

# Food for us, food for bees, food for thought



Katja Hogendoorn, Andrew Lowe



Australian Government  
Department of Agriculture  
and Water Resources



# Imagine a world without pollinators...



# Pollinators are important:

- 80% of crop species benefit from pollinators  
our staples foods do not
- 30% of our diet
  - 75% of vitamin C
  - Vitamin A, E
  - calcium, fluoride, iron
  - 95% of folic acid
- numerous vegetable seeds
- seeds of food plants for livestock
- 9 % of world crop production (GDP)



# Value of pollinators for South Australian crops



almond: 100% reliant on pollination

	Crop value	% reliance	Value of pollination
Almond:	\$ 126 m	100 %	\$ 126 m
Lucerne:	\$ 85 m	100%	\$ 85 m
Canola:	\$ 400 m	15 %	\$ 60 m
Apple:	\$ 75 m	80 %	\$ 60 m



lucerne seed : 100% reliant on pollination



canola: 15% increase in market value



apple: 80% reliant on pollination

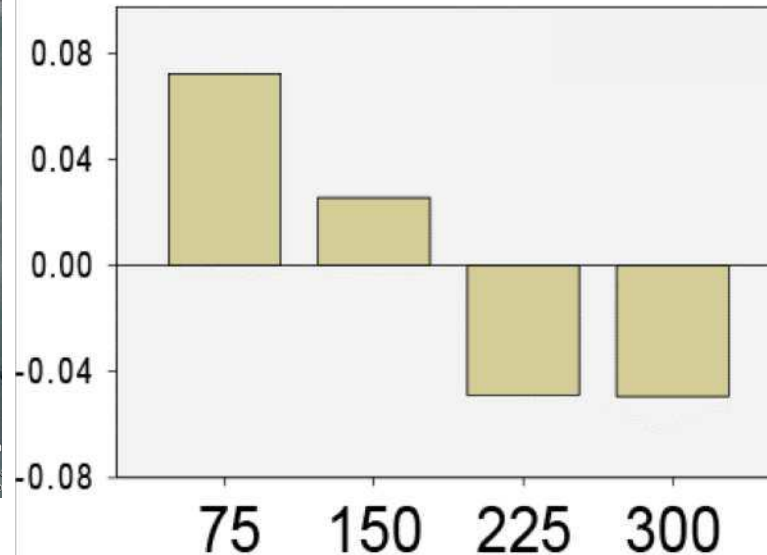
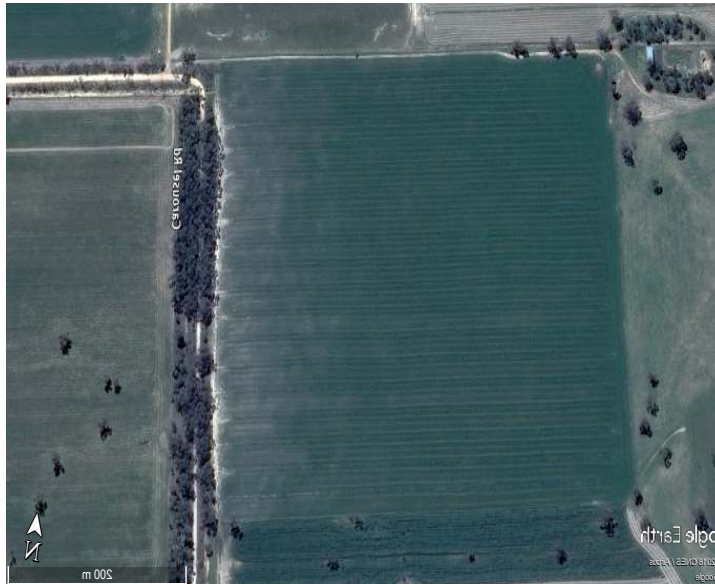
# honey bees: managed hives



currently growers pay ~ \$ 25 M for pollination

# honey bees: feral hives

- In areas with old trees and water
- > 22% production of seed lucerne
  - 67% of dryland seed growers do not use hives
  - value: \$ 20 – 25 M
  - edge effects in irrigated lucerne



## Native bees:

- 1700 species in Australia
- 50 species found on crops

## Other pollinators:

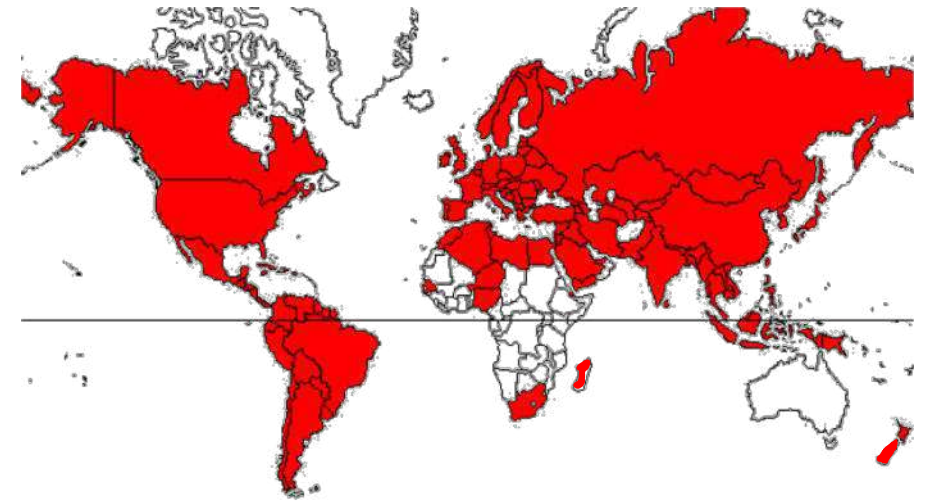
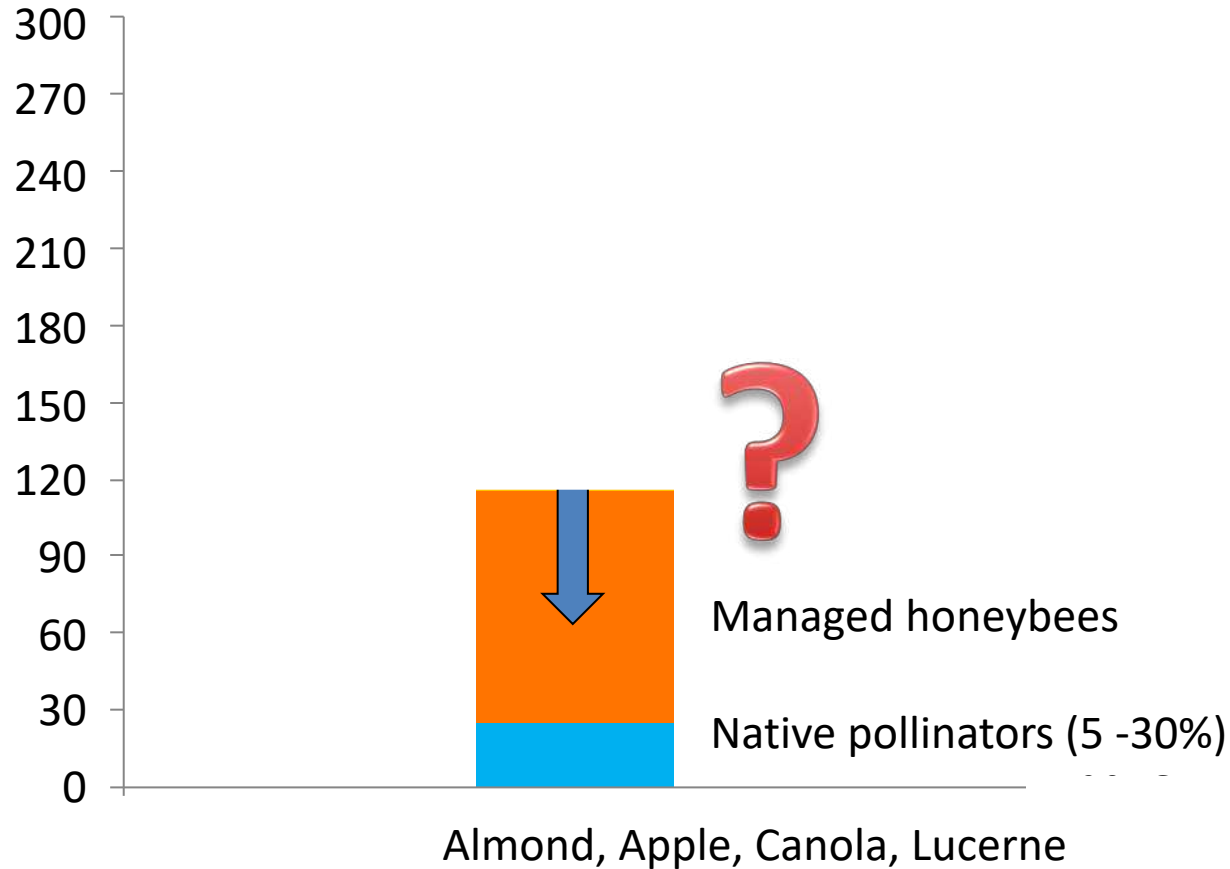
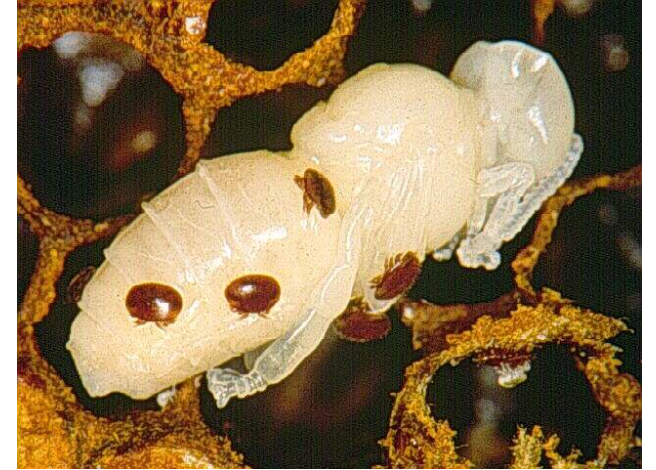
- Wasps
- Flies
- Moth
- Butterflies
- Beetles

0 – 30% of pollination services



# Value of pollination in South Australia

>> \$A 275 mln p.a.



Other pollination dependent crops:

Cherry, Pumpkin, Avocado, Capsicum, Zucchini, Tomato, Passionfruit, Melon, Watermelon, Faba beans, Plum, Apricot, Macadamia, Blueberry, Sunflower, Nectarines, Strawberry...



# Varroa: Likely consequences for Australia

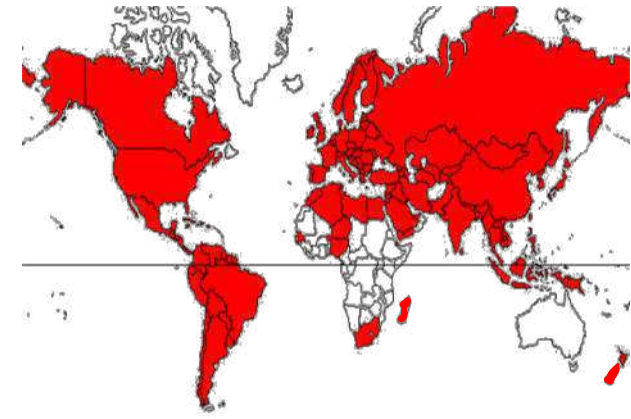
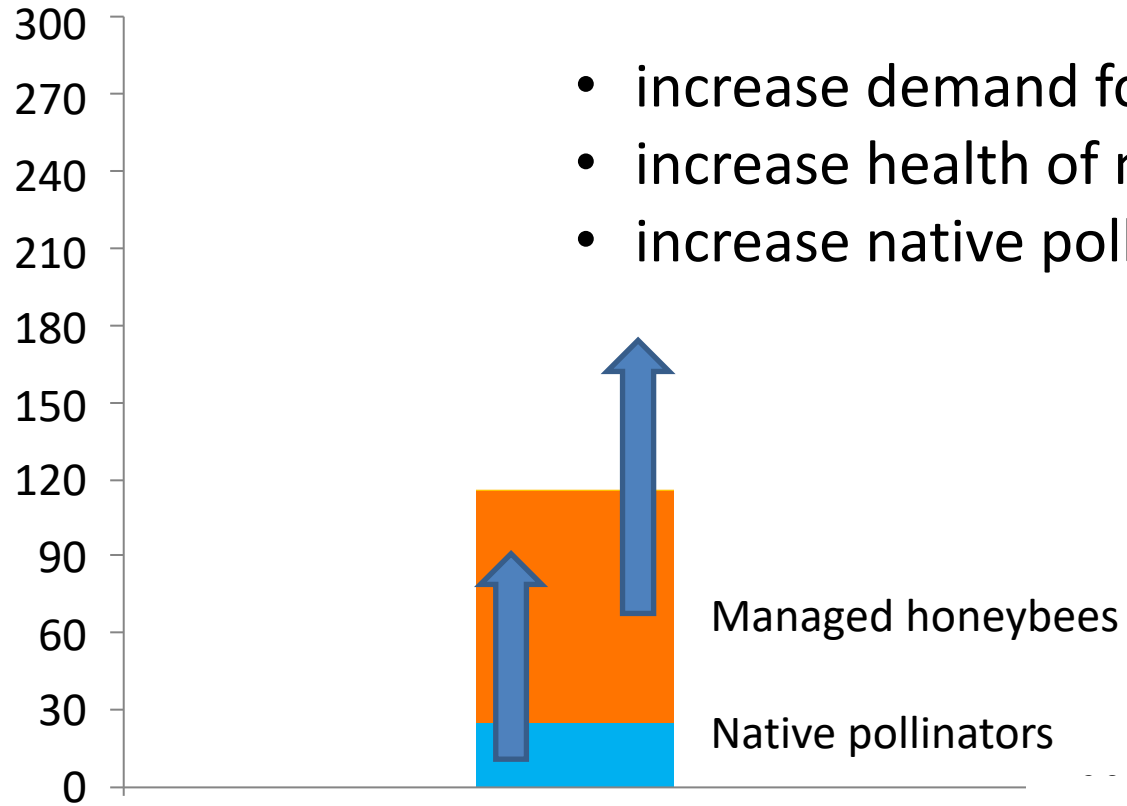
Loss of free pollination services from feral hives:

- Reduce crop yields
- Increase demand for managed hives
- Increase costs of managed hives  
(300% in NZ)



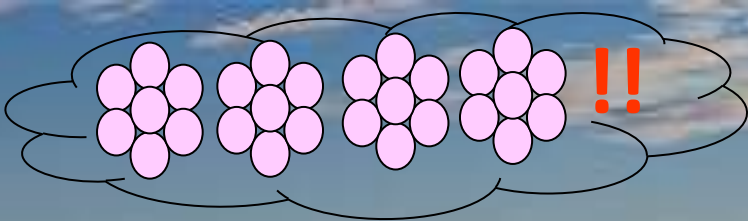
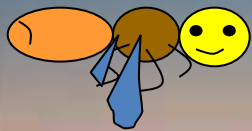
# Prepare for Varroa:

- biosecurity ✓
- increase demand for managed hives (-)
- increase health of managed hives (-)
- increase native pollinator populations (-)



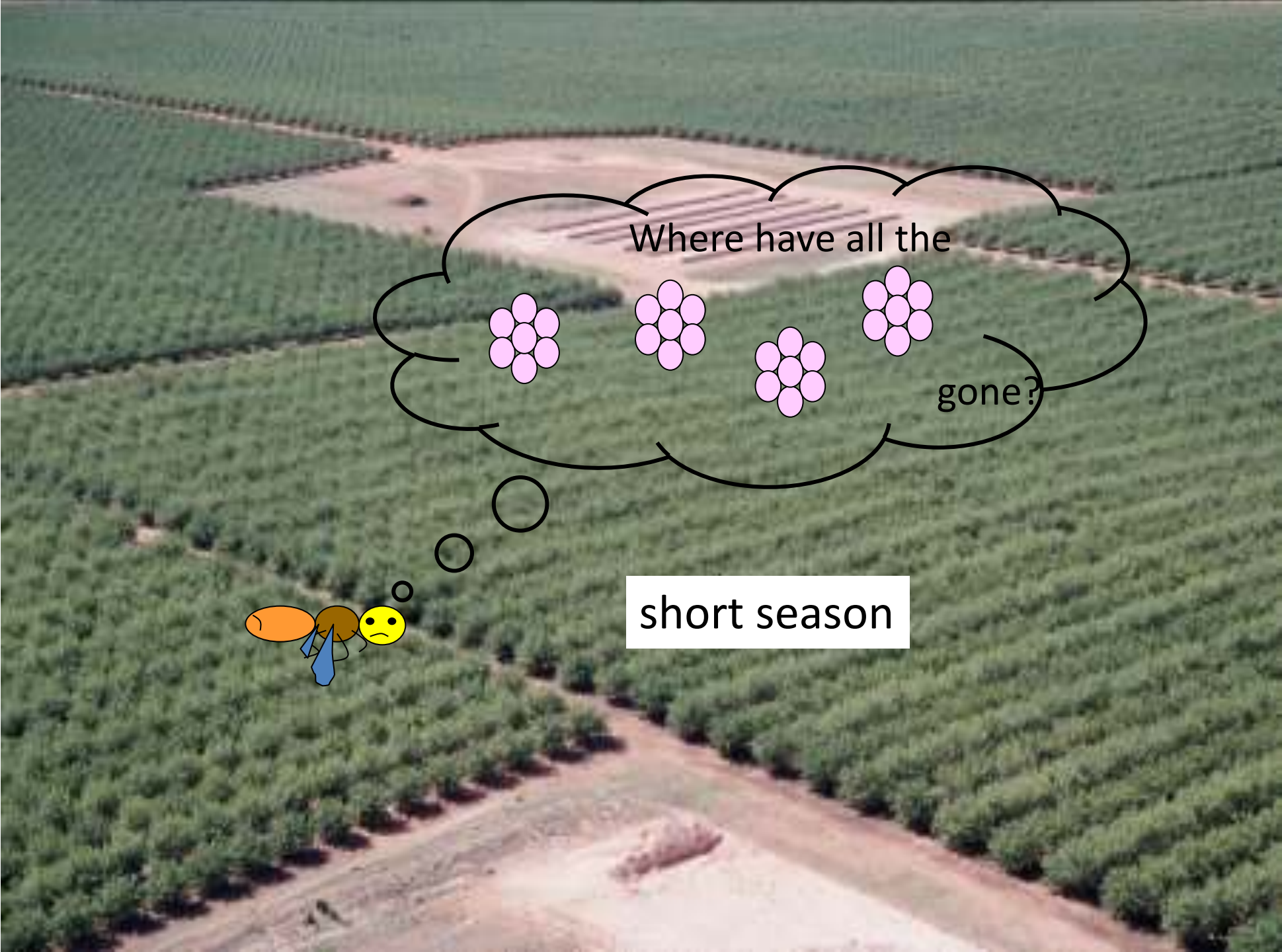
How??

- Creating healthy environments for crop pollinators

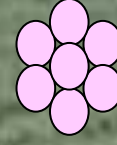
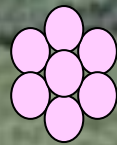


One-sided nutrition





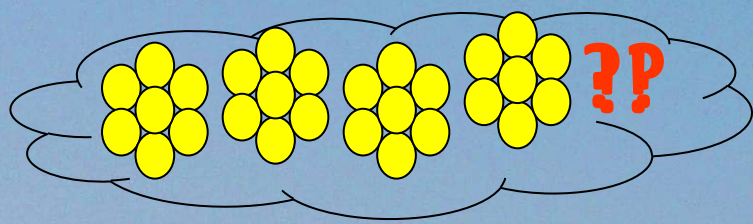
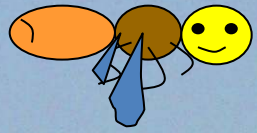
Where have all the



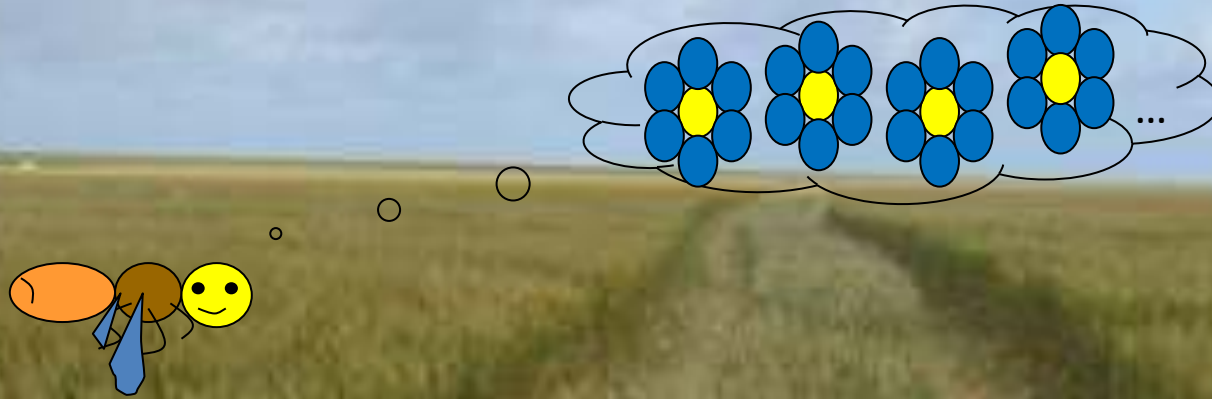
gone?

short season





**Large fields and crop rotation can mean  
NO Food for next generation**



# Extreme environment: crop rotation + herbicide



# Poor bee nutrition

- weakens immune system
  - reduces ability to deal with:
    - pesticides
    - disease
- ⇒ diseased bees (honey bees)
- ⇒ local extinctions (native bees)



Lack of pollinators affect crop production:

- increase cropping area to meet demand
- hand pollination
- move away from pollination dependent crops





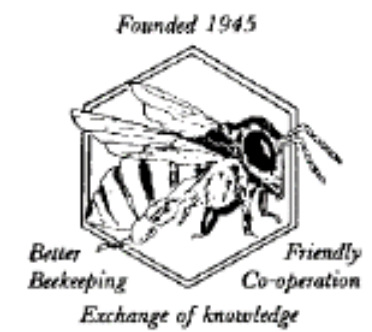


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# Plantings to support bees in the crop environment

## Specific for crop and region

- Minimise competition with crop for visitors
- Not have other adverse effects
- Be able to grow locally

## Different types of plantings

- Hedgerows
- Under trees
- whole area

## Quantify costs and benefits

- on-line planning tool

## Demonstration plantings

- Lucerne (Keith)
- Canola (YP)
- Apple (Adelaide Hills)



Advice soon available through PIRSA, Trees for Life and Industry websites

# many benefits from native vegetation

- weed control
- shelter for sheep
- dryland salinity control
- protection from fire and erosion
- biological control of crop pests
- water infiltration and nutrient cycling
- meet the demand for sustainable production
- protect our biodiversity







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