Paddock Preparation and Layout

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Introduction

Paddock preparation and layout is important for a successful papaya crop. This will need to be considered before planting a block.

There are some important things to consider before preparing papaya block:

1. Safe all-weather roads: Roads are important for being able ot access blocks all year round. If roads are prone to washing out and potholes this will put the fruit at risk as it is transported back to the shed for packing.
2. Erosion control and drainage structures
3. Row direction to suit runoff control and drainage
4. Efficient irrigation design
5. Windbreaks: Papaya, particularly in their fruiting stage are fairly unstable and are prone to rolling out. High wind can exacerbate this as well as cause marking to the fruit.
6. Soil pH and other nutritional considerations.

Paddock Layout

The paddock layout should address several issues including disease development and erosion control. Soil erosion can be a significant issue in papaya plantations on steep slopes, poor and sandy soils and high rainfall regions. Paddock erosion will remove the topsoil and nutrients unless effective runoff strategies are in place. Papaya is also highly susceptible to Phytophthora fruit, root and stem rot (Phytophthora palmivora). This is a disease which can be exacerbated by very poor draining soils and poorly planned blocks.

The paddock plan should minimise erosion while ensuring block dries while free water is not sitting, increasing the chance of phytophthora.

There are four main structures that are important in a successful papaya block:

- Diversion banks
- Mounds
- Grassed waterways
- Access roads

Diversion Banks

Diversion banks or drains prevent runoff water from entering from outside the papaya block. They are often built directly above the plantation to divert excess runoff into a stable watercourse or a grassed waterway.

Mounds

Mounds allow the soil around the root system of the papaya plant to dry more quickly. This will help to prevent disease by ensuring that the root system is not allowed to be too wet for too long. It also ensure that if the paddock is in a low lying around and the water table rises or the paddock does not drain quickly that the plants do not become waterlogged. While this is an advantage during the wet season, it may mean that more care is needed during the dry season to ensure plants do not dry out.

In trials conducted in the wet tropics, single row mounded beds were shown to give the best results. Recently some growers using mounds have had mixed results and, in some cases, quite severe losses due to root rot. Recent trials work has again shown the importance of mound shape in water removal and in reducing losses from root rot. The below diagram shows common bed shapes observed in commercial papaya production with comments on their effectiveness. Included is a diagram of water removal from the block which is another important factor.

Correct Mound Shape

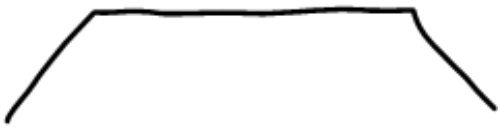
This mound shape is the best for shedding excess water from the mound whilst still providing a reasonable bed for the papaya plants to grower and fruit. To be avoided in hollowing of the mound as shown by the dotted line as this will be a collecting basin for excess water.

Mound Too Low

The shape of this mound is too low and rounded which slows the water shed from the mound and allows water to settle when large downfalls of rain occur. The depth of the soil is reduced, and the mound will remain saturated for longer. Mounds of this shape that haven't been planted can be reshaped using rice hillers or disk implements. This shape will eventually erode into a flat bed.

Single Bed Flat Top

This is the most common for single rows observed for North Queensland. While it does provide some degree of moisture removal, in times of high rainfall the beds can become hollowed (as indicated by the dotted line), retaining excess water. Compaction on the sides of the bed restricts drainage and should be avoided.



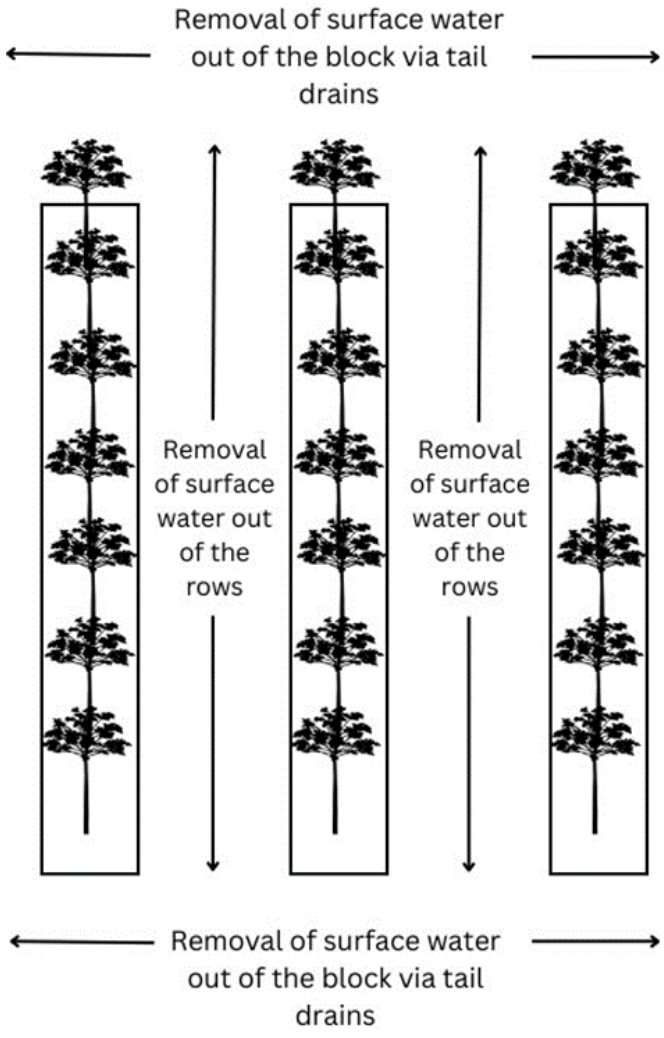
Double Row Flat Top

This is still the most common row and mound type used in Queensland papaya production. This shape can retain large amounts of moisture and promote root rot. Although a high plant density is attained, aspects such as correct spray application and control of leaf diseases will be more difficult.

Grassed interrows and waterways

Erosion can be a significant issue in papaya production in North Queensland. One of the approaches used to prevent erosion is grassed waterway and interrows. In the wet tropics, particularly in a well-designed block that removes water from the block quickly, such as in the diagram below, the flow of water can remove topsoil from the block, which can become a production penalty.

One of the approaches used to prevent erosion is the grassing of interrows and drains. This will also improve infiltration and accessibility during the wet season.



Other Considerations

- Land with slopes greater than 15% are generally considered too steep for papaya production because of the difficulty in constructing, maintaining, and working soil conservation layers
- Soil type has a big influence on the water infiltration and the disease risk of the block. Some soils are considered unsuitable for papaya production