Dairy Australia
Your Levy at Work

Water logging costs production

This fact sheet is part of the Profitable Dairying series - *Good business management reduces greenhouse gas emissions.*

The Australian dairy industry has committed to reducing greenhouse gas emissions intensity (emissions per litre of milk produced) by 30% by 2020.

Water logged soils are more likely to emit greenhouse gas emissions than well drained soils.

Causes of water logging

Water logging is a common problem on many soil types, particularly in predominantly clay soils.

Water logging may be due to periods of heavy rainfall, dispersion, compaction, poor irrigation management, rising water tables, or a combination of poor surface drainage (across the paddock) and poor subsurface drainage (down the soil profile).

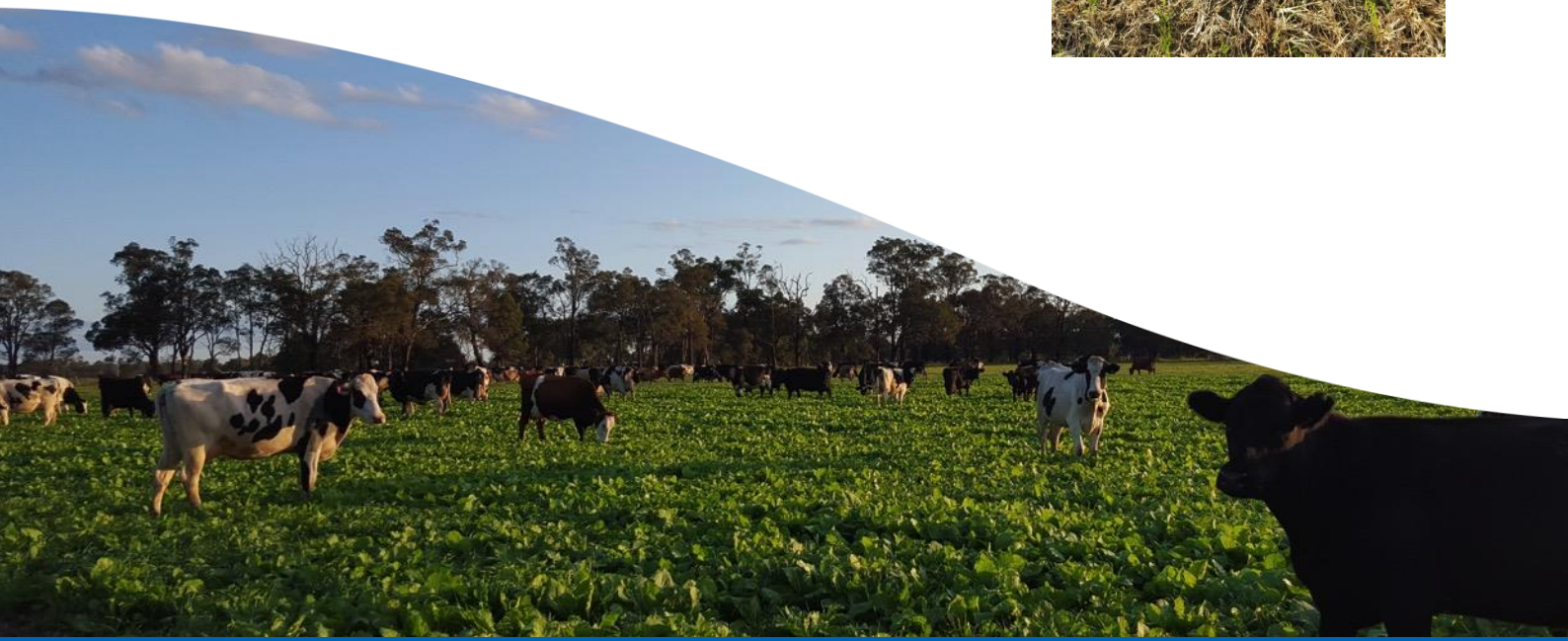
In rain-fed WA dairy soils, water logging occurs in flat areas on soils comprising 0.5 to 2.0 m sand to sandy loam soils over a very impervious clay layer. This forms a surface aquifer and the pasture root zone is no deeper than 20 cm.

Water logging occurs when most or all of the macropores become filled with water rather than air. It occurs more easily in soils that have a greater proportion of micropores than macropores, because the macropores promote free drainage while the micropores tend to hold on to water.

Effects of water logging

Soil strength decreases as the soil gets progressively wetter, resulting in a greatly increased potential for damage to the soil structure.

Water logging prevents air and many nutrients from reaching the roots, thus seriously inhibiting plant growth.



Where soil drainage is poor, numerous effects are seen. The severity of these effects will depend on things such as the duration of water logging and the soil texture. In light-textured soils the effects will not be as detrimental.

Water logging effects include:

- Plants are stunted and yellow as nitrogen is lost due to denitrification which is caused by a lack of aeration.
- Improved pasture plants are replaced by tolerant weeds (docks, smartweed, rushes, sedges, couch, etc.).
- Pastures become fouled with mud and utilisation is reduced.
- Pasture growth rates decline.
- Soils become pugged and water ponds on the surface.
- Responses to applied fertiliser are poor.
- Nutrient balance in the pasture is upset with lower nitrogen, potassium, magnesium and chlorine in the pasture.
- Change in soil biology from aerobic to anaerobic soil organisms.
- Increased greenhouse gas emissions.

Managing water logged soils

When water logging has occurred, prevention of further damage to the pasture and soil structure is the first priority. This can only be done by keeping vehicles and animals off water logged areas. A grazing management technique called 'on-off grazing' can significantly reduce pugging damage and increase pasture utilisation. With the 'on-off grazing' technique, stock are only allowed to graze the paddock for a short period (2 to 4 hours) and are then held in a **stand-off area**, such as a feedpad, a laneway, an old sand quarry, or the dairy shed yard.

In districts where waterlogging is caused by a high water table, management strategies aimed at controlling the level of the water table will be required. Click here for more information.

Overcoming waterlogging through drainage may help preserve soil structure.

In high-rainfall dairy pastures, increases in pasture utilisation of 40% to 60% have been measured on drained (subsurface drainage) compared to undrained paddocks.

Improved pasture yields and pasture composition have also been measured on drained paddocks. Soil salinity levels are also often lowered by subsurface drains because the drained water removes some of the salt.

Drainage systems need to be planned, constructed and maintained effectively to have a long-term, positive effect on both the on-farm and off-farm environments. Because the drainage water often has to flow onto neighbouring properties, drainage works are best done in cooperation with the neighbouring landholders and in conjunction with the relevant water authorities.

Further reading:

Agriculture Victoria: Planning farm drainage

Fert$mart Soil and Nutrient Management Guidelines – Managing Soil Limiting Factors

Managing wet soils

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