

# Science and Sustainable Development



**RIO+20**



**OUR  
COMMON  
FUTURE**

THE WORLD COMMISSION

ON ENVIRONMENT

AND DEVELOPMENT

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Expert group meeting, 9/5/13  
United Nations

# Overview

- Bringing Together Great Global Issues
  - Peace, Freedom, Development, Environment
- Science-Policy Interface
  - Early science, Late science, Divided science
- Sustainability Science
  - Moving knowledge into action

# Sustainable Development

## Bringing Together Great Global Issues

- **Peace** [1945]
- **Freedom** [1950s]
- **Development** [1960s]
- **Environment** [1970s]
- **Sustainable Development** [1980s]
- **Freedom and Development**
  - Brandt report, Independent Commission on International Development Issues, 1980
- **Peace, Freedom, Development**
  - Palme Report, Independent Commission on Disarmament and Security Issues, 1982
- **Peace, Environment, Development**
  - Bruntland Report, World Commission on Environment and Development, 1987

# Sustainable Development

## Good Politics, Little Science

- SD emerged early 80s from scientific perspectives on interdependence of society and environment led by International Union for Conservation of Nature
- Gained political attention -- Brundtland Commission (1983-87), UNCED 1992-Rio, Little science present
- Local successes -- local Agenda 21s, sustainable cities
- August 2002 Rio + 10 in Johannesburg, South Africa World Summit for Sustainable Development. Some science

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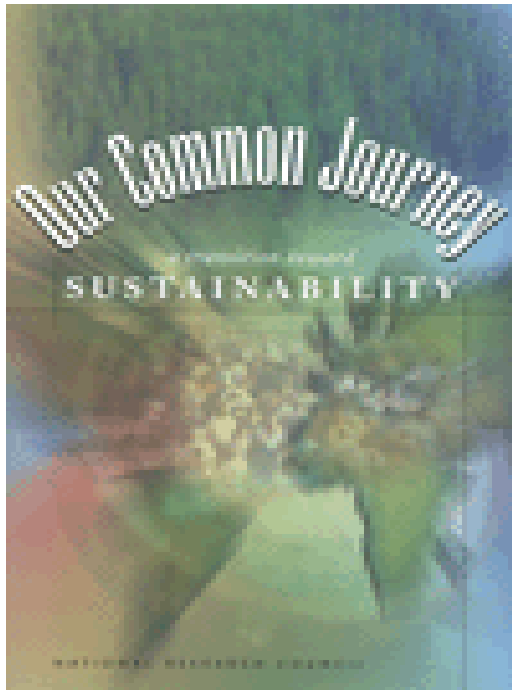
ON ENVIRONMENT

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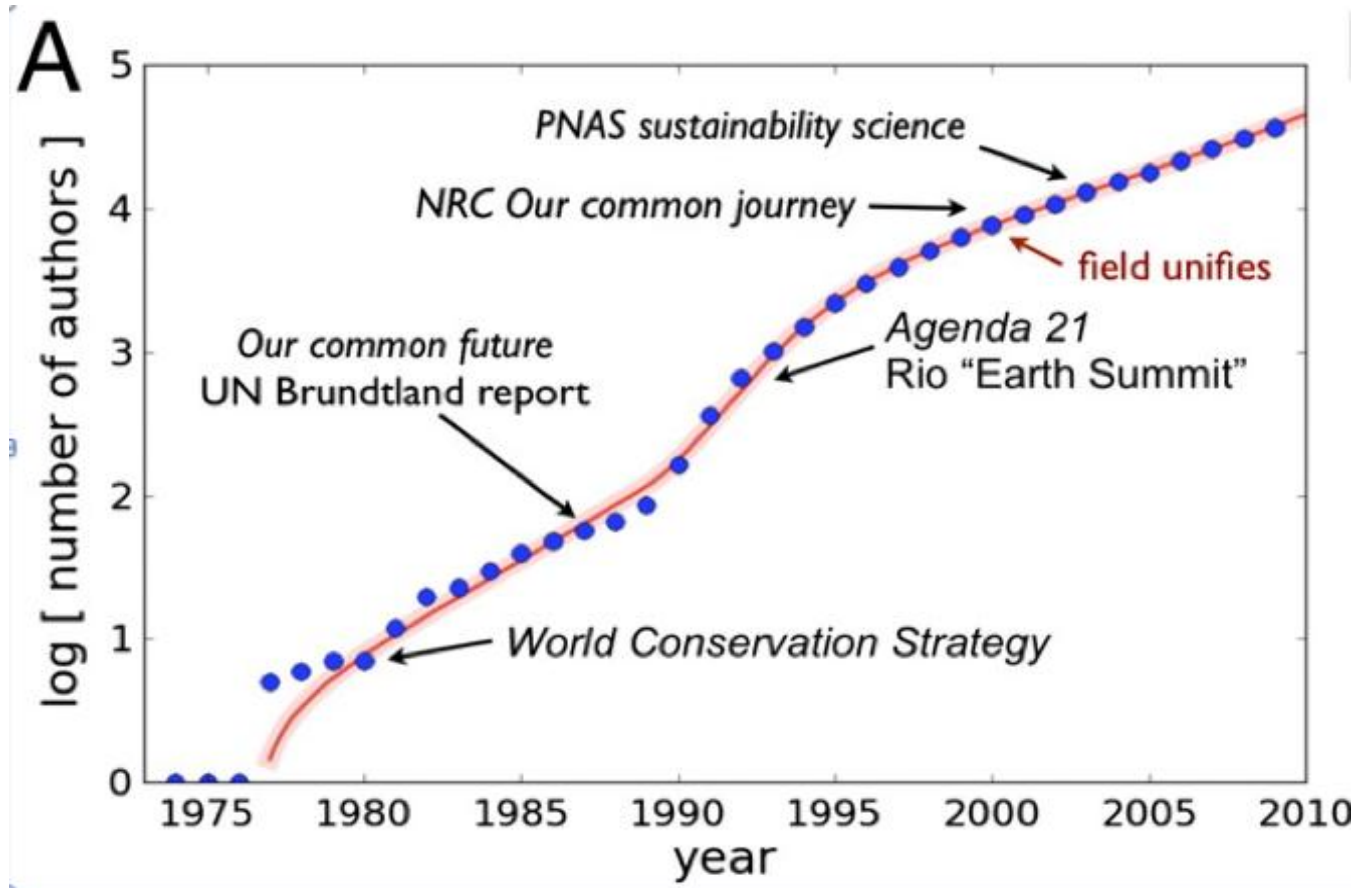
# NAS-NRC Board on Sustainable Development 1995-99

- **Published Report**

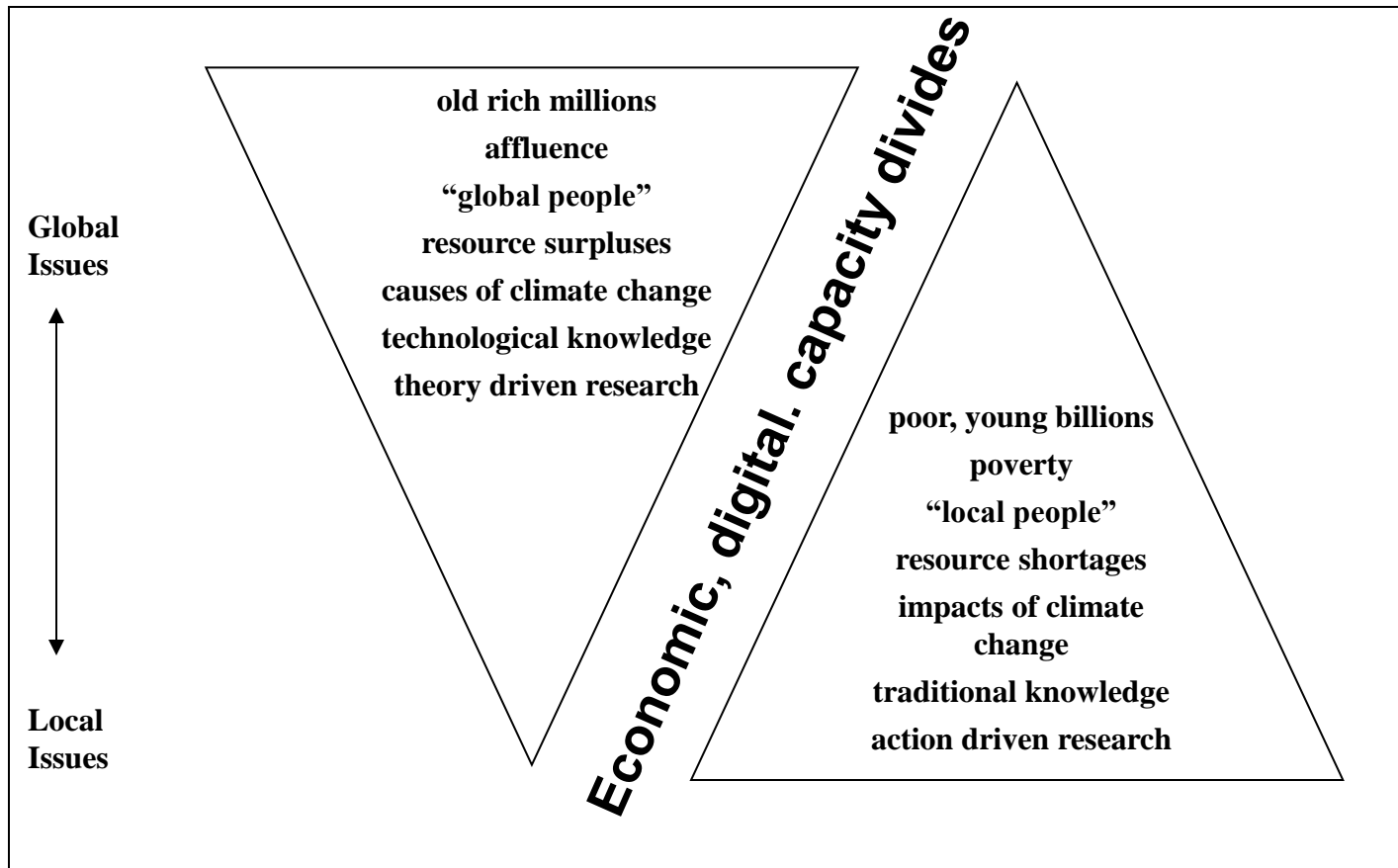


- **Reconnect science and technology to sustainable development**
  - **Focus on 2050 sustainability transition**
    - **Feed, nurture, house, educate and employ 9 billion people, *while***
    - **Preserving the earth's basic life support systems, and**
    - **Reducing hunger and poverty.**
- **Act now on what we know**
- **Develop sustainability science.**

# “Sustainability” “Sustainable Development” Articles In Titles, Abstracts, Key Words 1974-2010



# Science differences in problems and perspectives



# Sustainability Science is...

- *An emergent field* of ‘use-inspired’ research and innovation, like ‘agricultural science’ before it;
- *Defined* by the practical problems it addresses, specifically the problems of sustainability;
- *Conducted* by drawing from and integrating research from natural, social, medical and engineering sciences;
- *Linking knowledge with action* through the design and implementation of improved practices, technologies and policies.



# Knowledge into Action: Global Agendas

<b>WCED, 1987</b> <b>Our Common Future</b>	<b>NAS-BSD,</b> <b>1999</b> <i>Our Common Journey</i>	<b>Kofi Annan,</b> <b>2002</b> <i>Achievable Agenda</i>	<b>RWK, 2010</b> <i>Sust. Sci. Reader</i>
<b>Population &amp; Human Resources</b>	<b>Human Population</b>		<b>Population</b>
		<b>Health</b>	<b>Health &amp; Wellbeing</b>
<b>Food Security</b>	<b>Agriculture</b>	<b>Agriculture</b>	<b>Agriculture &amp; Food security</b>
<b>Species/Ecosystems</b>	<b>Living Resources</b>	<b>Biodiversity</b>	<b>Biodiversity Ecosystem Servs.</b>
<b>Energy</b>	<b>Energy Industry</b>	<b>Energy</b>	<b>Energy Materials</b>
<b>Industry</b>			
<b>Urban</b>	<b>Cities</b>		<b>Urban growth</b>
		<b>Water</b>	<b>Water &amp; Sanitation</b>
			<b>Poverty</b>
			<b>Climate Change</b>
			<b>Peace/Security</b>

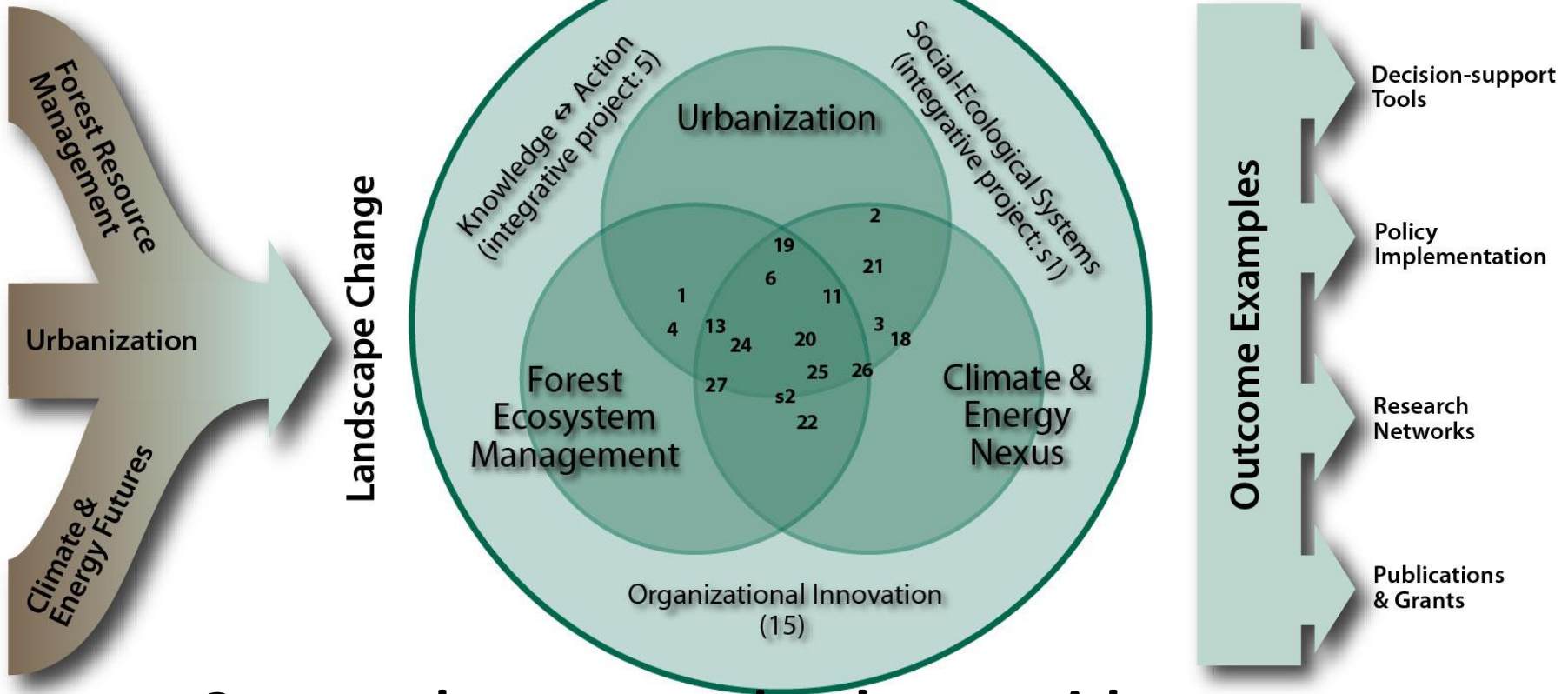
# **Use what we already know to move knowledge into action**

- **Bob's Law: Cut in half the bad, Double the rate of the good**
  - **Increase trends in fertility reduction**
  - **Reverse declining trends in agricultural production in Africa, sustain elsewhere**
  - **Accelerate improvements in use of energy and materials**
  - **Use opportunities for expanded urban systems to be habitable, efficient, and environmentally-friendly**
  - **Restore degraded ecosystems, while conserving biodiversity elsewhere**

## Model System

## Central Research Themes

## Solutions



**Create what we need to know with users to provide solutions**