



# **Farm Management**

## **Handout 4**

### **Production Management Planning and Scheduling**



# PRODUCTION MANAGEMENT

## PLANNING

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## Planning

### 1. Different Levels of Planning

Planning can be defined as developing an approach to achieve goals set at various levels. The level of planning can therefore be said to be determined by the level of goal-setting.

The executive boards of corporations, companies and institutions are responsible for setting the strategic goals for the institution. Strategic goals are concerned with achieving such parameters as growth, development and positive shareholder returns. By their very nature, such overarching goals are endorsed at the highest level and tend to span long time periods.

Attaining strategic goals depends on sound planning at the various levels in the organisation, starting with senior management.

Large multinational fruit producers and exporters, such as Del Monte, Unifrutti and Fyffes, plan new production, export and marketing ventures on a global level. This means that planning for these aspects are done across countries and continents. In each of the locations in which operations are set up, plans are made to meet the specific objectives set by their respective parent companies.

On a single citrus farm a similar process is followed, only at a different level. The production plan ranks alongside the financial plan and the marketing plan as an essential contributor to attaining the overall strategic plan for the farm.

The production plan comprises any number of component actions, each of which will have an objective, which can be measured, and a plan for carrying it out.

A typical production plan comprises, for example, the following:

- A pest and disease control plan
- A fertiliser and irrigation application plan
- An estate production expansion plan
- An orchard or tree replacement plan
- A new area extension plan
- A nursery tree order plan
- A fruit maturity indexing plan
- A harvesting plan

Each of these components is further broken down into actions and tasks, each to be completed within an allotted timeframe with accountabilities allocated to specific groups and their supervisors.

For example, the pest and disease control plan will typically list the following:

- Stated objectives, for example that the proportion of fruit rendered unmarketable due to pest and disease factors should not exceed 15%.
- The list of pests and diseases that have to be controlled and the advised control measures
- The start date for pest and disease monitoring, the monitoring methods and threshold levels.
- The control actions that can be done in at the same time.
- The tasks which require completion before others can start.
- The personnel and other resources required and available to complete the control program.
- The calibration and testing of equipment.
- The ordering of required control chemicals

Similarly, the estate production expansion plan would be based on the production goals as determined by the management team of the enterprise. Taking projected production levels of existing plantings into account, the expansion plan would indicate the number of hectares or trees required to be planted over a given time period to ensure that the production objectives can be achieved.

## 2. Enterprise and Product Options

The type and cultivar of citrus that a farm produces has a major influence on almost every component of the production plan. The question: “What crop type to produce?” is therefore fundamental for every citrus farm, and is best answered by analysing both marketing and production considerations.

Product is the first of one of the famous 4 Ps of Marketing (people, place, product, price). Working back from the market, the critical question for determining the appropriate enterprise or product to pursue is “What can I produce that the market will especially want?”

The first part of the question – “What can I produce...” – is concerned with the climatic and fixed resource capacity of the farm. The second part, being “...that the market will especially want”, concerns market opportunity. The key to deciding what crop type and what products to grow lies in finding the best match between these two aspects.

Example:

<b>Market Opportunity versus Production Potential</b>			
<b>Variety Options</b>	<b>Key Considerations</b>		<b>Sum of Ratings</b>
	<b>Market Opportunity</b>	<b>Production Potential</b>	
Grapefruit	1	1	2
Seedy Mandarins	1	2	3
Naval Oranges	2	2	4
Valencia Oranges	1	4	5
Lemons	2	4	6
Clementines	4	3	7
Seedless Late Mandarins	4	4	8

The example shows that under these specific circumstances, grapefruit is the least attractive and seedless late clementines the most attractive of the available varieties to plant. The example however just illustrates the point and, in reality, much would depend on the criteria used for ranking the Market Opportunity and Production Potential factors. For example, there may be good reasons to include the planting a variety with a ranking of only 5, such as valencias oranges, to lengthen the overall harvest period and thus make more efficient use of labour and packhouse facilities.

### 3. Factors Influencing Planning

Plans are generally produced on the basis of current and expected circumstances, or assumptions. If these change, the plan has to be adapted accordingly. Plans and the process of planning therefore have to be flexible, allowing changing circumstances to guide their relevance and validity.

For example, the pest and disease control plan will have to be adapted if a ban is placed on the use of one of the key chemical products intended for use. Similarly, the plan would have to be changed if a new destructive pest or disease is discovered in the orchard.

Other factors which influence the planning process include:

- New legislation;
- Labour disputes;
- Resource availability;
- Market circumstances; and
- Financial viability

### 4. Income, Expenditure, Costing and Budgeting

<b><u>Budgeting</u></b> Budgeting is the process that provides a detailed breakdown of what is planned to be spent and earned for each item of income and expenditure by month for the financial year.
<b><u>Income</u></b> Income is money generated from the sale of the product and may include other minor sources, such as interest received.
<b><u>Expenditure</u></b> Expenditure is the cost associated with generating the income and supporting the business over the longer term.
<b><u>Costing</u></b> Costing is a process for determining the actual cost of producing a particular product or providing a particular service.

We have learned that sound planning is a prerequisite for a successful and sustainable citrus production enterprise. We have also seen that one of the key objectives of any business is for it to be financially viable. The company's financial plan brings these two concepts, namely planning and financial viability, together

Financial viability simply means that the business must have sufficient cash in the bank to pay for the costs of running it and that the value of the business should increase over a period of time. For this

to happen, the amount of money generated from the sale of the products must exceed the costs of production and part of this excess, or profit, must go towards maintaining, improving and expanding the business.

The enterprise's budget is the financial expression of the enterprise's strategic plan. Similarly, its production budget is the financial expression of the production plan.

There are many places in the citrus production and marketing process where the actual costs associated with a particular item or action cannot be easily quantified. This is because it is often convenient and cost-effective to simply use the average costs over a number of items or over an extended time period. However, if this inaccuracy leads to a situation where, for example, it is not possible to assess the relative profitability of one variety compared to another with sufficient accuracy, it would be necessary to resort to such methods as, for example:

- Intuition or educated guessing, with its obvious limitations.
- Traditional cost accounting, which in itself may prove insufficiently accurate.
- Activity-based cost accounting, where costs are allocated to specific activities.

## Scheduling

### 1. Explaining Scheduling

In simple terms, scheduling involves deciding in advance when work will be performed. Planning determines what needs to be done. Scheduling puts the planned actions to a timeframe, indicating when a task has to be performed or completed. It is an essential tool for managing and implementing processes and actions such as fertilisation, irrigation, and pest and disease control. It is also used to formalise the sequence of events that need to take place for the execution of a project or program.

However, the scheduling process is not only about what will be done when. It also involves aspects such as:

- Who will perform the work
- Where will the work be performed
- What resources are required
- How will progress be measured against the scheduled work
- How will progress be reported on

Scheduling can be used as the basis for both the management of a specific project, such as the establishment of a new citrus orchard, or to enable a repetitive action, such as irrigation, to be carried out effectively. In both cases the design and implementation of schedules may involve individuals from different parts of the operation.

Example:

On a large citrus estate deciding on the ideal irrigation schedule could require inputs from:

- The horticulturist, to indicate the water requirements of the specific planting.
- The soils and fertilisation expert, to indicate the physical and chemical features of the soil and thus the advisable range of water application rates
- The irrigation engineer, to indicate the capability and capacity of the system to deliver the desired water application rates.

Similarly an effective pest and disease control program would require agreement from various specialists and managers regarding the operations required, by when and by whom. The output of such a schedule would be the required tasks listed in sequence and set to specific dates. Thus irrigation regimes, pest and disease control programs, and manufacturing projects all have one important thing in common: the need for scheduling.

The agreed schedule, including details of what, when, how and where, has to be communicated clearly and concisely to all those concerned in its management and implementation. This is formalised using an appropriate scheduling technique.

## **2. Different Scheduling Techniques**

A scheduling technique is a tool used to facilitate the scheduling process. Most recognised and frequently used scheduling techniques have their origins in the manufacturing and logistics industries. Whenever projects are undertaken, for example to investigate and produce a report, install a system, manufacture or assemble products, or move them from one place to the next, a clear step-by-step process needs to be designed, communicated and executed.

Depending on specific needs and circumstances, the manager selects the most appropriate scheduling technique for a particular project. Before selecting the scheduling tool, the project's information must be assembled in a certain way. The required information includes:

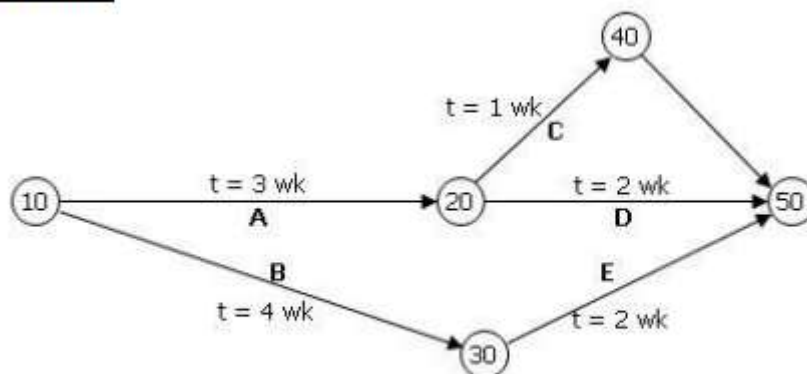
- The project start date
- The completion date
- The scope of the project, meaning what it includes and excludes
- The tasks, in the order in which they might be accomplished, by project phase
- An estimate of the personnel required and available for the project
- The interim milestones or interim deadline dates set for the project; and
- The project control or review points

The project manager would then decide which scheduling technique to use. There are a few to choose from, of which the most common are the following:

- **Flow charts** or **process charts** can be used, but do not normally include a timeframe and are thus not truly schedules
- **Milestone charts** are used to determine the overall status of each major project. It is however not a good schedule methodology for day-to-day monitoring of work effort at the detail level
- On **Critical Path Method (CPM) charts** the critical path, representing the key activity, is drawn along a timeline with the tasks associated with it indicated alongside
- **Programme Evaluation and Review Technique (PERT)** charts are used for complex projects requiring a series of activities, some of which must be performed in order and others at the same time. PERT charts are normally drawn on ruled paper with the horizontal axis indicating time period divisions. Each arrow, or diagonal, represents an activity that has to take place, or links to another activity that has to take place, to accomplish the end goal.

Example:

**PERT Chart**



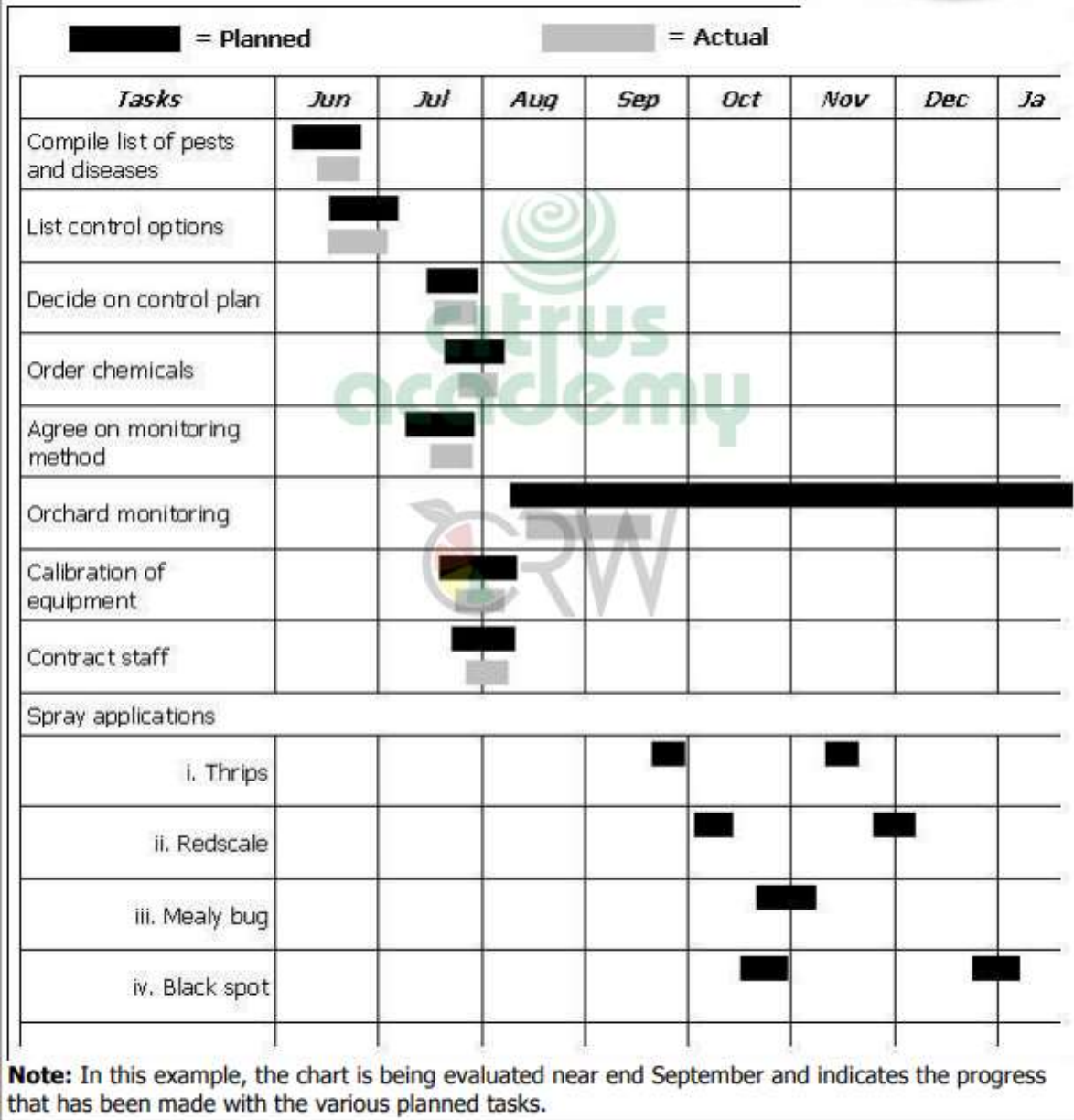
- The milestones are numbered **10, 20, 30**, etc.
- **t** denotes time in weeks for each activity
- **A, B, C**, etc. denote activities

- **Gantt charts** are bar graphs that help plan and monitor project development and resource allocation on a horizontal time scale. An example of a simple Gantt chart for pest and disease control is shown in the example below. Gantt charts can also be used to indicate:
  - The relationship between tasks planned and actual completion dates
  - The cost of each task
  - The person(s) responsible for each task
  - The milestones in a projects development





**Gantt Charts**



The production manager’s task is to consider the overall production plan and, where necessary through using such tools as Gantt charts, ensure that the allocation of resources and the implementation of the plan occurs effectively (that the right things are done), efficiently (that the things are done right), and on time.

### **3. Forward and Backward Scheduling**

Schedules can be created in two ways, being forward and backward scheduling.

Forward scheduling calculates schedules forward from today to project the completion date. For example, if a citrus packhouse is to be built during the off-season, it may be appropriate to start at today's date and plan each activity on a process chart. Having done this, and having put realistic deadline dates to each activity, it would then be possible to project the completion date.

Backward scheduling calculates job and event schedules back from the due date to project the start date. This is commonly used when the due date is critical, such as when a spray treatment has to be completed by a certain date to comply with harvest interval requirements. In this case the completion dates for the various actions required for the sprays to have been applied by the final date, will be scheduled accordingly.

### **4. Control Over Schedules**

A schedule is a living document that belongs to all who participate in its compilation and its implementation. This means that it should be displayed in a prominent place, feature as an agenda point at operational meetings, and be referred to constantly.

On a regular basis the schedule must be reviewed and evaluated and if necessary adjusted to take account of changing circumstances. The various scheduling techniques provide for this process of review and adaptation.