Coorong Tatiara LAP
Water Security Forum

Water quality and livestock nutrition

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How do we define water quality for livestock?

- Palatable
- Cool
- Clean
- EC (salinity)
    - < 6250 sheep & beef cattle
    - < 3750 dairy cows
- Nitrate - < 1500mg/l
- Sodium chloride - < 1.3%
- Magnesium - < 400mg/l
- Sulphate - < 2000mg/l

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Water testing

	Eyre Peninsula					Carrieton	
	Jan-12			Sep-11		Mar-11	
	Gums	***Paddock 17***	***Paddock 19***	***Cowra***	***Nan 1***	***Dam***	***Bore***
High quality water - <781 EC		***Soaks***		***Troughs***		***Troughs***	
EC - µS/cm	6093	**7187**	5625	819	974	234	4830
No adverse effects:							
Dairy cattle				< 3750			
Sheep & beef cattle				< 6250			

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Specific effects on livestock production of low quality water

- ***Sodium chloride:***
  - Increase -> decrease in water & DM intake
  - Increased rumen osmotic pressure & outflow
  - Loss of microbes -> reduced FCR
  - Reduced metabolic activity

- ***Sulphates:***
  - Reduced water intake
  - Increased risk of polioencephalomalacia:
    - Sheep
    - Cattle
- ***Nitrates:***
  - Haemoglobin -> methaemoglobin
  - suffocation

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Salt loads and dry matter intake

Sodium %	Potassium%	Weaner Intake kg/day (as fed)	LW gain g/day	Clean wool growth g/day
Sheep =0.1% *Cattle =0.15%*	*S =0.5%* *C =0.5%*	*W lamb=1.5kg* *W steer =10kg*	*250g min* *0.65kg*	*12-20g /day*
0.16%	1.6%	1.35	144	13.5
2.27%	1.6%	1.31	162	13.8
4.74%	2.3%	0.93	77	9.76
7.6%	2.5%	0.55	-12	8.6
7%	3%			

- 6 month old Merino wether lambs @ 34 kg LW
- Oats & lupins & oaten hay, mineral mix plus increasing levels of Na & K

Adapted from Masters *et al*, 2005

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General effects on livestock production of low quality water

- Decreased dry matter intake
- Increased energy demand
- Reduced microbial activity
- Increased rate of rumen throughput – bypass protein
- Initial 'water gain' vs. weight gain
- Adaptation will occur in *mature stock* up to:
  - 7800 EC – beef cattle
  - 15625 EC – sheep
  - 6250 EC – dairy cows

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Salt tolerance by difference classes of livestock

	No adverse effects	Scouring and resistance during adaptation	Short term tolerance with loss of production
	µS/cm - EC	***µS/cm - EC***	***µS/cm - EC***
Beef cattle	0-6250	6250-7812	7813-15625
Dairy cattle	0-3750	3750-6250	6250-10937
Sheep	0-6250	6250-15625	15625-20312*

**** Tolerance only with access to green feed***

Source ANZECC, 2000

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Daily water requirements of livestock

	Mean daily temperature (˚C)				
	15	***20***	***25***	***30***	***35***
Daily water budget - litres per kg DM					
Weaned cattle:					
Bos *taurus*	3.5	4	5.5	7.5	10
Bos *indicus*	3.0	3.5	4.5	6	8
Calves	2.5			9+	
Weaned sheep	2	2.5	3.5	5	7
Lambs	5-7			8+	
Late pregnancy - cattle & sheep	Increase daily allowance by 30%				
Lactation - cattle & sheep	Increase daily allowance by 1 litre per kg milk produced				

Source CSIRO, 2007

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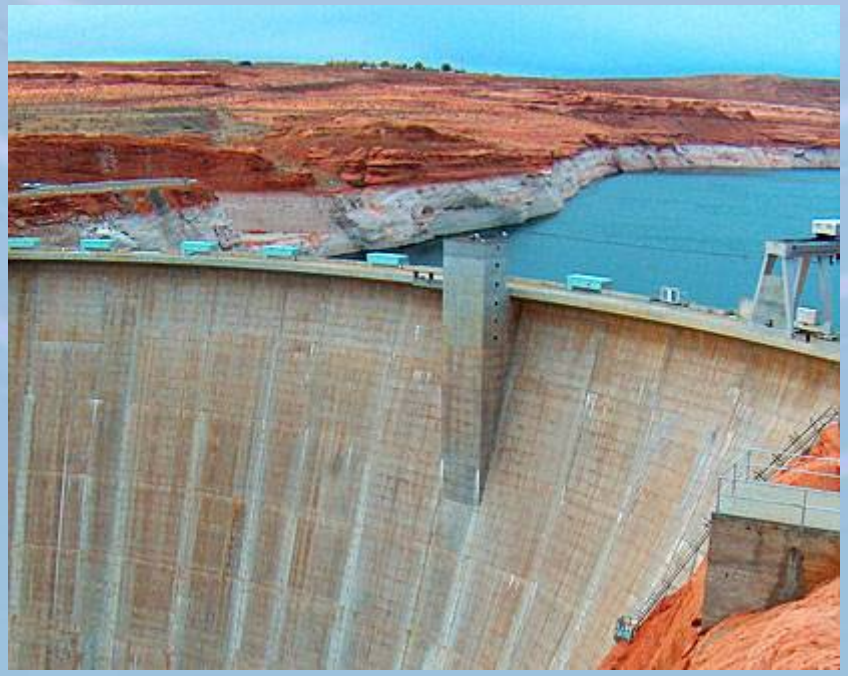
Water requirements of sheep grazing fodder shrubs

- Merino sheep - 30mls water per gram of salt
- Salt intake > 200g/d
- Water intake = 6 litres/d
- Border Leicester sheep – 35 mls per gram of salt
- Water intake = 7 litres per day

How to utilise low quality water effectively?

- Change the feed resources
- Change the enterprise mix
- Dilution strategies to improve water quality



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Change the feed resources

- Graze cereals – COP +/- 40/t DM

- Sow salt tolerant spp:
  - Kikuyu
  - Tall wheat grass
  - Puccinellia

Change the enterprise mix

- Dairy cattle -> beef cattle……?

- Wool production – Increase proportion of Merino wethers
  - Current GM +/- $270/ha

- Trading lambs on standing crops
  - Current GM +/- $1100/ha

- F1 ewes – increase proportion of Merino ewes

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In summary….

- Water quality drives productivity
- Tolerance differs between species and classes of sheep and cattle
- Increase water quality when grazing fodder shrubs
- Consider a change in enterprise mix or feed supply

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Thank you

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