

Potential for summer cropping

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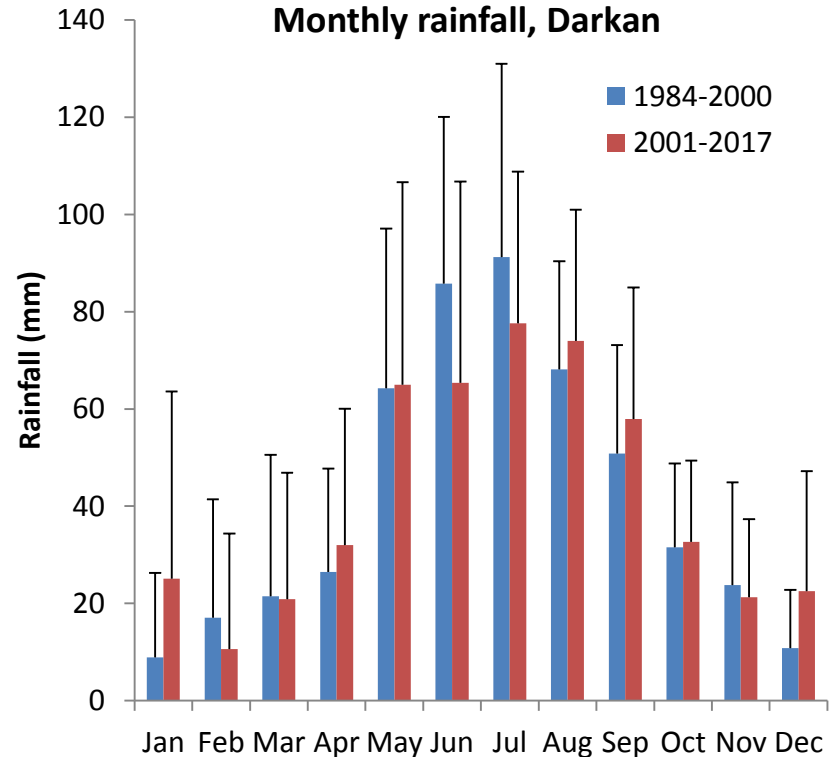


- Summer cropping options
- Constraints – temperature, water
- Likely yields – forage and grain
 - Opportunistic, after big summer rain
 - After a failed winter crop
- Impacts on winter crops and water balance

- South Coast examples, tailored for Darkan conditions

Why summer crop?

- 'Enforced' fallow from Dec – Apr
- Increased summer rain?
 - Opportunistic crop sowing
- Failed winter crop
 - Use stored soil water
- Grain or forage?
- Effects on next winter crop?



Summer cropping options

- Grasses
 - Sorghum, millet
 - Generally most common – good growth and adapted to soils
- Broadleaves
 - Sunflower, safflower, canola?
 - Germination is crucial
- Legumes
 - Lablab, pigeon pea, cowpea
 - Generally not suited to WA conditions – shallow roots?



Photo: Brad Wooldridge

Summer crop agronomy

- Excellent publication
 - “Guide to growing summer grain & forages in the south coast region, Western Australia” by Andrea Hills and Sally-Anne Penny, available on DPIRD web site

2005

Guide to growing summer grain & forages in the south coast region, Western Australia

Andrea Hills

Sally-Anne Penny

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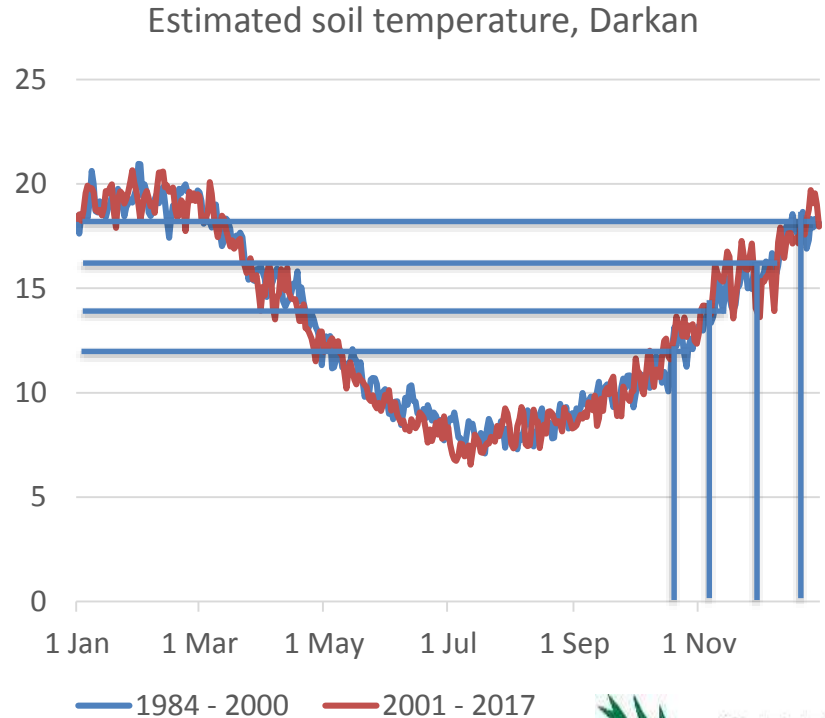
Recommended Citation

Hills, A., and Penny, S. (2005). *Guide to growing summer grain & forages in the south coast region, Western Australia*. Department of Agriculture and Food, Western Australia, Perth. Report 20/04.

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Soil temperature

Crop/Forage	Minimum soil T	Optimal soil T
Grain sorghum	16	18
Forage sorghum	16	18
Shirohie millet	14	
Pearl millet	18	20
Safflower	Ok	
Sunflower	12	14
Lablab	18	
Pigeon pea	18	

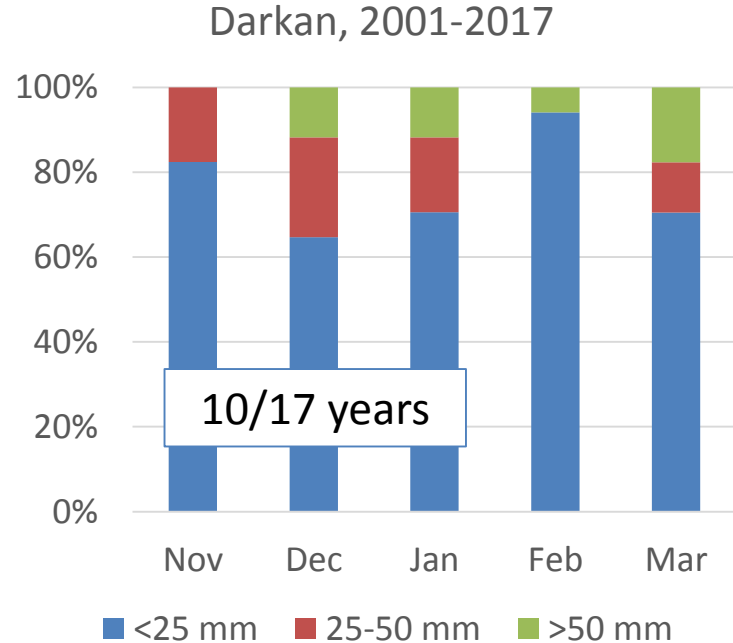
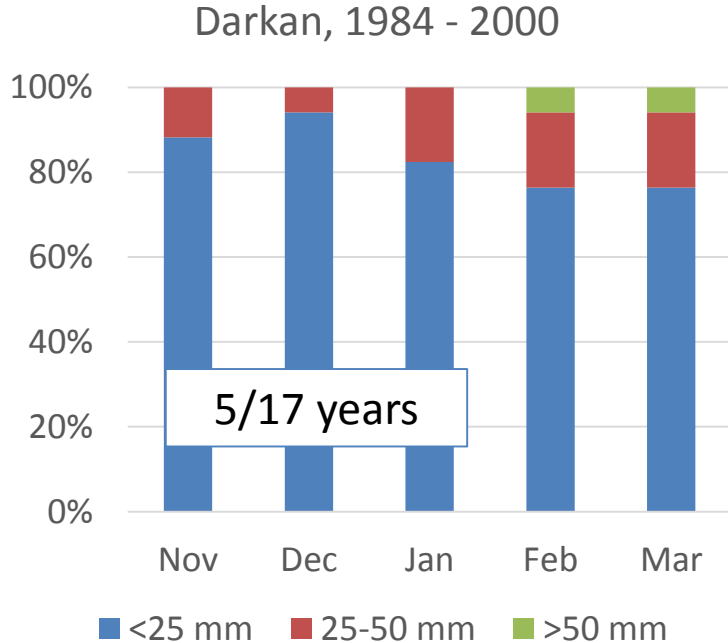


Opportunistic summer cropping

- Normal winter crop harvested in Nov/Dec
- Wet conditions around and after harvest
- Summer crop sown in December or January **if** soil water adequate
 - Usually no available soil water after annual crop
- Crop grazed or harvested in April
- Back to normal winter crop in May

- **Relies on Dec/Jan rainfall**

How often do opportunistic windows open?



Looking for total rainfall of at least 25 mm occurring over 4 days

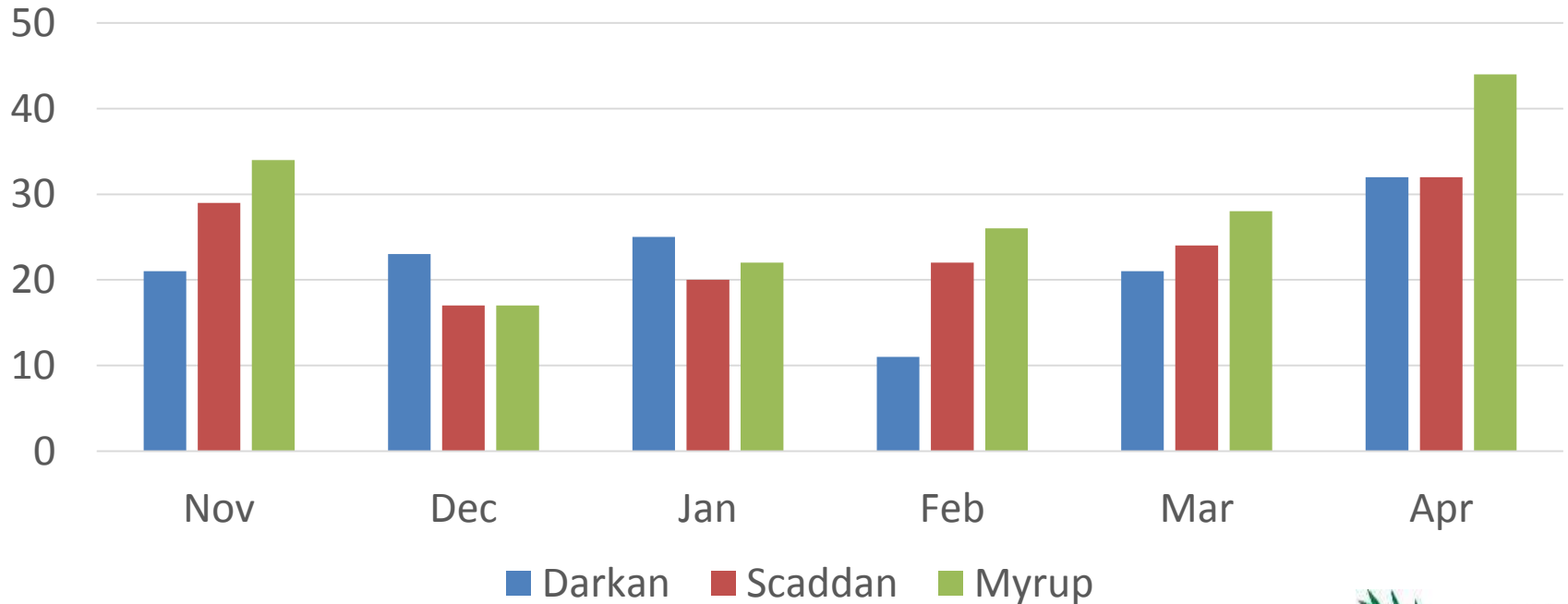
Modelled results from Scaddan and Myrup (& Northam)

Hills and Penny (2005) “Guide to growing summer grain & forages in the south coast region, Western Australia”

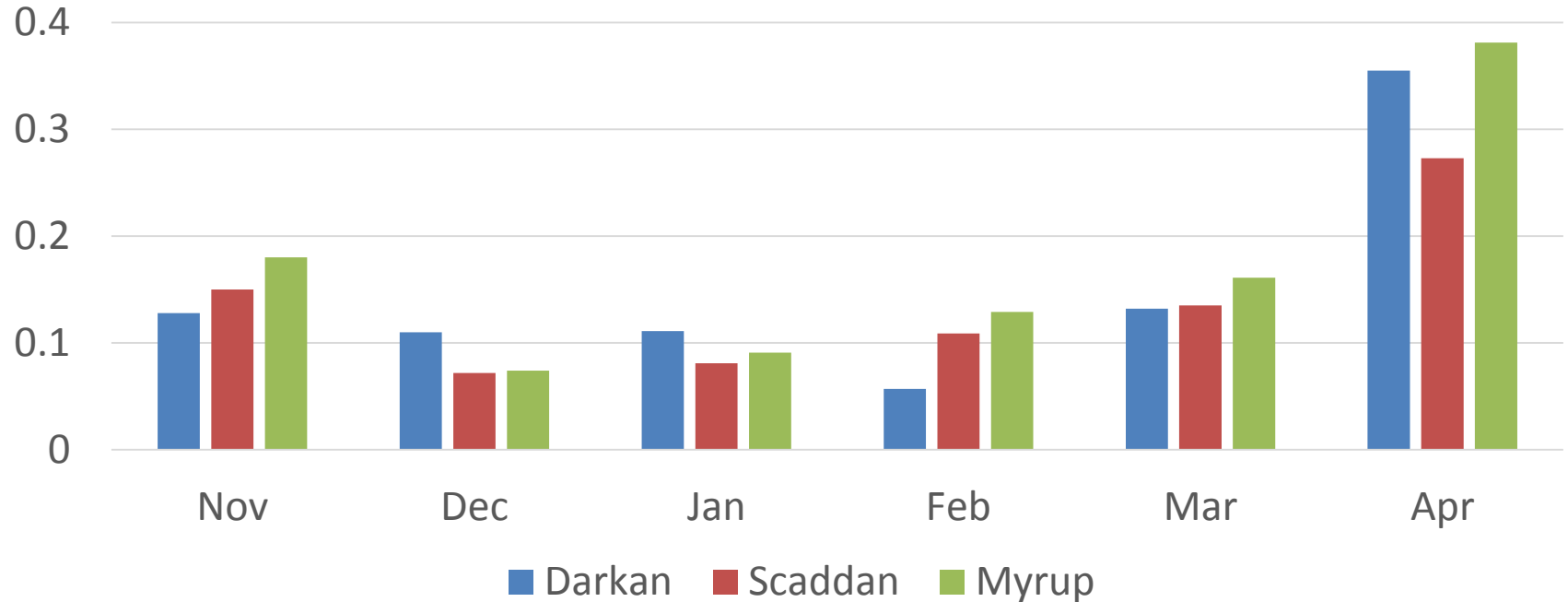
Robertson et al. (2005) “Production risks and water use benefits of summer crop production on the south coast of Western Australia”. Australian Journal of Agricultural Research Vol 56, pp 597-612

Chen et al. (2015) “Model-based explorations to assess climate risk to summer crop production and its effects on wheat yield in the central wheatbelt of Western Australia” 21st International Congress on Modelling and Simulation (MODSIM2015).

Comparison of Darkan rainfall (2001 – 2017) with Scaddan and Myrup (1957-2003)



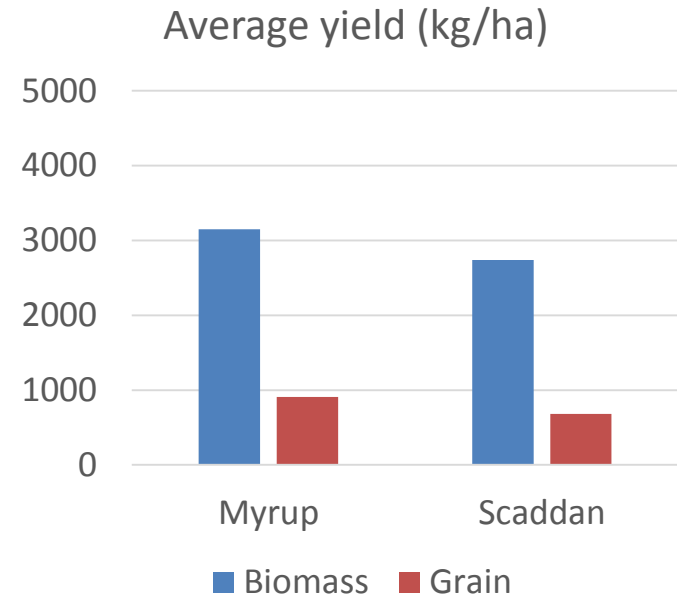
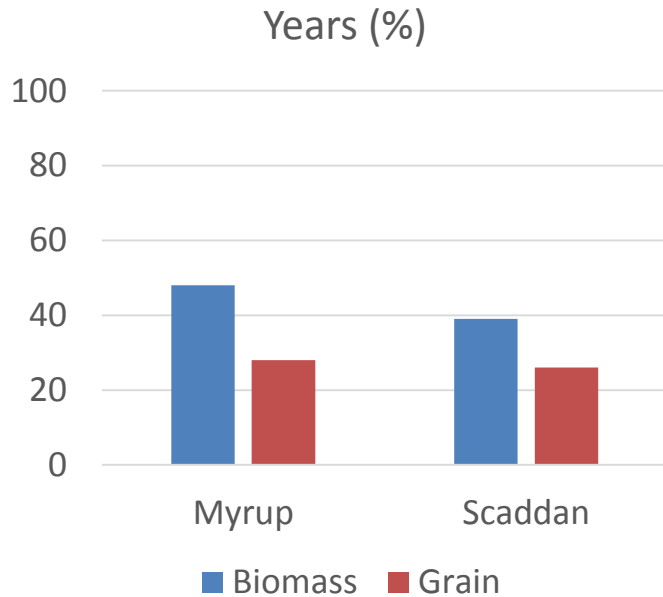
Rainfall / potential evaporation



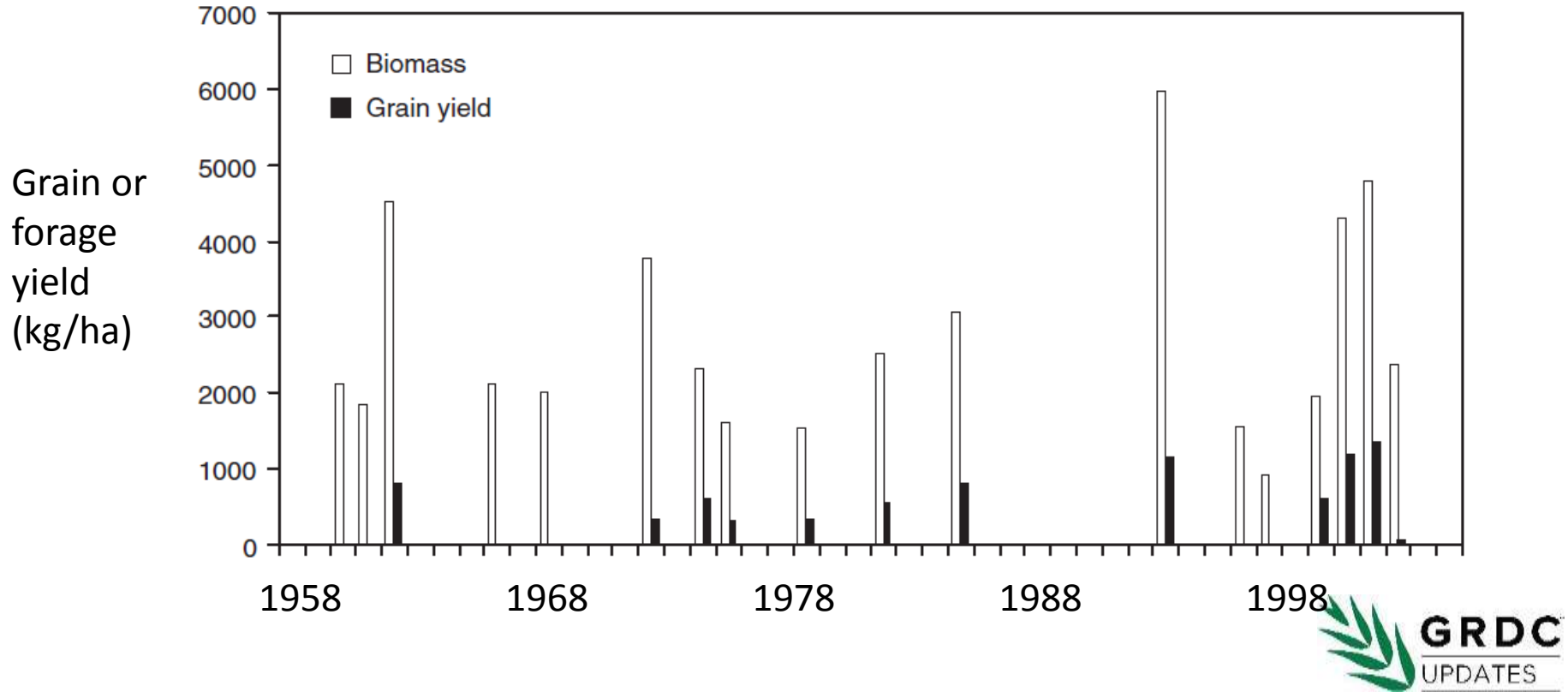
Soil types

- Myrup – deep sand, PAWC 90 mm to 1.5 m
- Scaddan – sandy duplex, PAWC 98 mm to 90 cm
- A bit of a gap for the forest gravels! PAWC 20-60 mm...

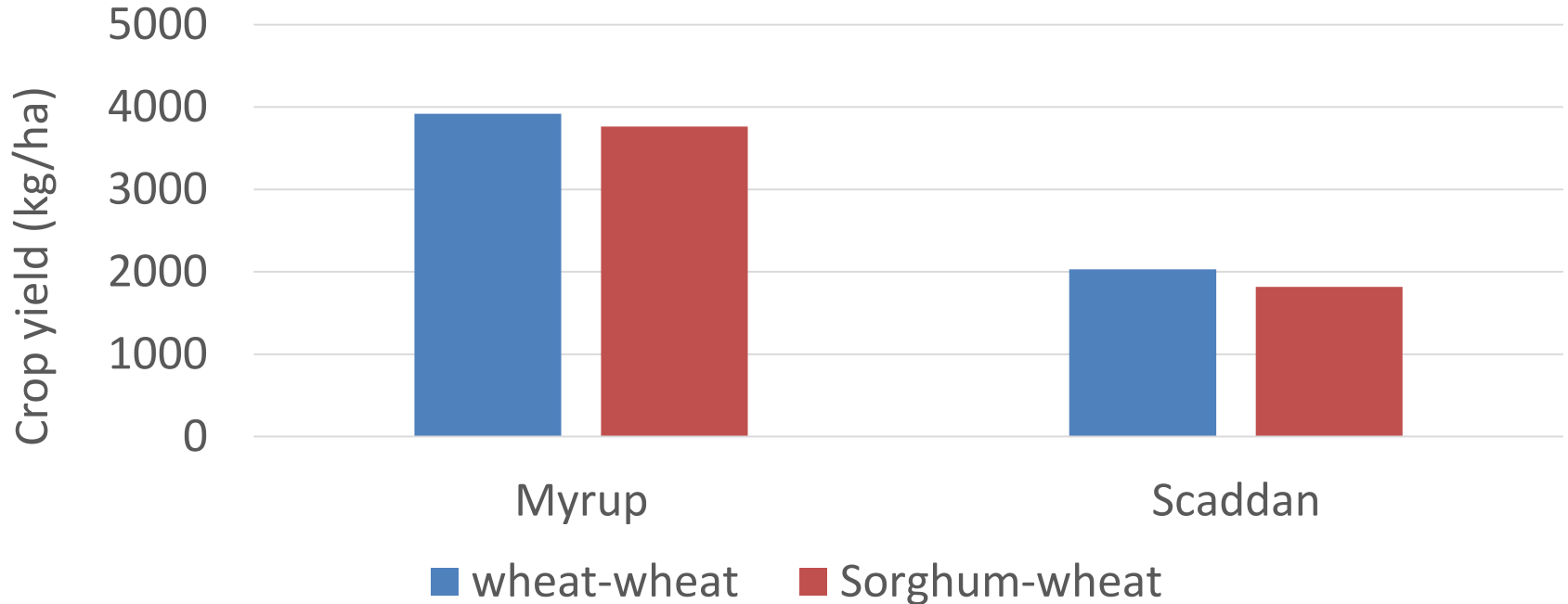
Likely sorghum grain and forage yields – opportunistic



Production variability, Scaddan



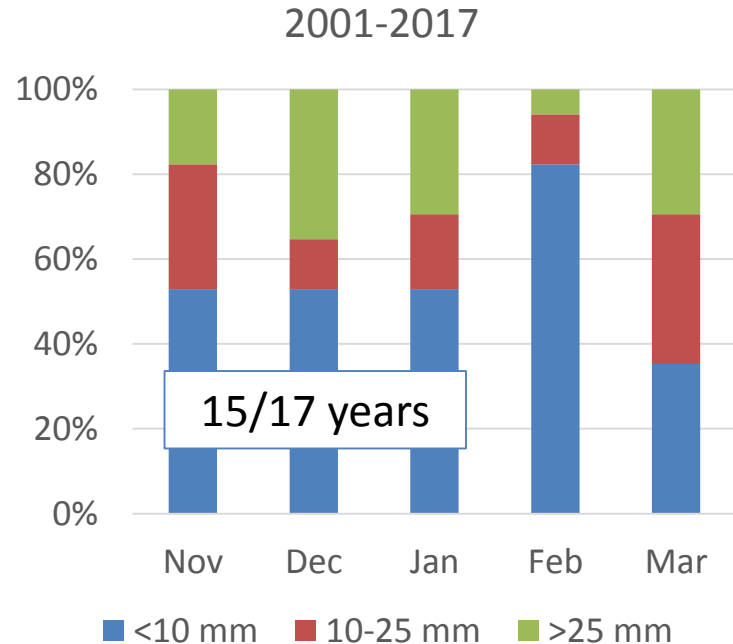
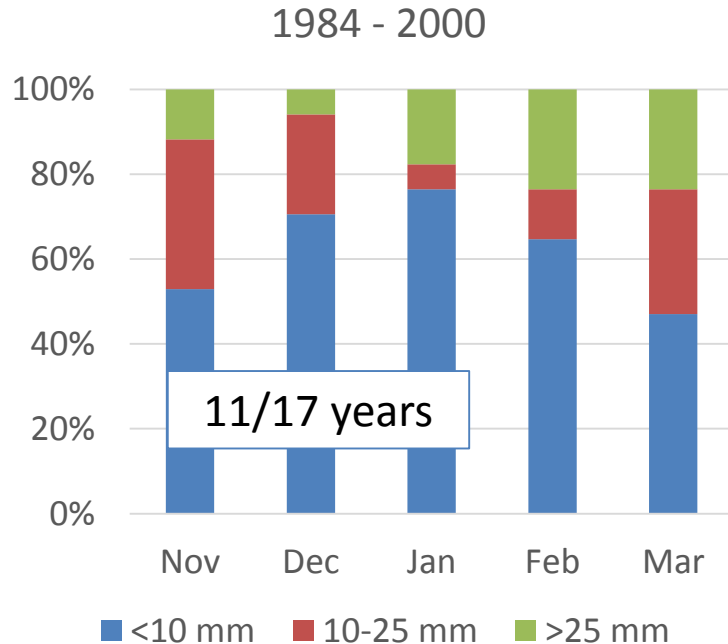
Effect on next winter crop – opportunistic summer crop



Summer crop after pasture or failed winter crop

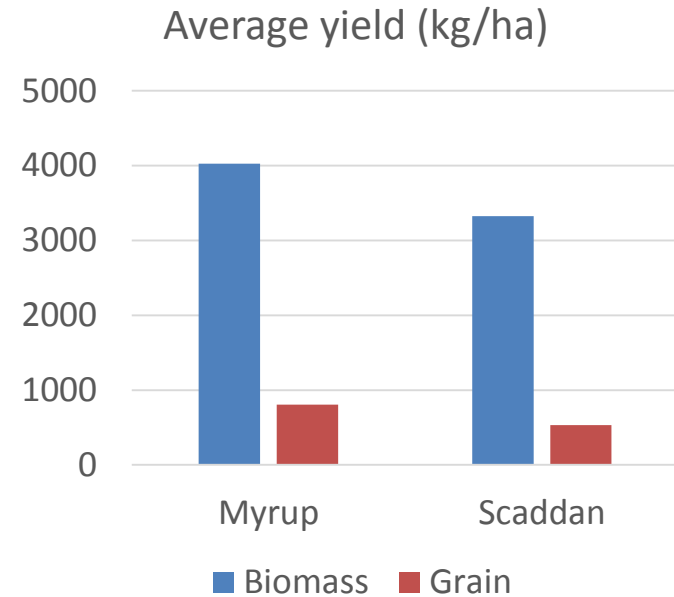
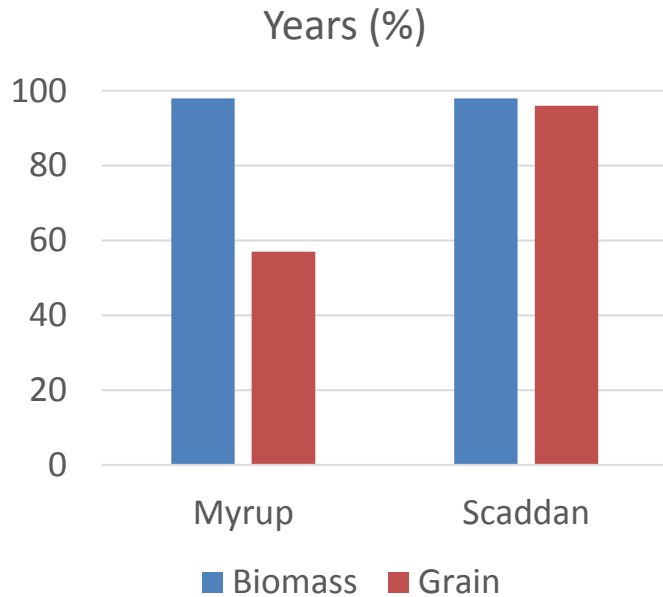
- Crop failure due to
 - Waterlogging, disease, pest, emu, frost, etc
 - Pretty much anything *except* drought
- No prediction on how frequently this happens
- Soil profile full of water below about 20 cm
- Still requires Nov/Dec/Jan rain for germination

How often does the 'sowing after a failed crop' window open?



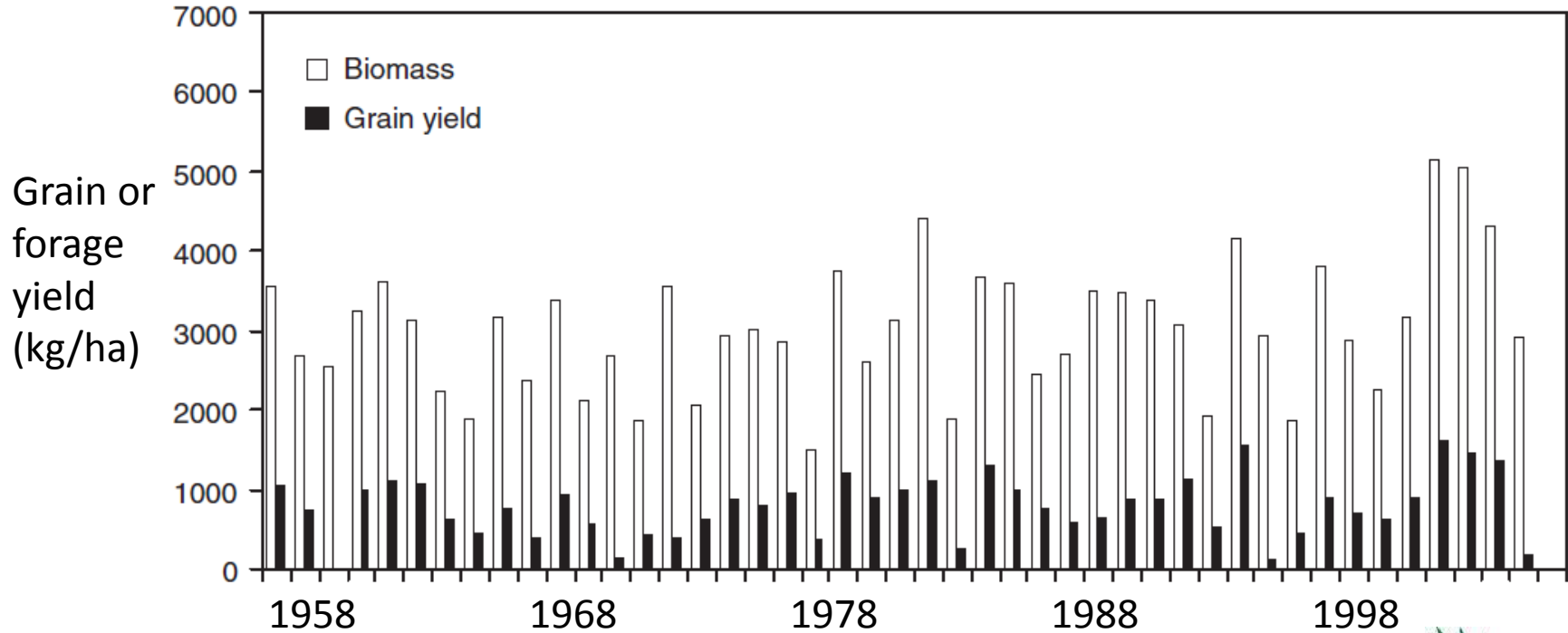
Looking for total rainfall of at least 10 mm occurring over 4 days

Likely sorghum grain and forage yields – failed winter crop

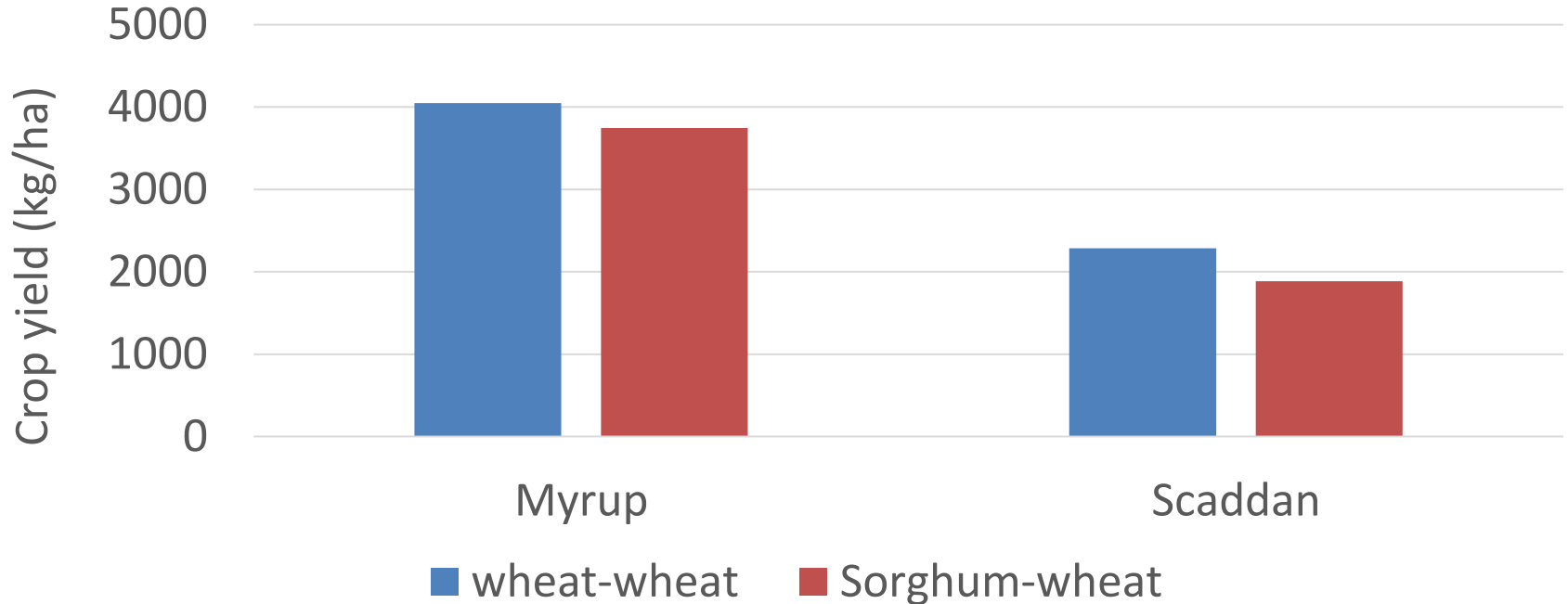


NB: Myrup annual rainfall 586 mm; Scaddan annual rainfall 415 mm

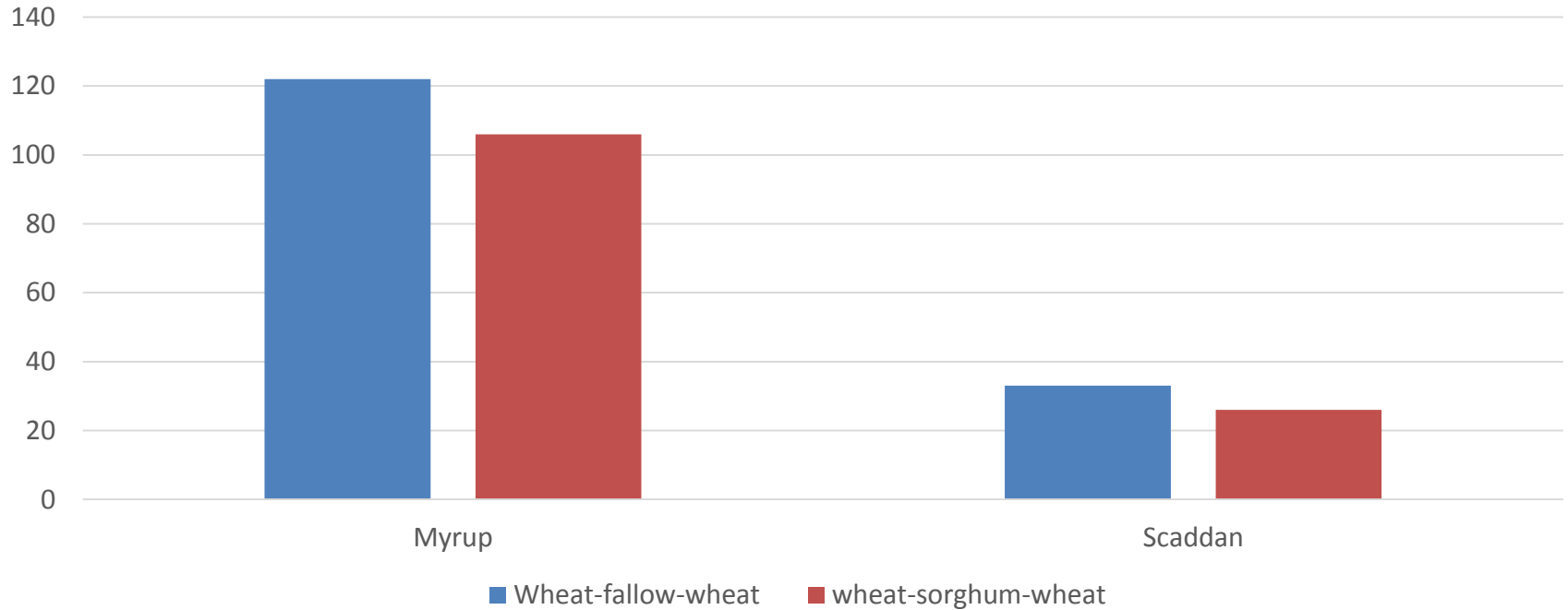
Production variability, Scaddan



Effect on next winter crop – summer crop after failed winter crop



Summer crops and deep drainage



Location, location, location

- Position in the landscape can be really important
- Lower, water gaining – grain more likely?
- Reliable forage for livestock

Summary

- **Sowing before November is risky – soil temperature too low**
- **Opportunistic summer cropping**
 - Could be sown in about 50% of years
 - Sorghum - average of 3 t/ha forage, or <1 t/ha grain
- **Summer crop after failed winter crop**
 - Can be sown in most years if winter crop fails
 - Similar yields to opportunistic cropping
- **On average, will reduce next winter crop yield by 200-400 kg/ha**
 - Higher yield losses in drier years
 - Can be yield benefits in wetter years
- **Very little impact on ground water**

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