



**International Institute for
Applied Systems Analysis**
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Welcome to IIASA

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22 February 2006, NEESPI Meeting at IIASA

IIASA Mission

To conduct scientific studies to provide timely and relevant information and options, addressing critical issues of global environmental, economic, and social change for the benefit of the public, the scientific community, national governments, and national and international institutions

(IIASA enters the 21st century, p. 1)

IIASA Goals

- **Provide timely and relevant information and policy analyses for:**
 - ❖ the scientific community
 - ❖ national and international institutions
 - ❖ industry and the public

- **Address critical global issues in an innovative manner**

IIASA Structure

A renown research institution that is

- **International**
- **Interdisciplinary**
- **Independent**
- **Non-governmental**
- **Sponsored by a consortium of National Member Organizations from 16 countries**

IIASA Networking

Relationships crucial to IIASA

- **Scientists from more than 50 countries**
- **2,300 IIASA alumni from 60 countries**
- **Partnerships with leading authorities in wide range of scientific fields**

IIASA Young Scientists Summer Program (YSSP)

- **Offered annually June–August**
- **Unique research opportunities for advanced science students**
- **Hands-on research with senior IIASA research staff**
- **Since 1977: More than 1,300 YSSP scholars from 70 countries**

Nobel Prize Laureates

- **Kenneth Arrow (USA), Economics**
- **Paul Crutzen (Netherlands), Chemistry**
- **Murray Gell-Mann (USA), Physics**
- **Leonid Kantorovich (USSR), Economics**
- **Tjalling Koopmans (USA), Economics**
- **Tom Schelling (USA), Economics**

IIASA Home Page

www.iiasa.ac.at

- More than 10,000 pages of scientific information
- 18 million annual visits to IIASA Web Site

IIASA Research Themes

- I. Environment and Natural Resources**
- II. Energy and Technology**
- III. Population and Society**

2006–2010:

Environment and Natural Resources Theme

Atmospheric Pollution and Economic Development (APD) Program

- will do interdisciplinary research to develop modeling tools for supporting strategies in order to protect local, regional and global atmosphere with least burden on economic development

Evolution and Ecology (EEP) Program

- will do interdisciplinary research on human-induced evolutionary changes in exploited fish stocks and on impact of environmental disturbances on the structure and functioning of food webs

Forestry (FOR) Program

- will do interdisciplinary research on three major areas of the management of the forest sector
 - greenhouse gas cycling and terrestrial ecosystems
 - global impacts of forest sector development in emerging economies
 - international governance of forests

Land Use Change and Agriculture (LUC) Program

- will do interdisciplinary research on agro-ecosystem services as food, fiber, carbon, bioenergy and with special emphasis on food security and rural livelihoods, sustainable soil and water resources and impacts of climate change

2006–2010: Energy and Technology Theme

Energy (ENE) Program

- will do interdisciplinary research on three major areas
 - global energy assessment
 - energy modeling
 - investments and financing in energy

Transitions to New Technologies (TNT) Program

- will do interdisciplinary research on
 - describing the diffusion of new technologies in time and space
 - assessing economic, social and environmental implications of technology diffusion
 - assisting policy making on technological innovation and diffusion

Dynamic Systems (DYN) Program

- will do interdisciplinary research on large scale dynamic systems with emphasis on
 - methodology development
 - technology and energy development
 - environmental dynamics

2006–2010: Population and Society Theme

World Population (POP) Program

- will do interdisciplinary research on population dynamics and population-environment interactions focusing on three issues
 - population forecasting
 - population characteristics and human capital
 - population and environment

Population and Climate Change (PCC) Program

- will do interdisciplinary research on integrated assessments of climate change with respect to
 - influence demographic change on emissions
 - the role of uncertainty and learning
 - medium-term response strategies

Risk and Vulnerability (RAV) Program

- will do interdisciplinary research to contribute to decrease the risk and vulnerability of societies and ecosystems (vulnerability consider multiple stress and system resilience) by addressing four goals
 - methodological development of risk and vulnerability models
 - case studies on risk and vulnerability assessments
 - integrative stakeholder led case studies
 - develop interactive tools for training on vulnerability and adaptation

Processes of International Negotiation Network (PIN) Program

- will do interdisciplinary research in order to facilitate or support international negotiations on disputes, conflicts and international regimes

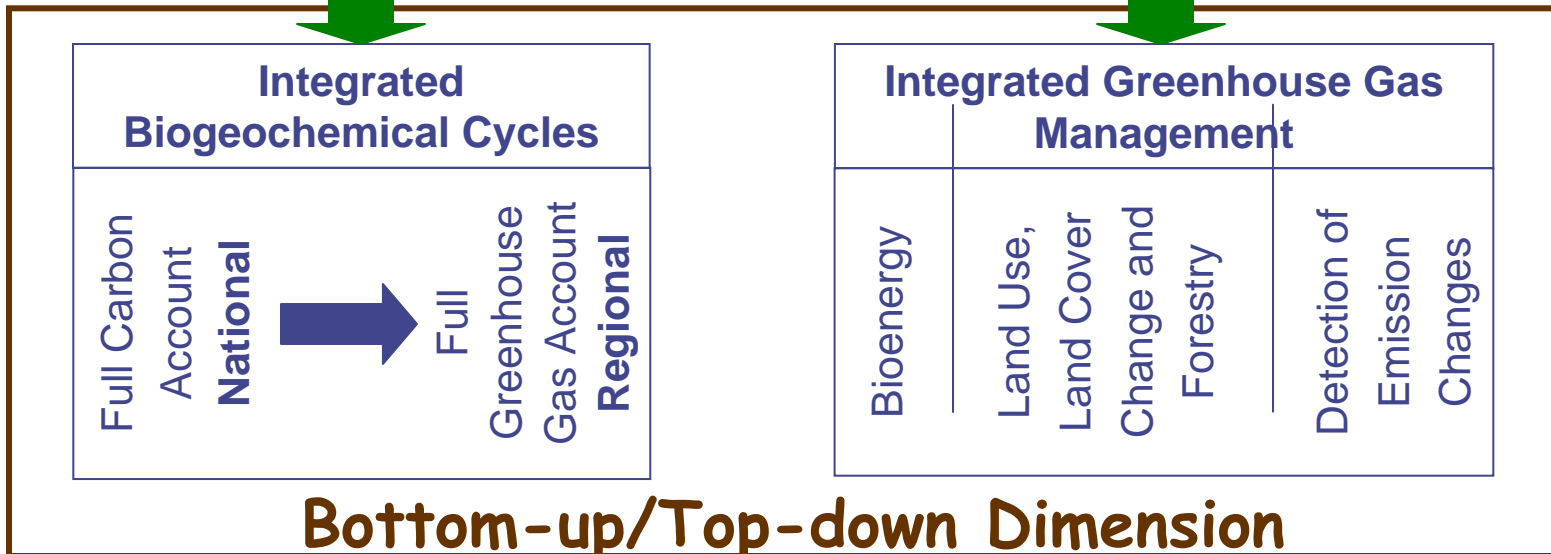
Crosscutting Theme: ***Greenhouse Gas Initiative (GGI)***

The objective is to bridge temporal and spatial scales of climate change, from shorter-term national and place-specific policies and measures directed at mitigating and adapting to climate change, to the longer-term global objective of stabilizing atmospheric concentrations of greenhouse gases at a “non-dangerous” level

Forestry Program GHG Analysis

Earth Observations and Modeling

Data, Knowledge and Systems



Bottom-up/Top-down Dimension

Spatio-Temporal Dimension

Uncertainties and Risks

Policy and Scientific Challenges

Important Issues to Deal With

Full GHG Accounting

Compulsory but time consuming and expensive to carry out.

How can NEESPI contribute to better full accounting?

Lacking Knowledge about Soil/Below Ground Processes

Processes for below ground NPP, heterotrophic respiration, CH₄, N₂O fluxes, permafrost, run-offs, sediments and leakage to lithosphere not very well understood.

How can NEESPI contribute to better understanding?

Huge Temporal Variations in Fluxes

Huge temporal variations due to climate variations and disturbances.

What can NEESPI do in order to reduce these uncertainties?

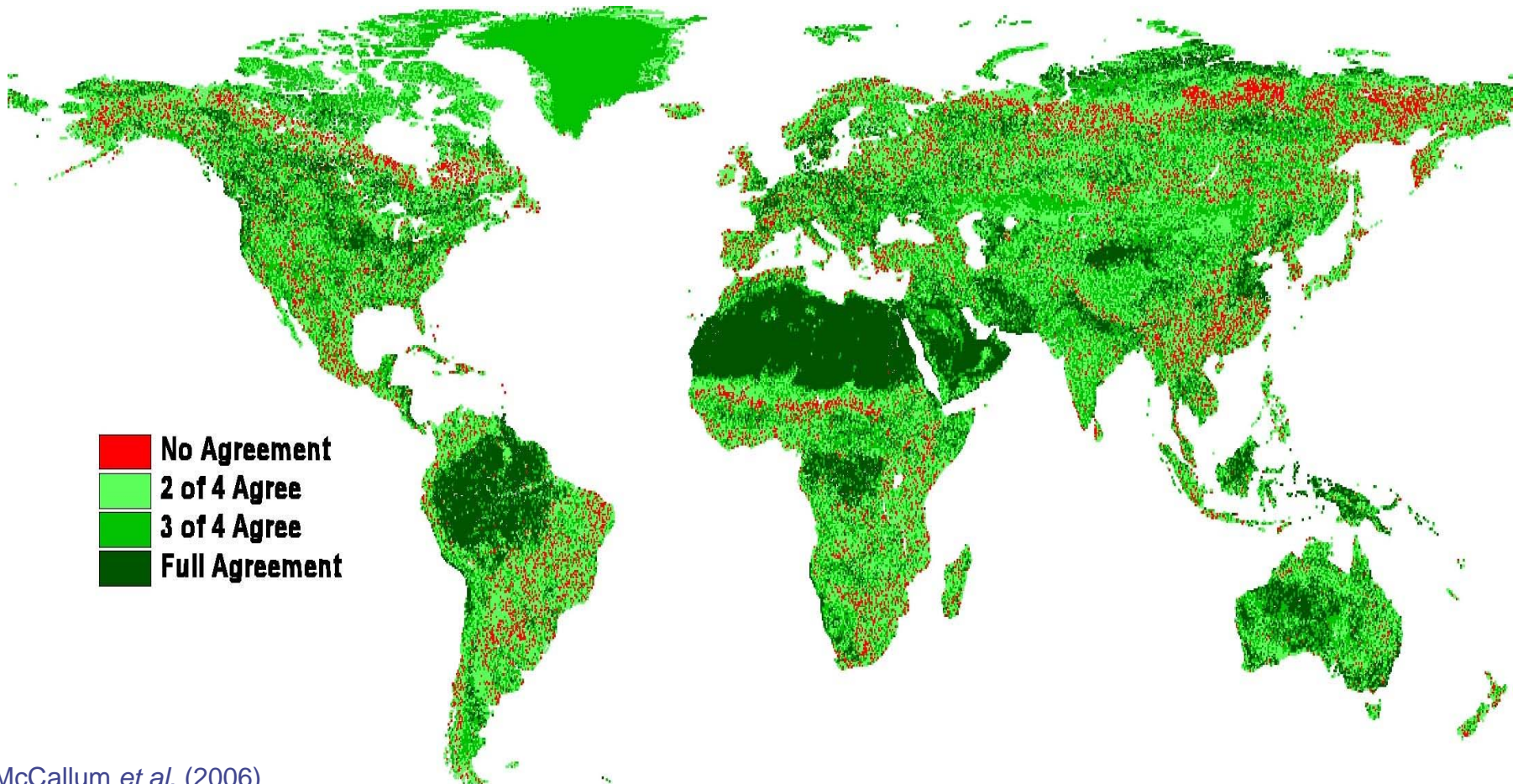
Data Deficit/Earth Observations

For many areas we lack relevant data and we have insufficient data on the disturbances.

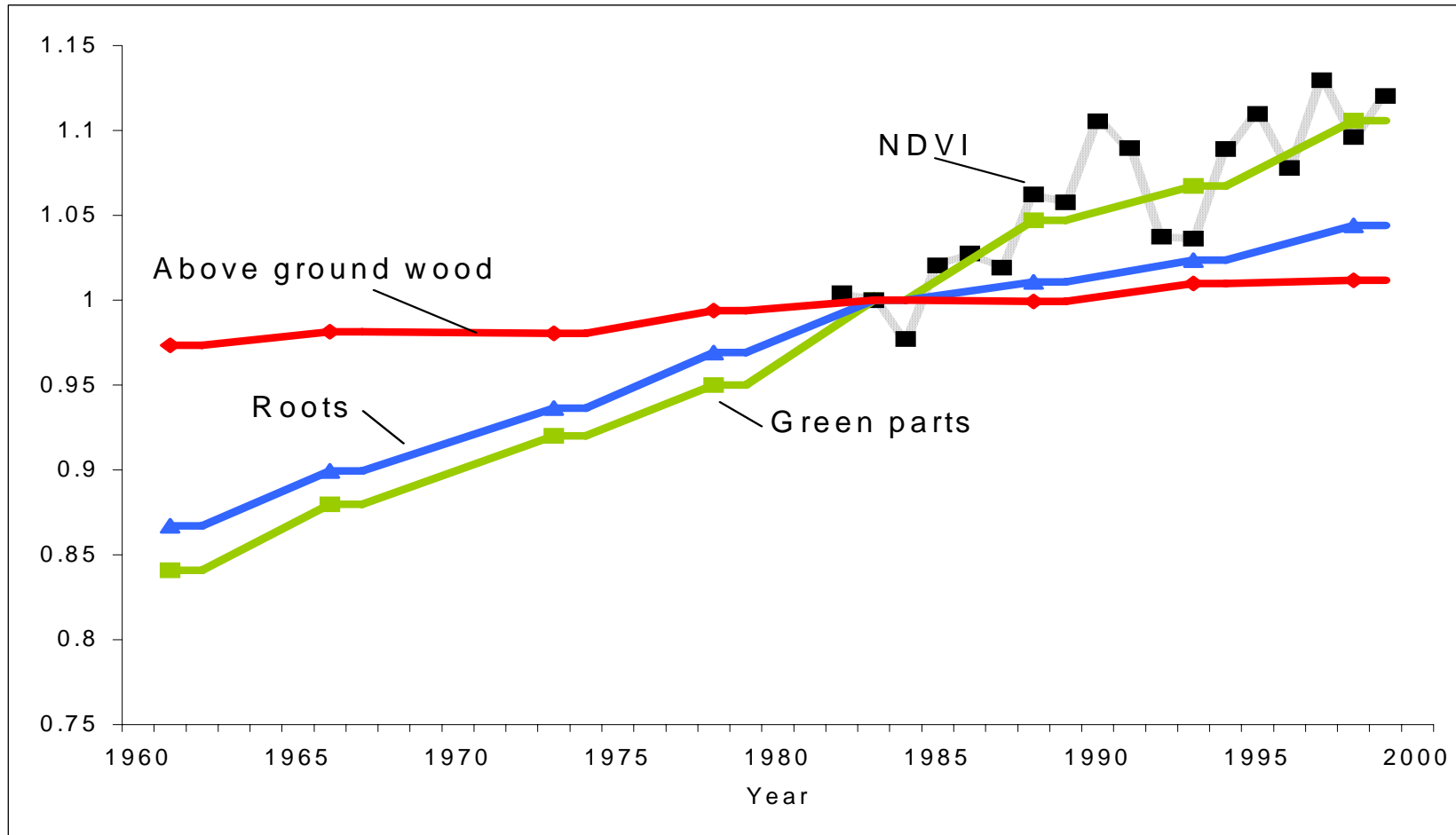
What can NEESPI do in order to improve this data gap?

Four Global Land Cover Sets

The global level of agreement among the four datasets using complete IGBP classification



Change of Phytomass Structure of Russian Forests, 1961-1998



Average density of phytomass fractions (normalized to values of 1983)

Important Issues to Deal With

Uncertainties

The uncertainties are huge around the GHG budgets and are not counted for in current climate policies. **What can NEESPI do in order to reduce the uncertainties and efficient treatment of the same in policy setting?**

Integrated Approach

There is not one single approach which will help us better understand the GHG cycling but an integrated approach will probably do it (inventory methods, remote sensing, process models, experiments, inverse modeling, etc.). **What will NEESPI do in order to come up with a sufficient integrated approach on GHG cycling?**

Archiving/Maintenance of Data

In order to be able to make breakthroughs on the GHG cycling we need free access to a huge number of datasets, which should be maintained and updated. **What will NEESPI do in order to secure archiving/maintenance of needed datasets for improved analysis of the GHG cycling?**