

**Workflow: Production – Basic Farming Practices****Toolkit 3.6**  
**Plant Manipulation and Fruit Set****target audience**

Farm owners, managers, and supervisors.

**what it is**

Plant manipulation is the skilful management or treatment of plants to derive a specific outcome.

Citrus is sold to overseas consumers through fresh fruit exports, local supermarkets, hawkers, juice manufacturers, and processors. Each of these markets has their own requirements in terms of the external and internal quality of the fruit. The highest income is from fresh fruit exports.

What fruit would a discerning overseas buyer prefer? It has been found that overseas consumers prefer fruit that is large, orange-red in colour, unblemished, sweet, and easy to peel. If you want to sell your product at a good price, you must meet consumers' preference.

A fruit tree will not necessarily naturally produce fruit that complies with these requirements. Plant manipulation methods contribute to producing a marketable product at an acceptable price.

**why it is important**

Fruit and tree manipulation is a vital practice to ensure that you optimise your yield of large, tasty, and healthy fruit with good rind integrity (no creasing).

Manipulation is a multifaceted practice that includes many techniques such as pruning, skirting, girdling, manual fruit thinning, chemical plant manipulation, fruit set improvement, flower manipulation, fruit size enlargement, and delaying harvesting.

Correct pruning is important because it ensures higher export packout percentages, more efficient pest and disease control, better fruit quality and colour, better rind integrity, lower picking costs, and greater production efficiency such as agrochemical application.

The mastery of these practices is important if you intend competing in a highly demanding export market.

**success factors**

The key success factors are as follows:

- Overall Knowledge of Stages and Annual Phenology of Citrus Trees

- This includes the physiology of the plant, flower formation, flower drop, physiological drop stage etc., and how and when plant manipulation techniques can be exercised.
- Knowledge of each Cultivar and their Specific Characteristics
- Each cultivar has its own characteristics and natural traits, such as a predisposition to alternate bearing. Know what each cultivar requires and will allow for desirable production.
- Knowledge and Established Practice of each Method of Manipulation
- The farmer should be familiar with each manipulation method, the desired outcome, and the detailed practice (when and how) appropriate for each cultivar on the farm. For each you should have clearly written SOPs enabling you to set and control the standard. These techniques include:
  - Pruning
  - Skirting
  - Girdling
  - Manual fruit thinning
  - Chemical plant manipulation
  - Fruit set improvement
  - Flower manipulation
  - Fruit size enlargement
  - Delaying harvesting
- Pruning
  - Pruning assists in helping trees to reach their full production potential (Refer to the audio video resource “Plant functions and structures” for more information), by ensuring that the mechanisms that ensure proper nutrient flow, metabolic processes, transpiration and respiration rates, and photosynthesis are all working properly. In short, pruning ensures adequate light for optimal photosynthesis, and thus promotes the resultant leaf, flower, and fruit growth.
  - Each cultivar has its own characteristics which, together with prevailing climatic and regional conditions, will determines the pruning strategy.
  - Correct pruning equipment.
  - Removing dead wood to reduce wind damage to fruit and plays host to pathogens.
  - Using the most optimal pruning method. Generally, mechanical pruning is not advisable as it is not very discerning. Manual pruning is more selective but requires more labour.
  - Using pruning to break alternate bearing cycles.
  - Optimal pruning timing and scheduling.
- Training – The correct execution of each method and technique is critical. You cannot reverse this if done incorrectly and that could have serious consequences, both for the tree and for your pocket. Training supported by well formulated SOPs (whether verbal or pictorial) can ensure correctness and consistency. Both general and one-point-lesson training are important.
- Recordkeeping – A fundamental principle of continuous improvement is to establish the relationship between practice and performance. Is what you are doing (practice) producing the desired result (performance)? You can only do this if you keep records of both in a consistent and comparable way. Each season you should have records of exactly what manipulation

intervention you implemented, as well as where and when it was implemented (practice), and then a meticulous record of the result (performance – yield, fruit size, fruit colour, comparison to your desired optimal target etc.). You should be able to go back many seasons, understand the trends, learn from mistakes, and thereby drive improvement and best results.

- External Benchmarking – The above recordkeeping becomes your internal benchmark (comparing season to season and orchard to orchard). The next step is to expose yourself to external comparison. What is the best performance in the industry? What is the best performance in your region? How do you compare with your neighbours?
- Observation – Farming is not a matter of mechanics. It is dynamic, organic, and subject to ever changing variables (weather, rainfall, regional pest risks, wind, etc.). You must understand both the techniques and the context. Observation is a key success factor (refer to the Gemba Walks Toolkit) when you bring your experience to bear, where you should carefully assess an action (practice) and its consequences (result), where you coach and guide your team, and where you touch, sense, and “smell” your trees.

## execution steps

See success factors above.

## assessment questions

**Please Note:** There is no minimum / maximum amount of questions you can add

1.	Do you have adequate knowledge of the stages and annual phenology of citrus?
2.	Do you have detailed knowledge of the specific characteristics of your farm’s cultivars?
3.	Do you have knowledge and experience of the various crop and flower manipulations methods that you could apply to your orchards?
4.	Do you fully understand the outcomes you wish to achieve and how to achieve them?
5.	Do you have clearly defined SOPs regarding pruning?
6.	Do you have trained employees, experienced in crop and flower manipulation?
7.	Do you have the necessary equipment, and is it organised (5S) and in good working order?
8.	Do you keep meticulous records (season by season), recording both the intervention and the results?
9.	Do you compare both practice and results with your neighbours, the region, and the industry?

## resources

1.	CRI Production Guidelines Volume II: Chapter 5 – Crop Manipulation
2.	Citrus Academy AV module – Plant Structures and Functions
3.	Citrus Academy AV module – Pruning Principles
4.	Citrus Academy AV module – Pruning Equipment

5.	Citrus Academy AV module – Pruning Practices
6.	Citrus Academy production learning material – Plant Structures and Functions
7.	Citrus Academy production learning material – Plant Manipulation