





# Sustainability

## The Brundtland Commission

Sustainable development is development that "meets the needs of the present generation without compromising the ability of future generations to meet their own needs."

Brundtland Commission — formally, the World Commission on Environment and Development

1987

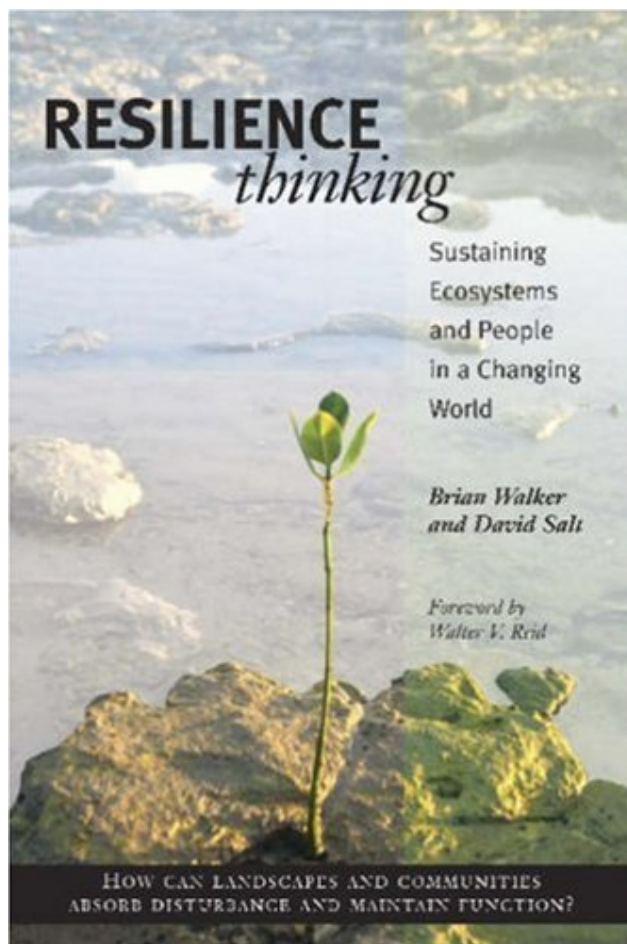


# Sustainability --

## What is it?

Sustainability is the management of socio-ecological systems to preserve both the quantity and quality of natural capital and our ecosystem services so both can perform their essential tasks of supporting life.

Michael Nairn



## Socio-ecological systems

We all live and operate in social systems inextricably linked with the ecological systems in which they are embedded.



## Sustainability -- What is it?

### ■ Natural capital

- forests
- oceans
- wetlands
- soils

### ■ Ecosystem services

- photosynthesis and respiration
- pollination
- fisheries and CO<sub>2</sub> sequestration
- agriculture
- soil development



# Sustainability

## ■ The Problem

- How to feed and provide for 9 billion people by the year 2050
- How to balance the needs of people while protecting and enhancing the natural capital and associated ecosystem services necessary to sustain life on the planet.

**Investing in Agriculture:  
Far-Reaching Challenge,  
Significant Opportunity**

An Asset Management Perspective

June 2009

# Meeting the Demand for Agricultural Production

- The global agricultural system must:
  - Modernize
  - Integrate the production of food, feed, and fuels
  - Raise the productivity of land
  
- How???????????????



**Investing in Agriculture:  
Far-Reaching Challenge,  
Significant Opportunity**

*An Asset Management Perspective*

June 2009

# Meeting the Demand for Agricultural Production

- Investment Opportunities in:
  - Irrigation
  - Fertilizer
  - Machinery
  - Commercialization
  - Infrastructure



**Investing in Agriculture:  
Far-Reaching Challenge,  
Significant Opportunity**

*An Asset Management Perspective*

June 2009

# Meeting the Demand for Agricultural Production

## ■ Investment Opportunities in:

- Land Expansion

  - Intensification

  - Extensification

- Biofuels

- Biotech and Genetically Modified Organisms

## ■ New Policies

- Global Free Trade




**Investing in Agriculture:  
Far-Reaching Challenge,  
Significant Opportunity**

*An Asset Management Perspective*

June 2009

# Meeting the Demand for Agricultural Production

## Agricultural Policy

-  The global agricultural system should be a fair and free trade system that fosters growing the right soil, in the right climate, with the right technology and management practices as depicted in our analysis.



## Investing in Agriculture: Far-Reaching Challenge, Significant Opportunity

An Asset Management Perspective

June 2009

# Meeting the Demand for Agricultural Production

EX 2: Supply and demand factors influence our food, feed and fuel production/distribution systems

Supply and demand factors influence our food, feed and fuel  
production/distribution systems

### Demand factors

- World population is growing
- World GDP per capita is growing
- Global increase in protein consumption
- Increased demand for biofuels
- Inclement weather

### Supply side responses

- Expansion of land acreage
- Fertilizers
- Irrigation
- Biotech crops
- Machinery
- Food system efficiency

### Constraints

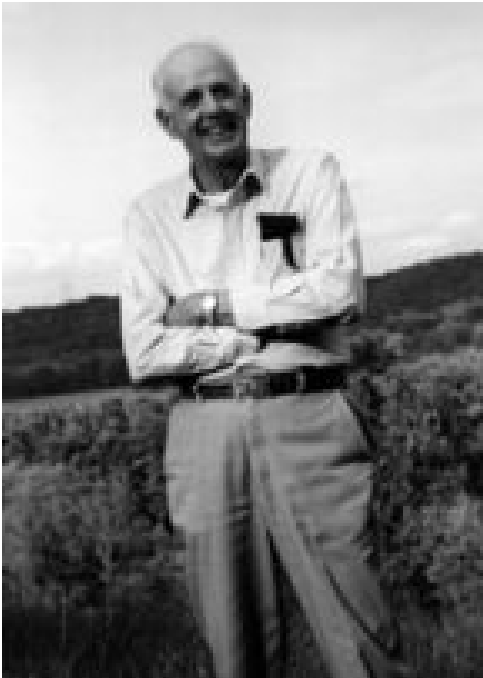
- Water availability
- Environmental, i.e. Nitrogen, salinization, eutrophication, pests
- Land ownership
- Carbon constrained economy
- Climate change

Source: DBCCA analysis, 2009.

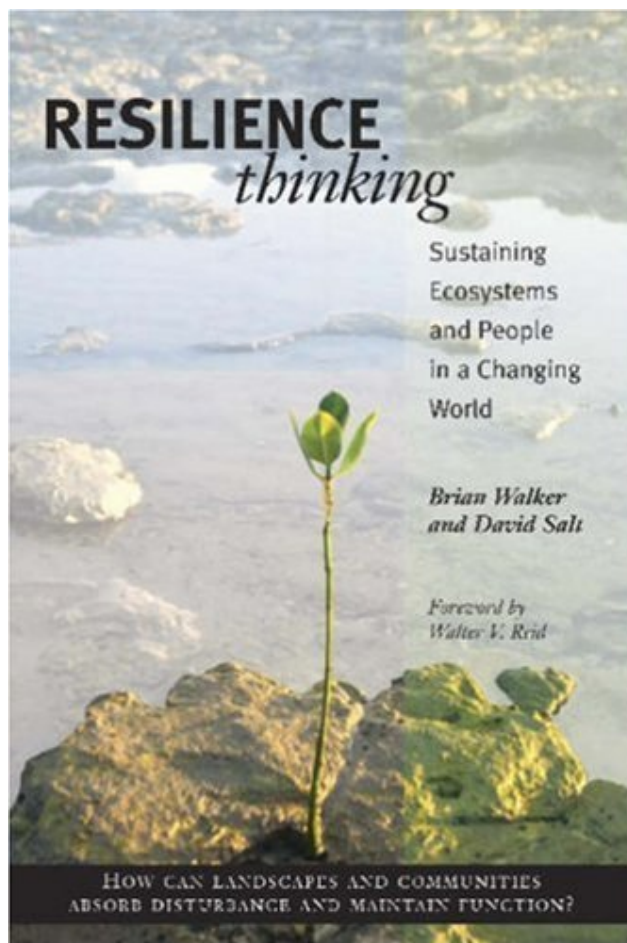


## Wendell Berry

### Solving for Pattern



- Three kinds of solutions
  - A ramifying set of new problems
  - Hellish Symbiosis
    - Immediate worsening of the problem
  - A ramifying series of solutions



## Principles In A Resilient World

### ■ Diversity

Promote diversity in all forms (biological, social, landscape, economic)

### ■ Ecological Variability

Embrace and work with ecological variability rather than trying to control it.

### • Ecosystem Services

Include all unpriced ecosystem services (now paid for as externalities) in development proposals & assessments.

### ■ Innovation (local knowledge)

### ■ Social Capital





**Fair Food**

Dedicated to bringing locally grown food into the Philadelphia marketplace and promoting a humane, sustainable agriculture for the Greater Philadelphia region.

## Food-Producing Community Gardens and Median Household Income in Philadelphia, PA

