

Opportunities and Conflict in Agriculture and NRM in the Australian Tropics

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“A FOOD SECURE WORLD: Challenging Choices for our North”
The Crawford Fund 2011 State Parliamentary Conference
Parliament House, Brisbane
April 6, 2011

Key Points

- 1. Large natural resource base (soils, water, biodiversity)**
 - 2. Scope for future agricultural development is contested**
 - 3. Even so, is there adequate Northern R&D capacity in production agriculture?**
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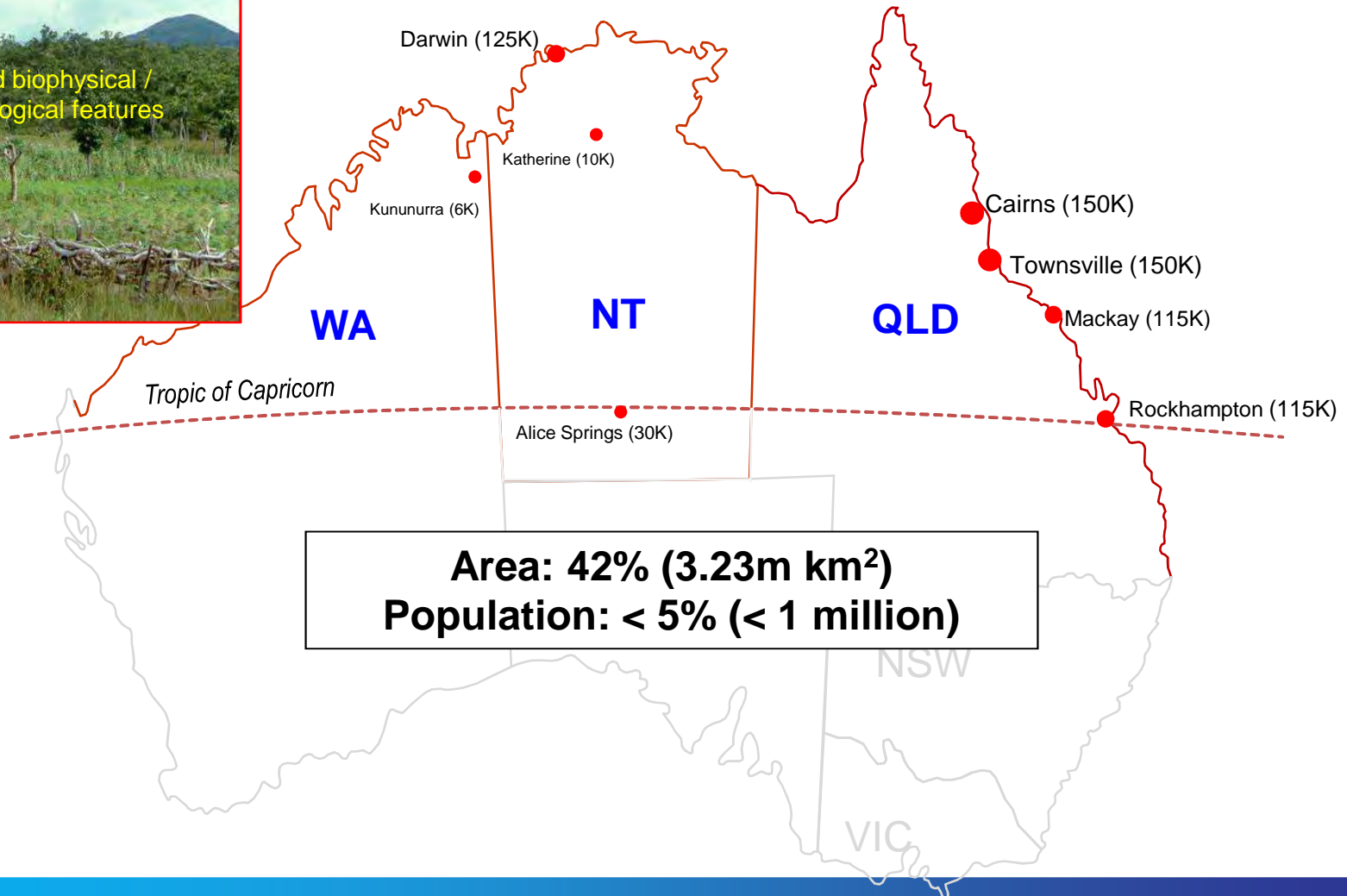
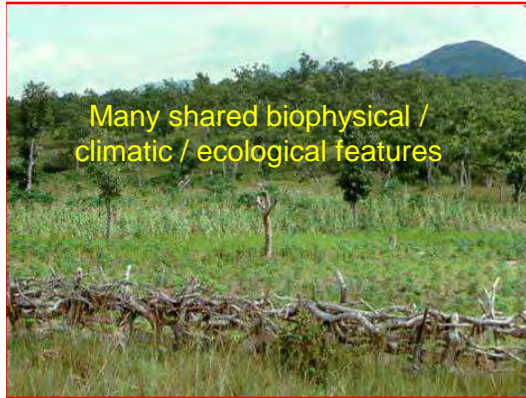
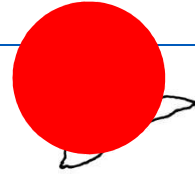
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TROPICAL AUSTRALIA

Huge area, low population density

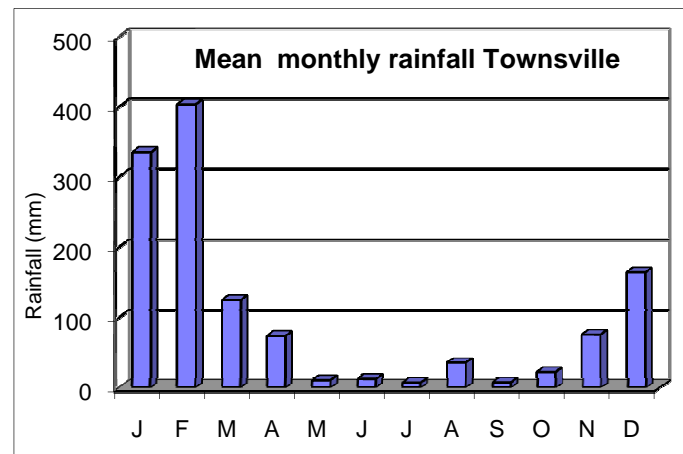
Timor (3000K)
0.037m km²



SEASONALLY ARID MONSOONAL CLIMATE

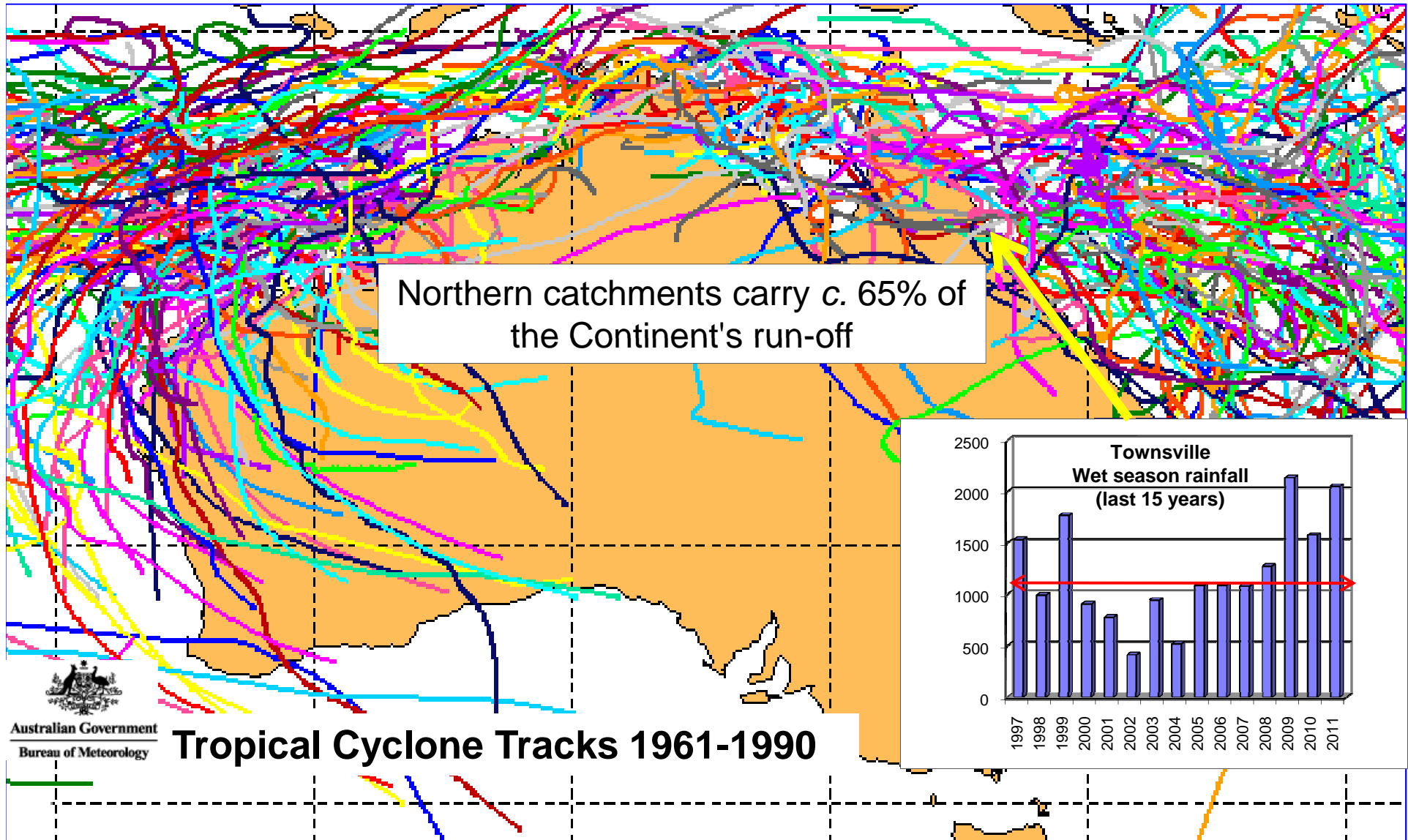
Tropical savanna woodland - grassland – desert ecosystems


Australian Government
Bureau of Meteorology



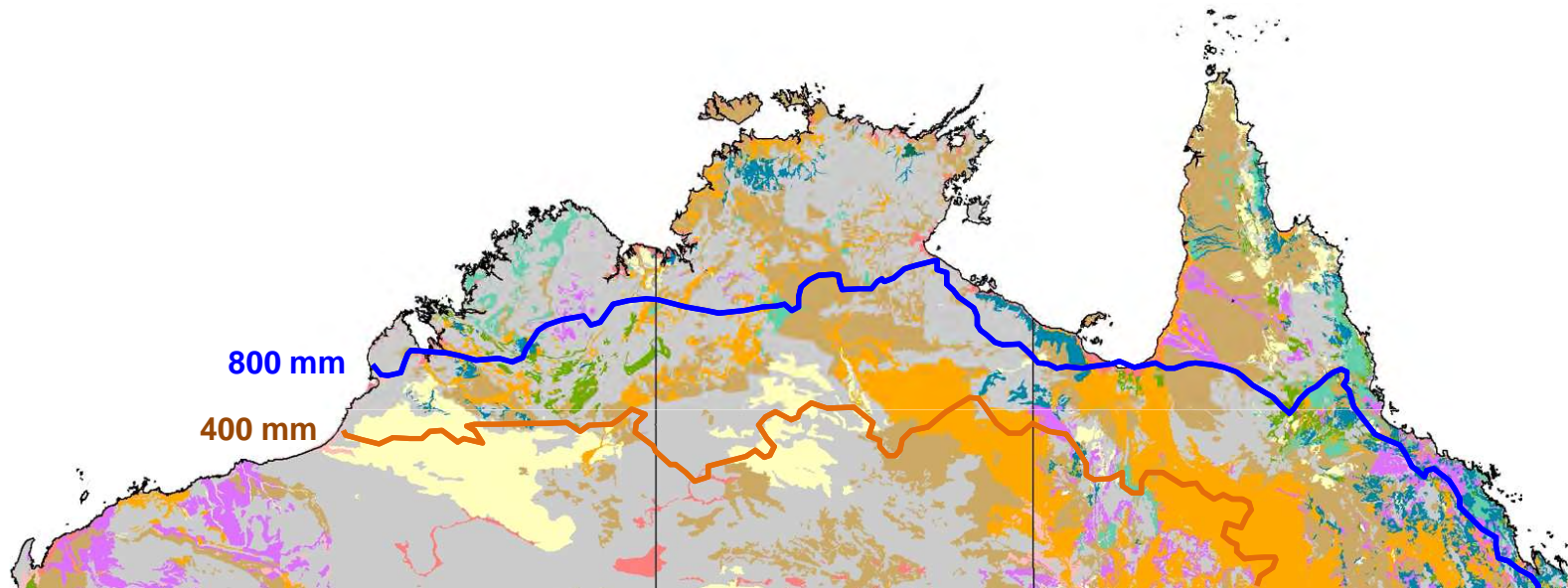
MOST RAIN DELIVERED BY MONSOONAL LOWS & CYCLONES

Large spatial & temporal variation



LANDSCAPES & SOILS

Ancient, highly weathered, uneven topography



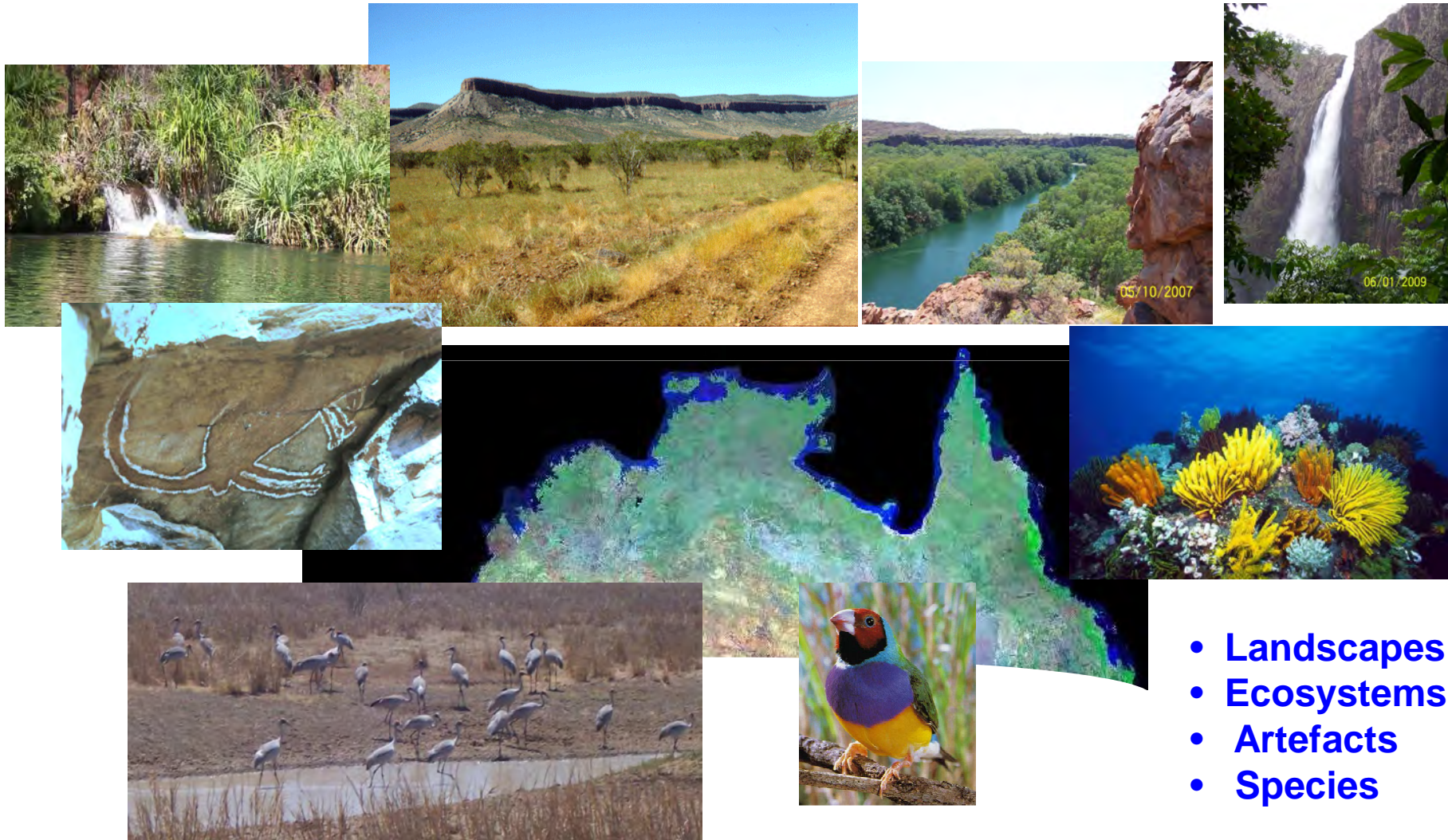
- Highly fragmented soil mosaics
- Generally low fertility, low C
- Fragile (i.e. erosion susceptible on disturbance)
- Even so, large areas are potentially arable, given water ...

“Crop production in northern Australia is limited by water, not soil ...”

(North Australia Land & Water Science Report 2009)

MANY UNIQUE, IN SOME CASES ICONIC FEATURES

National & International Conservation Value



- Landscapes
- Ecosystems
- Artefacts
- Species

The basis for the agriculture vs natural environment schism

Plus

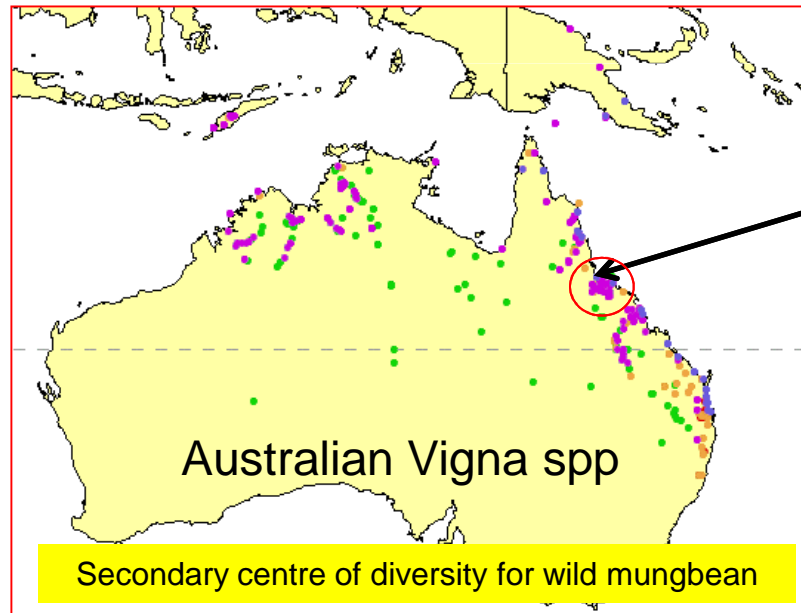
BIODIVERSITY RELEVANT TO AGRICULTURE National & International Significance



...+ many more



Wild Relatives of Cultivated Crops



Germplasm storage
in line with
International Treaty
obligations is a
national challenge



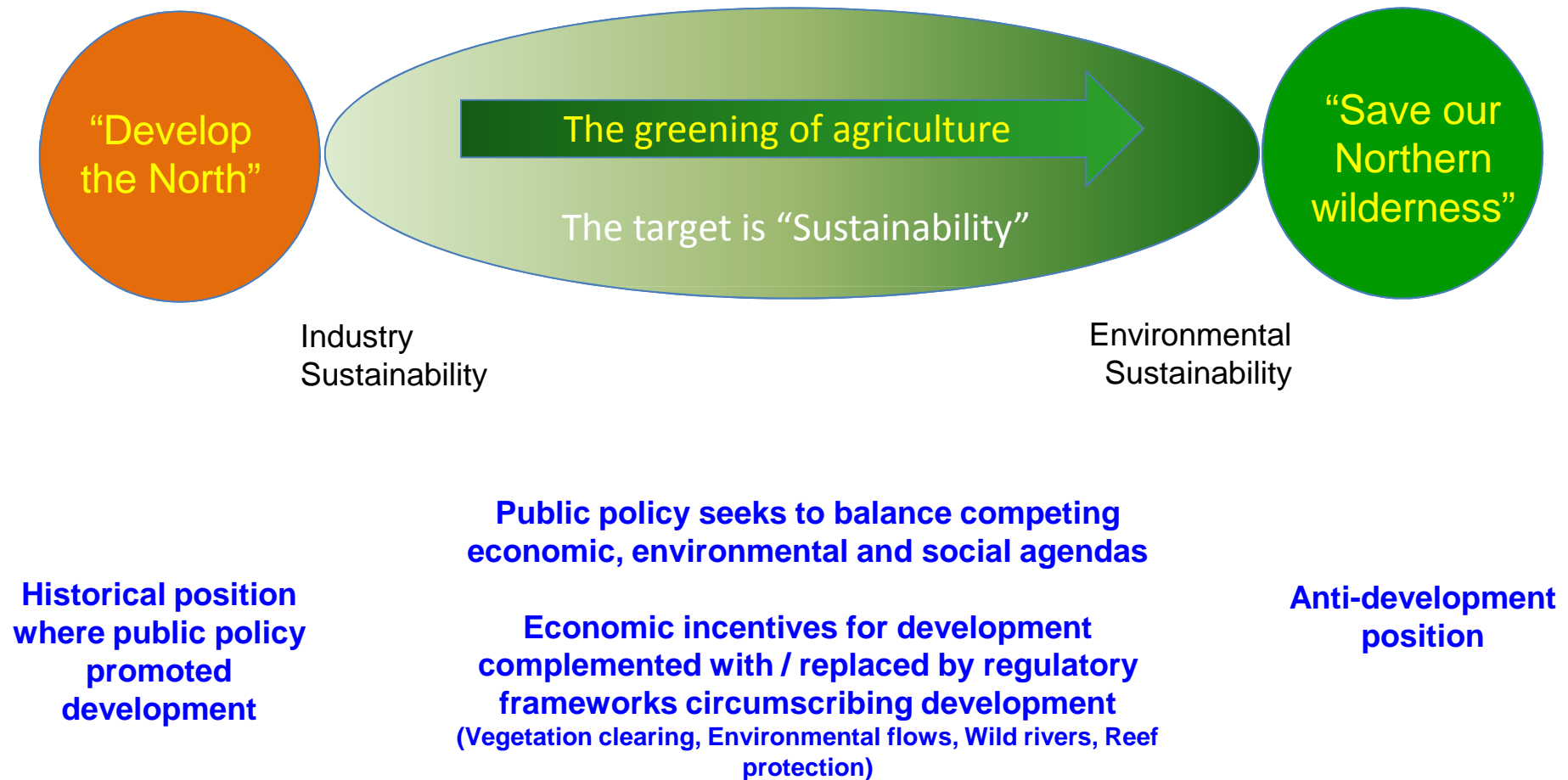
“Much of this biodiversity is new to science ...”

Key Points

1. Large natural resource base (soils, water, biodiversity)
 2. **Scope for future agricultural development is contested**
 - Competing values – development vs natural environment
 - Mixed record of past experience
 3. Even so, is there adequate Northern R&D capacity in production agriculture?
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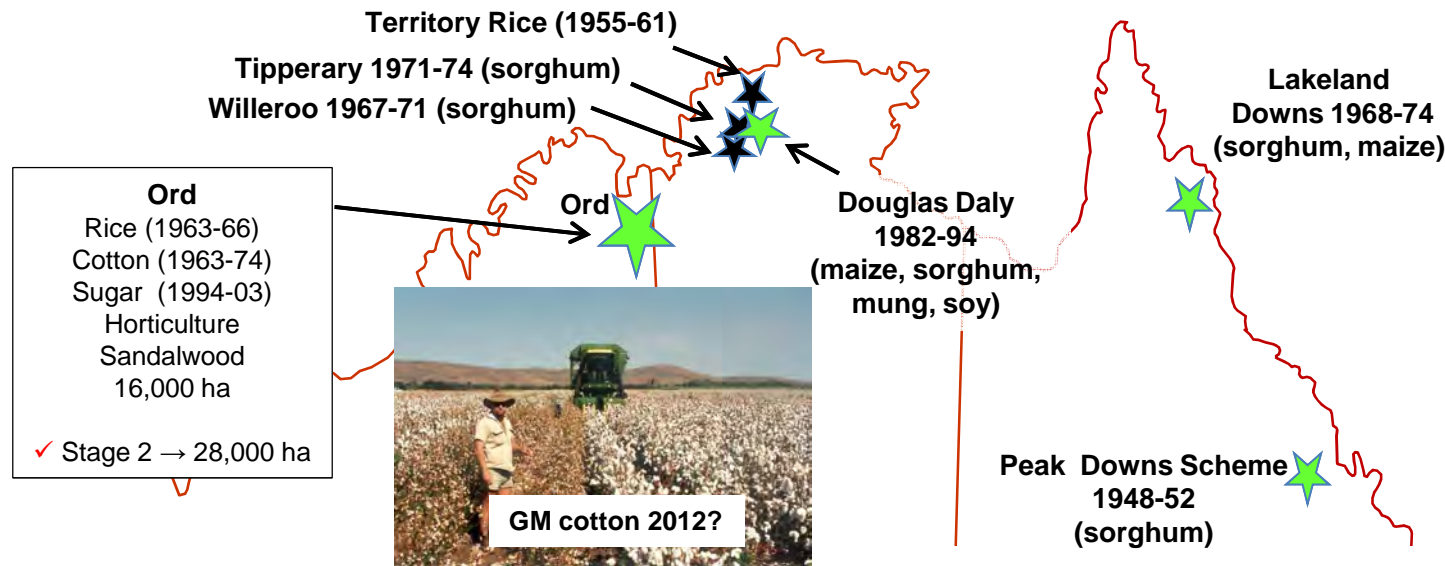
COMPETING COMMUNITY VALUES

Development vs Natural Environment



AGRICULTURAL DEVELOPMENT TO DATE

Mixed success with remote developments



Reasons for initial failures :

- **High cost structure** (remoteness, lack of markets, infrastructure, centralised admin.)
- **Unsuitable technology** (imported from south)
 - Massive issues due to highly variable rainfall, difficult soils, biotic challenges
 - R&D played 'catch-up' - solutions often delivered after the event

Proponents of Northern Development point to the ultimate successes ★

Opponents focus on the initial failures ...

ESTIMATES OF NORTHERN POTENTIAL HAVE CONTRACTED Especially for irrigation

Pre-1980s Projects	ha
Territory Rice	200,000
Ord River	72,000
Lakeland (partial)	6,000
CSIRO Land Research (1960-1970)	
North Kimberley	At least 80,000
West Kimberley	“Excellent dam sites”
National Land & Water Audit (2001)	
Surface water (NT alone)	107,000
Groundwater (NT alone)	27,500
Northern Australia Land & Water Science Review (2009)	
All northern Australia	60,000 perhaps up to 120,000
	Mainly groundwater (“No more dams”)



Drivers for the downgrades on earlier optimistic assessments:

- Early adverse development experiences
- More detailed knowledge of the resource base
- Assessments of possible environmental impacts factored in
- Strong sensitivity to past mistakes in southern Australia
 - Over-allocation, extensive clearing, degradation, salinity

Key Points

1. Large natural resource base (soils, water, biodiversity)
 - A brief overview
 2. Scope for future agricultural development is contested
 - Past experience
 - Competing values – development vs natural environment
 3. **Even so, is there adequate Northern R&D capacity in production agriculture?**
 - Capacity in crop & pasture science in the North has collapsed
 - The Brazilian Cerrado: A case study on what can be achieved with R&D
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NORTHERN CAPACITY IN CROP & PASTURE SCIENCE

Whither or wither Northern Agriculture ?

➤ Lessons from the past

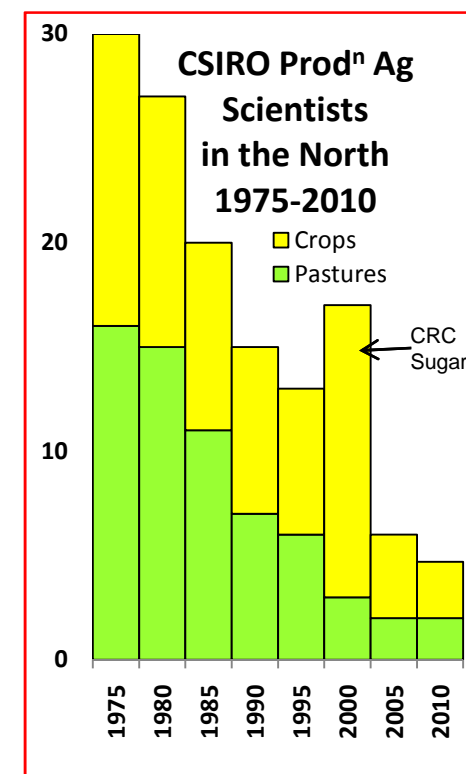
- R&D needs to be proactive, not 'catch-up'
- Systems R&D needs to be developed locally, not imported (Some elements transferable e.g. GM cotton varieties in the Ord)

➤ Northern R&D in crop & pasture science has shrunk

- Much more than the downsize in regional potential

➤ Does the North retain adequate R&D capacity?

- Or will the North once again be reliant on imported capacity or "fly in – fly out" science



“Our landscapes are remote but the relevant science is even remoter”

Noelene Gross, CEO Northern Gulf Resource Management Group, Outlook 2010

A CASE STUDY IN THE VALUE OF AGRICULTURAL R&D

THE BRAZILIAN TROPICAL SAVANNAS (CERRADO) 1970-2010

The World's largest expansion of mechanised dryland agriculture in the tropics



➤ More favourable climate & terrain, but like the North:

- Natural vegetation is depauperate savanna
- Infertile soils (acidic oxisols)
- Early large-scale project failures (unsuitable 1970s USA technology)

➤ Unlike the North:

- a massive sustained R&D effort (EMBRAPA)
- successful no-till cropping systems integrated w. livestock
- 50 m ha (→ 300 m ha)
- World's #1 Food Exporting Nation (70% ex cerrado)

See "The Miracle of the Cerrado" *The Economist*, 28 August 2010



No-till legume cereal rotations



Sao Paulo State 2010:
2000 New Agronomy
Graduates

An aerial photograph of a rural landscape. The foreground and middle ground are dominated by large, rectangular green fields, likely corn or soybean crops, separated by narrow dirt roads or furrows. A dense forest of trees runs diagonally across the middle ground, separating the fields from the background. In the distance, more green fields and a few small buildings are visible under a clear sky. The overall scene is a typical agricultural landscape.

Thank You