Any additional issues that are product/ cultivation / market specific and may influence food loss