

Ground water on rice

Ground water has higher salinity than surface water. Salinity is measured using electrical conductivity (EC) in dS/m (decisiemens per meter). Channel water is usually below 0.2dS/m, yet ground water can have varying levels at much higher concentrations.

What are the issues?

- **Yield**
 - Rice yields are affected when the ponded water salinity reaches 2dS/m or 1280ppm, or 1-1.5dS/m during the sensitive stages (ie. Seedling stage and PI through till booting).
- **Higher water use**
 - Infiltration rate increases as the salt concentration reduces soil swelling and dispersion. Water with a salinity content of 1dS/m can use 2-4ML more than typical surface water.
- **Drainage time**
 - Drainage decision becomes difficult as the excessive salt will cause haying off if drained prematurely, yet the higher salt content of the water will lengthen the drying time.
- **Sodicity**
 - Test for sodicity after rice for next crop. May need to apply gypsum.



Figure 1: Ground water. Photo credit, John Fowler, FarmTalk, NSW 2015:

Water management

It is important to circulate the water within the bays of a rice field. If water is supplied down one side of the field with overflow checks, it allows salt to accumulate at the end of the bay opposite to the supply. With high evaporative demand during January and February, this effect is worsened as the salt content will increase without the addition of fresh water. Some key management tips are:

1. Promote water circulation in bays to prevent salt accumulation in low areas or bottom bay.
 - a. Set up stops at alternate ends of bays, or;
 - b. Block off each bay and use large siphons over banks to circulate around.
2. Monitor weekly at different locations using a calibrated portable salinity meter.
3. Monitor away from water flow parts.
4. Try to lower salt levels around PI and flowering by using surface water or releasing water from lower bays to fresher water up and reduce salt levels.

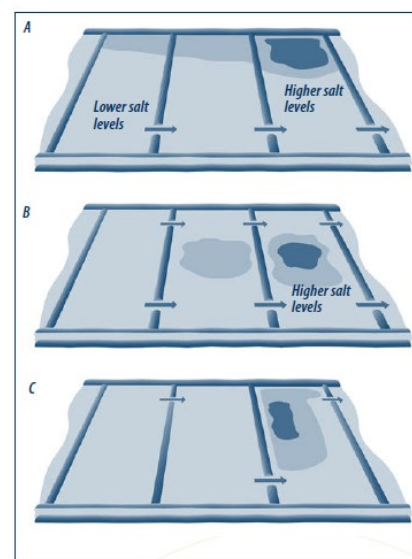


Figure 2: Accumulation of salt in bays noted by dark blue. Photo: Rice Check recommendations (2006).

Thresholds at different growth stages

Growth stage	Sensitivity level	Thresholds
Germination	Reasonably tolerant	2 dS/m
Seedling	Sensitive	1-1.5 dS/m
Tillering	Some tolerance	2 dS/m
PI	Sensitive	1-1.5 dS/m
Flowering	Sensitive	1-1.5 dS/m
Booting- Maturity	Reasonably tolerant	2 dS/m

Conversions

d S/m decisiemens per meter	μ S/cm Microsiemens per meter	ppm Parts per million
1 dS/m	=1000 μ S/cm	=640 ppm*
2 dS/m	=3000 μ S/cm	=1280 ppm*
3 dS/m	=1000 μ S/cm	=1920 ppm*

*approximate depending on salts present

To convert μ S/cm to d S/m	Divide by 1000
To convert ppm (mg/L) to d S/m	Divide by 640
To convert d/Sm to μ S/cm	Multiply by 1000

Can I shandy my ground water with surface water if my groundwater is above an acceptable threshold?

A rough rule of thumb is that a 1:1 mix of surface and groundwater will halve the salinity content. However, the shandied water will still contain the same amount of salt that will be put onto the paddock, and the long term decline in soil health must be considered. The subsequent evaporation of the shandied water will also cause the salinity to increase and fresh water will need to be applied.

Are some varieties more tolerant than others?

Medium grains are more tolerant than short and long grains.

Can I use ground water on my drill sown crop?

While experiments on the effect of ground water on rice have only been conducted on aerial sown crops, NSW DPI Research & Development Agronomist David Troidhal believes that ground water can be used even more successfully on drill sown crops.

Each successive flush or rainfall event will help to push the accumulated salts further down into the profile. Depending on the salt content of the ground water, flushes can alternate between ground and surface water or be shandied together.

As the ground dries out between flushes, the salt content will increase, so it will be important to not stretch out the timings between each flush.

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