

# Rainfed cropping – better water use and carbon fixation in north western NSW

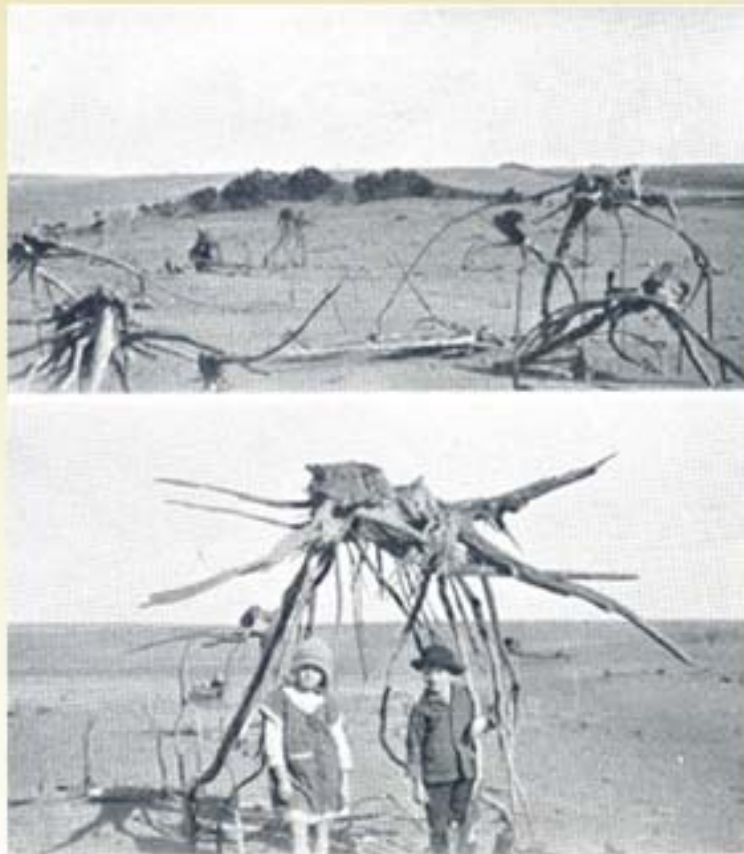
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*NSW Department of Primary Industries*  
*Tamworth Agricultural Institute*



## Rainfed cropping - better water use and carbon fixation in north western NSW

- Permanent agriculture means living on the soil's income, not its reserves
- Early clearing and continuous cropping of the mallee regions of southern Australia, stimulated by soldier settlement, was fostered by the state despite contrary "scientific prejudice"

■ [Callaghan and Millington 1956]



Exposed mallee roots  
showing the loss of  
about 8 feet of soil  
in the 1930's

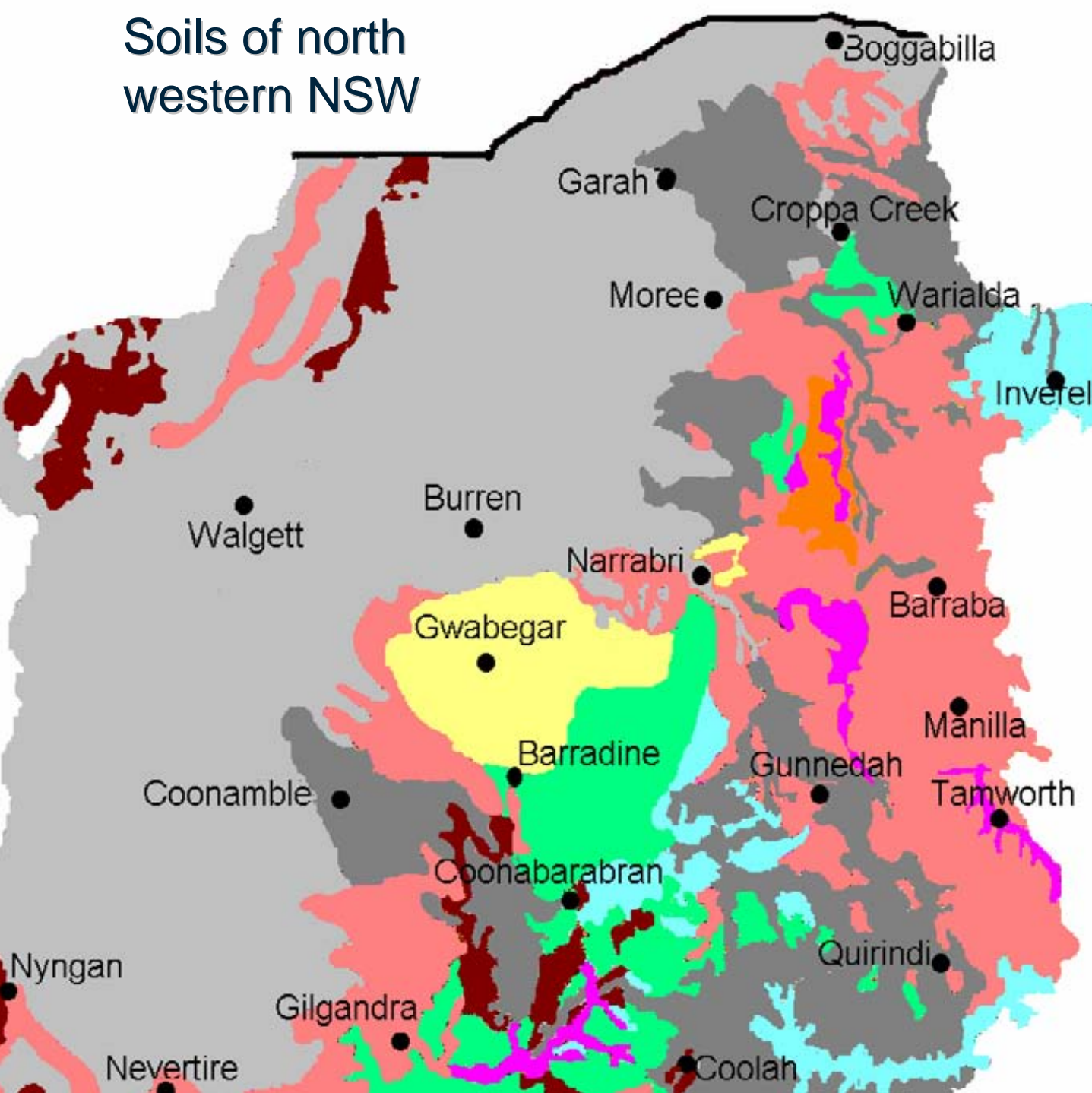
*(Department of Agriculture,  
South Australia)*

Source: Callaghan and Millington  
(1956)

Crop stubble ploughed in - not burnt - on the Darling Downs  
(early 1950s)



# Soils of north western NSW



'red' soils, sandy & loamy soils, from granite, sandstone (Chromosols, Kandosols, Sodosols)

black, grey and brown cracking clays, from basalt (Vertosols)

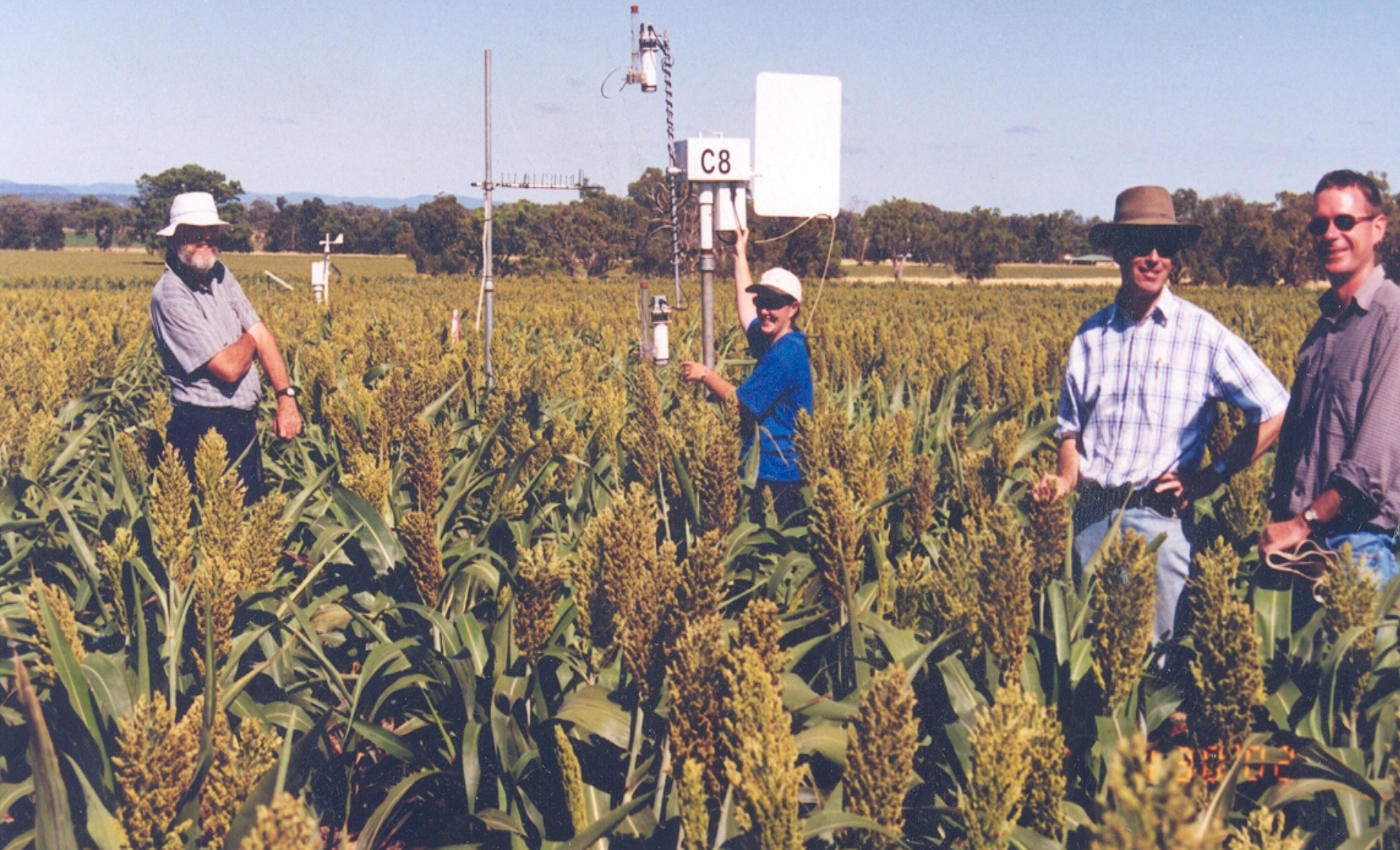


# Response or opportunity cropping

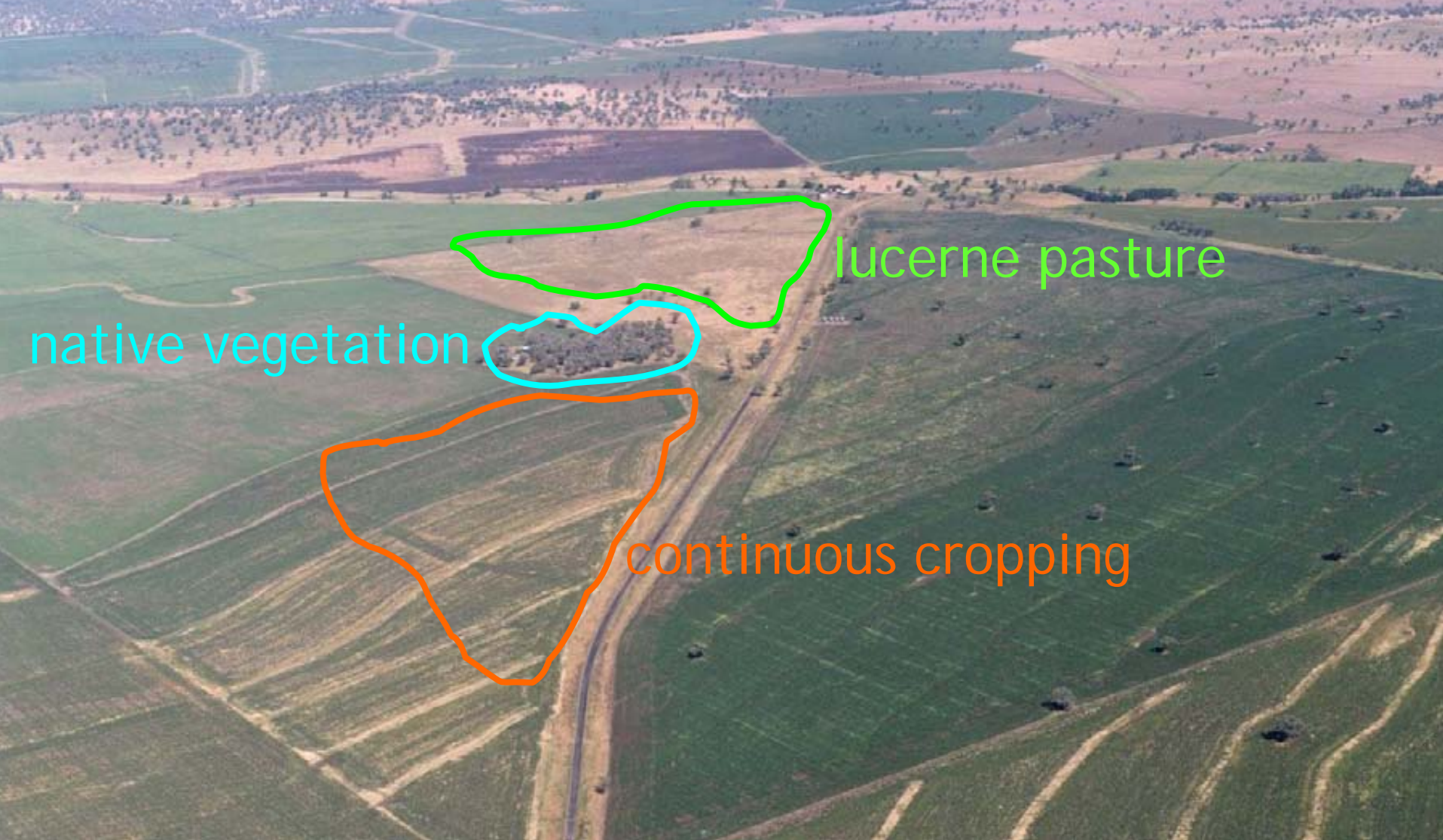
Mung beans double cropped into wheat stubble on 60 cm wet soil



# Measuring water use of grain sorghum using micro-meteorological (Bowen ratio) methods



# Comparison of historic deep drainage under native vegetation, continuous cropping and lucerne pasture between Willow Tree and Blackville



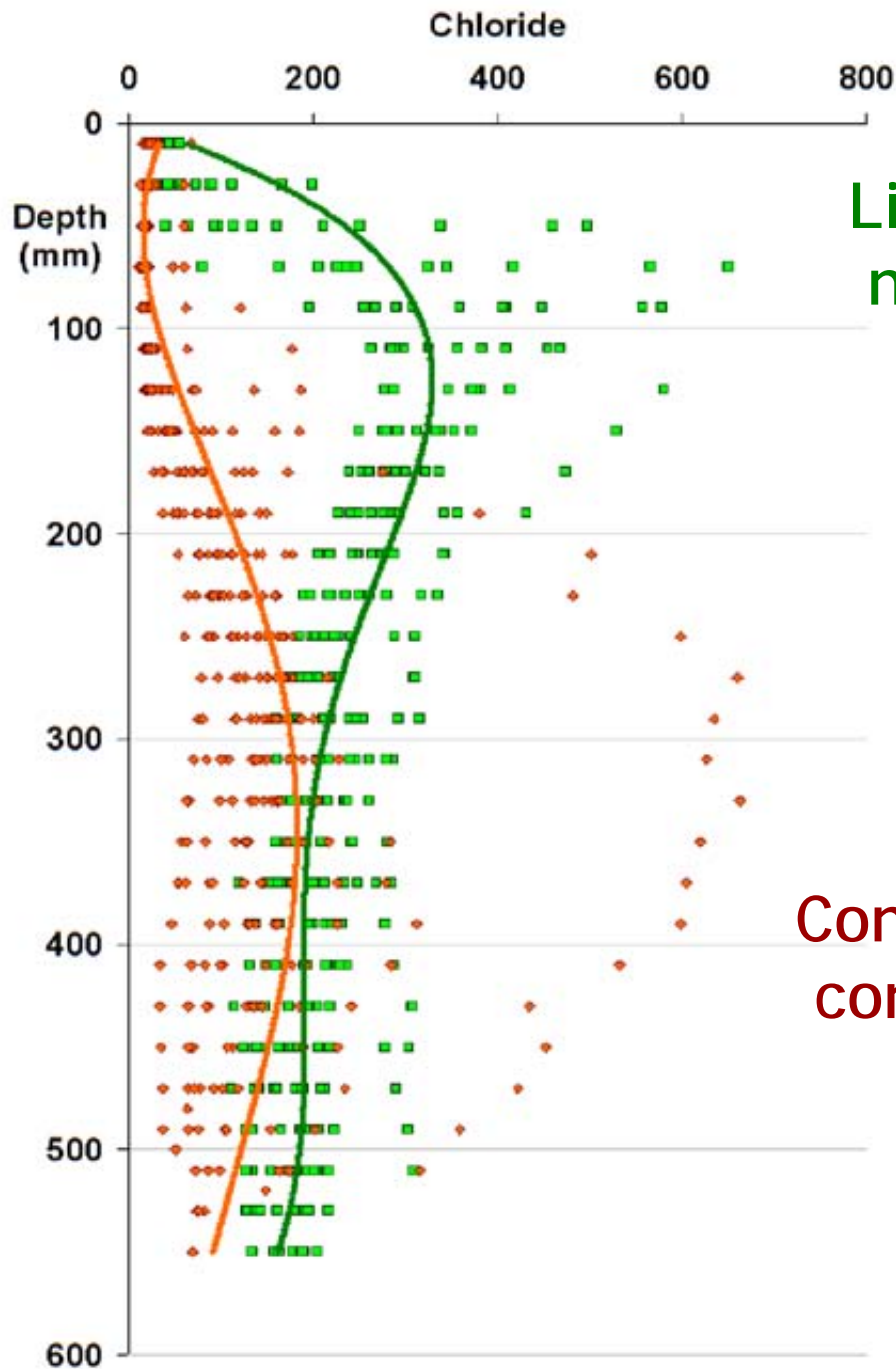
native vegetation

lucerne pasture

continuous cropping

Soil coring to compare historic deep drainage under native vegetation and cropping

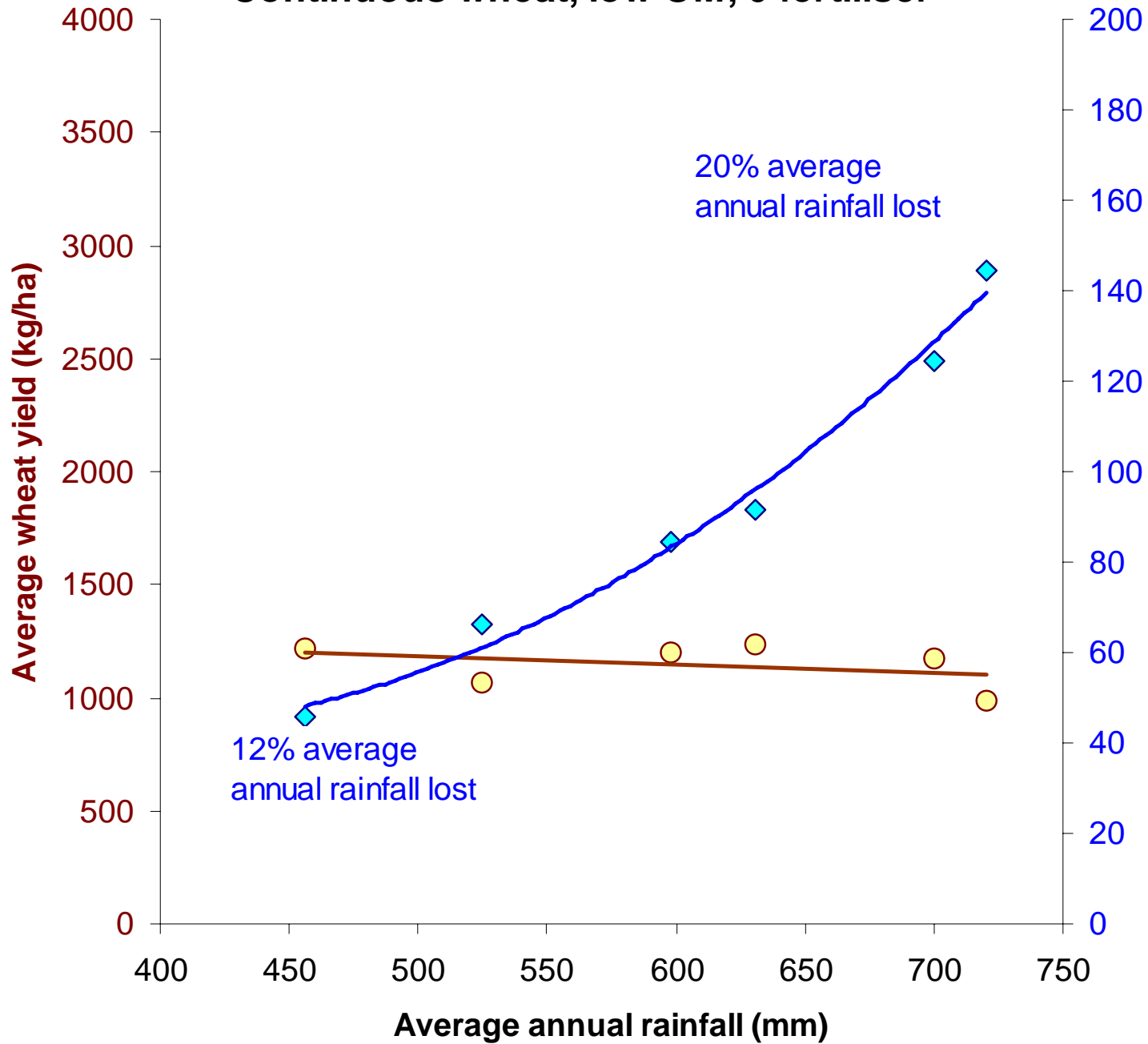




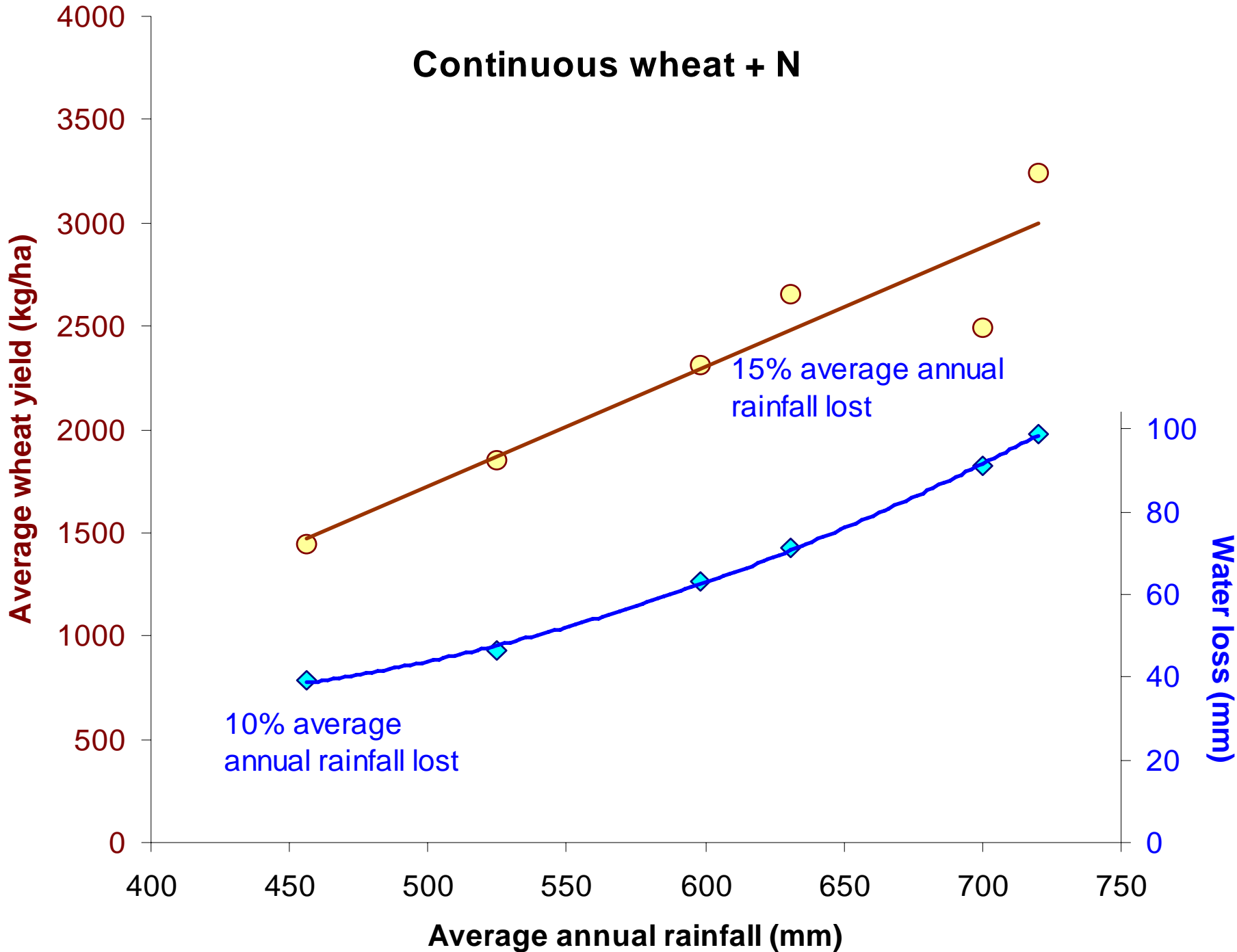
Little leaching under  
native vegetation  
= 1 mm/yr

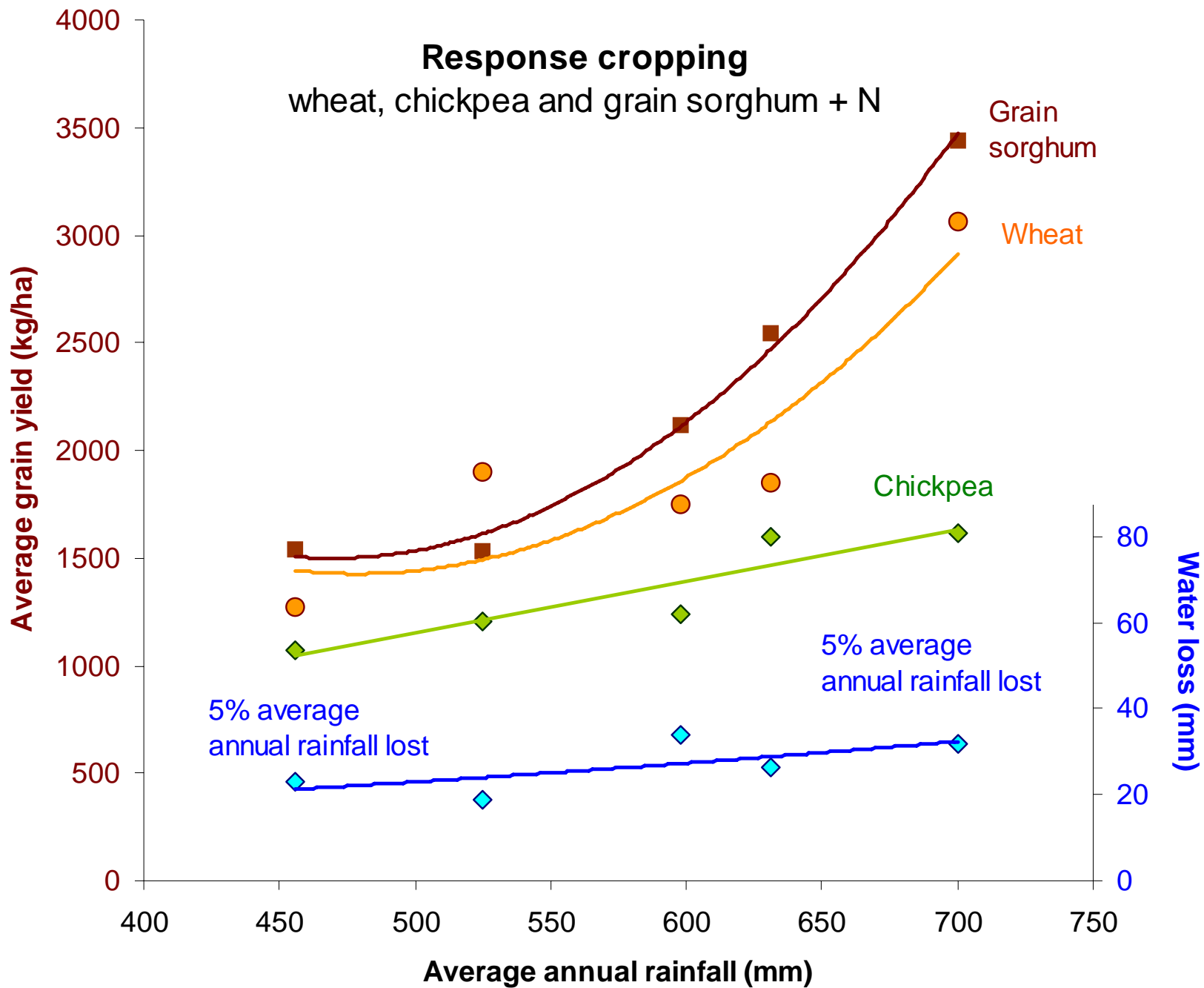
Considerable leaching under  
continuous cropping  
= 20 mm/yr

# Continuous wheat, low OM, 0 fertiliser



# Continuous wheat + N





# Response cropping

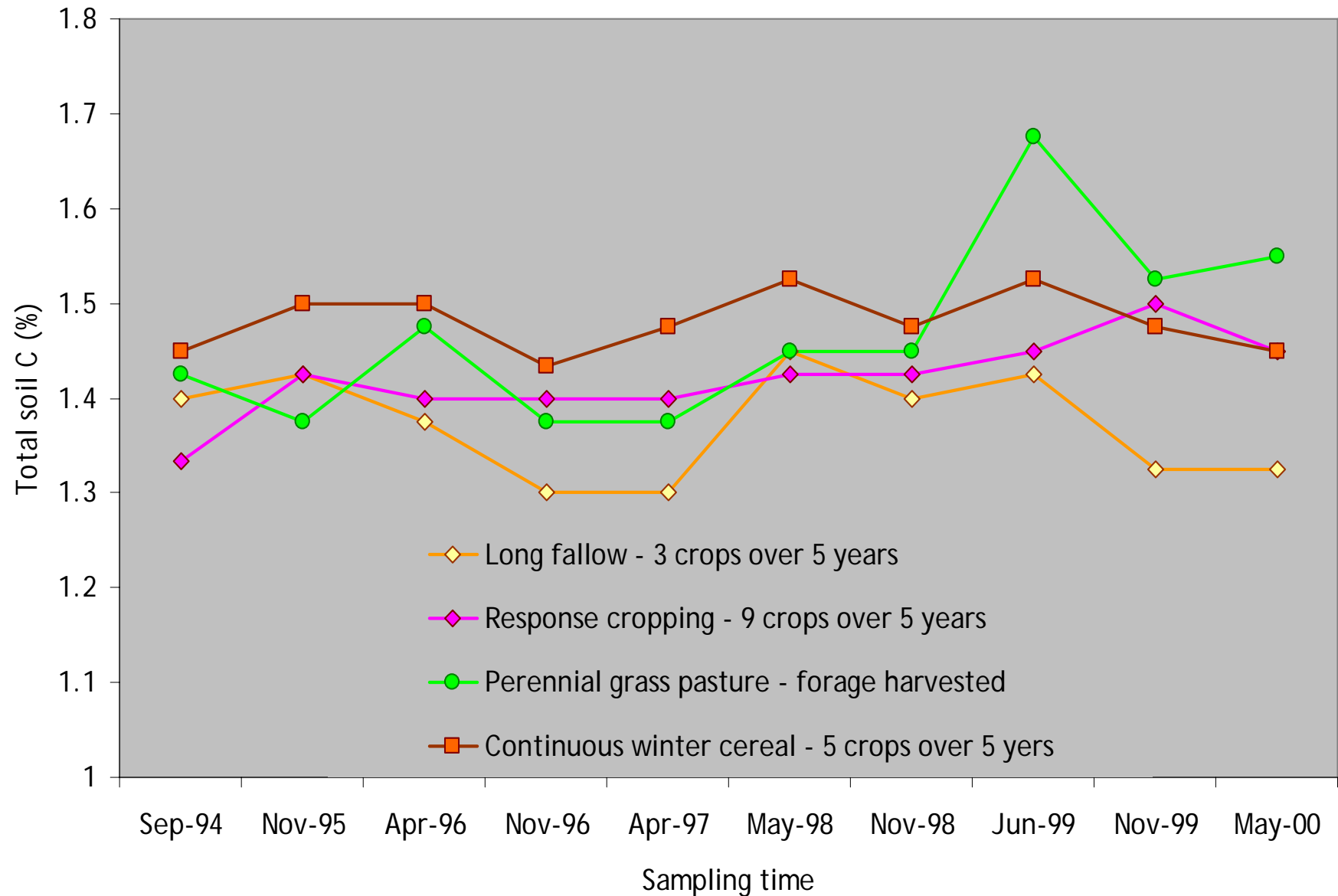
- effective capture and conservation of rainfall
- using stored soil water before the soil bucket overflows or leaks out the bottom
- maximizing the exchange of water by plants for atmospheric CO<sub>2</sub>
- dependant on healthy and profitable crops

# Permanent agriculture means living on the soil's income, not its reserves

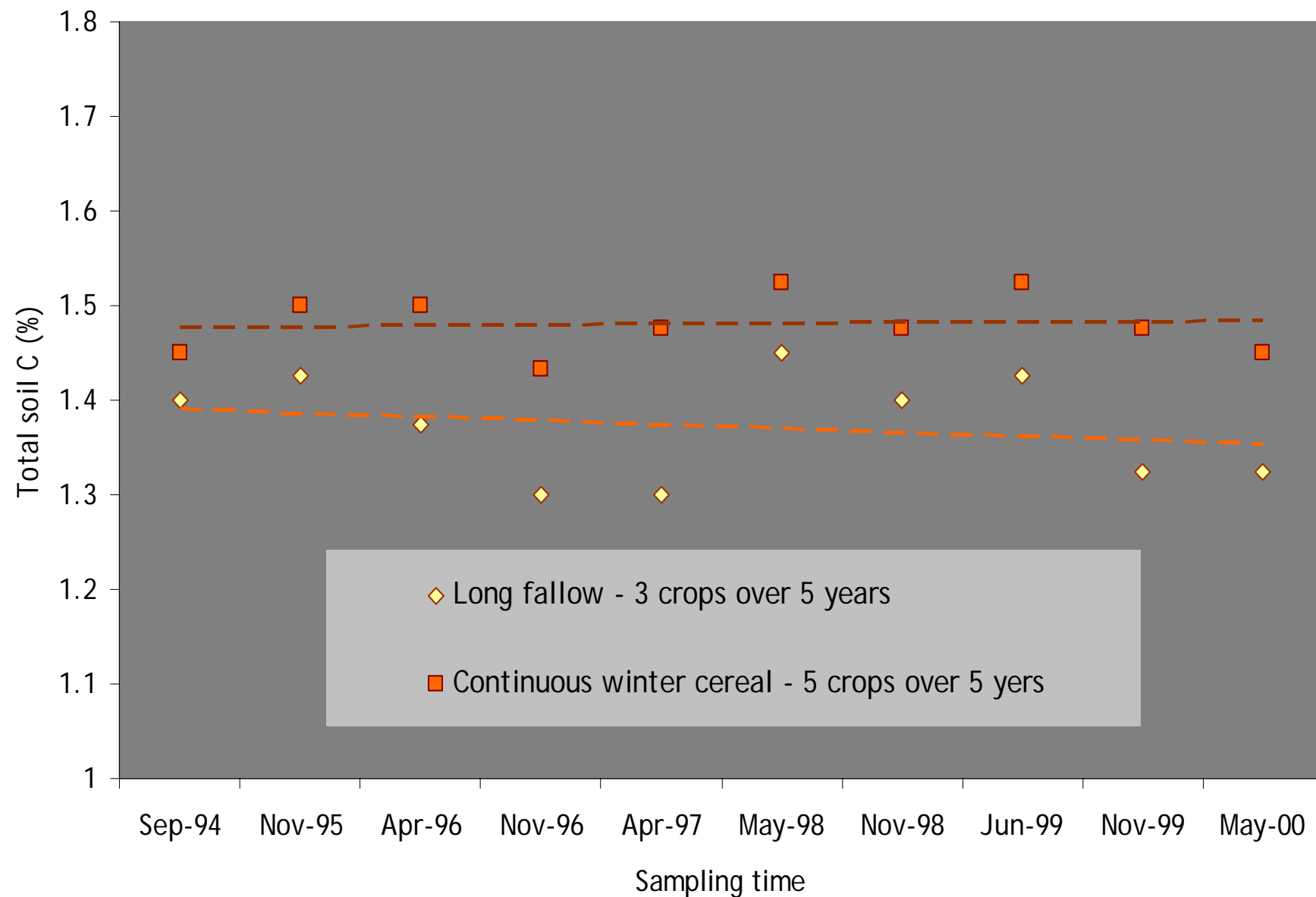
- Accumulation of carbon under conservation farming systems in north western NSW [NSW GHO CAG]
- Hudson 1994-2000



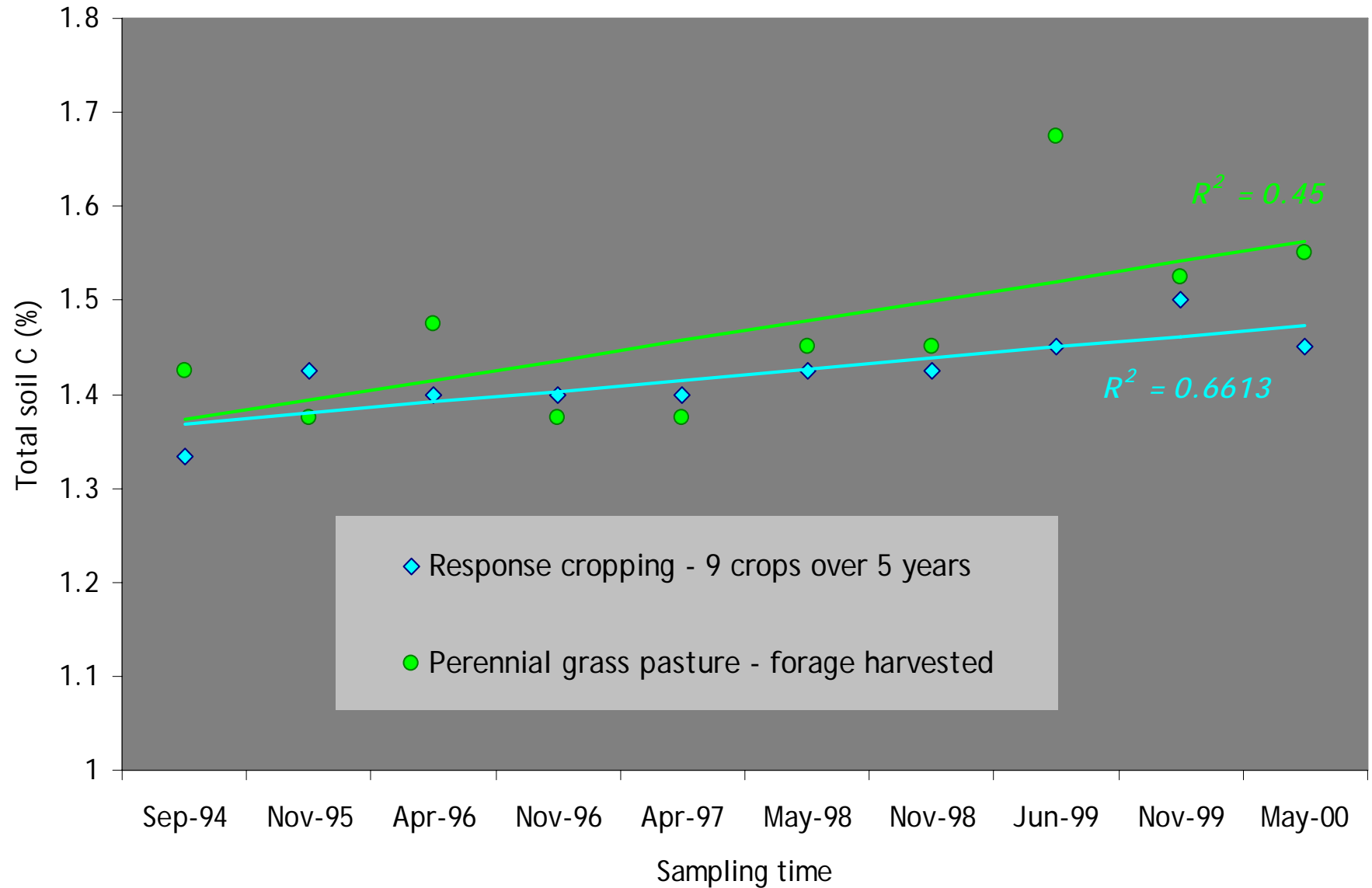
# Soil carbon under crops and pasture - Hudson 1994-2000



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