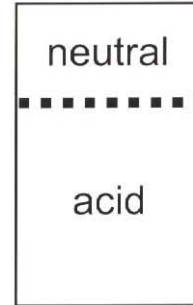
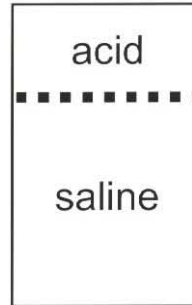
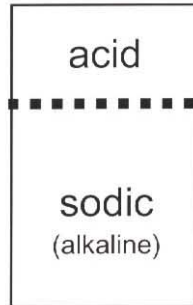
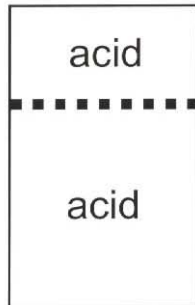
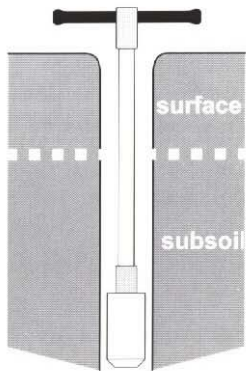


# Controlling the problem

Examples of commonly found soil profiles and what to do

Is your soil....



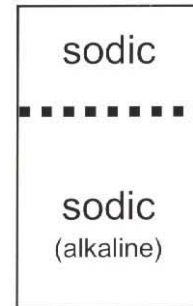
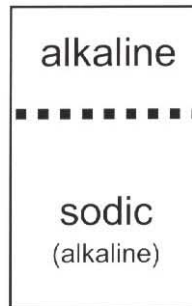
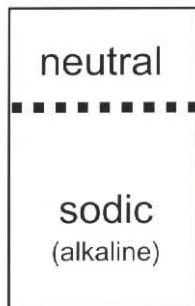
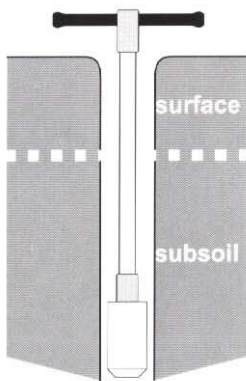
You need to....

- add lime

- add lime first
- then add gypsum

- add lime
- lower water table

- add lime



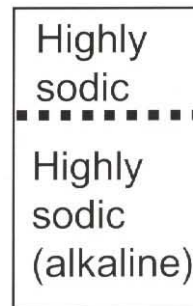
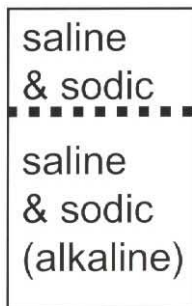
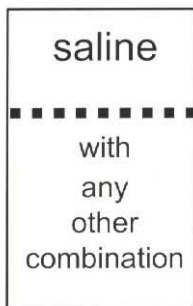
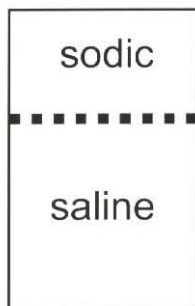
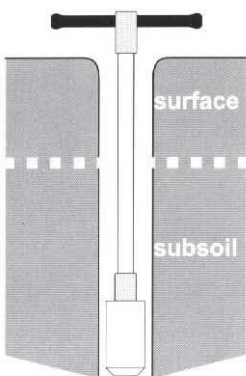
You need to....

- add gypsum

- lower water table

- grow acidifying legumes
- add gypsum

- add gypsum



You need to....

- add gypsum
- lower water table

- control salinity before adding gypsum or lime

- control salinity
- try test areas of gypsum

- add gypsum

# Rates of lime

- Treat either sodicity or acidity first according to which is considered more severe.
- Where lime is suggested, aim to increase pH (water) to above 6.0.
- As a guide lime rates to raise soil pH about 1 pH unit in top 10 cm of soil;  
sand 1-2 t/ha, loam 2-3 t/ha, clay 3-4 t/ha.
- On light sandy or iron stone soils lime rates above 2.5 t/ha may induce a manganese deficiency.
- To establish perennial horticultural plantings up to 10t/ha is used, especially on acid subsoils and where a pH increase of more than 1 unit is needed.

# Rates of gypsum

- For sodic soils apply 2.5 t/ha gypsum.
- For sodic (alkaline) soils apply 5.0 t/ha, as gypsum is less effective at high pH.  
Consider planting acidifying legumes to reduce pH.
- For highly sodic soils apply 5.0 t/ha gypsum.
- For highly sodic, alkaline soils apply 5.0 t/ha gypsum (up to 10.0t/ha under irrigation ) and consider planting acidifying legumes.

# Remember

- Increase application rate if using lower quality lime or gypsum.
- Do not use products with impurities that may be harmful, e.g. sodium chloride.



*Lime spreading on high productivity pastures.*

# For saline soils

- Saline conditions in the soil surface over-ride any other problems and need to be addressed first.
- Use salt tolerant crops and pastures. High water use plants in recharge areas will lower water-tables. This usually requires a whole catchment approach, not just on individual farms.
- Under irrigation leaching of saline soils may be an option.
- For saline and sodic soils try a test strip of 2.5 t/ha gypsum (5.0 t/ha if also alkaline). This may have little effect if salinity is high.
- Adding high rates of gypsum can increase soil salinity by up to 1dS/m for a short period, but this has not been observed to affect crop yields.
- Salinity due to dryland scalds is usually treated by retaining or adding stubble if practical, to build up organic matter.

## What is the best way to apply lime or gypsum ?

- Ensure a faster result by spreading high quality agricultural lime or gypsum, and incorporating into the surface soil.
- Apply directly to the subsoil, if needed, with deep-ripping equipment only in high value crops.

## How do you know your control methods are working ?

- Each of these problems may take many years to correct.
- Test soil every 2-3 years to identify follow-up treatments
- Testing and treatments should be part of your normal crop or pasture nutrition program

# Soil hard-setting ? Build up soil organic matter at the same time.

- This will improve the effect of gypsum added to a sodic soil.
- If the soil is not sodic or has been broken down by excess cultivation, then reducing or eliminating cultivations and retaining stubble as in Figure 6, will improve soil structure.



Figure 6. Chickpea sown into stubble retained from the previous wheat crop on a hard setting soil.

## Equipment requirements

- An EC and a pH meter. If you cannot borrow meters then you might consider purchase.
- A number of hand held meters are available such as those shown in Figure 1, which cost around \$100 each: DIST 4 (Total dissolved solid tester), PHEP3 (pH meter 0-14 pH waterproof)

Manufactured by: **Hanna Instruments Pty. Ltd.**  
18 Fiveways Boulevard,  
Keysborough Vic. 3173

- If you do decide to purchase, seek the advice of the reseller, who will advise which of the available meters best suits your requirements.
- EC and pH meters require calibration before use.
- The meters are electronic and need to be operated and stored with care (eg not in extremes of temperature)
- EC and pH meters are available from any reputable supplier of scientific equipment including:

**Crown Scientific Pty Ltd**  
NSW: Toll Free: 1800 449 115  
Vic: Toll Free: 1800 134 175  
Qld: Toll Free: 1800 773 442  
SA: Tel: 08 8347 3310  
WA: Tel: 08 9479 4655  
Tas: Tel: 03 6229 7437

**Selby - Biolab**  
Phone: 13 2991  
Free Fax: 1800 067 639  
Melbourne, Sydney, Brisbane, Perth, Adelaide  
Darwin, Newcastle, Townsville

The Cooperative Research Centre for Soil & Land Management does not warrant or recommend any particular manufacturer/supplier or model of meter.

## Want further information ?

Contact your local agricultural or soils consultant or the Cooperative Research Centre for Soil & Land Management Tel: 08 8303 8670, Fax 08 8303 8699, e-mail [crclm@adl.clw.csiro.au](mailto:crclm@adl.clw.csiro.au)