

# Global Food Security

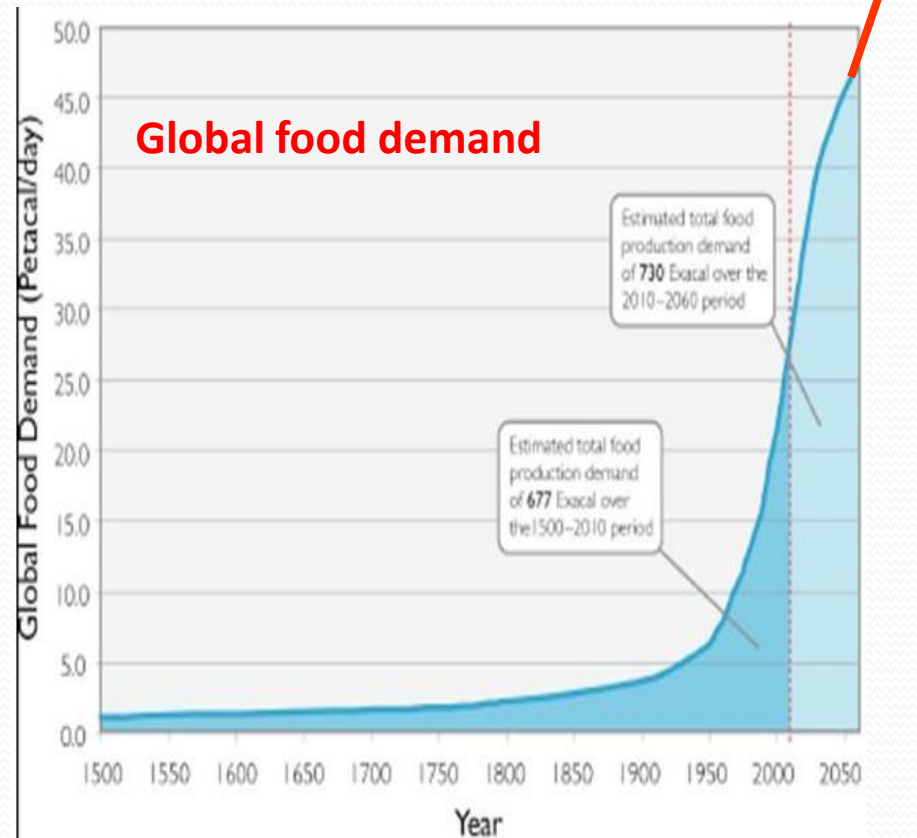
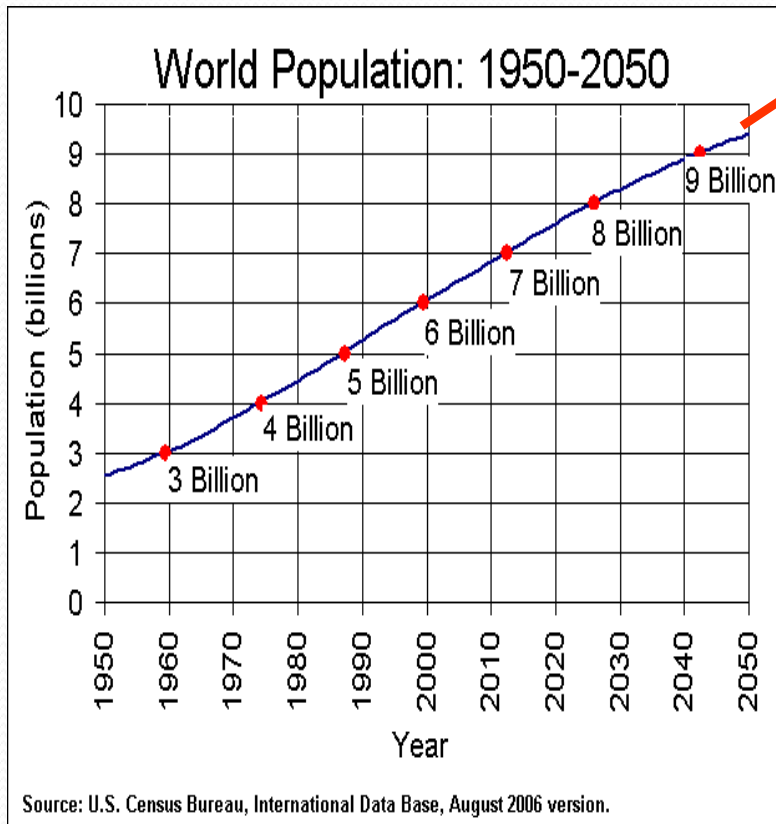
Risks, challenges, solutions.

Julian Cribb FTSE

Regional Soils Forum, Bendigo, 7 April 2011



# Surging demand



# No simple fixes....

## DEMAND:

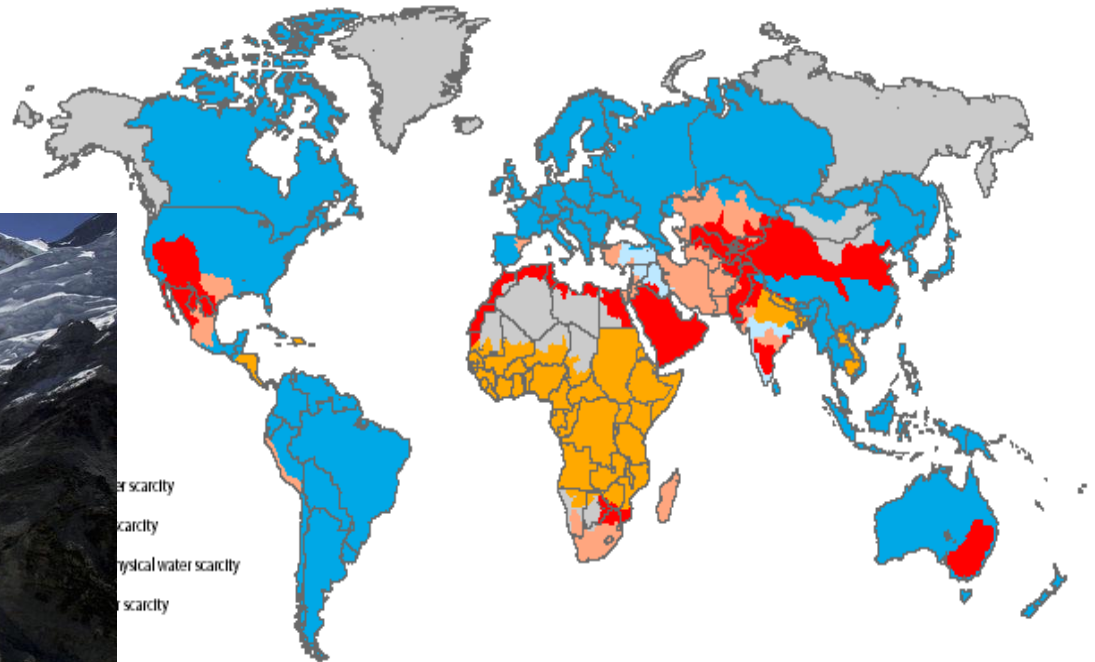
- Population 11+ billion by mid 2060s
- Total food demand doubles
- 600 petacalories/day for 50+ years

## CONSTRAINTS:

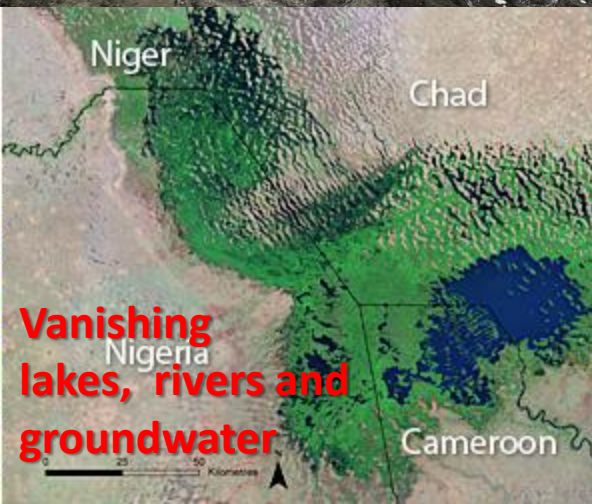
- 'Peak water'
- 'Peak land'
- 'Peak oil'
- 'Peak P'
- 'Peak fish'
- R&D drought
- Capital drought
- Climate extinction

# Peak Water

Water scarcity ▶

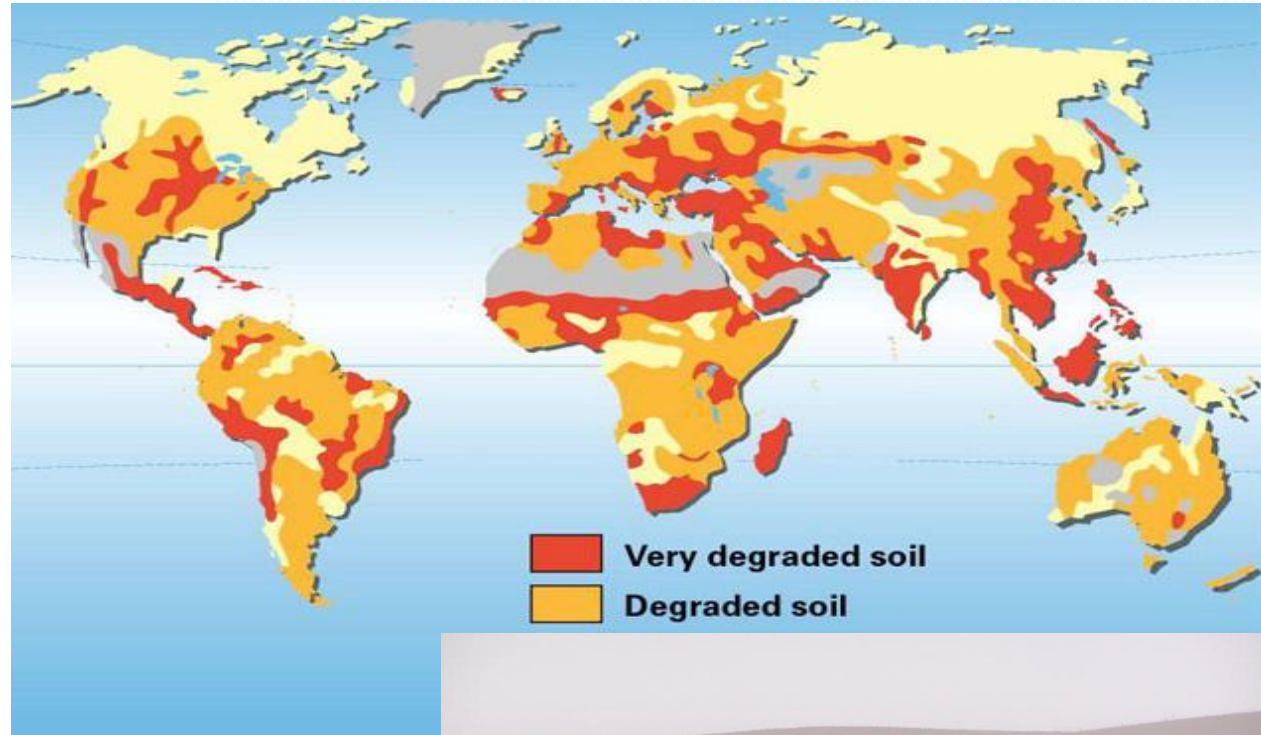
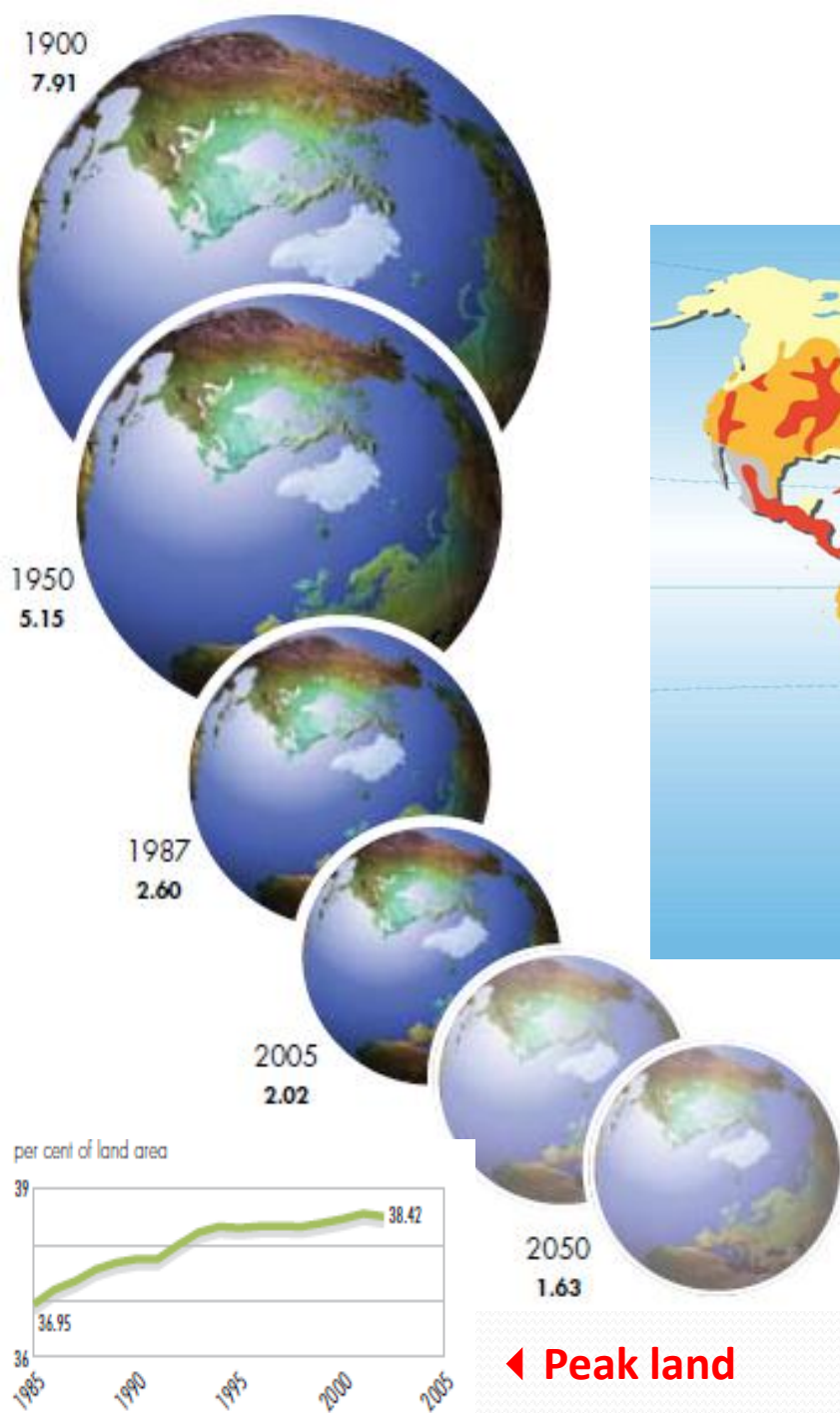


Melting glaciers



“Current estimates indicate we will not have enough water to feed ourselves in 25 years time...”  
– Colin Chartres, IWMI .

# Peak Land



Desertification: 1% loss each year

◀ Peak land

# Megacities: mega-risks



By 2030...

Population (in  
millions)

Jakarta	37
Tokyo-Yokohama	36
Manila	36
Mumbai	30
Delhi	30
New York	20

By 2050...

**7.7 billion will inhabit cities  
whose land area = China  
WITH NO ABILITY TO FEED  
THEMSELVES**

# Nutrient pollution

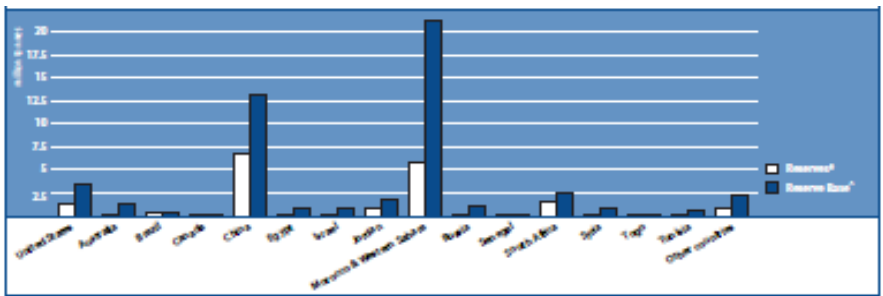
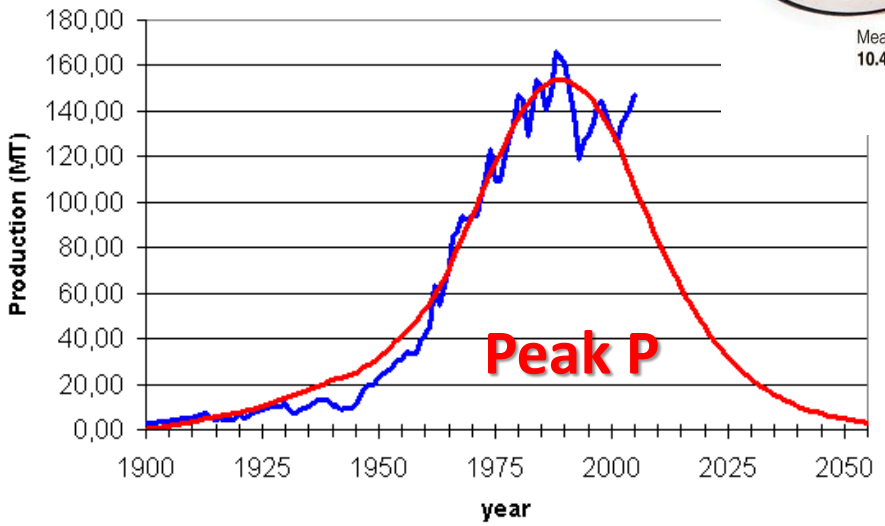


# Nutrient scarcity

▼ Food trashed by avg family



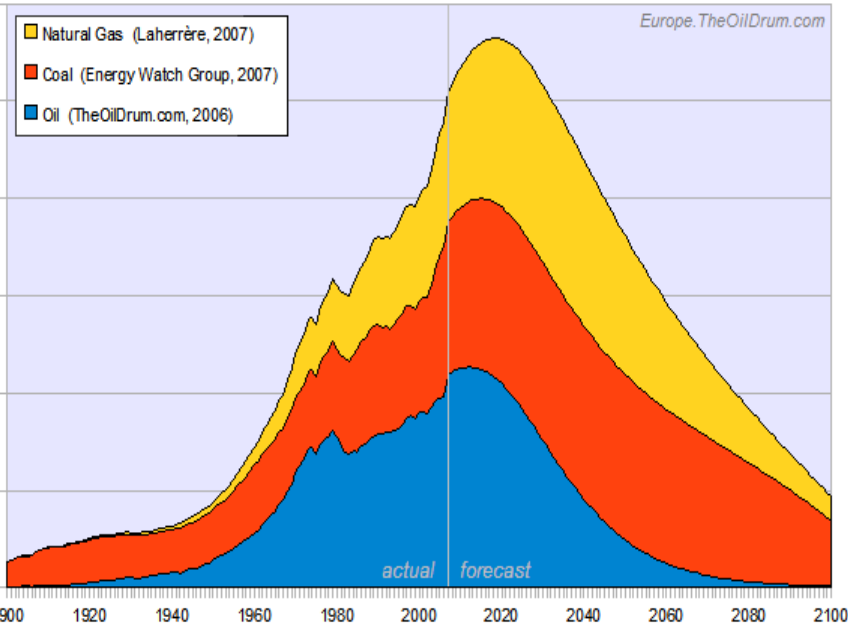
World rock phosphate production



▲ World P reserves

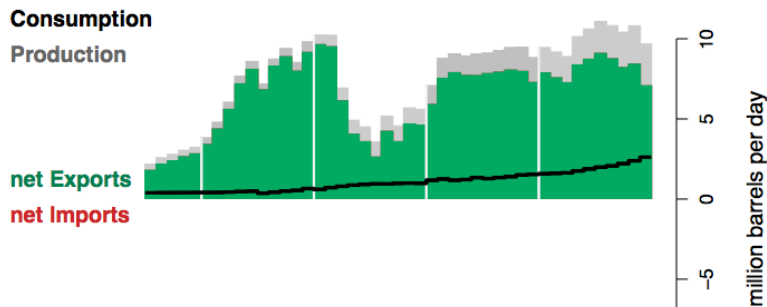
# Peak oil

Conventional Fossil Fuels



## Saudi Arabia : Oil

2009 exports decreased by 16. %



Australian food production has no immediate alternatives to oil...

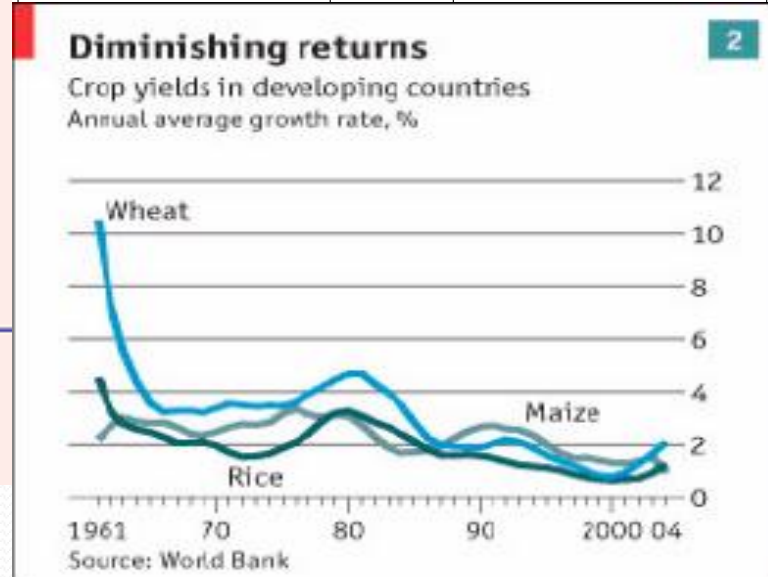
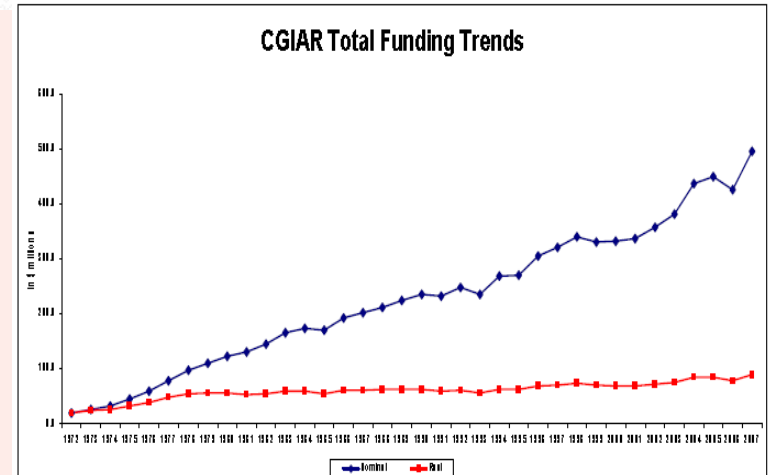
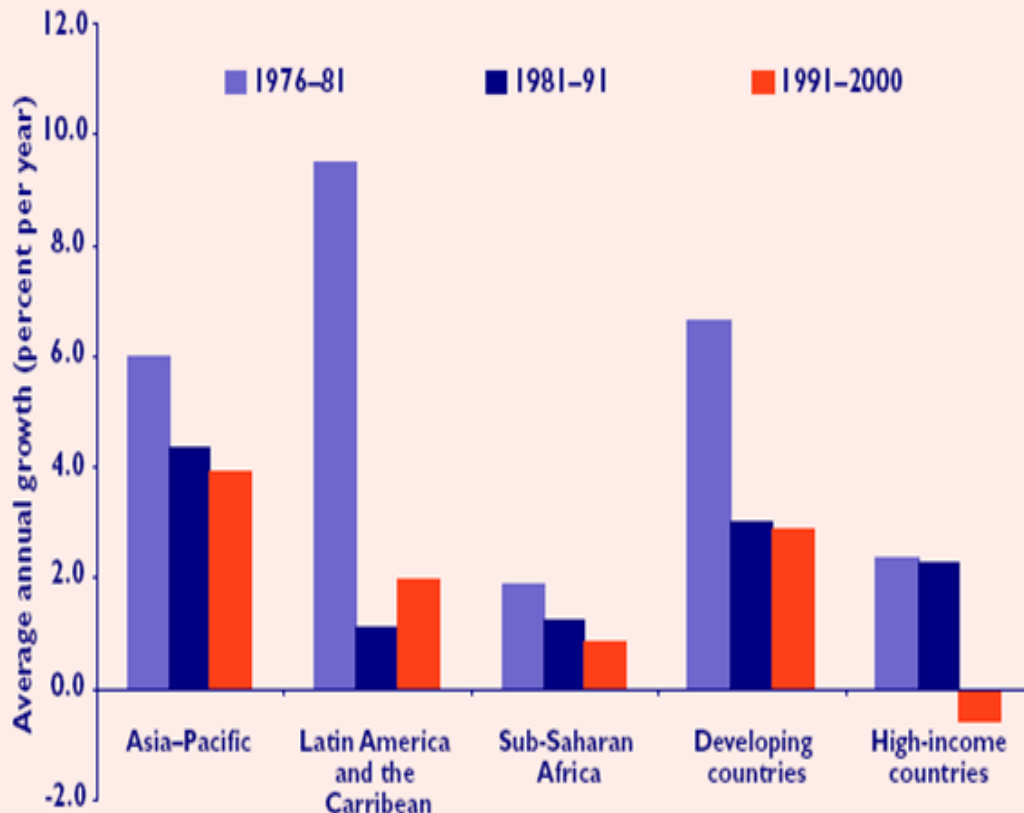


▲ Algae farms – a future answer?



# Technology pothole

Figure 1 Public agricultural R&D spending trends



# Floundering fisheries



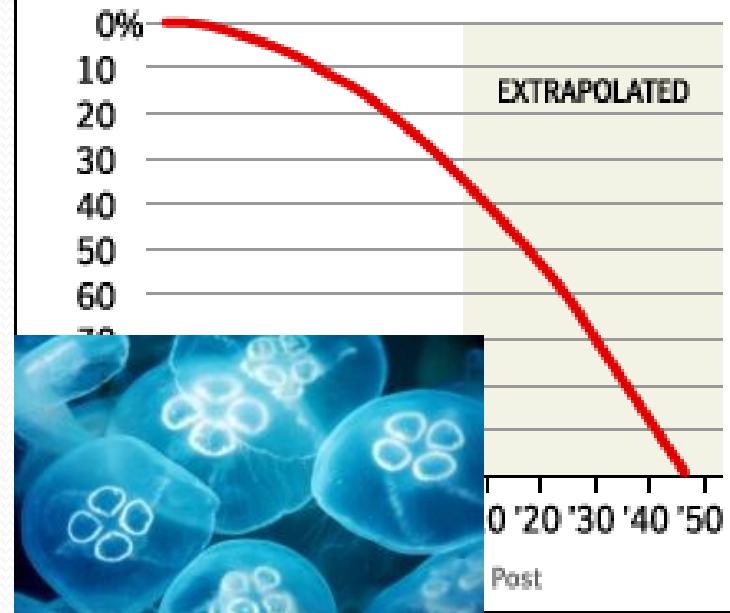
**“The maximum wild capture fishery potential from the world’s oceans has probably been reached .”**

- FAO

## Fisheries' Downfall

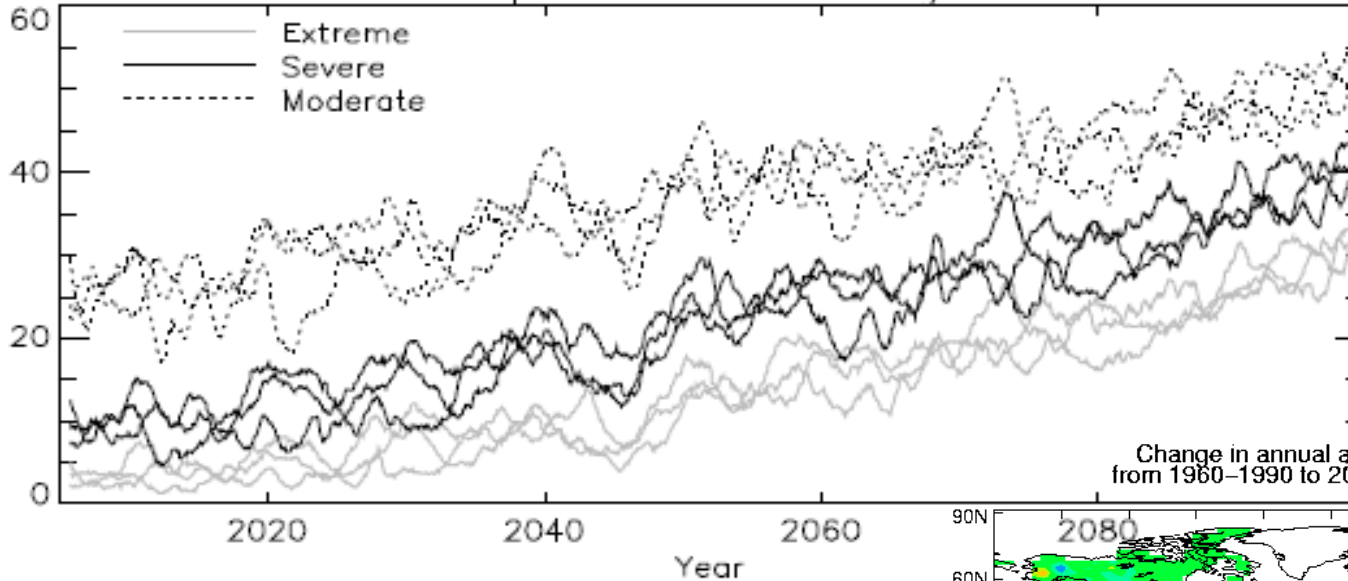
If current fishing trends continue, all of the commercial fisheries will have collapsed by 2050, according to a peer-reviewed study.

### Percentage of fisheries collapsed



# Climate instability

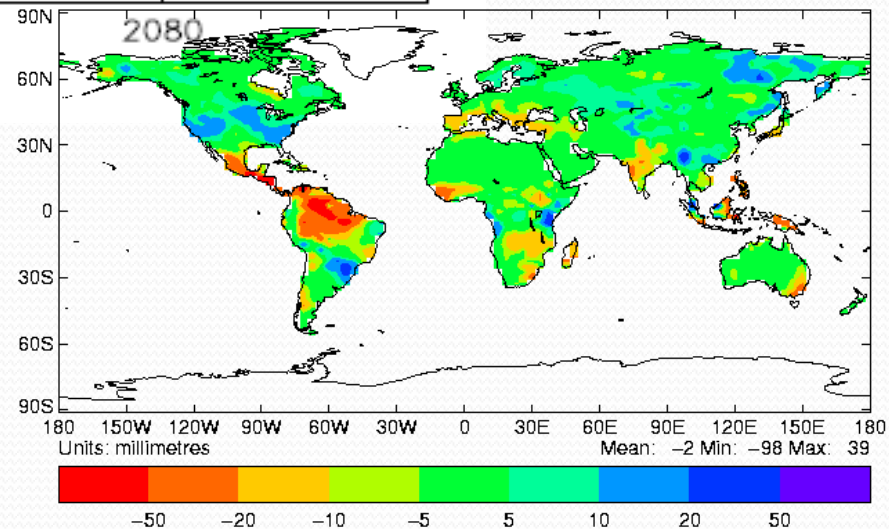
Proportion land in drought



More floods



Change in annual average soil moisture content from 1960-1990 to 2070-2100 from HadCM2 IS92a

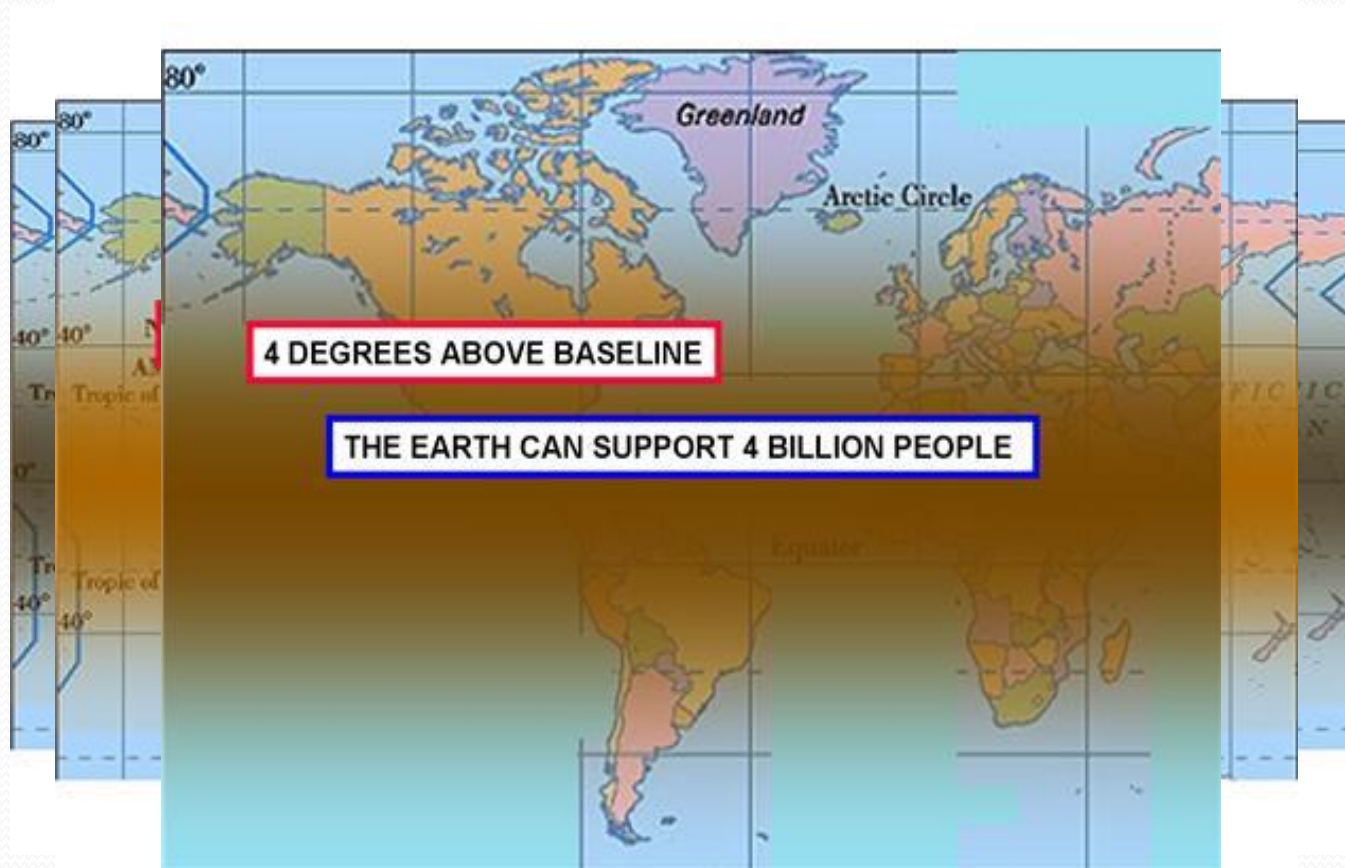


▲ Hadley Centre says: 4x more drought

Global soil moisture forecast ▶

**Scientific consensus:  
25% less food**

# Climate impact on food ?



Source: Dr James Martin, 21<sup>st</sup> Century School, Oxford: Commonwealth Lecture 2010

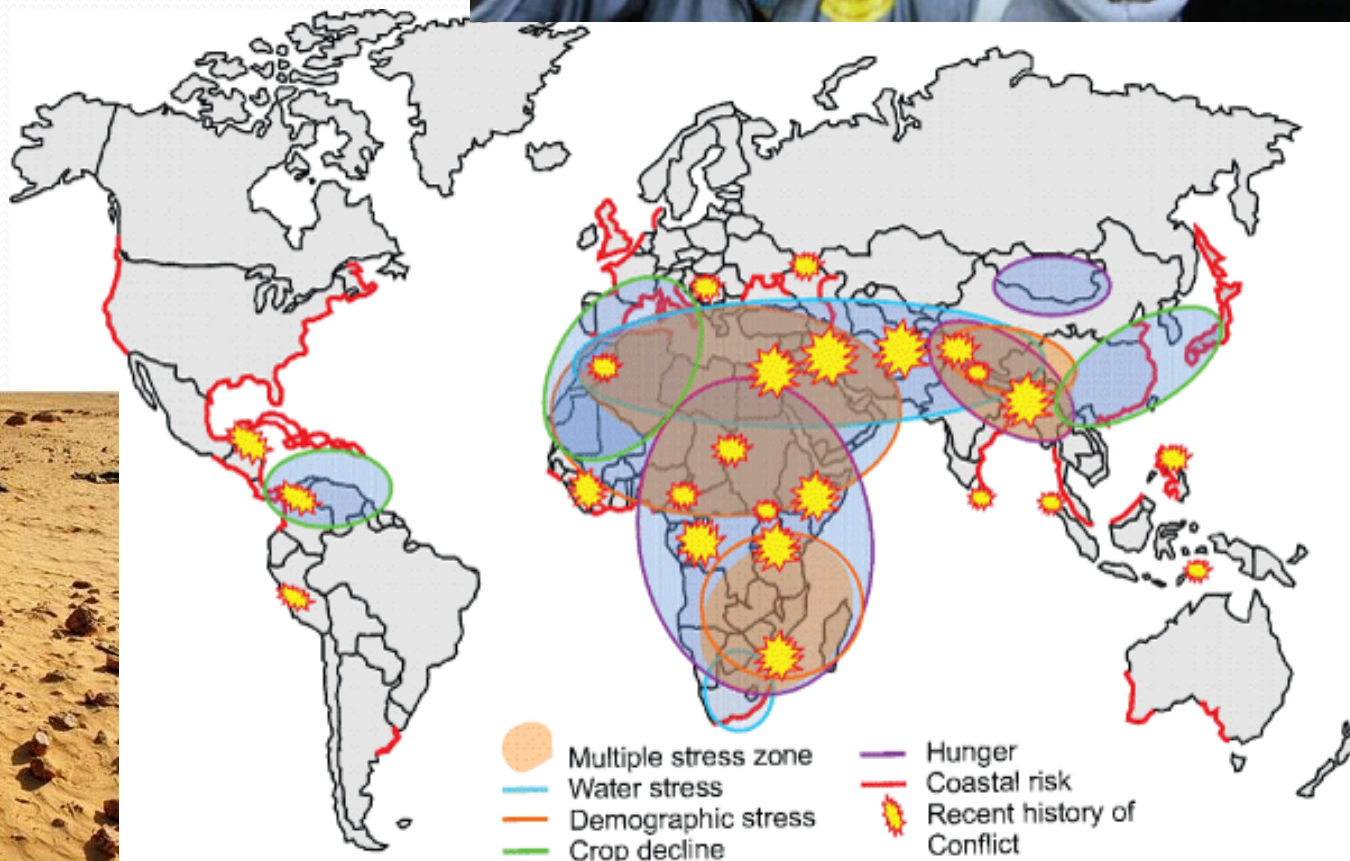
# The challenge

To **double** global food production with:

- **half** the present fresh water
- far **less** land
- **no** fossil fuels (eventually)
- **scarce** and costly fertilisers
- **less** technology
- more **drought, heat & storms.**

**Food stress =  
conflict, govt failure  
refugee tsunamis,  
inflation.**

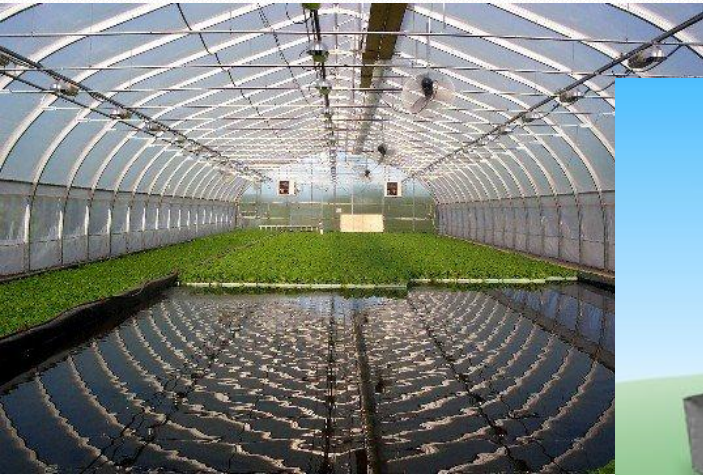
UK Ministry of  
Defence threat  
assessment 2008 >



# Solutions 1

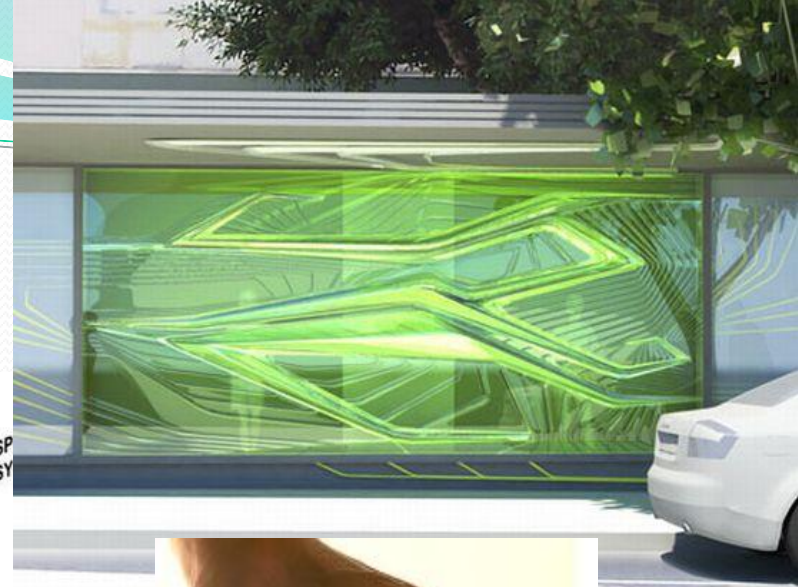
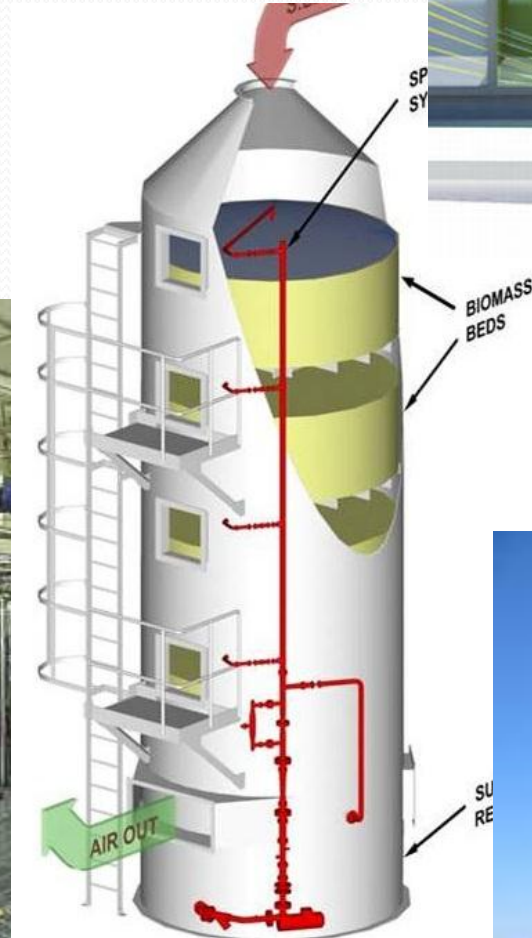
- **Develop** a new **eco-agriculture** that uses far less land, water, energy, fertilisers and pesticides – the greatest scientific challenge of our age
- **Urgently** develop **renewable energy** sources for agriculture
- **Lift** global investment in ag science & transfer to **\$160 billion/year**.
- **Fair incomes** for **farmers** - or it won't happen.

# 2. Green Our Cities





# New food industries: biocultures & algae farms



# 4. New diet: 23,000 edible plants



# Rehydrate, revegetate, recarbonise



# Solutions 6: respect for food

- A **Food Year** in every junior school on the planet
- Teach new respect for food: how to eat for health *and* sustainability



OR  
?



# Australia's role...

- **Lead** in designing new eco-agriculture
- **Lead** in green cities and urban farms
- Be first to **invest** in new food systems
- **Share** sustainable food knowledge globally
- **Lead** a global diet revolution
- **Awake** the world to the dangers of food insecurity.

# Thank you

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