Project Summary

Improving the capacity of primary industries to withstand cyclonic winds

Objective

To identify production practices or technologies that primary producers can use to minimise the damage cyclonic winds cause to their businesses.

Background

Cyclones across northern Australia have caused hundreds of millions of dollars’ worth of damage to tropical primary industries over the past several decades. Industries affected include tropical tree crops, forestry and animal-based industries. With the threat of increasing cyclonic activity as a result of climate change, the economic sustainability, employment opportunities and rural communities supported these primary industries may be under threat without changes to production practices.

Research

Strategies being used by various industries to reduce the damage caused by cyclonic winds were identified and research trials undertaken to develop new production practices and technologies that could further minimise the damage caused by cyclonic winds.

Trellis production has shown promising results in terms of cyclone protection for tropical tree crops. Trials were established to assess the suitability and productivity of a broad range of tropical tree crops grown on different trellis systems. Information was used to make an economic assessment of trellis versus conventional production with and without the risk of being impacted by cyclones.

Nursery trials were conducted to develop rapid propagation methods for a range of tropical tree crops and to produce nursery planting material better able to resist uprooting. Defoliation trials on a range of fruit and forestry trees were conducted to determine if defoliation could be used to reduce the forces on a tree’s canopy to reduce the damage caused by cyclonic winds.

A list of wind resistant tree and shrub species suitable for establishing windbreaks in cyclone prone regions was developed as well as identifying the important characteristics in designing an effective windbreak.

The project also assessed the range of insurance products available for primary industries and their suitability for covering cyclone damage; and a survey of primary producers’ insurance knowledge and needs.

Nursery trials indicate the susceptibility to uprooting of newly established fruit trees can be reduced by establishing nursery plants in pots with a good depth/diameter ratio, anti-spiralling and root pruning features.

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Outcomes

This research has identified a range of production practices and technologies that can be implemented by producers to minimise the damage caused by cyclonic winds to their farming enterprises.

The trellis trials indicate many tropical fruit tree species ranging in vigour, flowering habit and size are able to be grown on trellises. Management guidelines on training, pruning, plant spacing and trellis specifications for a range of crops has been developed.

The economic analysis found that the high early yields and improved fruit quality justifies the high capital costs and labour requirements for plant establishment for a range of crops. The economics of trellising is further bolstered when the risk of cyclones is taken into account. The findings suggest that trellising could provide a solution to growing a productive, economically sustainable tropical fruit industry in cyclone prone areas of northern Australia and other regions of the world.

An economic decision tool (which is for download from the DAF website) allows producers to determine if trellising is economic in their circumstances.

Nursery trials indicate establishing nursery plants in pots with a good depth/diameter ratio, anti-spiralling and root pruning features can reduce the susceptibility of newly established fruit trees to uprooting. Propagation trials identified methods to rapidly and cheaply propagate a number of tropical fruit species using cuttings. This will aid the re-establishment of these industries following cyclone damage by improving the availability and reducing the cost of planting material.

Where trellising is not being used (e.g. existing orchards, forestry plantations), defoliating trees was found to be an effective technique to reduce the wind forces on a trees canopy by up to 90%, protecting them from cyclone damage. An ethrel urea mix was effective at causing defoliation in the short time frame required prior to the impact from a cyclone. A paint, lime and water mix applied after defoliation prevented sunburn. For the species where chemical defoliation doesn't work, mechanical pruning could achieve a similar outcome. Following defoliation, trees recovered to full production within two to three years.

A list of wind resistant trees and shrubs suitable for establishing a windbreak, with information on designing an effective windbreak in a cyclone prone region is presented.

A study of agricultural insurance products highlighted the lack of affordable plans for managing the risk of cyclone damage for primary industries domestically. The insurance sector, working closely with industry (through the Queensland Farmers Federation, QFF) is currently developing indexed-based insurance products which could be offered to primary industries affected by cyclones this cyclone season. The survey found that while 80% of producers had comprehensive general-property insurance cover, only 4% had insurance cover for their crops against windstorm or cyclonic events. There is sufficient evidence to suggest that crop insurance products could be better advertised to producers in cyclone-prone regions.

Defoliation using an ethrel urea mix followed by a sun protectant was an effective way to reduce the wind loads on trees during strong winds, protecting them from cyclone damage and allowed them to fully recover.
Cyclone mitigation strategies identified in the animal-based industries included alternative and backup power sources, improved and increased storage capacity for fuel, feed and medicines, improvements to farm infrastructure including animal housing, sheds and farm access points, removal of large trees and replacement where necessary with artificial shade and changes in stock management. The potential for innovative fencing and animal identification methods in the future are also discussed.

Implications

Adoption of new production practices identified in this project will reduce the impact that severe cyclones have on primary industries and improve economic sustainability, even with the threat of increasing cyclonic activity. Improving cyclone resilience would also improve the reliability of production, reducing risks associated with primary production in cyclone-prone regions and making access to finance and insurance cover easier. This will contribute to further development and expansion of existing and emerging industries. It will provide economic and employment opportunities in rural communities, which in turn will contribute toward local, state and national economies.

Acknowledgements

This research was funded by AgriFutures Australia and the Queensland Department of Agriculture and Fisheries.

Propagation trials identified methods to rapidly and cheaply propagate a number of tropical fruit species using cuttings. This will greatly aid the re-establishment of these industries following cyclone damage, by improving the availability and reducing the cost of planting material.

Trellis trials indicate many tropical fruit tree species ranging in vigour, flowering habit and size are amenable to being grown on trellis (guava and mango shown).

The final report is available from the AgriFutures Australia website:

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