

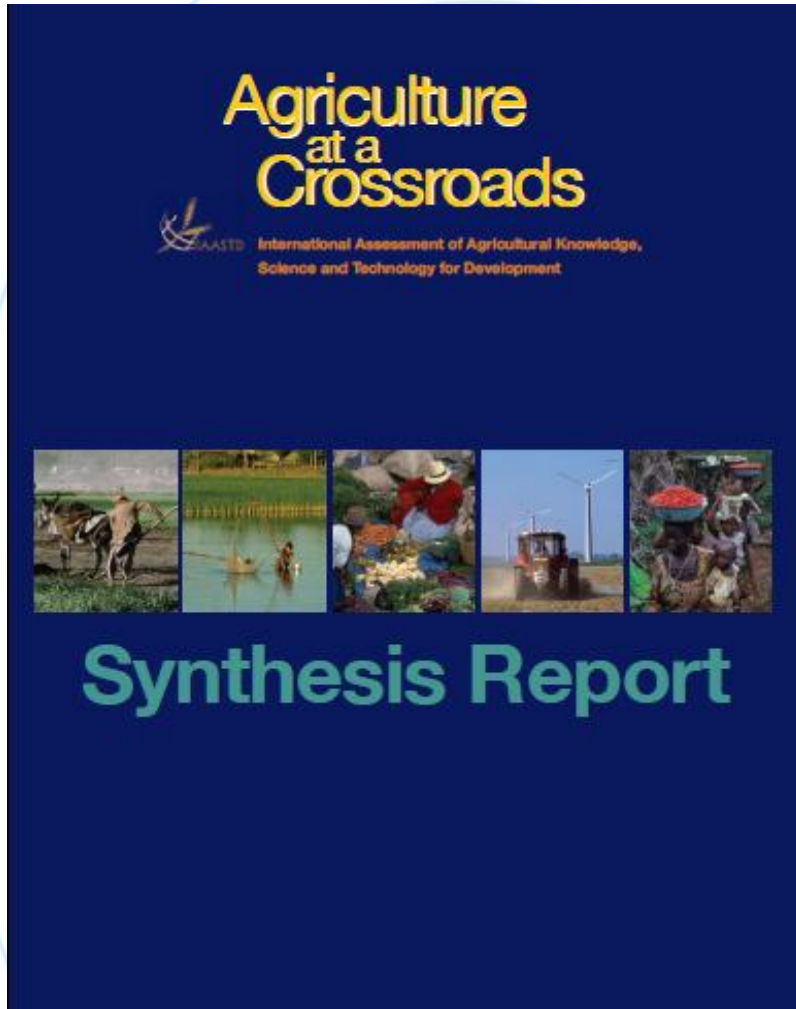
Can we secure our  
food whilst  
maintaining our  
environment?

John Williams  
Commissioner, Natural Resources Commission  
and Member the Wentworth Group of  
Concerned Scientists



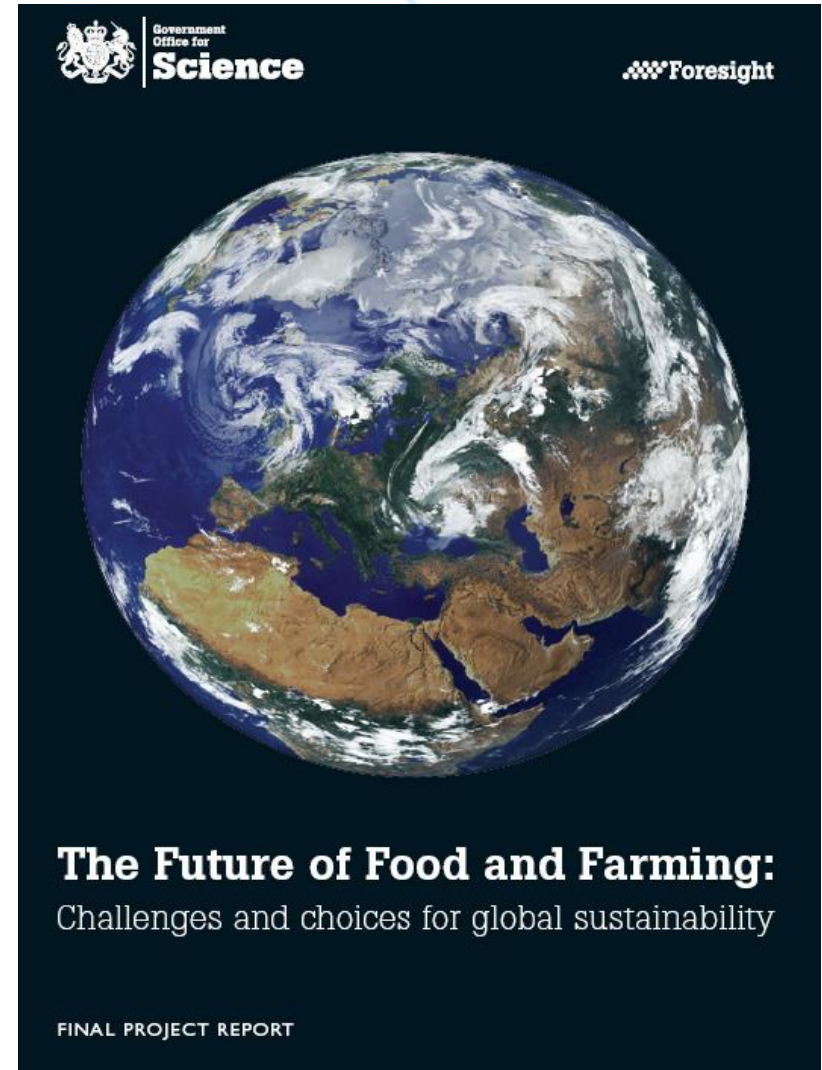
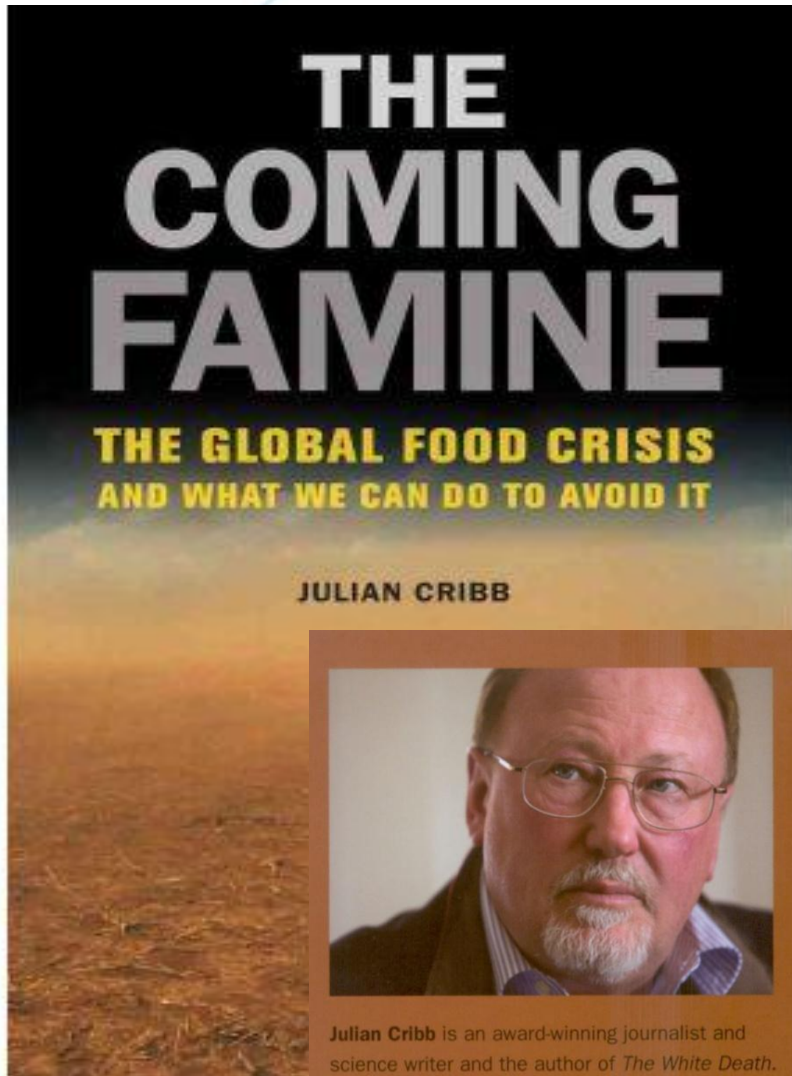


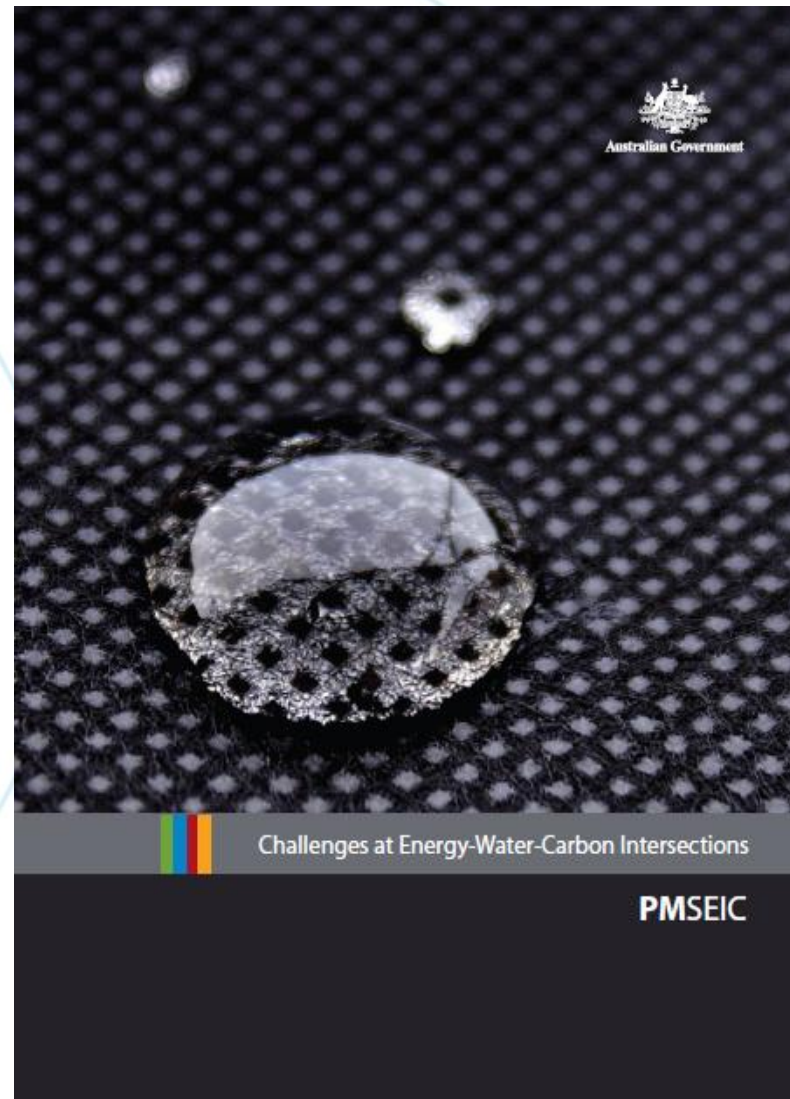
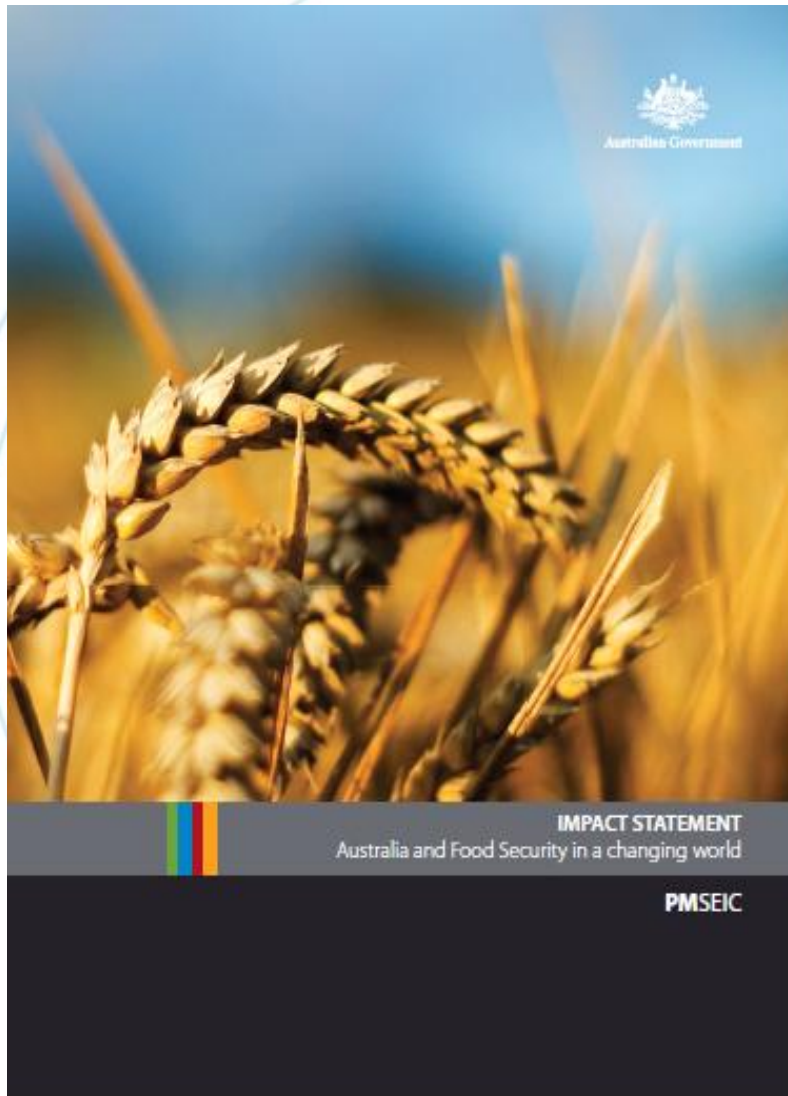
# Food or environment



**To avoid the emerging food crisis without further and increased damage to the environment and natural resources.....**

- world population expands
- at a time of rising costs for energy...fertilizer/pesticides
- evidence that peak P is near
- within a spectre of climate change

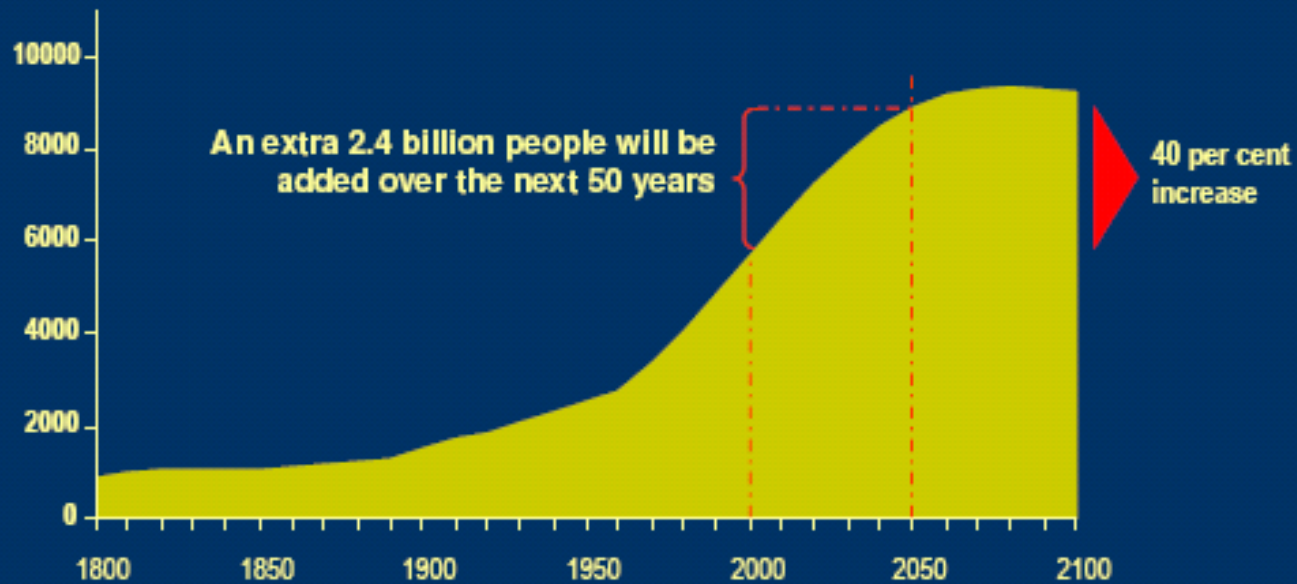






## The dimension of the problem

Population in millions



Data source: United Nations World Population Prospects Database: 2006 revision



# Food or environment

- Essentially, global agricultural production has increased substantially to

Food for extra 70 million people EACH YEAR

- but increasing impact on  
  - Water resources/rivers stressed
  - loss of production due to land degradation is 19 millions tons grain PER YEAR

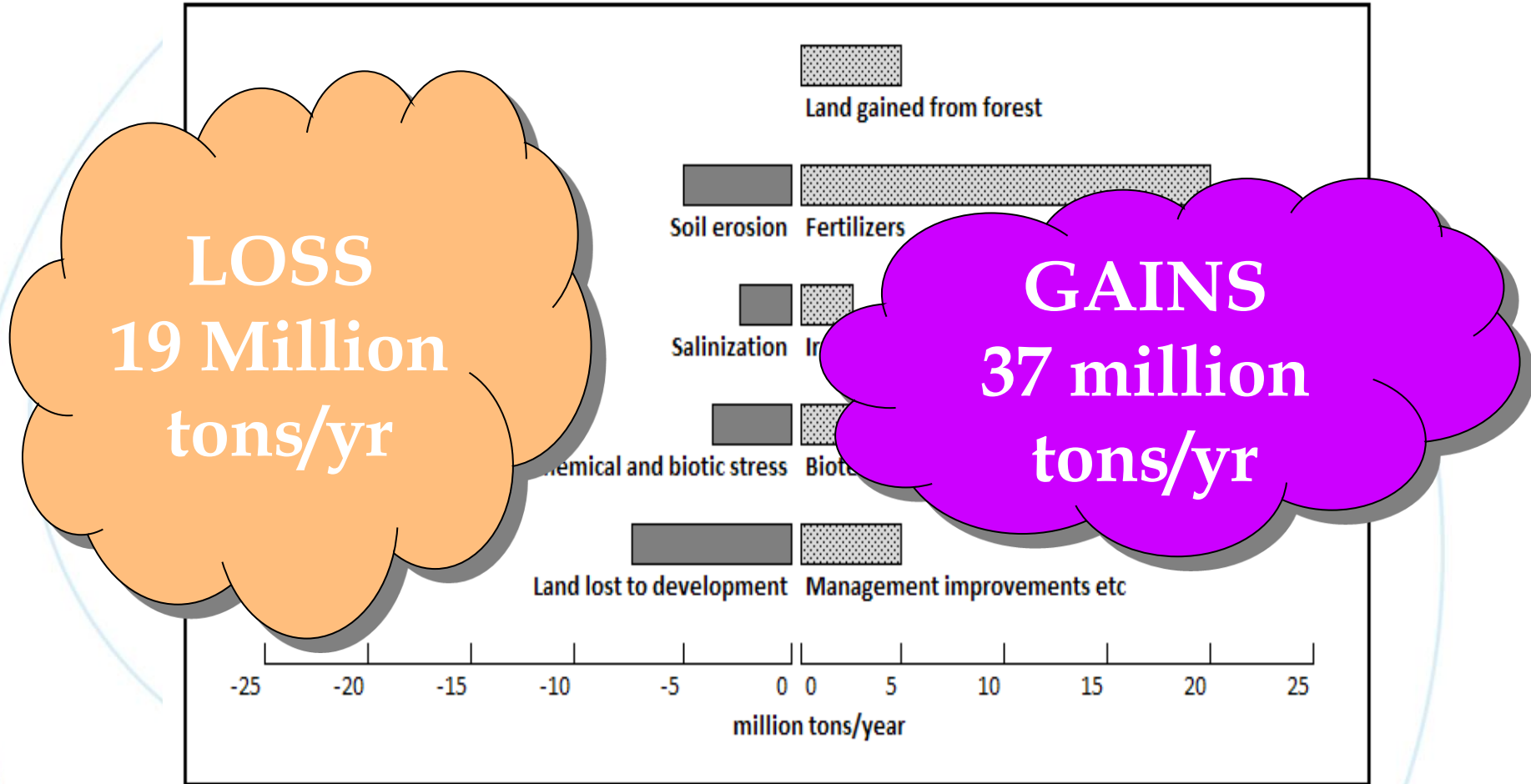
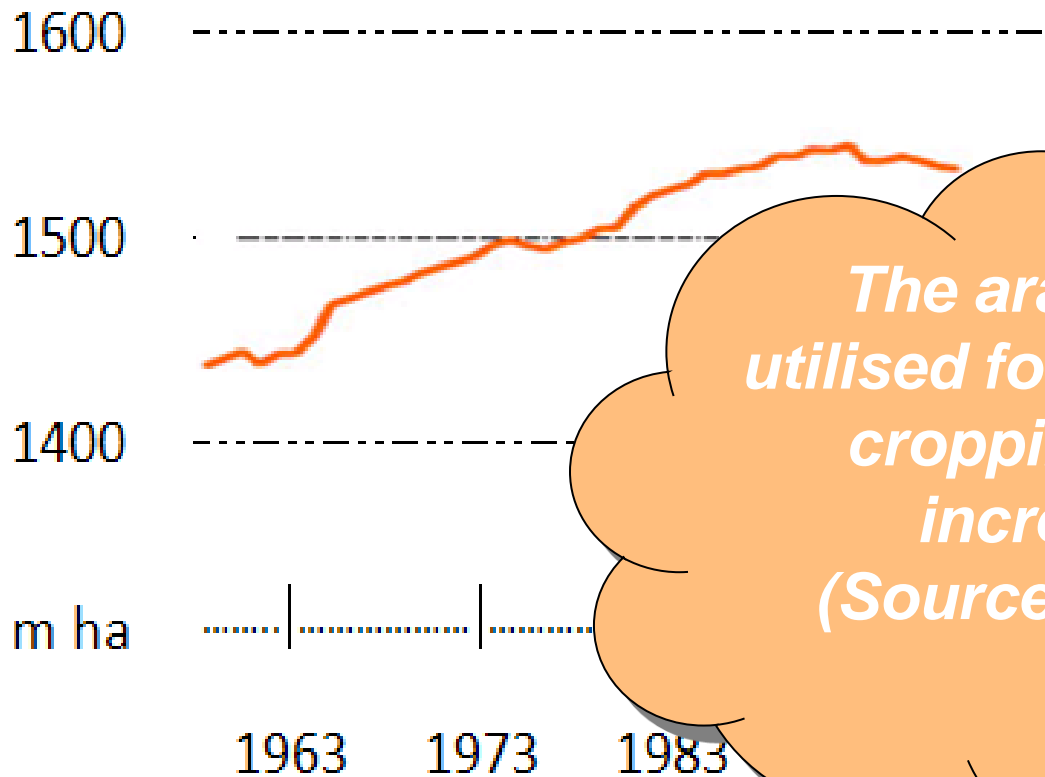


Figure2: Schematic gains and losses balance out to yield the global food production (Doos undated)

## World utilised arable and permanent crop area



*The arable land utilised for permanent cropping is not increasing (Source: ABARE)*

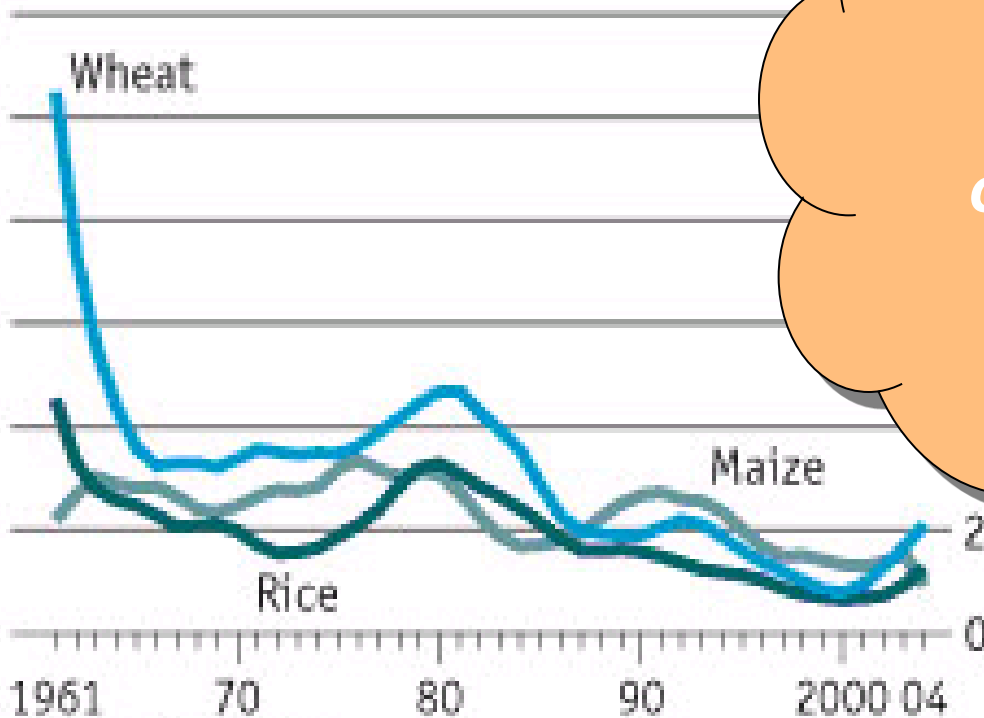
Source: World Bank



## Diminishing returns

2

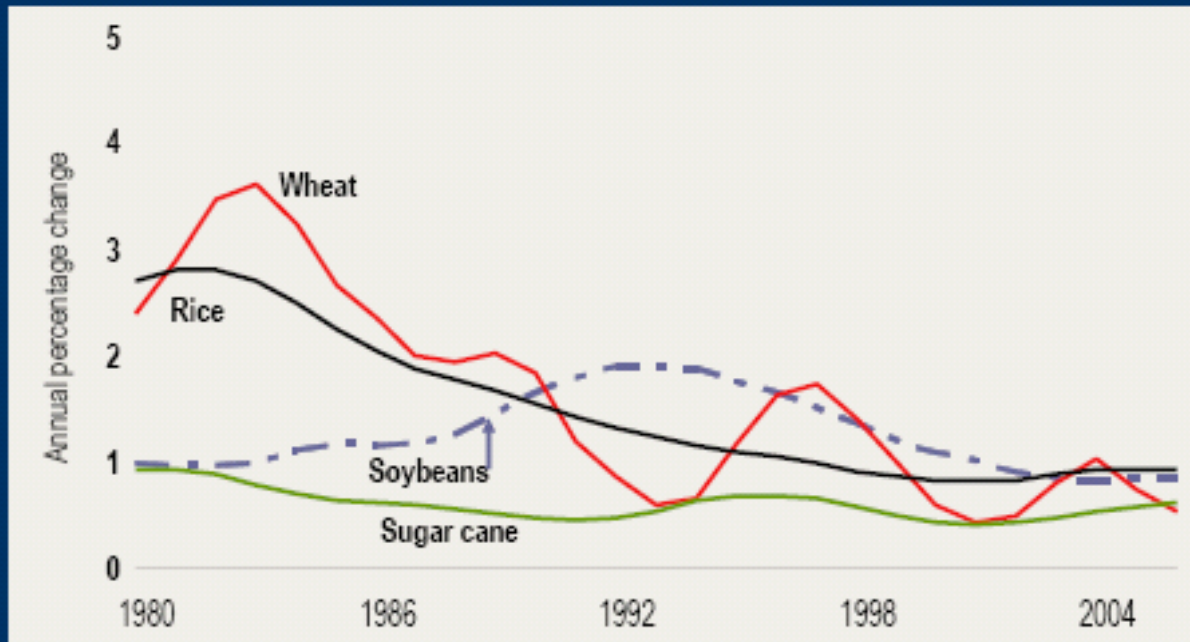
Crop yields in developing countries  
Annual average growth rate, %



Source: World Bank

*The average annual yield increase in developing countries has stopped increasing*

## Trends in global yields (tonnes per hectare) for the major food crops — annual percentage changes



## DECINE IN PRODUCTIVITY GAINS MUST BE REVERSED

**OVER 40 YEARS = 1.75% pa**  
**Currently = 1% pa**

**NEEDS TO BE BETWEEN 2-3% pa**



# Food, Energy, Carbon or Environment

**This is perhaps the greatest challenge yet to face**

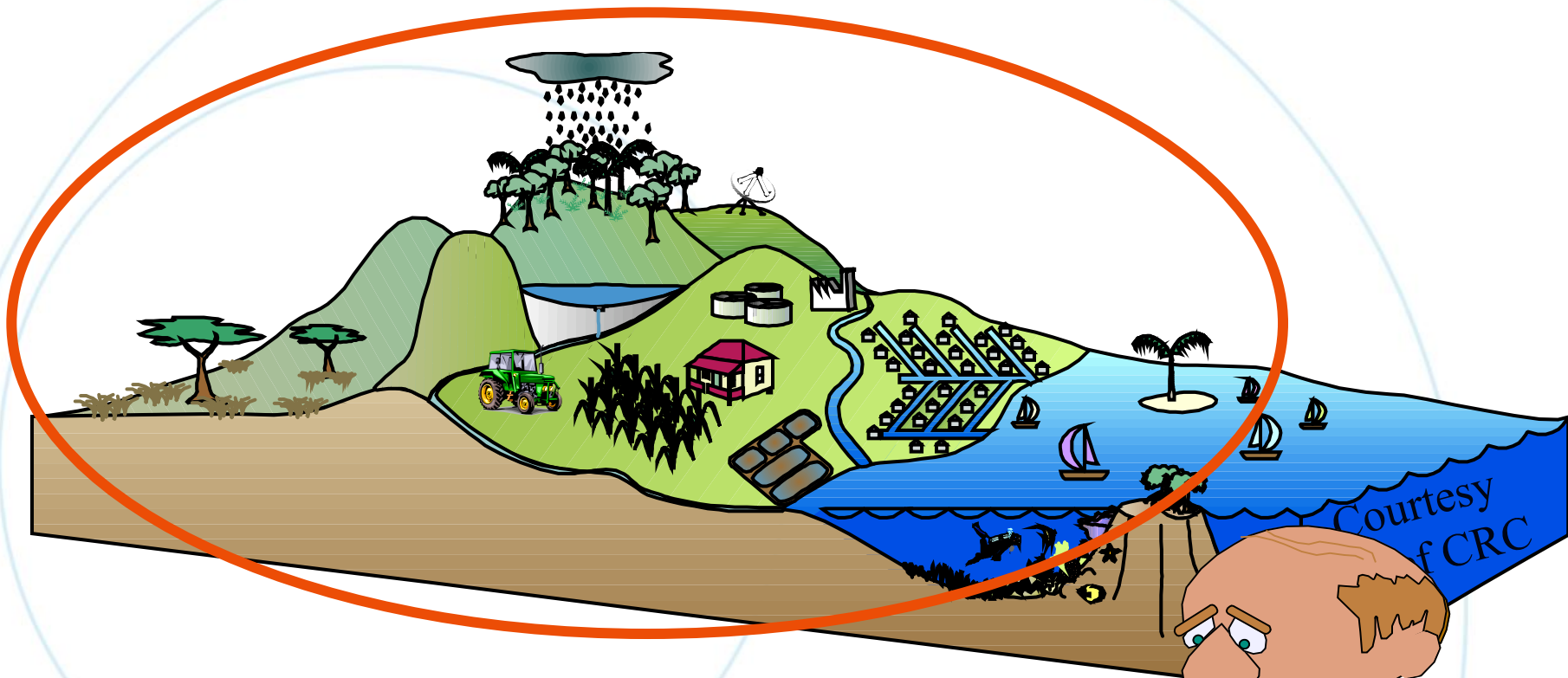
- **agricultural sciences**
- **Policy-food and NRM**
- **communities and society**



# Whole Systems Science Solutions Urgent

- **We've got to look at ecological, energy and water systems as a whole to appreciate the impacts or the footprint of our food on our natural resource base.**
- **This was a core message from the recent International Assessment of Agricultural Science & Technology (IAASTD) report**

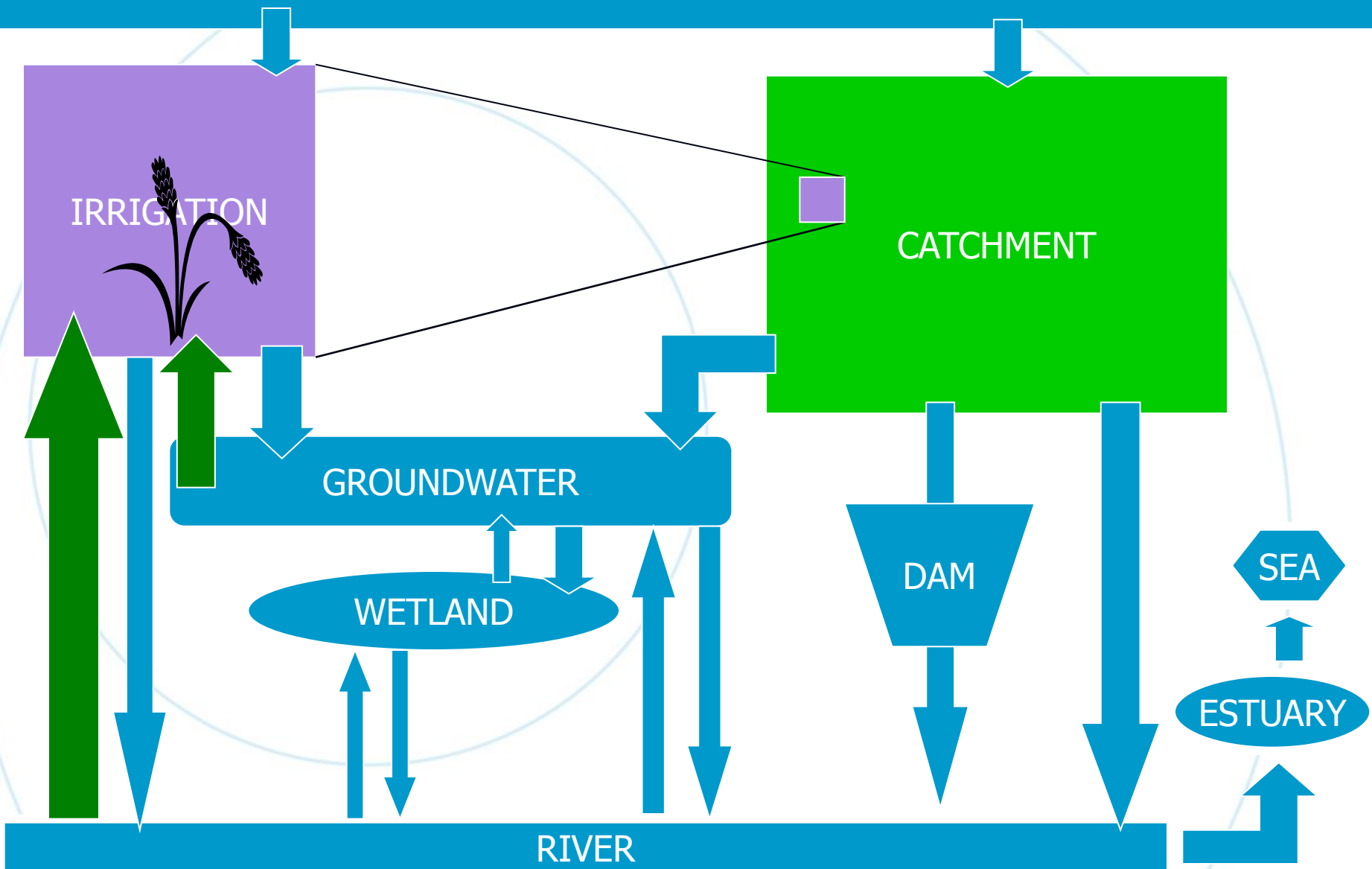
# WHOLE SYSTEM PLEASE



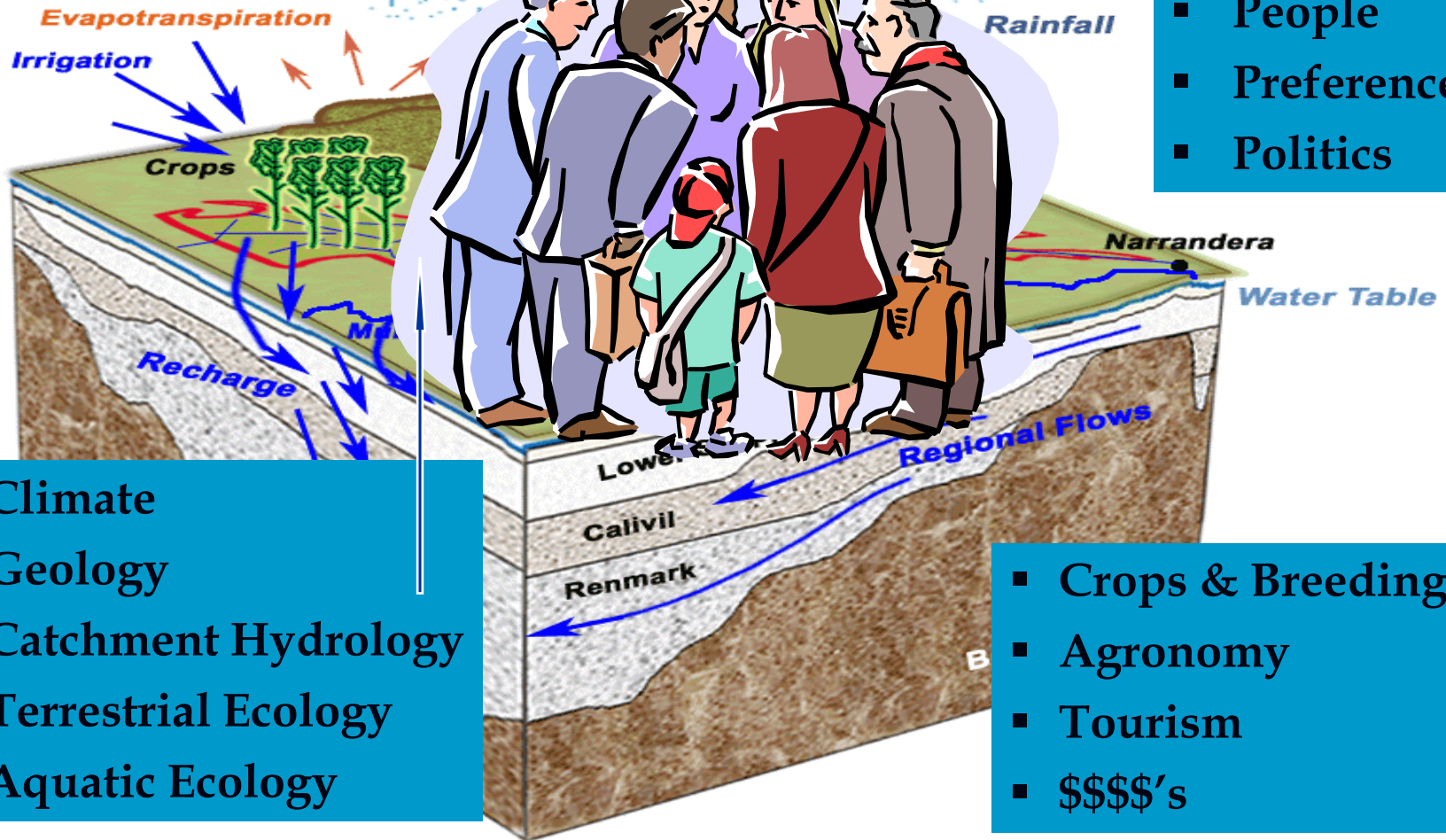


# CLIMATE VARIABILITY and CHANGE

## Rainfall



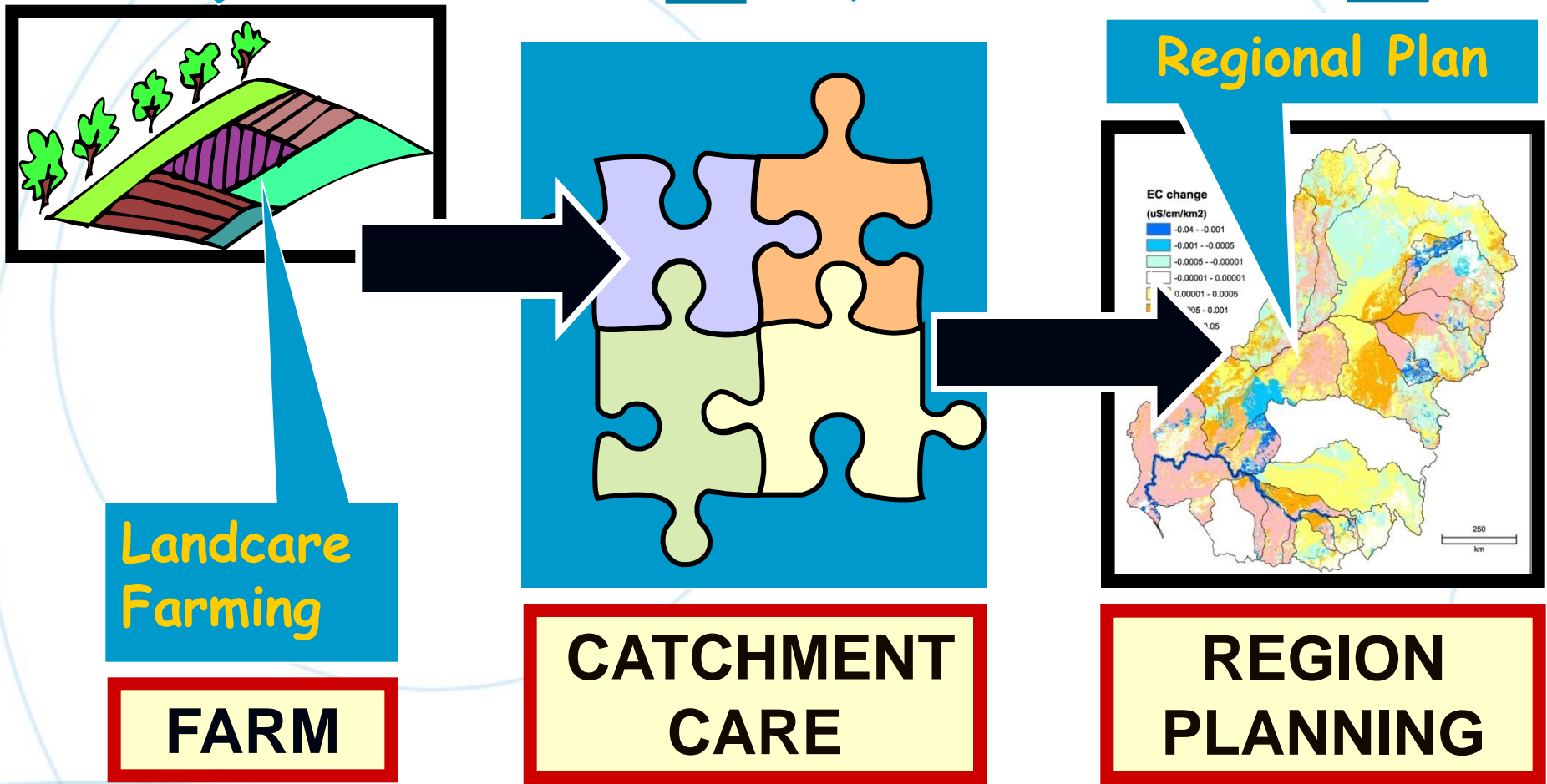
# Integrated Catchment Solutions Urgent



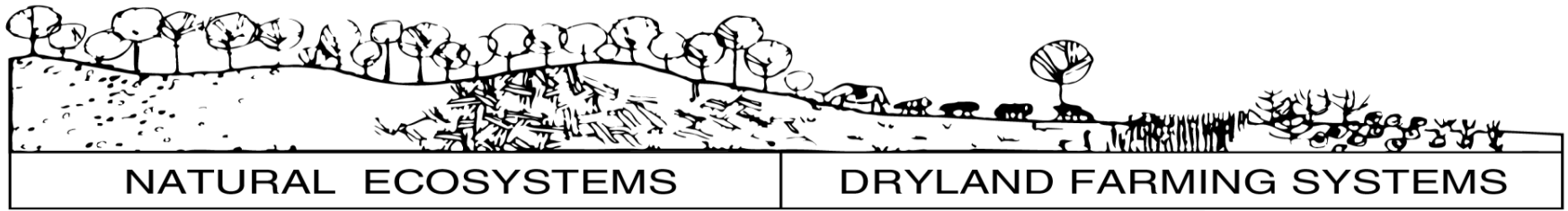
- People
- Preferences
- Politics

- Climate
- Geology
- Catchment Hydrology
- Terrestrial Ecology
- Aquatic Ecology

- Crops & Breeding
- Agronomy
- Tourism
- \$\$\$s

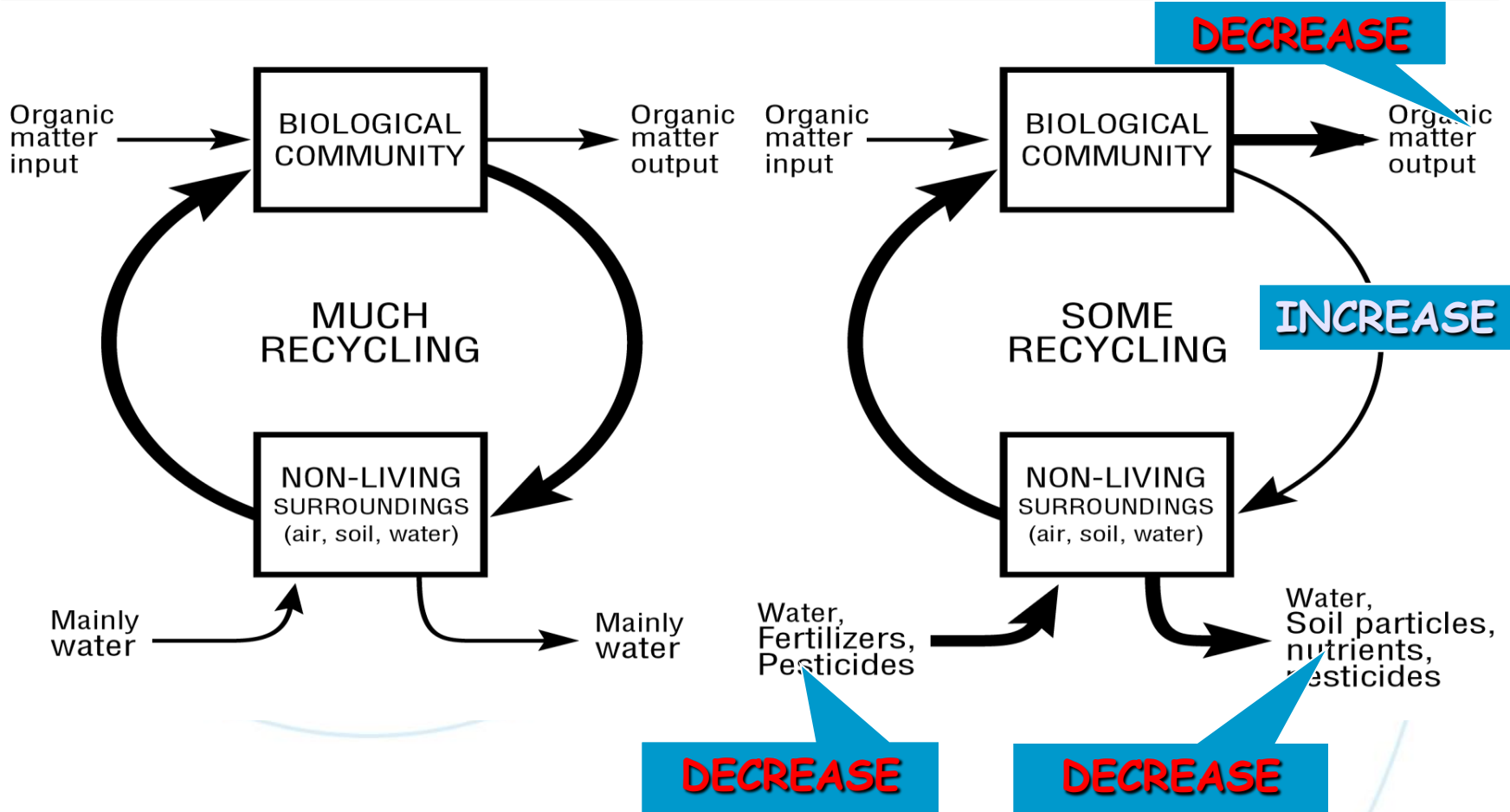


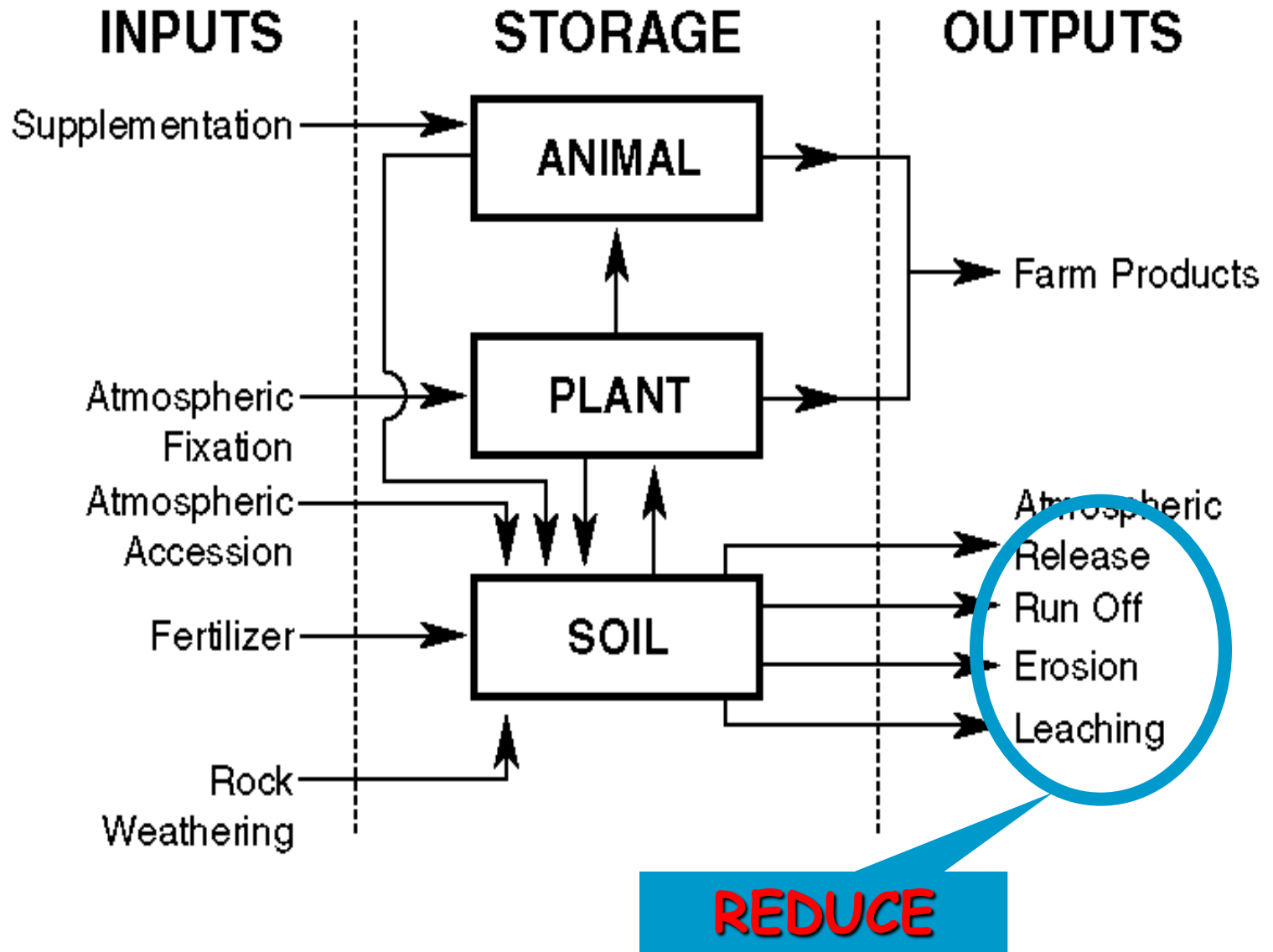




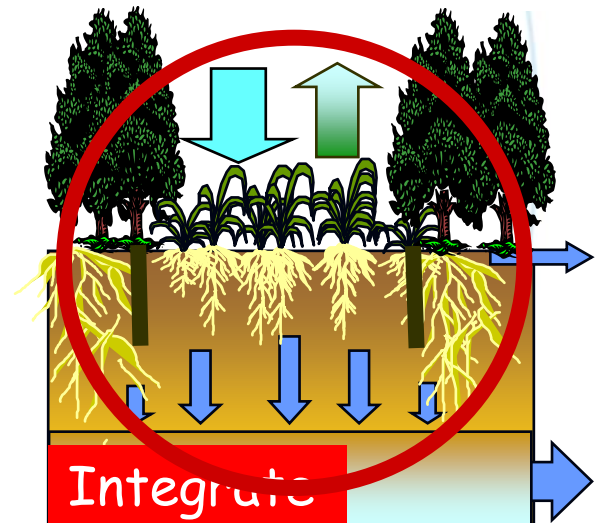
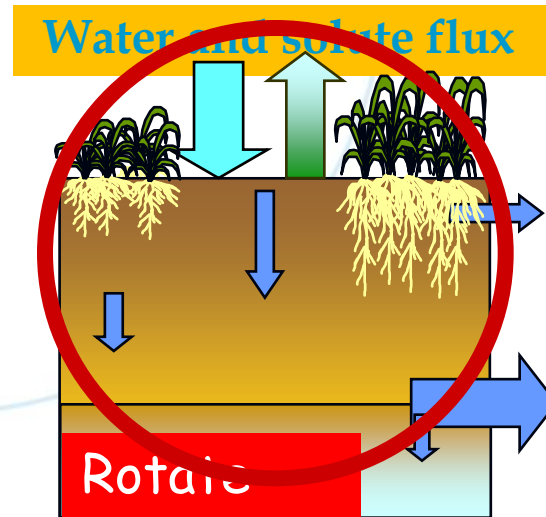
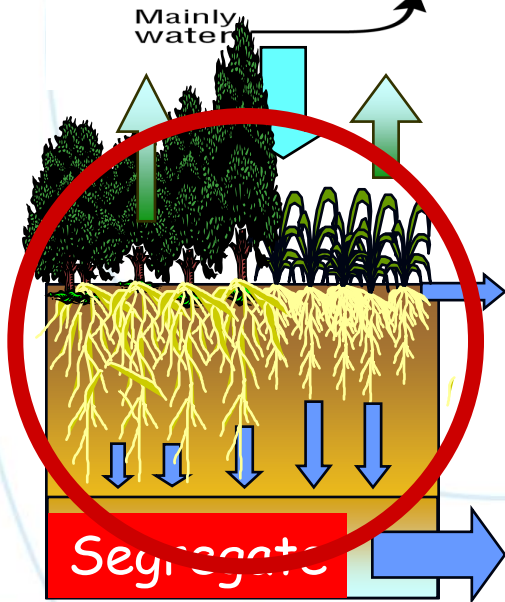
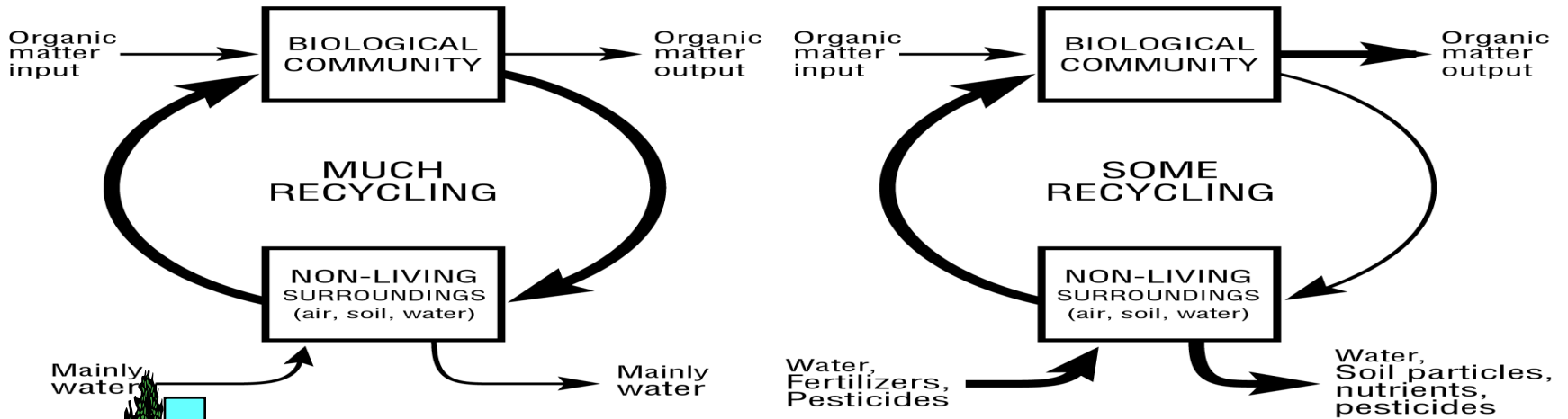
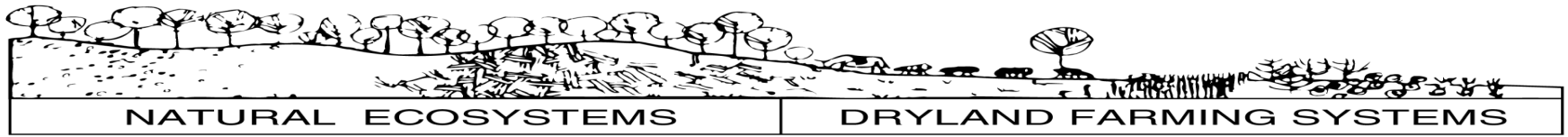
NATURAL ECOSYSTEMS

DRYLAND FARMING SYSTEMS

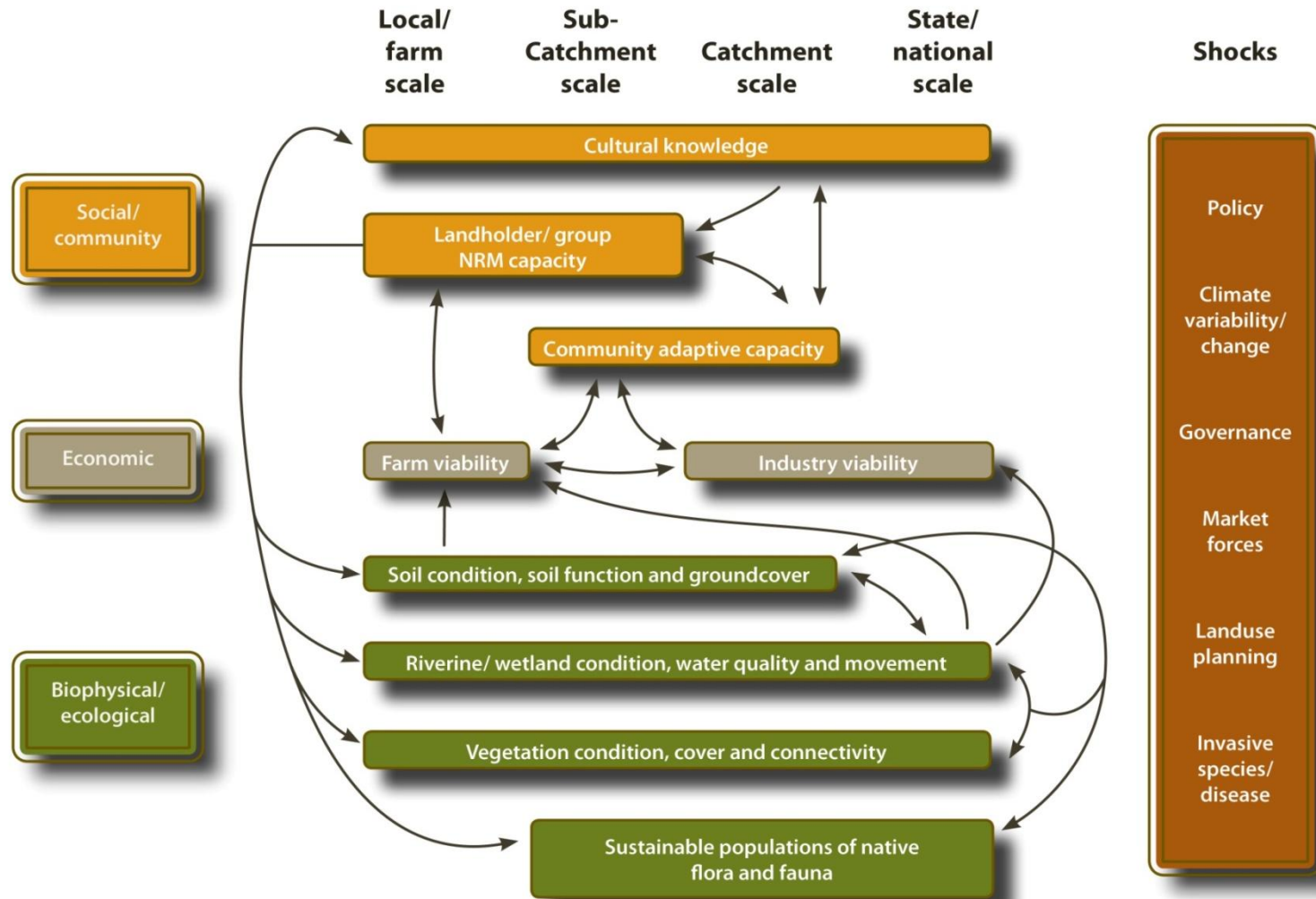




Williams, figure 1.



# Linked systems





# Challenges for Agricultural Science



**Sorghum established with minimum tillage and a trash blanket is an example of improved farming practice to cope with climate variability and improve soil health. Development like this is needed to increase food security and reduce damage to the environment.** Photo: Matt McKenzie



**Millet sown into native pasture, helps to integrate productivity with the ecological processes of the landscape.**  
Photo: Matt McKenzie

# Whole Systems Science Solutions Urgent

- **It's clear that business as usual is not an option.**
- **For too long, the emphasis of agricultural science has been on delivering innovation and technologies to increase farm-level productivity.**
- **Too little attention has been paid to a more holistic integration of natural resource management with food and nutritional security (IAASTD, 2008).**
- **Fortunately, there is increasing recognition that this current mode of operation requires revision.**
- **Landcare has a critical role in this in Australia**



## LandcareFarming

### Securing the future for Australian Agriculture

Prof. Peter Cullen  
Dr. John Williams  
Dr. Allan Curtis



August 2003  
[www.landcareaustralia.com.au](http://www.landcareaustralia.com.au)

**Landcare farming can improve profitability, maintain the productive capacity of the farm's natural resource base, and improve the farm's capacity to cope with adversity.**

### *Landcare farming*

Landcare farming is an approach that is more compatible with land use capability in Australia, and aims to be economically viable, while maintaining or enhancing the natural resource base. There has been significant progress in developing landcare farming systems that are moving towards sustainable agriculture, but more needs to be done.

<http://www.landcarecentral.org/References/landcare%20farming.pdf>

# Pricing Food for Sustainability

- **Cost of food doesn't include cost of maintaining natural resource base.**
- **We need governments to adopt policies that create incentives for sustainable practices and costs to the environment being internalized in the economy.**
- **Traditionally, food prices do not include the cost of environmental damage. The natural resource base (land, water, biodiversity) for agriculture continues to suffer.**
- **We can't afford to keep running down the systems that feed us.**





- Voluntary Instruments
- Price Based Instruments
- Regulatory Instruments

1. Policy mechanisms. Source: Adapted from Young et al. (1996)

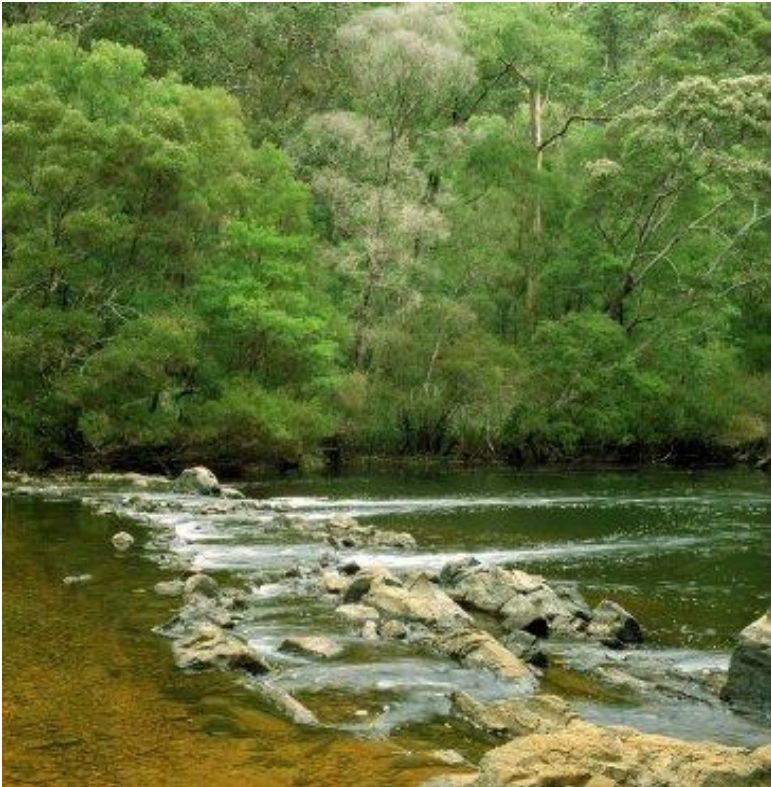
# Ecosystem services...

“ ... the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life”

Daily (1997)



# Ecosystem services



**OR?**



# Pollination as ecosystem service

native plants  
produce nectar



nectar feeds  
bees



bees pollinate  
crops at no cost to  
growers



*sunflower*

*lucerne*

*clover*

*pumpkin*

*cherry*

*apple*

*grapefruit*

*plum*

*apricot*

*All >70%  
dependent on  
pollinators*

## VALUE OF PRODUCTS: \$1.2b pa



# Ecosystem services



# Pricing Food for Sustainability

- **Rewarding the provision of ecosystem services is a good start**
- **We need investment in the economic valuation of ecosystem services**
- **With a market for these services, farmers in the future will not only be paid for the goods they produce but also for the services they deliver through the management of healthy landscapes, rivers, wetlands and estuaries for the public good**



BIODIVERSITY CREDITS

CARBON CREDITS  
TIMBER

WATER MANAGEMENT/  
SALINITY CREDITS

RENEWABLE ENERGY



COMMODITY	BUSINESS SHARE %	CLIENT
WHEAT	40	WORLD MARKET
WOOL	15	WORLD MARKET
TIMBER	10	PULP WOOD, BIOMASS ENERGY, SPECIALTY TIMBER
CARBON CREDITS	7.5	STEEL MILL
SALINITY CREDITS	7.5	COST SHARING FOR CATCHMENT MANAGEMENT
WATER SUPPLY MANAGEMENT	15	WATER SUPPLY COMPANY
BIODIVERSITY CREDITS	5	PUBLIC/PRIVATE TRUSTS

# A future form of sustainable agriculture

(Credit: Dinah Johanson. Modified from Wayt Gibbs, Scientific American, 2005)

# Pricing Food for Sustainability

- **For as long as the cost of maintaining and improving the natural resource base in agricultural systems is not included in the price of food, farmers will never be able to farm sustainable and profitably.**
- **We need market and trade policies that remove perverse subsidies which drive damage to land, water and biodiversity.**
- **The cost of sustaining and improving our natural resources must instead be built into the price of our food.**



## Australian Landcare Management System

Australia's only national system for land management



- *To motivate landholders to improve environmental outcomes we need a positive feedback loop between effort and reward.*
- *However we are missing the essential link which is an on-going and widely applicable land management certification system.*

Gleeson T and Reid C (2007) Integrating land based systems-five easy steps. Paper delivered at the EMS conference Hobart, Tasmania [www.alms.org](http://www.alms.org)

# Australian Landcare Management System

Australia's only national system for land management



## ALM FACTS

Number 1 March 2009

### Australian Land Management Group

Tony Gleeson, ALM Group  
CEO  
07 4666 4112  
0402099884  
[tonygleeson@alms.org.au](mailto:tonygleeson@alms.org.au)

Julia Telford, ALM Group  
Membership Director  
0427 580 399  
[julia.telford@almg.org.au](mailto:julia.telford@almg.org.au)

Anne Currey, ALM Group  
Communications Director  
0414878175  
[anne.currey@almg.org.au](mailto:anne.currey@almg.org.au)

## Capturing the benefits from improving environmental outcomes

### Quick facts

- ALM Certification System requires continuous improvement and operates whole of farm and across land use types
- Improves land based environmental outcomes from public and private land
- Improves the self esteem and wellbeing of landholders
- Partners provide support and add to the credibility of the system

# Pricing Food for Sustainability

- **regulatory framework to ensure food production minimises damage to natural resources & environment**
- **need an Australian standard for sustainable agriculture for local & imported products**
- ***'Australian Sustainable Agriculture Standard'* must include whole life cycle analysis of energy, water, land & biodiversity inputs into production**

# Some ways forward

## Link Agribusiness groups with Landcare

- Farmer production groups believe the way agribusiness are not in Landcare
  - Southern Farmers , Birchip Cr
  - Young Agribusiness Professio
  - Young Industry Groups



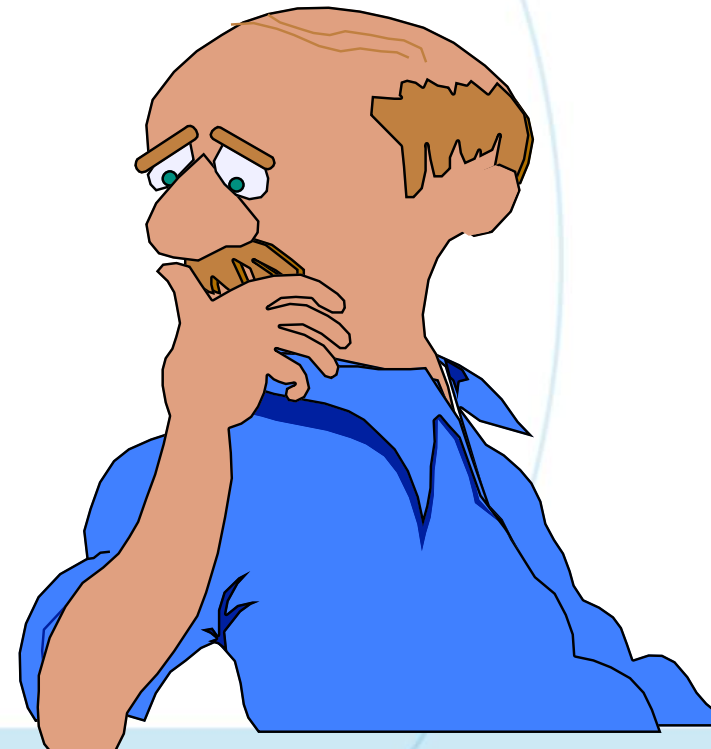


# Some ways forward

- **Expand this reformed R&D effort in agro-ecological systems**
- **Recognize that Landcare and Food Production are two sides of the same coin.**
- **Integration of Landcare Farming into regional catchment planning.**
- **Reform of markets and regulations to ensure cost of food includes the costs to natural resources and environment**
- **Move to a more market-based system of production, distribution and consumption of food which internalizes the future costs of sustaining the resource base.**

# As Individuals and Community

- So it is in **our** hands, here in this theatre what we choose to do.
- **You and I** have **21** opportunities each week to determine what happens.
- Each time we eat we have an opportunity to determine the impact we have on this planet by the food we eat.



# Water Food Community

- If **WE** were determined to only eat meats, grain, vegetables and fruit which had been produced in the most sustainable way possible.
- WE would make a difference and begin to turn the tide.
- **THE FOOTPRINT OF OUR FOOD** is perhaps the biggest impact we have on the ecology and environment of the planet.

# Building security from the bottom up

- **Landcare is about people in our landscapes bringing productivity and care of the resource base together**
- **Challenge is to work better in a strategic framework with others such as regional bodies**
- **Governments can learn a lot from Landcare - having policy settings that balance food and energy security with environmental security for the future**



# Conclusion

- It is a time of Change.
- We cannot afford to be “asleep at the wheel!”
- It is a time for turning Challenges into Opportunities. We will have to make choices.
- It will pay to be on the front foot.
- Adaptation and innovation will be important.
- It is not the time to panic!
- But it is the time to think and to change.
- Landcare and Landcare Farming can be the catalyst.

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