



Extreme Weather: Storms and Heatwaves The Role of Landscaping and Vegetation in Reducing Impacts and Risks

In this training pack, we are aiming to build resilience against the risks of extreme weather such as storms and heatwaves. We will be focusing on the role of landscaping and using vegetation to reduce impacts.



Nature-based Interventions to Combat Extreme Weather

By building in risk mitigation into sustainable production and Landcare restoration projects and by keeping track of extreme weather warnings, many impacts can be reduced. There are also a number of nature-based measures that can be undertaken by Landcarers.

It must be noted that Landcarers can manage these risks to a degree, understanding that in extreme events it is almost impossible to mitigate all risks.

Implementing nature-based solutions enhances resilience to both storms and heatwaves, helps to protect infrastructure, improves soil health, and supports regenerative farming practices.

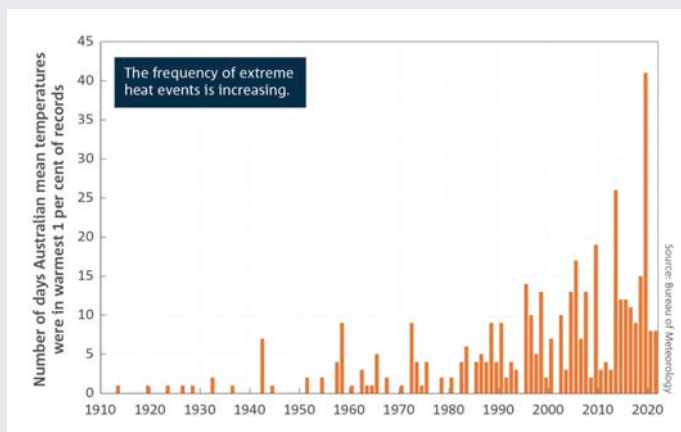
**This training packet does not cover specific interventions for floods and fires, as these topics have been extensively addressed in other training materials. For more in-depth discussions and intervention strategies, please refer to those resources.*



Long Term Weather Outlook and Climate Change - Using Nature-based interventions to combat extreme weather

Extreme Heat:

The frequency of extreme heat events in Australia is increasing. According to the CSIRO, Australia has warmed, on average, by 1.47 ± 0.24 °C since national records began in 1910, with most warming occurring since 1950.

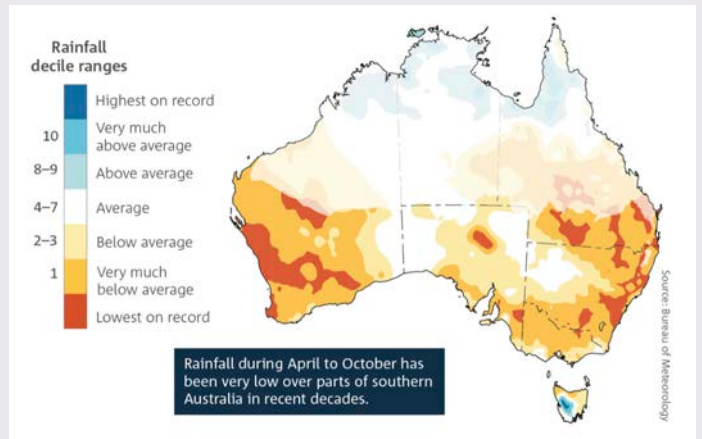


HEATWAVE MITIGATION

Intervention	What it does
Agroforestry/Plant Trees in the Pasture	Integrate trees with crops or livestock. This approach provides shade and shelter, reduces heat stress, and improves overall farm resilience.
Windbreaks and Shelterbelts:	Plant rows of trees or shrubs along the edges of fields or pastures. These provide shade for livestock, reduce soil temperature, and decrease wind speeds, which helps to mitigate heat stress.
Use Organic Mulch	Use organic mulch in gardens, orchards, and stubble retention in crop fields to retain soil moisture, reduce temperature, and improve soil health.
Focus on Groundcover - Cover Crops	Plant cover crops or green manures during the less productive season to protect soil from erosion, retain moisture, and reduce soil temperatures.

Drought/Drier Conditions:

The CSIRO reports a trend toward drier conditions in Australia's southwest and southeast, particularly during the cooler months from April to October. Between 2000 and 2021, 19 of the 22 years recorded below-average rainfall for this period, compared to the 1961-1990 average.



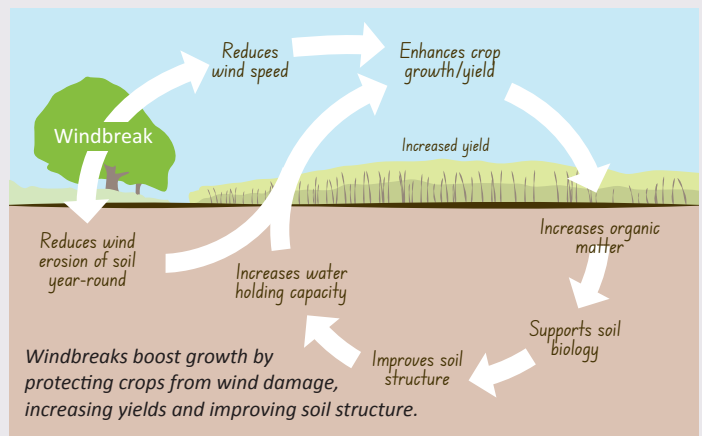
DROUGHT MITIGATION

Intervention	What it does
Water Retention - Dams and Ponds	Construct dams or ponds to store water for irrigation and livestock. Surround these water bodies with vegetation to cool the water and reduce evaporation.
Water Retention - Swales and Contour Banks	Build swales and contour banks on slopes to capture and retain water, reducing runoff and promoting infiltration.
Drought-Resistant Crops	Plant drought-resistant crop varieties that are better adapted to high temperatures and reduced water availability.
Polyculture	Polyculture is the practice of growing more than one crop species together in the same place at the same time. Using polyculture practices increases biodiversity and resilience, reducing the risk of crop failure during heatwaves.

Extreme Wind:

East Coast Lows (ECLs), sometimes referred to as Australian east coast cyclones or maritime lows, are weather systems that can bring significant hazards. They are characterized by at least one major hazard, such as extreme winds, heavy rainfall, large waves, or flooding. These systems can produce damaging winds, prolonged heavy rainfall, and very rough seas.

ECLs often feature strong winds and rotational motion extending through various vertical levels of the atmosphere, especially during the more extreme events that typically occur in winter.



HIGH WIND MITIGATION

Intervention	What it does
Shelter Belts/Windbreaks	Plant rows of trees or shrubs to act as windbreaks, reducing wind speed and protecting crops and soil.
Prune Existing Trees	Your tree will be more resistant to being uprooted by strong winds if you prune it and remove any dead or extra limbs.
Species Selection	Use a mix of native species that are well-adapted to local conditions and have strong, deep root systems.
Cover Crops	Use cover crops during fallow periods to protect soil from wind erosion. Legumes, grasses, and other fast-growing plants can help anchor the soil and reduce dust.
Mulching	Apply organic mulch to retain soil moisture and protect the soil surface from wind erosion. This can be particularly effective in gardens and around young trees.
Crop Stubble Retention	Retaining crop stubble in the soil after harvesting prevents wind erosion of soils as well as preventing soil moisture loss and adds organic matter.

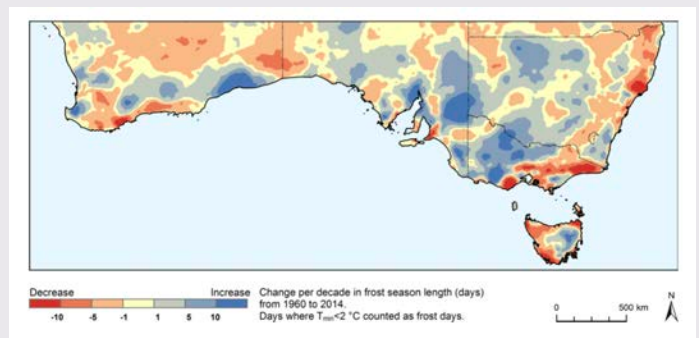


“Planting smaller shrubs and groundcovers under the canopy of larger trees can create a microclimate that is less susceptible to frost.”

Frost

As per a study done at the Australian National University, despite the overall trend of increased temperatures across Australia, there is a ‘climate surprise’ where there have been some increases in frost frequency:

- The ongoing warming versus regionalised increases in frost frequency and more extensive broadening of the frost window, represents a climate surprise.
- Regional analysis (75 sites and 10 GCMs) show that despite continued anthropogenic warming, frost frequencies over the August to November period will remain comparable to current levels until the early 2030s.
- The BOM Regional Weather and Climate Guide showed that the August and September total frost nights in Tamworth increased an average of eight more nights per year between 1989–2018 compared to 1959–1988.



FROST MITIGATION

Intervention	What it does
Selection of Frost-Resistant Species	Choose native plant varieties that are more tolerant to frost.
Understory Planting	Planting smaller shrubs and groundcovers under the canopy of larger trees can create a microclimate that is less susceptible to frost.
Irrigation	Water the soil adequately before an expected frost, as moist soil retains heat better than dry soil. This can help protect root systems and reduce the severity of frost damage.
Mulching, Shelterbelts, Cover crops	These all help to retain heat in the soil and reduce the risk of frost damage.

The tables in this document have highlighted some intervention strategies that can be used to lessen the negative impacts from extreme weather. It should be noted that one of the simplest and most effective ways to combat climate change in the long term is by planting trees.

Trees absorb carbon emissions, improve both above and below ground ecology, and increase biodiversity. They also protect against risks like drought, heatwaves, wind, and frost. Additionally, trees have significant cooling effects, lowering temperatures and providing shade for animals.

Landcare NSW is actively involved in native tree planting initiatives to promote environmental sustainability and combat climate change. You can get involved by joining a local landcare group, volunteer for projects, attend workshops and training, participate in community events, apply for grants and network with like-minded people.

To find a group near you, you can contact your local Landcare coordinator here:
<https://landcare.nsw.gov.au/groups>

Weather Monitoring - How to read weather updates and hazard info

The above information provides a variety of interventions to lessen the impacts of extreme weather. To fully prepare, it's important to understand how to monitor, read, and interpret weather forecasts and hazard predictions. This is crucial as it enables you to anticipate and prepare for adverse weather conditions. This way, you can plan the right actions at the right time, which cuts down on the risk of damage to crops, animals, and buildings. Staying on top of weather updates and predictions also makes the farm more resilient and supports better management and productivity in the long run.

There are several websites and weather apps that are particularly useful to predict weather and manage response to natural hazards effectively. Please check the resources page on our website for links to these websites and apps.

BOM Weather - Provides official weather forecasts, warnings, and observations. It includes detailed information on temperature, rainfall, wind, and severe weather alerts.

Climate Change in Australia - Provides climate information, projections, tools and data.

NARCLIM - NSW and Australian Regional Climate Modelling (NARCLIM) is a NSW Government led initiative that generates detailed climate projections and data for NSW. They use computer modelled climate projections on our future climate.

Ag360 - A weather app specifically designed to support agricultural decision-making by providing tailored weather forecasts and climate information for farmers and landcarers - this can help with better agricultural management and risk mitigation

My Climate View - Delivered by the Bureau of Meteorology and CSIRO, the program gives farmers better climate information for specific commodities and at a local scale right across Australia.

For more information, please see the NSW State Emergency Service (SES) and NSW Local Land Services (LLS) websites for more resources on storms and how you can prepare your house for storm season.

Disclaimer

The information provided in this training pack, though well researched is general in nature and it should be recognised that every situation has different circumstances and requirements. Landcare NSW provides this information with the understanding that you exercise reasonable care when using it. If you are uncertain about applying this information to your specific situation, seeking further professional advice is advisable. By using the information in this training pack, you agree that the authors who have compiled this information and original sources cannot be held liable for damage or loss incurred due to any emergency situation.

Landcare NSW does not accept responsibility for how you apply or rely on the information in this training pack.



Australian Government



PEOPLE LED PREVENTION PROJECT

Landcare NSW's People Led Prevention project empowers communities across regional NSW in developing disaster resilience and preparedness skills. Jointly funded by the Australian and NSW Governments.