

“Making Progress Toward Sustainable Societies in the Context of Global Climate Change”

Prof. Dr. Donald Huisingh

Senior Scientist in Cleaner Production and Sustainable Development

**The Institute for a Secure and Sustainable Environment, The University of Tennessee
Knoxville, TN 37996-4134, U.S.A**

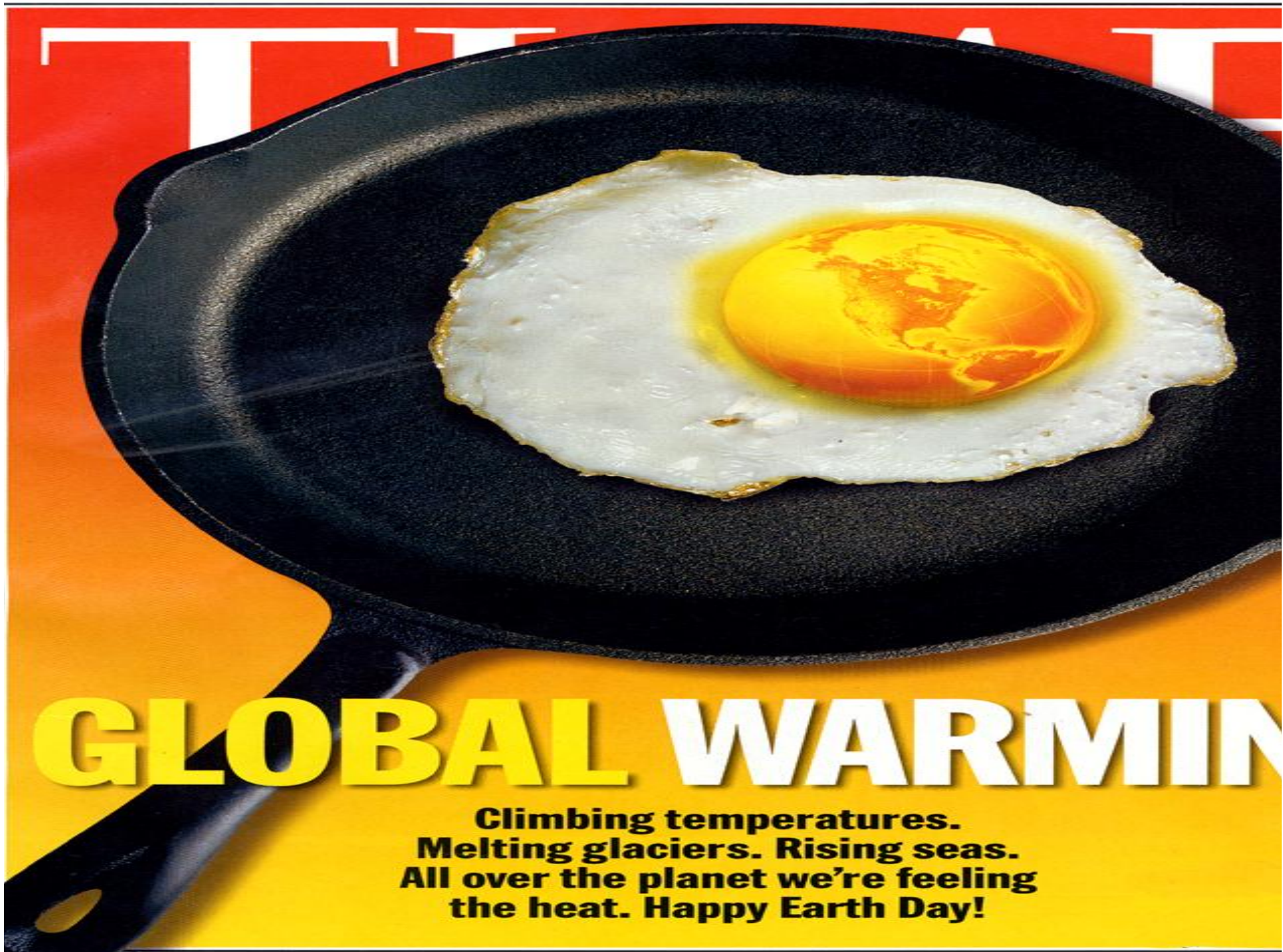
**Editor-in-Chief of Elsevier’s
Journal of Cleaner Production**

E-mail: donaldhuisingh@comcast.net

SKYPE NAME: huisinghdon







GLOBAL WARMING

**Climbing temperatures.
Melting glaciers. Rising seas.
All over the planet we're feeling
the heat. Happy Earth Day!**

Overview of this Presentation

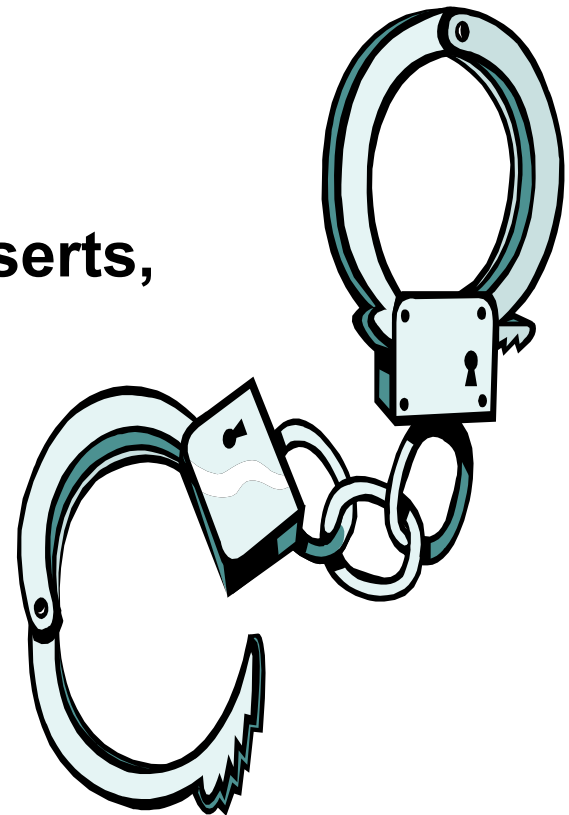
- **What are some ‘big picture’ issues that we need to address?**
- **What is needed IF we wish to real progress toward sustainable societies?**
- **What is happening in China in this context?**
- **What is my perspective as editor of the Journal of Cleaner Production?**
- **What can educators do to help make progress toward sustainable societies?**

Overview of this presentation

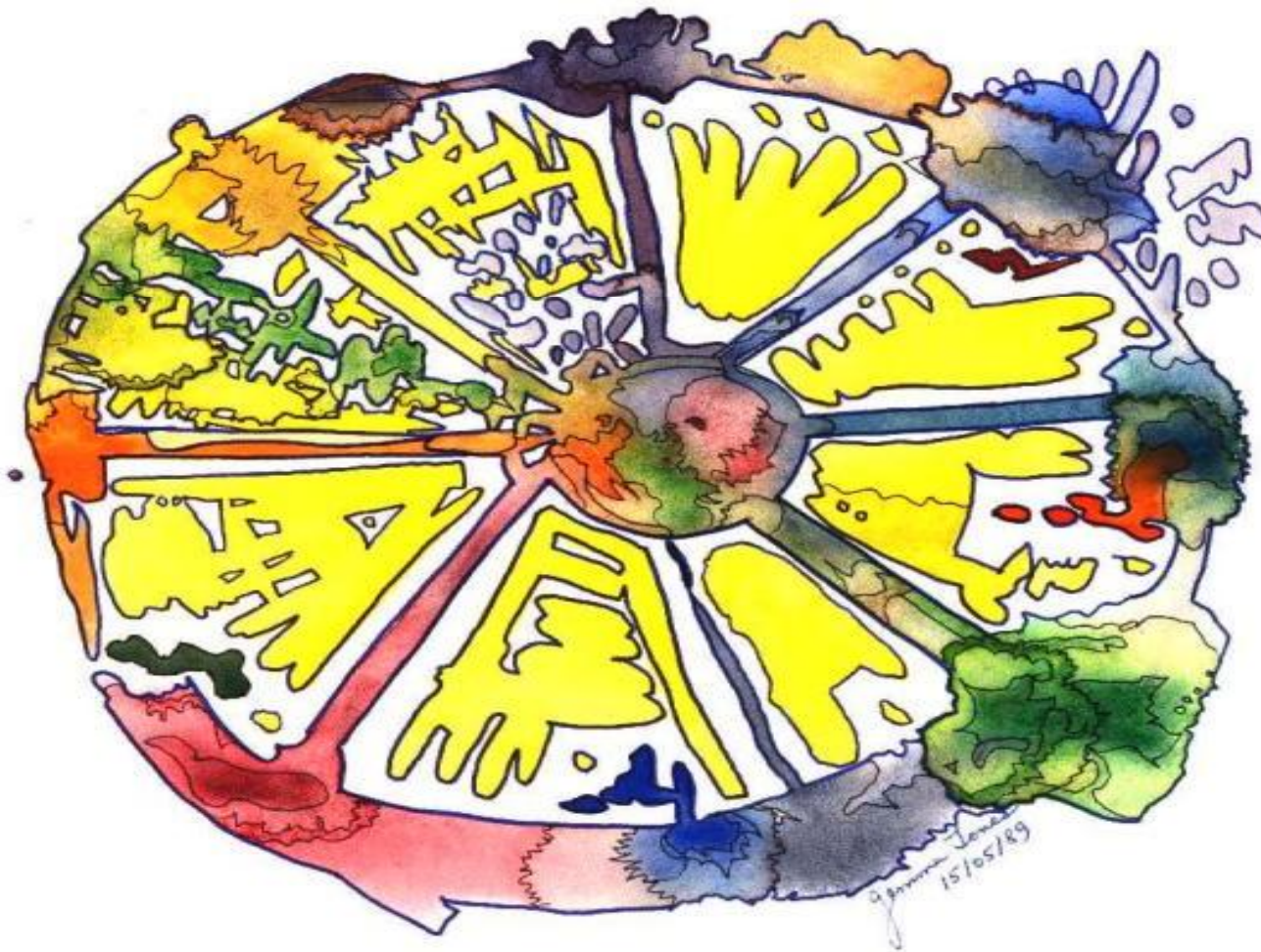
- **What are some 'big picture' issues that we need to address?**

What Issues Are Increasingly Threatening Our Societies with *Un-sustainability?*

- **Global Warming;**
- **Ozone layer destruction;**
- **Species diversity losses;**
- **Water insecurity, spreading deserts,**
- **Food insecurity;**
- **Economic insecurity**
- **Toxic substances;**
- **Human population explosion;**
- **Poverty, disease & corruption;**
- **Terrorism.**



Where Are We and Where Are We Going?



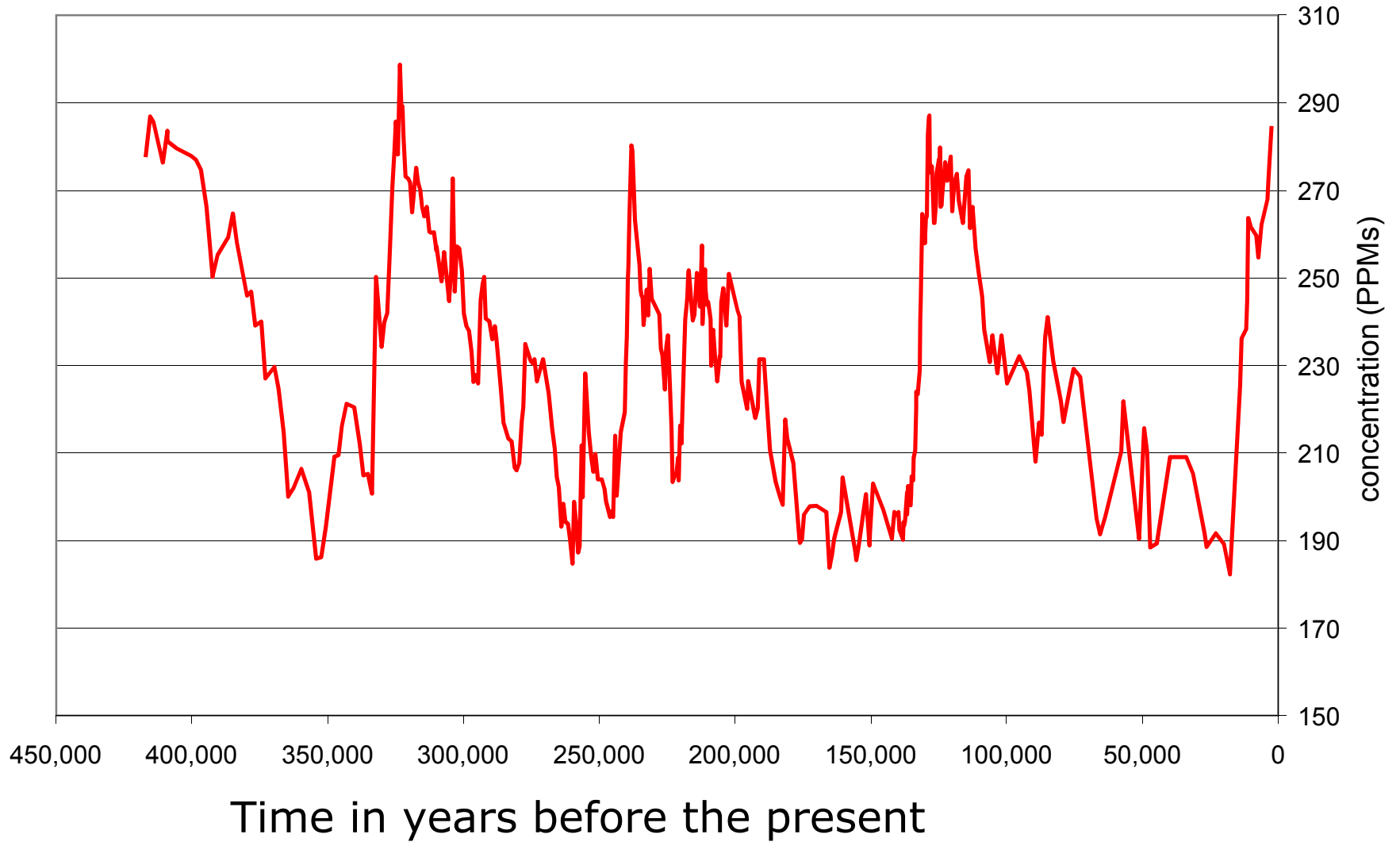
What is Ahead on Our Road to the Future?



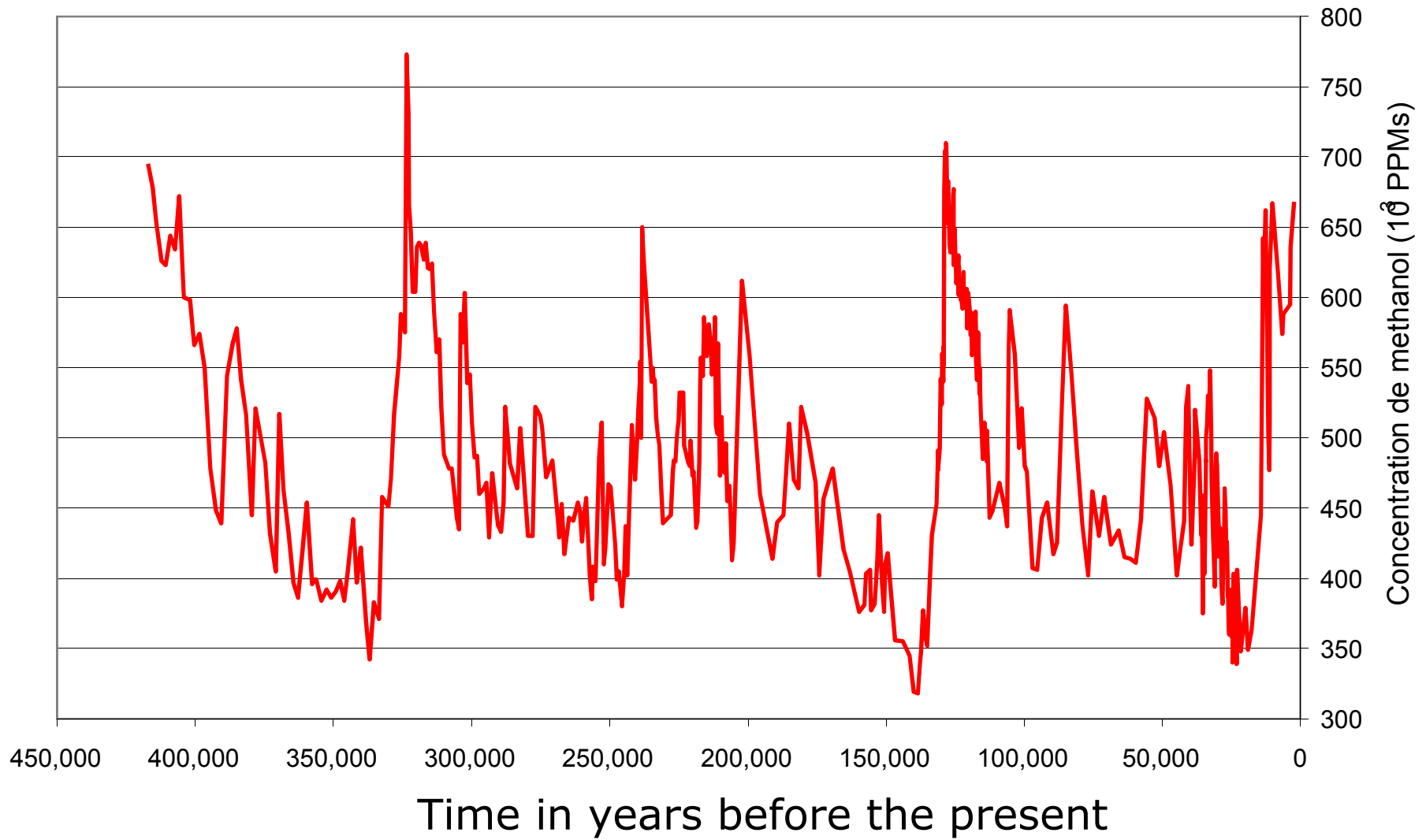
Janus, the Roman God of gates and doors, beginnings and endings



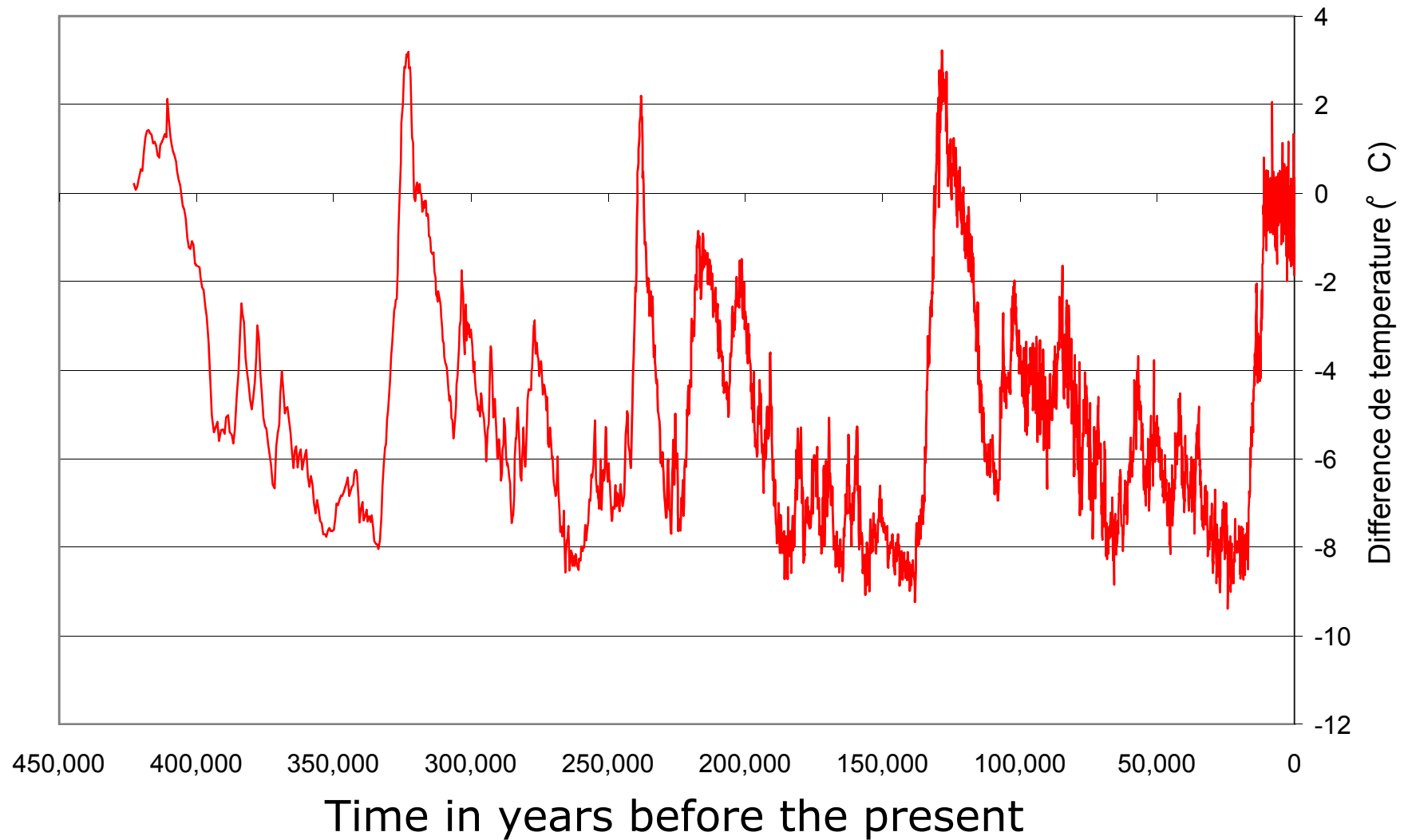
Concentration of Carbon Dioxide in Antarctic ice



Methane concentration in the Antarctic ice



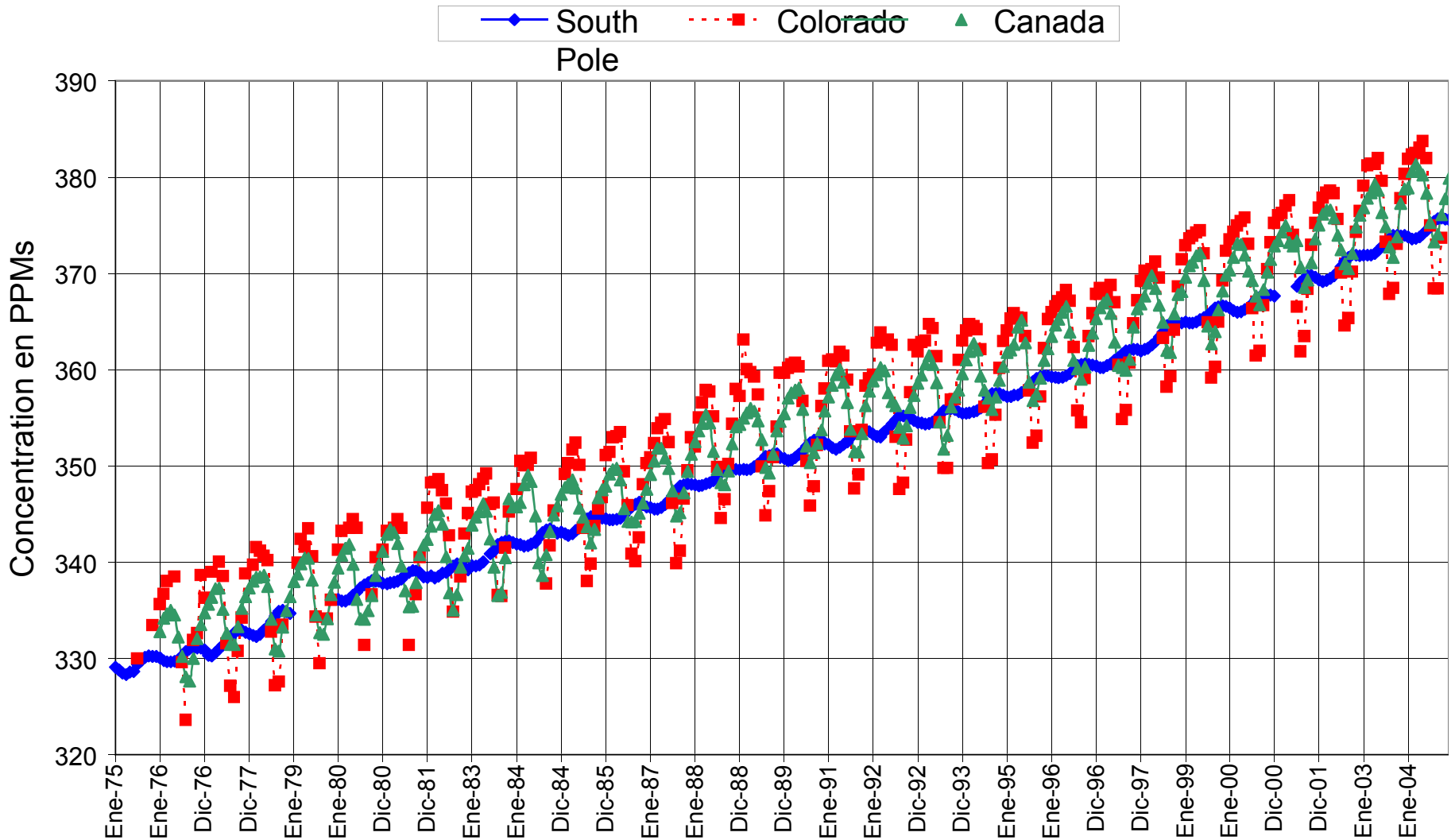
Atmospheric Temperature Variations as detected from the Antarctic ice



Ranges and concentrations during 450,000 years

- Carbon dioxide concentration range =
(185 – 295 PPM) (2004 380 PPM)
Projected by 2050 to
be between 450 & 750 PPM!
- Methane concentration range =
(340 – 760 PPM) (2004 1700 PPM)
Projected by 2050???
- The average temperature range
during this period was 10° C.

Concentration of Carbon Dioxide as measured in Colorado, Canada and at The South Pole



SOURCES OF CARBON DIOXIDE





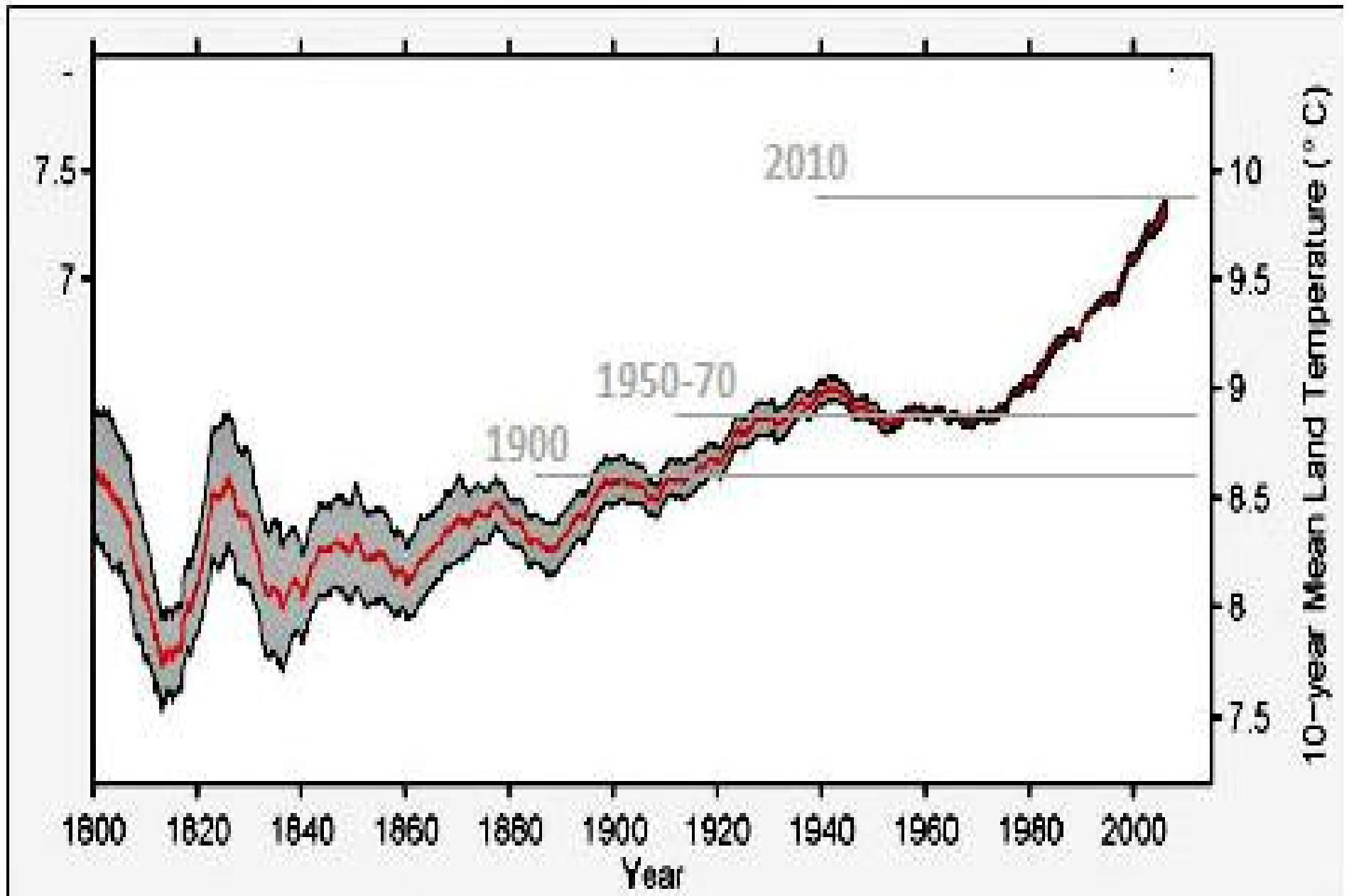






John McColgan / U.S. Forest Service

Climate Skeptics Take Another Hit

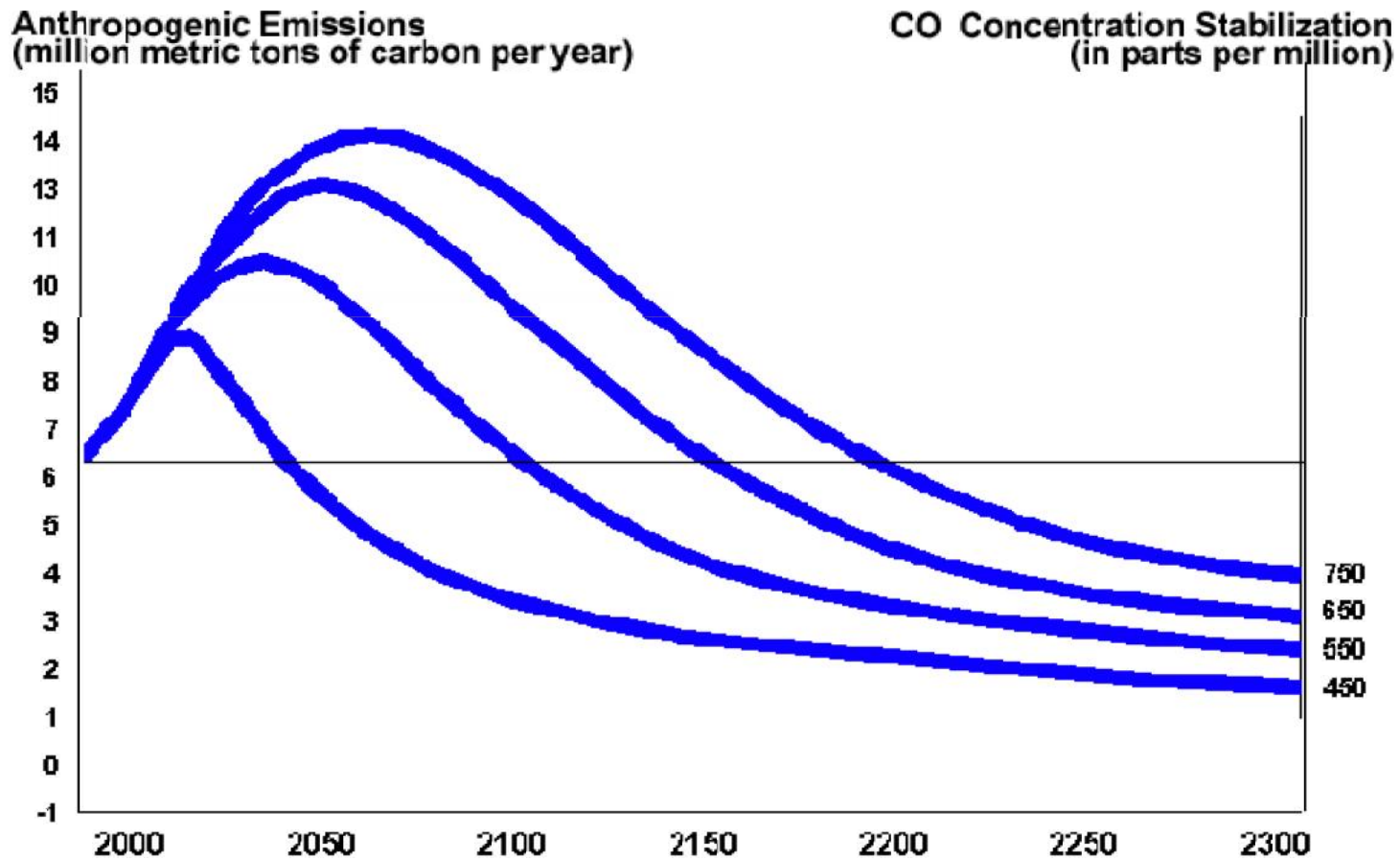


What is the net amount of carbon dioxide that is being added each day to the global atmosphere?

What is the net quantity of carbon dioxide that is being added each day to the atmosphere, globally?

Estimates vary from 100,000,000 to more than 1,000,000,000 tons per day!

Stabilizing CO₂ Means Steep Emission Cuts



**Half of the world's forests
have been destroyed by
human activity.**

**Annually, 22 million acres
of forests are being cut;
this is an area that is 3.5X
as large as the state of
Massachusetts!**





**What happened last week with
regard to the global human
population?**

What happened last week with regard to the global human population?

- It reached 7,000,000,000!**
- If it continues to increase at the rate it has for the last three decades, it will reach 9,000,000,000 by 2050!**
- Many leading ecologists have estimated that planet earth can only support 4,000,000,000! What do we have to do?????**

The Earth is Shrinking!!!

- **The Human Population continues to increase:**
 - **70,000,000 per year!**
 - **That is almost 10X as many as the population of Massachusetts, are being added to the earth each year!**
 - **From, “The Earth is Shrinking: Advancing deserts and Rising Seas Squeezing Civilization,”
by Lester Brown**

[http://www.earthpolicy.org/updates/2006/updat
e61.htm](http://www.earthpolicy.org/updates/2006/updat
e61.htm)

The Earth is Shrinking!!!

- **Deserts are spreading;**
 - **China is losing productive land to deserts at an accelerating rate**
 - **1950 – 1975 they lost 1,560 sq. km/yr..**
 - **By 2000 they lost 2,480 sq. km/yr.**
 - **In recent years Afghanistan lost 100 villages and Iran lost 124 villages due to advancing deserts;**



The Earth is Shrinking!!!

- Nigeria had a 5x increase in population from 33 million to 170 million between 1950 and 2011;
- At the same time it had an 11x increase in domestic animal population and **lost 3,400 sq. km to deserts;**
- *Does anyone see any problems?*
- *What do you think should be done?*



Drought, Drought, Drought

Ethiopia requested emergency food aid for 6.2 million people.

(Thursday, Oct. 22, 2009)

Since then due to prolonged drought that in the Horn of Africa, including Kenya and Somalia much larger populations are now starving.

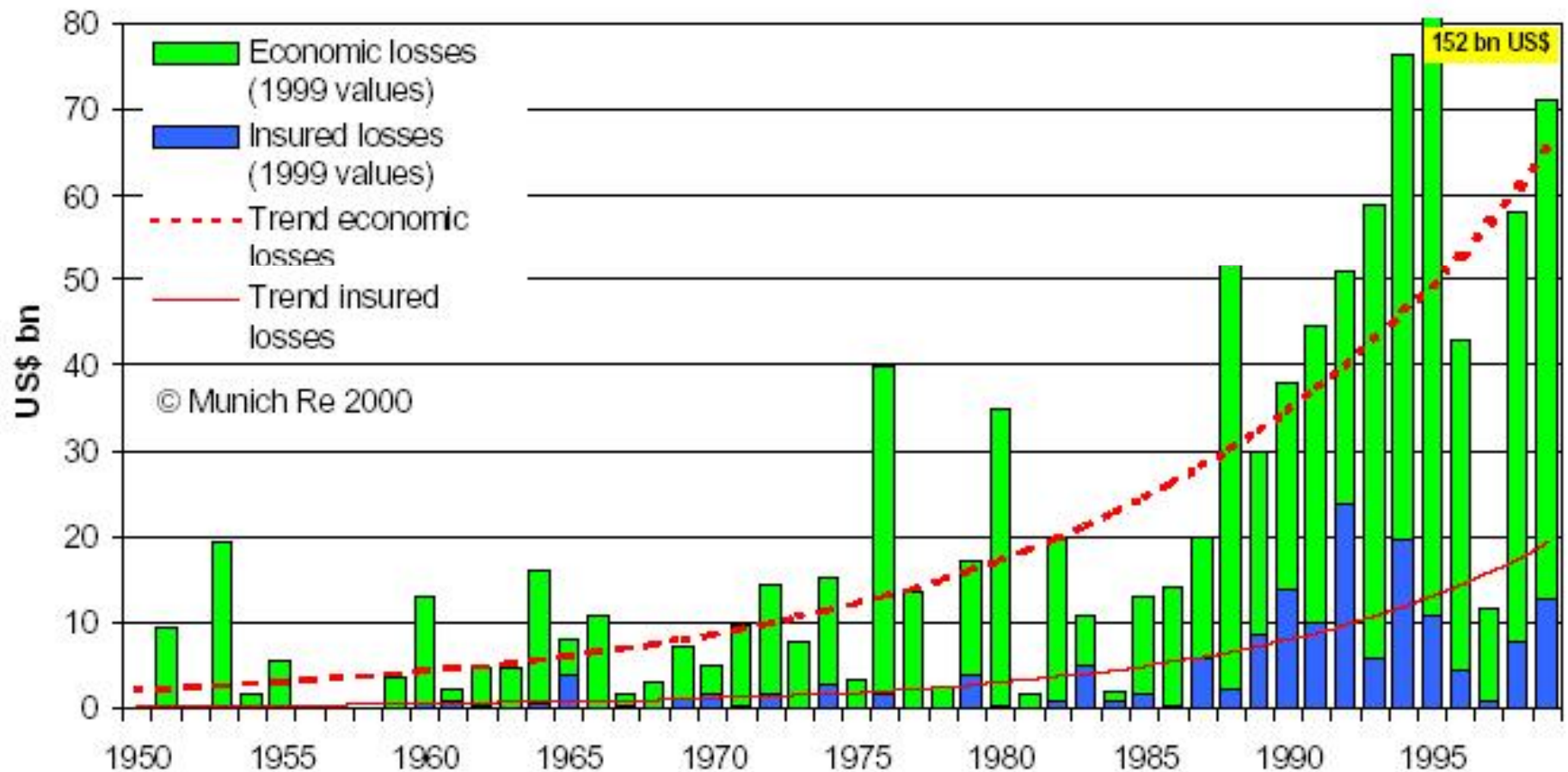
Flooding, Flooding, Flooding

In the last 9 months there was extensive flooding in:

- 1. Australia**
- 2. Pakistan,**
- 3. Philippines**
- 4. Brazil**
- 5. U.S.**
- 6. Thailand**

Sustainability Trends (I)

Damages due to Natural Disasters 1950-1999



Source: Munich Reinsurance

**We are over-pumping our
aquifers, many of which
are nearly dry!**



**66% of oceanic fisheries
are fished at or beyond
their sustainable yields!**



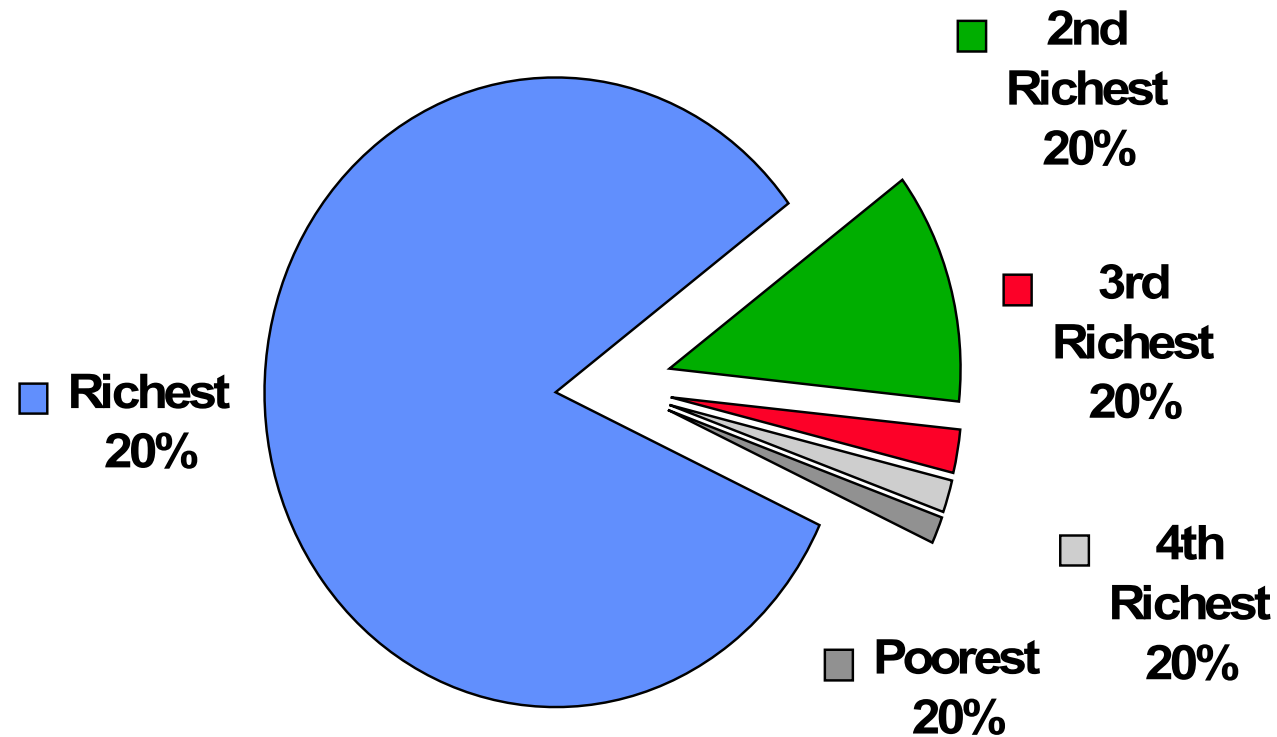
**We are now in a period of
mass species extinction.**

**104 species become
extinct
every day!**

**We must find solutions for
these problems?**



Global Income and Economic Disparities In Distribution of World Income



Source: [Agenda for Change](#), Center for our Common Future. 1989 figures from UNDP

Over 1.5 billion (25%) of
the world's population is
impoverished and
malnourished!

*We must find solutions for
these problems?*





What is Ahead on the Road to the Future?



Overview of this presentation

- **What is needed IF we wish to real progress toward sustainable societies?**

Changing our Ways of Thinking & Acting

**If mankind is to survive,
we shall require a
substantially new
manner of thinking.**

Albert Einstein

Changing our Ways of Thinking & Acting

We must begin to see the possibility of evolving a new lifestyle, with new methods of production and new patterns of consumption; *a life-style designed for permanence.*

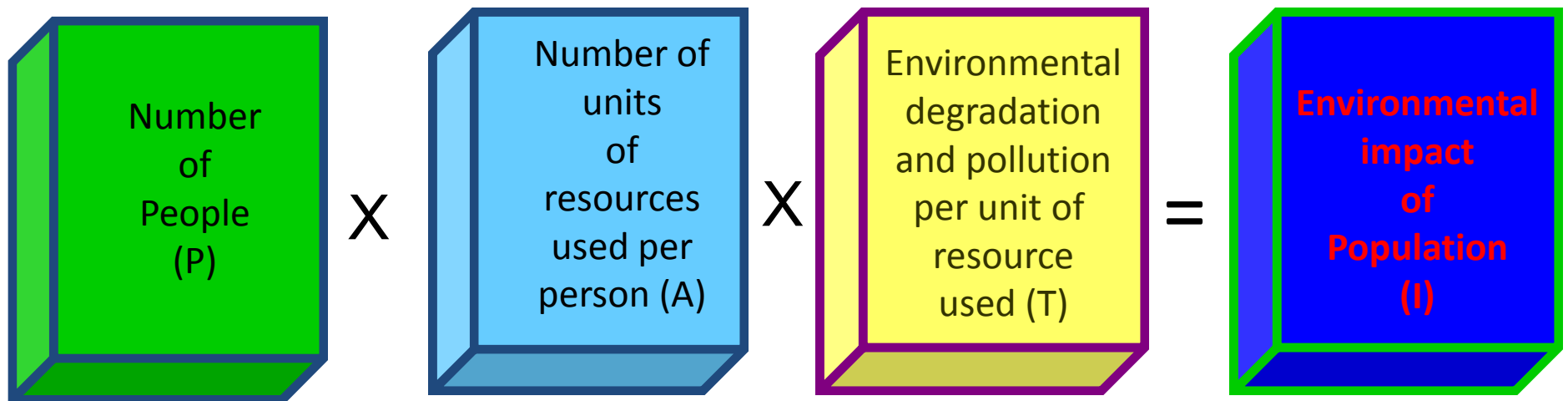
E. F. Schumaker

Changing our Ways of Thinking & Acting

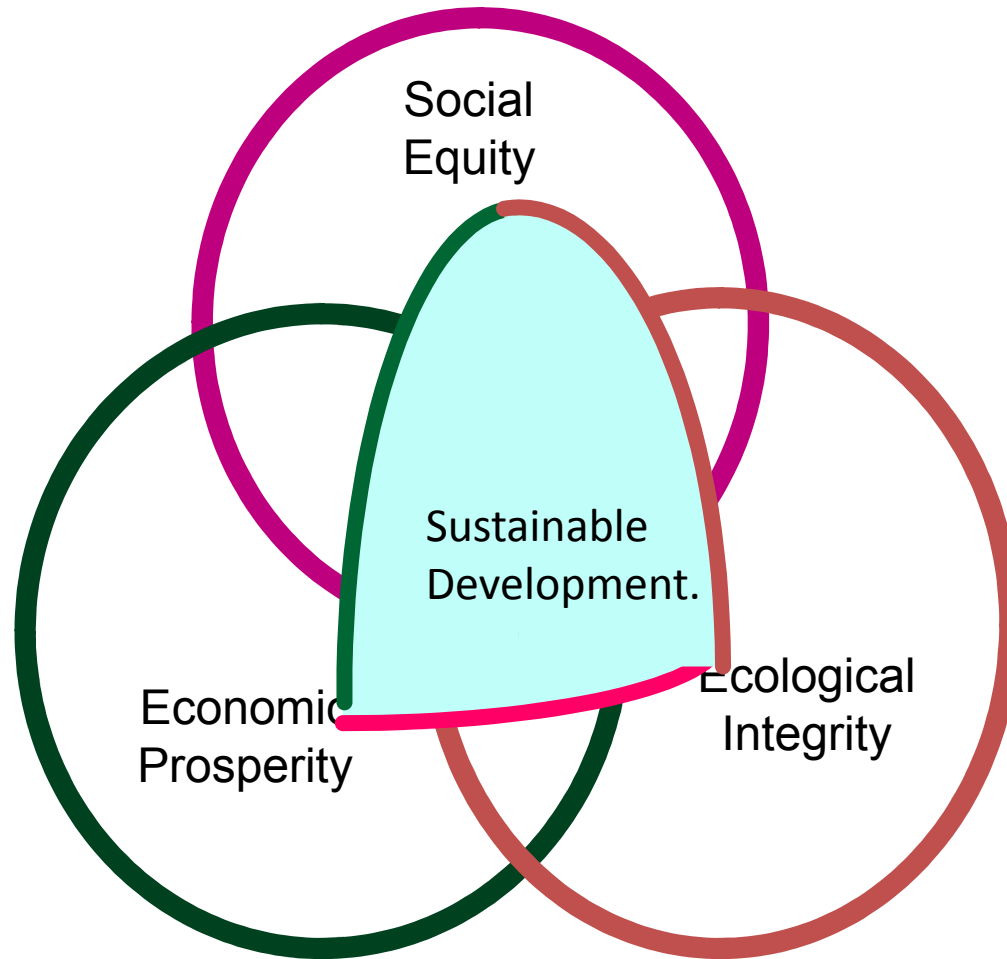
All things are bound together. All things connect. What happens to the earth happens to the children of the earth. Man has not woven the web of life. He is but one thread. Whatever he does to the web, he does to himself.

» Chief Seattle (1860)

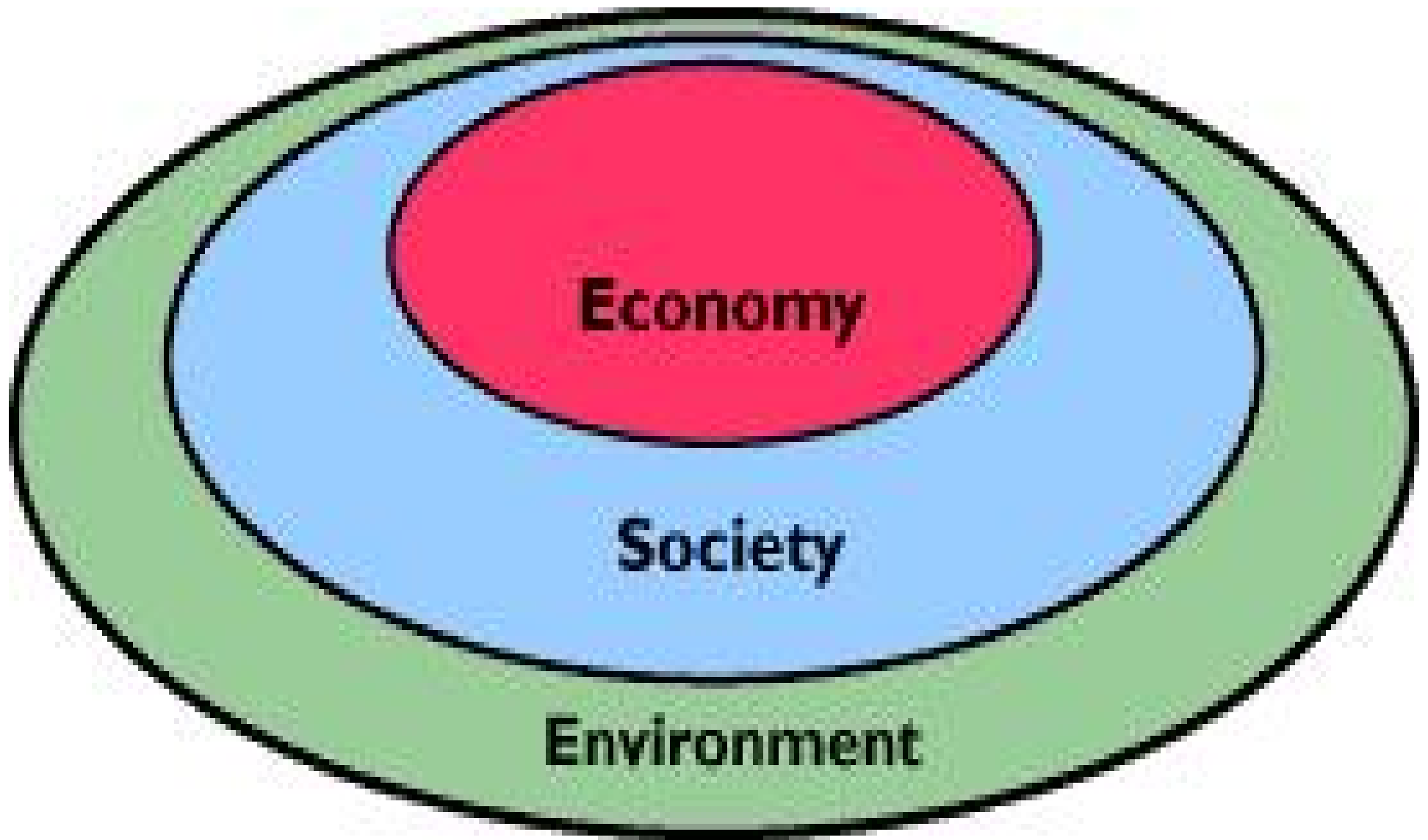
Interconnectedness of Population, Affluence & Technology



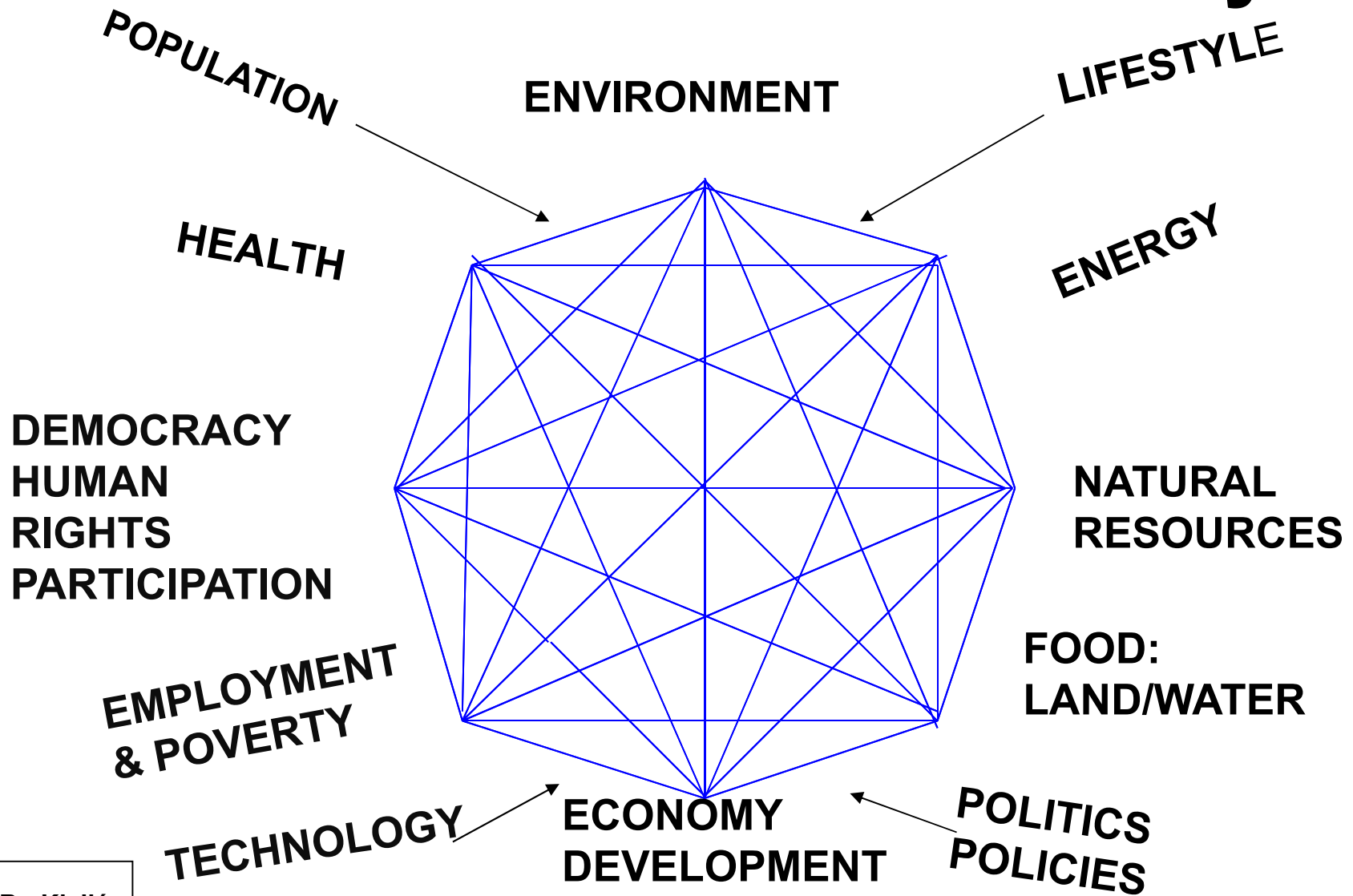
Sustainable Development



Sustainable Development?



Diamond of Sustainability



Let's Focus Upon These Five Re Words

- Re-thinking;
- Re-envisioning;
- Re-evaluating;
- Re-dedicating;
- Re-vitalizing.

A Brief History of Preventive Environmental Protection

- Agenda 21;
- The Earth Charter;
- Millennium Development Goals
- The Precautionary Principle;
- The Natural Step Principles;
- The Melbourne Principles;
- The Decade of Education for Sustainable Development (EfSD) 2005 – 2014;
- The Equator Principles for Sustainable Finance.

The Millennium Development Goals

- Goal 1. Eradicate extreme poverty & hunger;
- Goal 2. Achieve universal primary education;
- Goal 3. Promote gender equality and empower women;
- Goal 4. Reduce child mortality;

The Millennium Development Goals

- Goal 5. Improve maternal health;
- Goal 6. Combat Hiv/Aids, malaria and other diseases;
- Goal 7. Ensure environmental stability;
- Goal 8. Develop a global partnership for development.

Designing products and services for the Base of the Pyramid

Affordability

Acceptability

Availability

Awareness

Reactive Approaches

Foul & Flee

Dilute & Disperse

Concentrate & Contain

End-of-pipe Treatment

Preventive Approaches

Cleaner Production
of Cleaner Products &
Services

Sustainable Consumption
Sustainable Communities
& Regions

Overview of this presentation

- What is happening in China in this context?

A few observations from within and outside of China

- **Increasing depletion of aquifers and expanding regions of salt water intrusion;**
- **Increasing deforestation and erosion;**
- **Climate change induced drought and spreading deserts.**
- **Rapid increase in respiratory diseases;**
- **Inadequate attention to worker health and safety in industrial and mining facilities;**

A few observations from within and outside of China

- Rapid and extensive urban-rural shift of the population;
- The rural population continues to be poor;
- Rapid shift from bicycles, and buses to cars;
- Rapid growth of the super wealthy class;
- Toxic substances in products, some corporate leaders in jail; (New Toxics Rules, Cleaner Production and Circular Economy)
- Increasing questioning of the consequences of rapid growth;
- Increasing openness to limited-criticism in the search for other approaches

A few observations from within and outside of China

- Unanticipated consequences of the 'One child family policy;
- Governmental officials admitted that the 'Three Gorges Dam' is causing local and regional earthquakes and that it may have been a mistake to build it!!!
- They send tens of thousands of students to foreign universities;
- They encourage faculty to publish in international, peer reviewed journals;
- Earth Day celebration on April 22, 2011,

A few observations from within and outside of China

**The Chinese Government invited
their citizen's involvement in
helping to make a transition to
SD with the theme: “Cherish the
Earth's Resources: Help us to
Change our Developmental
Model!”**

PP

Gross National Happiness
is more important than Gross
National Product.

By: HM. Jigme Singye Wangchuk.

Other Encouraging Initiatives

- Bhutan's 'Happiness Index';
- The UN's Quality of Life Index;
- **The Arab Spring**
- **The Occupy Wall Street**
- **Avaaz**

A few observations from within and outside of China

- **'Modern China is yearning for a new moral code.'**

*(Financial Times, Thursday
Nov. 3, 2011)*

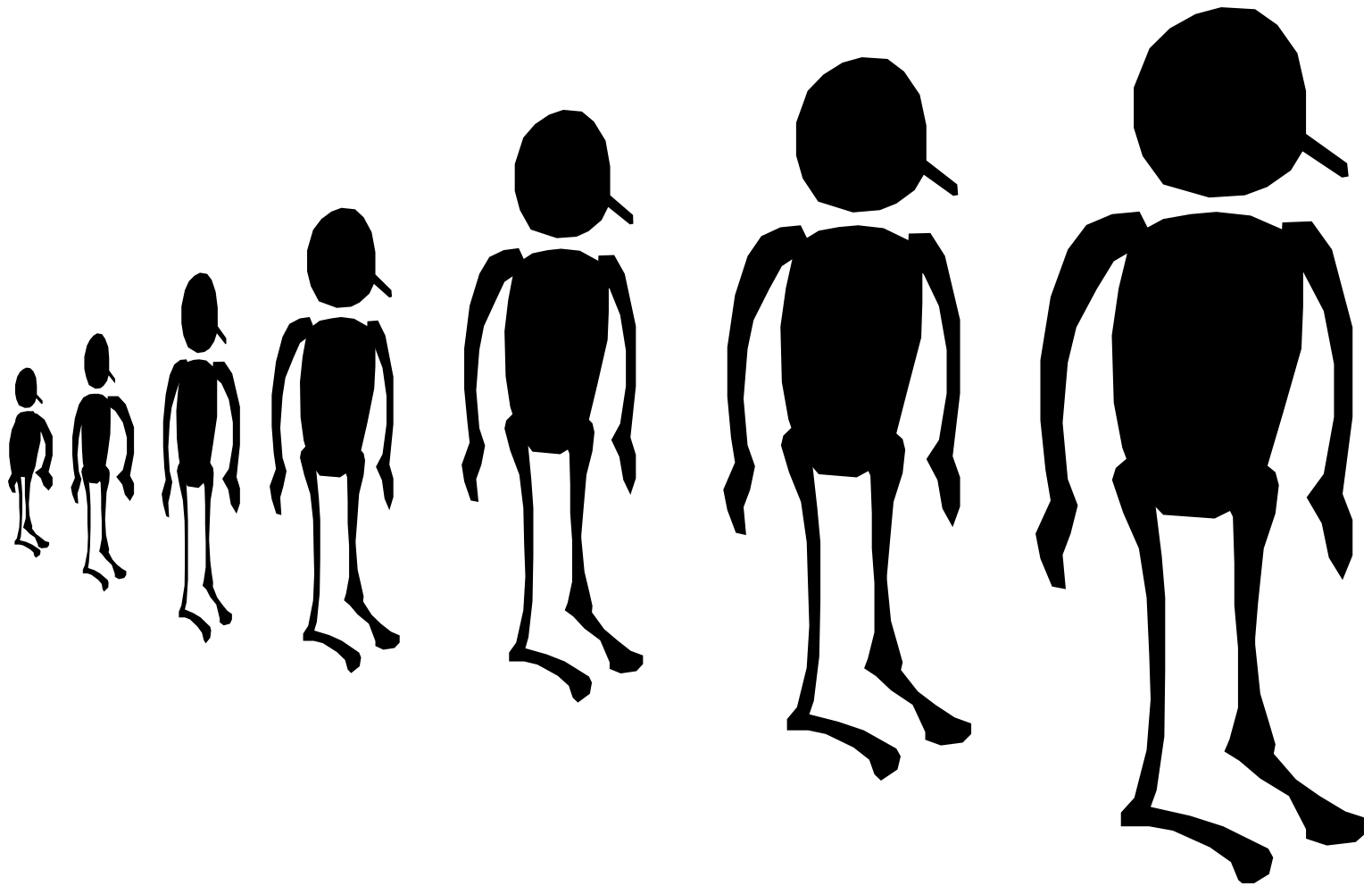
- **"China looks to boost image with global English language TV drive.'**

*(Financial Times, Tuesday
Nov. 8, 2011.)*



Changes are
happening all
over the world!

Who should be empowered to make decisions on local, national, international and global welfare issues ?



Overview of this presentation

- What is my perspective as editor of the Journal of Cleaner Production?



Volume 15 Number 4 2007 ISSN 0959-6526

Journal of Cleaner Production

- Pollution Prevention
- Source Reduction
- Industrial Ecology
- Life Cycle Assessment
- Waste Minimisation
- Sustainable Development

Cleaner Production

Available online at www.sciencedirect.com



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JOURNAL OF CLEANER PRODUCTION Vol. 18/6 (2010) 511-606

SPECIAL ISSUE

ELSEVIER

Journal of
Cleaner
Production

A Recently Published Special Issue of the Journal of Cleaner Production

- **Promoting Transformation Towards Sustainable Consumption and Production in a Resource and Energy Intensive Economy- The Case of Finland, JCLP Vol 19, Issue 16, Nov. 2011.**

Some Special Issues of the Journal of Cleaner Production

- Sustainable Fisheries;**
- Sustainable Agriculture;**
- Sustainable Forestry;**
- Sustainable Tourism;**
- International Trade in Bio-Fuels;**
- Hydrogen for a Sustainable Global Economy.**

Some Special Issues of the Journal of Cleaner Production

- **Opportunities and challenges with Nanotechnology**
- **Industrial Ecology;**
- **Sustainable Production and Consumption;**
- **Extended Producer Responsibility;**
- **Innovation and Innovation Diffusion;**
- **More Sustainable Transportation;**

Some Special Issues of the Journal of Cleaner Production

- Electroplating, Leathermaking, Papermaking**
- Green Chemistry;**
- Green Engineering;**
- Green Buildings;**
- Global Supply Chain Management;**
- Advances in Regional Sustainable Development;**
- The Smart Grid**

Evolving Challenges

Clearing the Rising Bar

- Transitioning to Post Fossil Energy Societies;
- Food Security;
- Low Water Footprint Systems;
- Green Chemistry;
- Low Toxicity Raw Materials and Products;
- Responsible Supply Chain Management;
- Bio-mimicry: Learning from Nature;
- Societal Equity!!!!

Overview of this presentation

- What can educators do to help make progress toward sustainable societies?

Special Education for SD issues of the Journal of Cleaner Production

- Higher-Education's Responses to Challenges and Opportunities in Education and Research for Sustainability;**
- The Roles of Higher Education in Regional Sustainability Initiatives;**
- Going Beyond the Rhetoric: System-Wide Changes in Universities for Sustainable Societies.**

- **Green Universities and Environmental Higher Education for Sustainable Development in China and in other Emerging Countries.**

Sustainable Development In Higher Education Requires Us to Adopt

– New thinking;



Sustainable Development In Higher Education Requires Us to Adopt

- New thinking;
- New paradigms;



Sustainable Development In Higher Education Requires Us to Adopt

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- New policies;



Sustainable Development In Higher Education Requires Us to Adopt

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Sustainable Development In Higher Education Requires Us to Adopt

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- New management;



Sustainable Development In Higher Education Requires Us to Adopt

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- New policies;
- New technologies;
- New management;
- New cooperation;



Sustainable Development In Higher Education Requires Us to Adopt

- New thinking;
- New paradigms;
- New policies;
- New technologies;
- New management;
- New cooperation;
- New values.

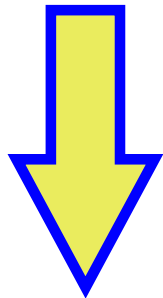


Where should our

Commitment

be?

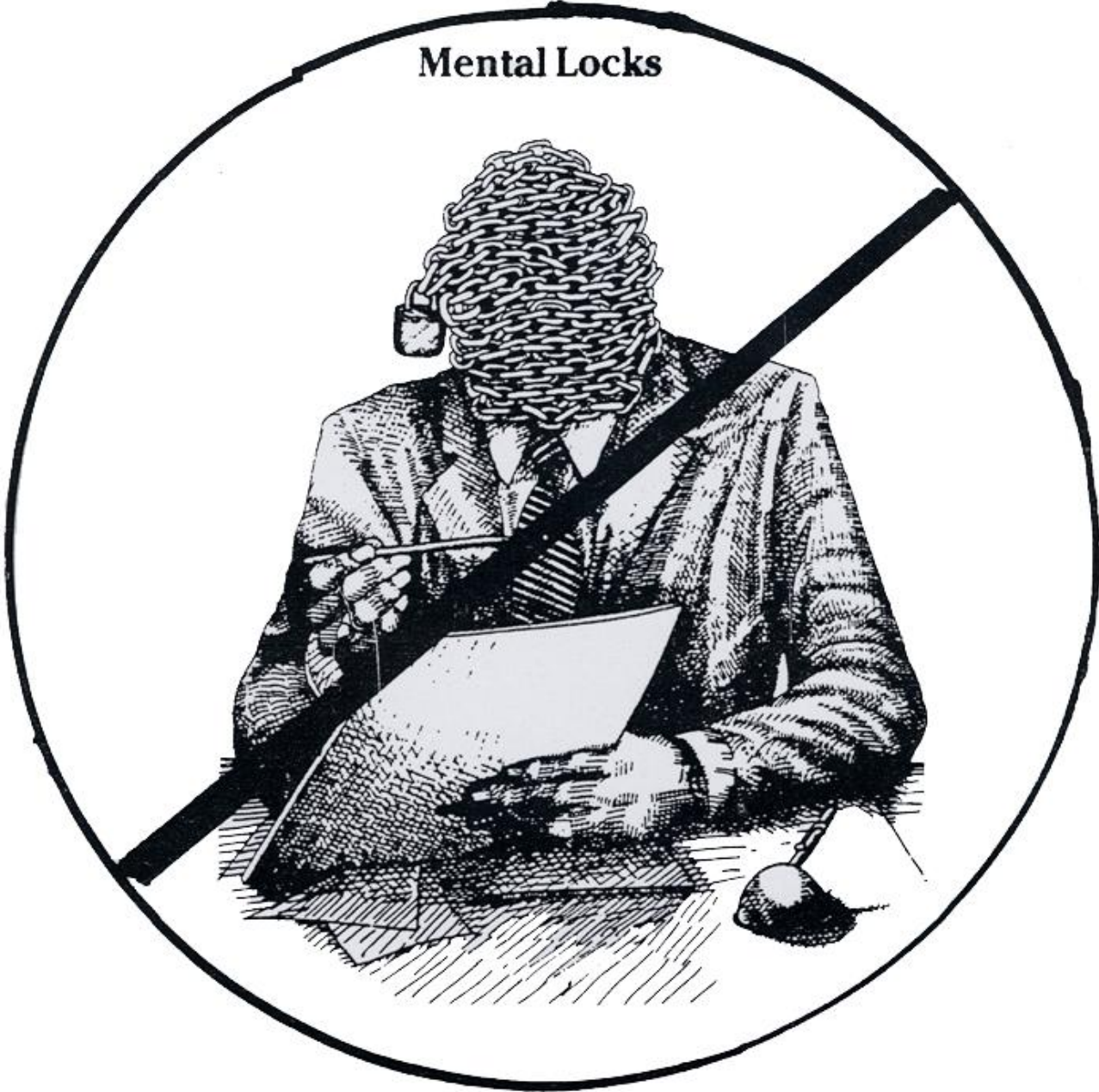
Rea **c** tive



C reative

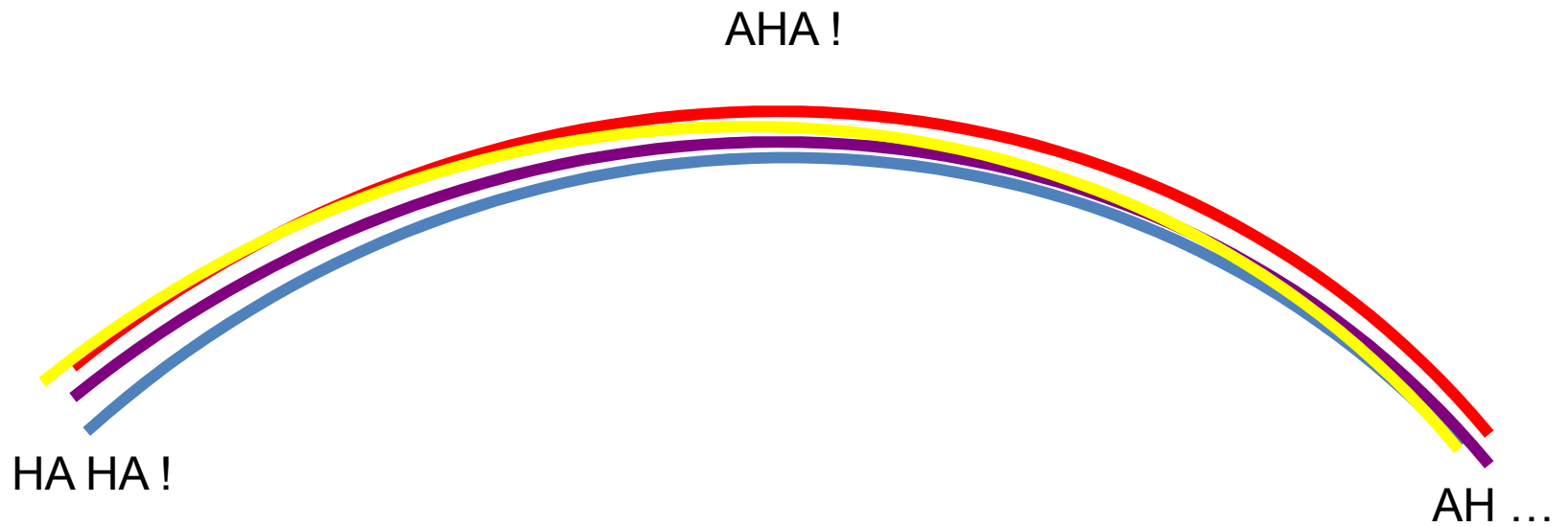
4. Be Practical

Mental Locks



Ten Blocks to Creativity

- Fear of making mistakes
- Fear of being seen as a fool
- Fear of being criticized
- Fear of being misused
- Fear of being alone (a person with an idea is automatically a minority of one.)
- Fear of disturbing a tradition AND making changes
- Fear of being associated with taboos
- Fear of losing the security of habit
- Fear of losing the group's love
- Fear of being truly an INDIVIDUAL



“haha-aha-ah” curve

-after Arthur Koestler

Sustainable Development
Is a
Journey

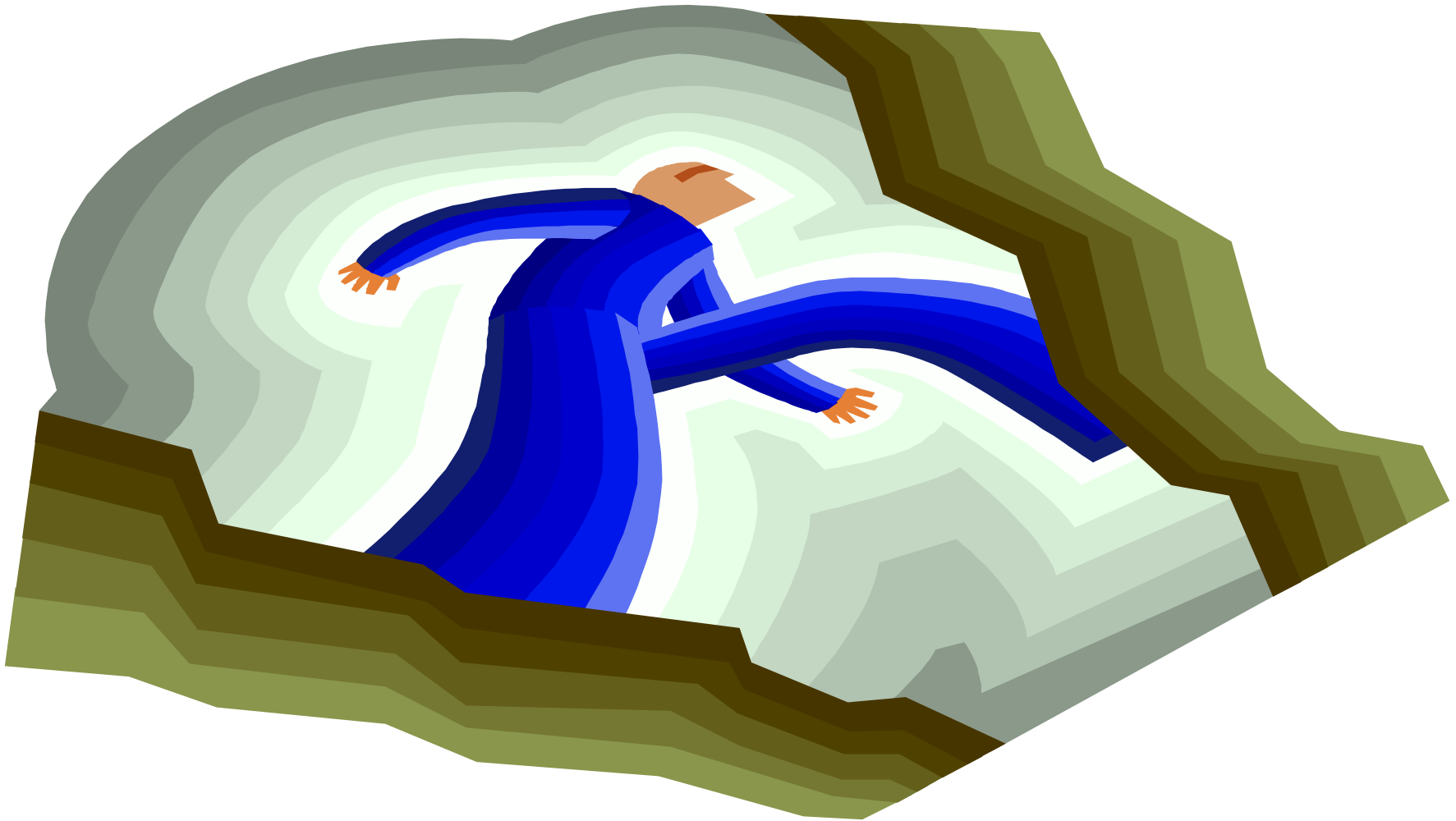
..... Not a Destination!!

From the Tragedy of the Commons...

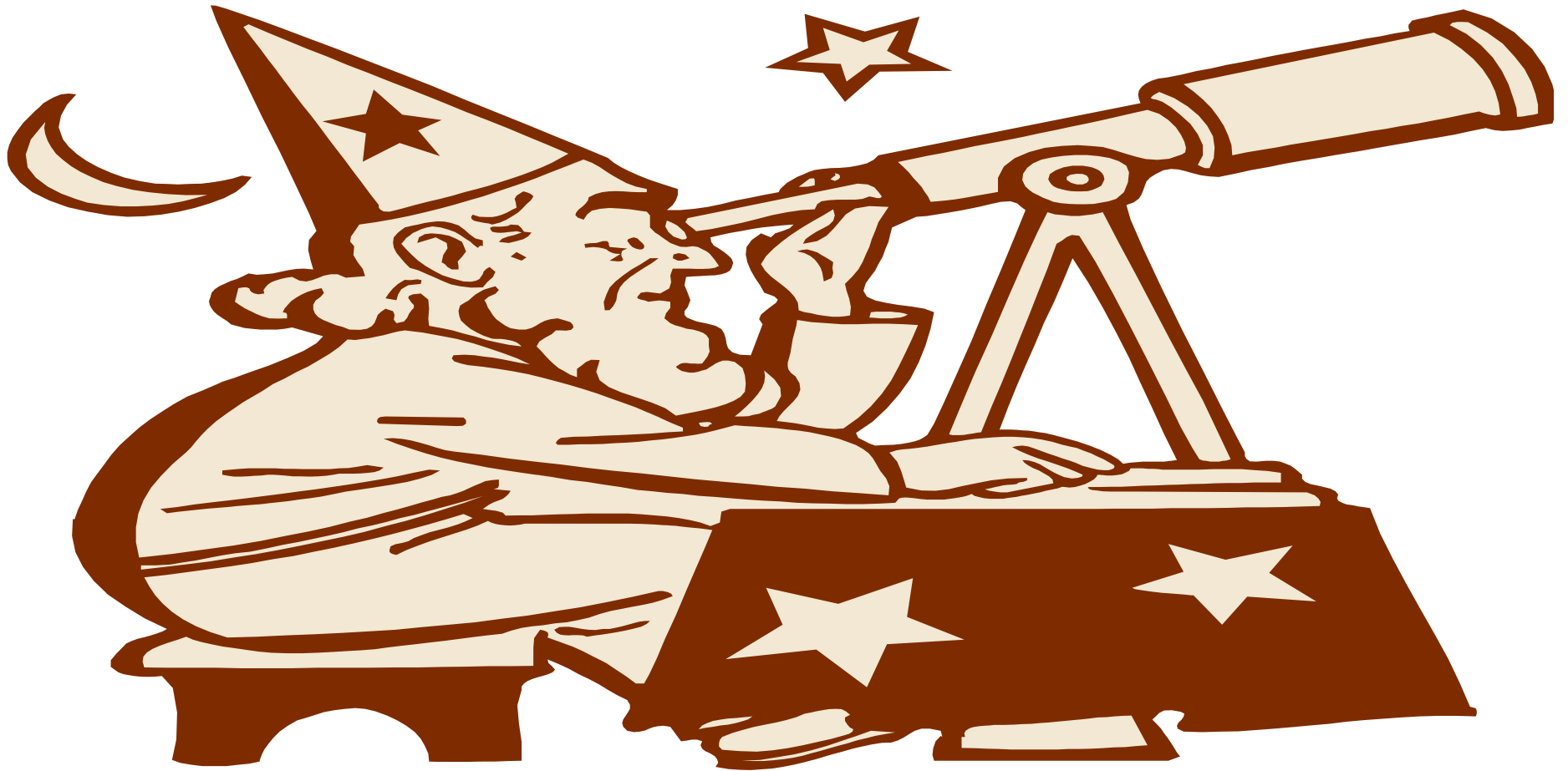


To the Treasury of the Commons.

- *Are they ready & willing to take the necessary steps?*



How can/should we move forward?

















Who should be empowered to make decisions on international and global welfare issues?



**IT'S AMAZING WHAT PEOPLE CAN ACCOMPLISH
WHEN THEY WORK TOGETHER.**

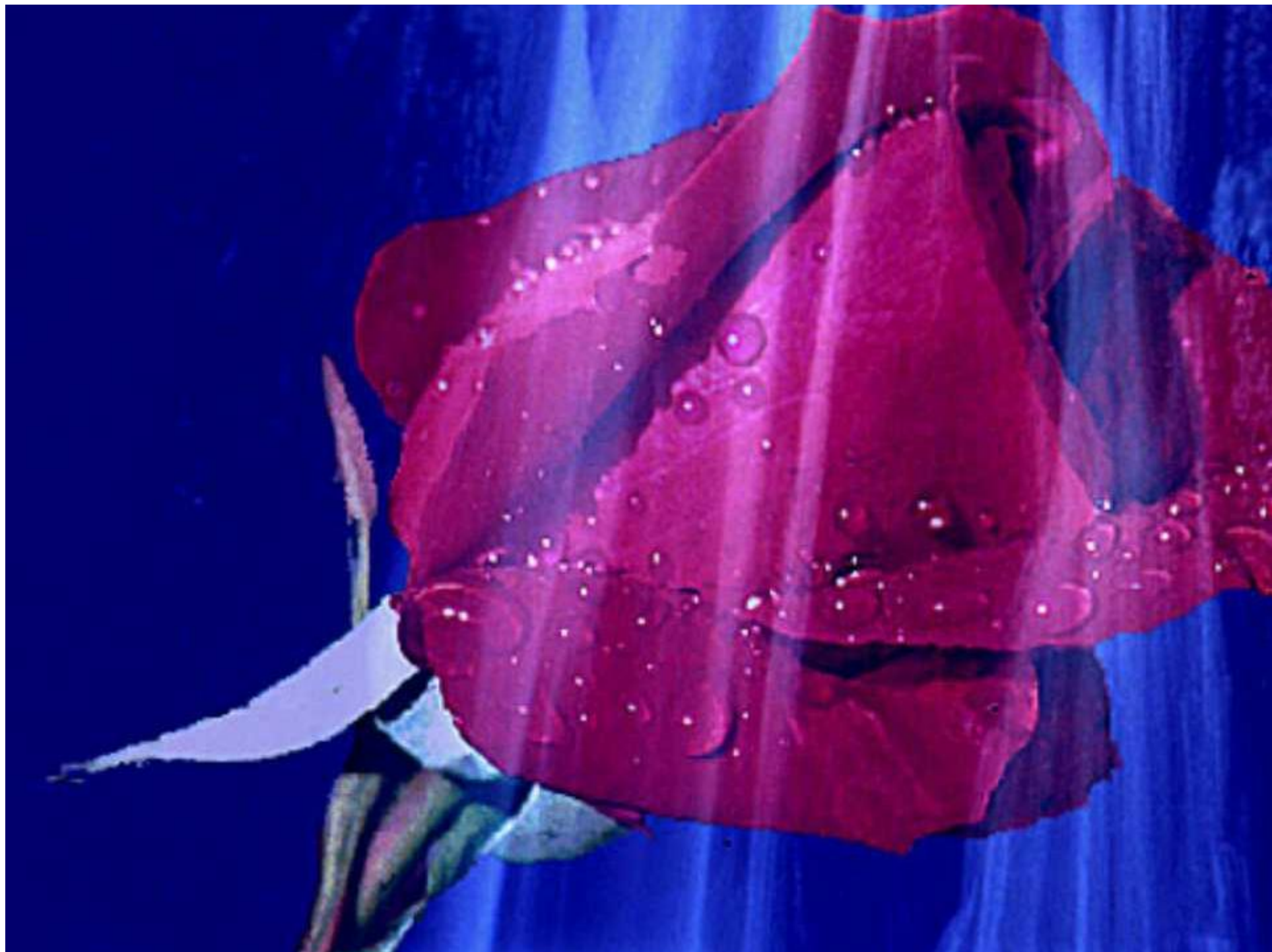




Dec. 4, 1992
Jemma T. M. Jones
"Thinking"









Tack

Vielen Dank

Obrigado

Merci

ありがとうございます

Bedankt

Takk

感謝您

Terima Kasih

谢谢

Grazie

ขอบคุณ

Спасибо

Thank You

Ľiitos

Tak

Teşekkür Ederiz

감사합니다

Gracias

Dziękujemy

Σας ευχαριστούμε

A Brief History of Environmental Protection

- This is the web address for the Environmental Time Line from the World Watch Institute, for 1960 – 2004

[HTTP://WWW.WORLDDWATCH.ORG/BR
AIN/FEATURES/TIMELINE](http://www.worldwatch.org/brain/features/timeline)

- They have numerous excellent publications.

New Challenges

- Green Chemistry to be integrated with the design of products that are free of toxic substances and are made using safer chemistry pathways.

“Frontiers in Green Chemistry: meeting the grand challenges for sustainability in R&D and manufacturing,” J. Manley, P. Anastas & B. Cue, JCLP Vol.15 (2007) 1–8.

Improving Eco Efficiency by Cradle-to-Cradle Design

- Integration of Eco-Efficiency and Eco-Effectivity;
- **Or integrating doing things right with doing the right things.**

“Cradle to cradle design: creating healthy emissions –a strategy for eco-effective product and system design,” M Braungart, W. McDonough and A. Bollinger. JCLP Vol 15 (2007) 1337-1348.

A New Recycling Material for Removing Phosphorus from Wastewater

- Oyster shells are usually considered to be a waste however, when heated to 750 C they can be transformed into 'activated oyster shells (AOS), which effectively recover phosphorus from wastewater.
- The AOS + phosphorus can then be used as a calcium and phosphorus fertilizer and the wastewater is no longer polluted with excess phosphorus.

JCLP 17: (2009) 683-687