

An aerial photograph of a vast, dense forest, likely a tropical rainforest, stretching to the horizon. The sky is filled with large, white, fluffy clouds, and the overall lighting is soft and diffused. The forest canopy is a deep, dark green, with some lighter patches visible. The horizon line is straight and divides the image roughly in half.

International Workshop on
Vegetation LIDAR and Application from Space

**Pathways from remote sensing
toward sustainable world;
SATREPS, Future Earth and SDGs**

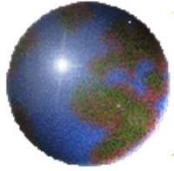
Yoshifumi YASUOKA
Director, Professor
Center for Environmental Remote Sensing
Chiba University

26 May 2017, Chiba University

Topics

@ SATREPS, Future Earth and SDGs

@ Social implementation of REMOTE SENSING



Collaboration between S&T and Society

@ “**SATREPS**” by JST and JICA (2008)

--- International (bi-lateral) collaborative research program to solve social problems in counter country

@ “**Future Earth**” by ICSU and Vermont Forum (2012)

--- Integration of WCRP, IGBP, IHDP and DIVERSTAS to solve the wicked problems

@ **SDGs** by UN (2015)

--- 17 goals and 169 targets to transform our world with concept of “no one left behind”

SATREPS

Science and Technology Research Partnership for Sustainable Development

Japan Science and Technology Agency (JST)

&

Japan International Cooperation Agency (JICA)

SATREPS Projects



In total (since 2008) : **115 projects** with **46 countries**

As of March, 2017

Program Description

(1) Research fields

- Environment
- Energy
- Bio Resource Utilization
- Disaster Prevention and Mitigation
- Infectious Disease Control

(2) Research period: 3-5 years

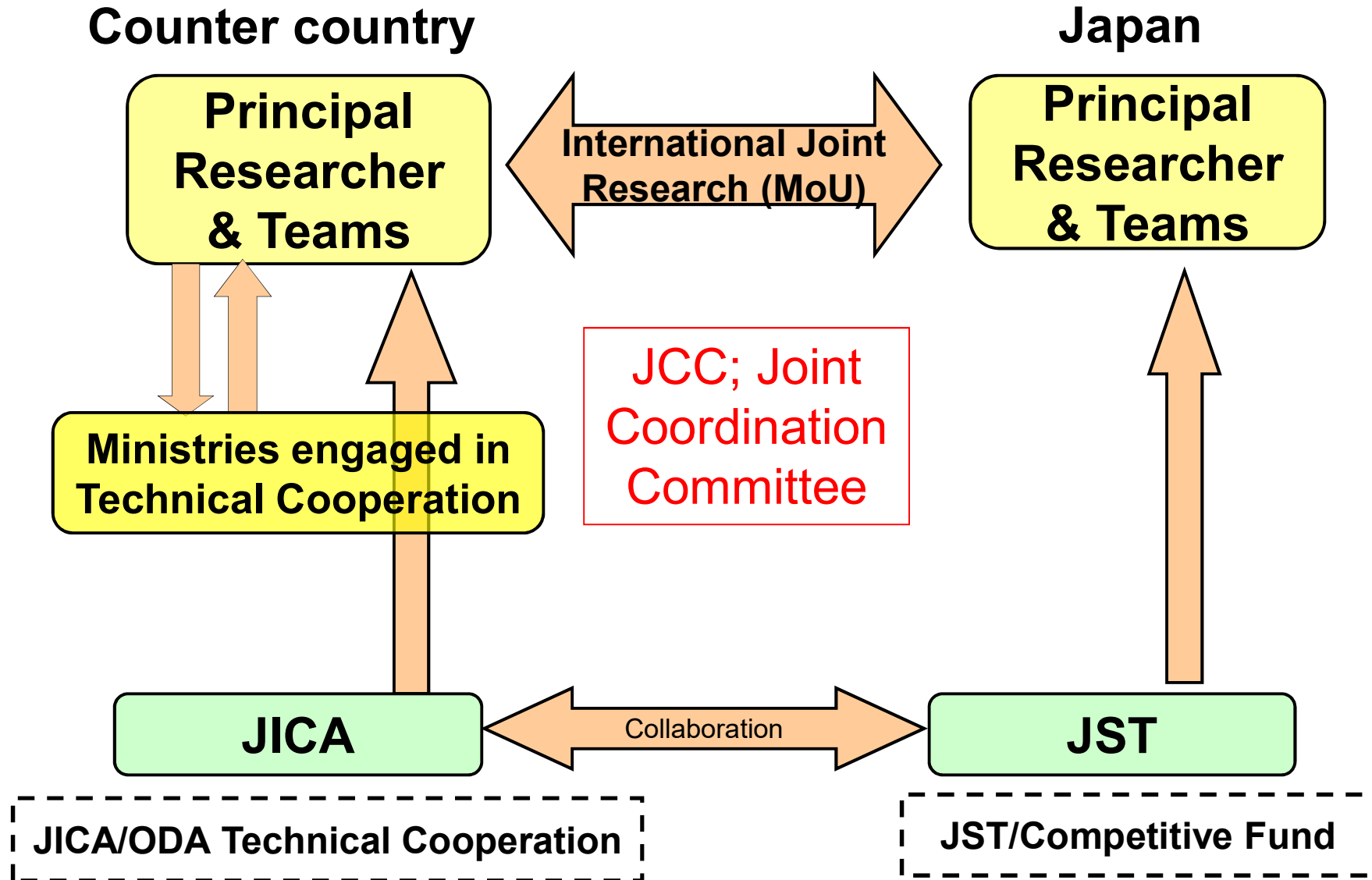
(3) Research budget: 1M USD/Project/year

SATREPS

**Science and Technology Research Partnership
for Sustainable Development**

Science and Technology	x	International Cooperation (Bi-lateral collaboration)
Global Issues	x	Local Needs (Social Implementation)
Japan's Capability	x	Counter Country' Capability

Framework of SATREPS



Stakeholder's involvement in SATREPS Project

1. **Joint Coordination Committee** (JCC) is organized in each project to promote research and to watch the progress.
2. **Stakeholders in the counter country** are involved in the JCC to co-design the project from the beginning.
3. In particular, policy makers are involved in the JCC to realize **social implementation** of the research results.

New Project between Indonesia and Japan from 2017

Development and Implementation of New Damage Assessment Process in Agricultural Insurance as Adaptation to Climate Change for Food Security

Principal Investigators

Japan side;

Prof. Chiharu HONGO

Center for Environmental Remote Sensing, Chiba University

Indonesian side;

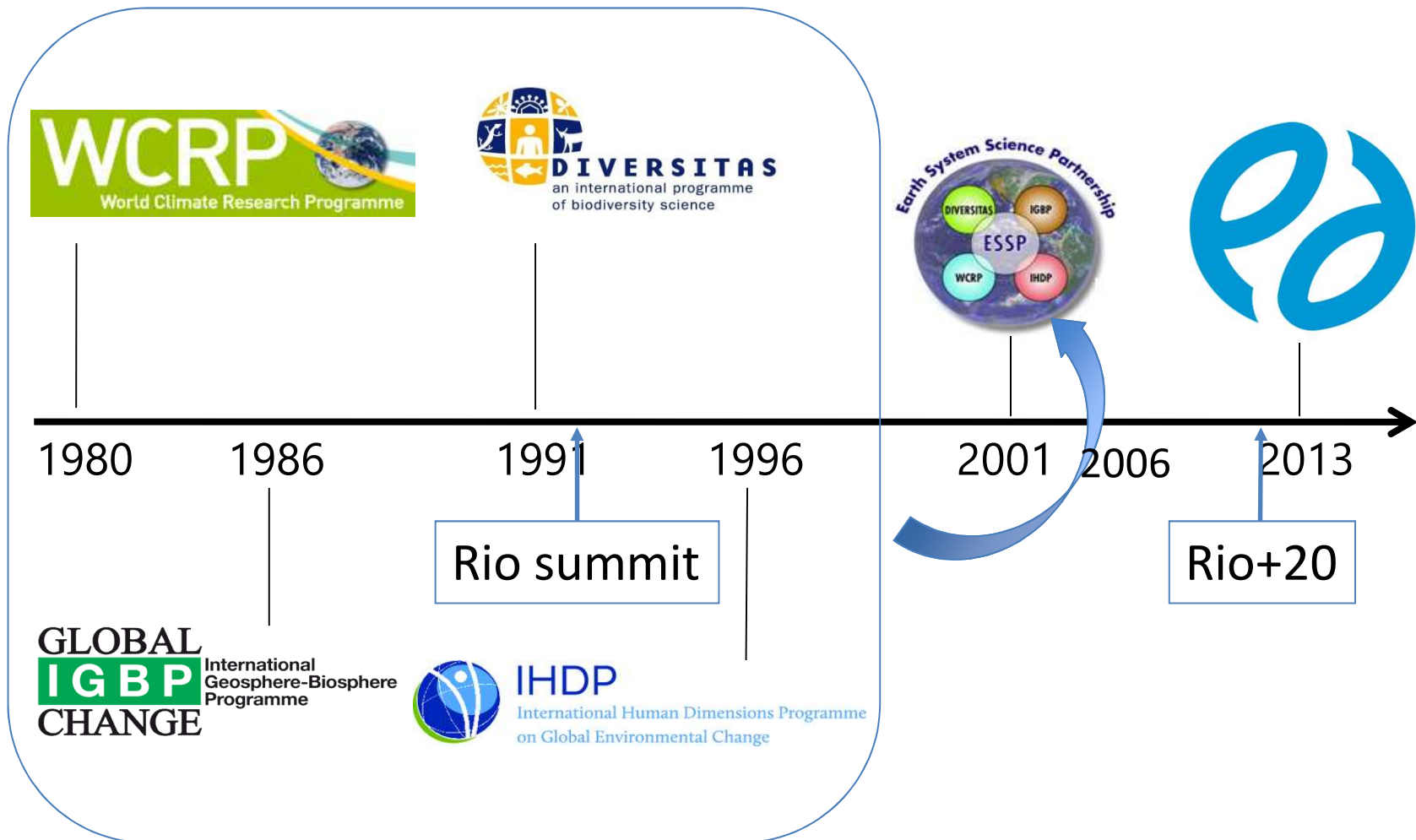
Prof. Baba Barus

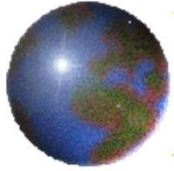
Bogor Agricultural University



Future Earth Program
by
ICSU, UNESCO, Belmont Forum,
NSF, JST, etc.

Future Earth - integration of GEC programmes-





UNESCO & ICSU Budapest declaration

“Science for Society and Science in Society”

is added besides

Science for Knowledge,

Science for Peace and

Science for Development

as a new theme (1999)

Still we have many unsolved problems although many scientific papers have been published, and many new knowledges have been developed.

What is missing, and what should be added?

What is Future Earth?

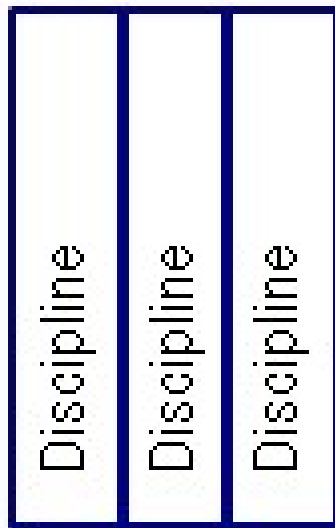
- Is a **global platform** for international research collaboration on global environmental change and sustainable development
- Provides integrated research on major **global change challenges and transformations to sustainability**
- Strengthens partnerships between researchers, funders and users of research through **co-design/co-production** of research
- Is **solutions-oriented**, aiming to generate knowledge that contributed to new more sustainable ways of doing things

Trans-disciplinary Approach

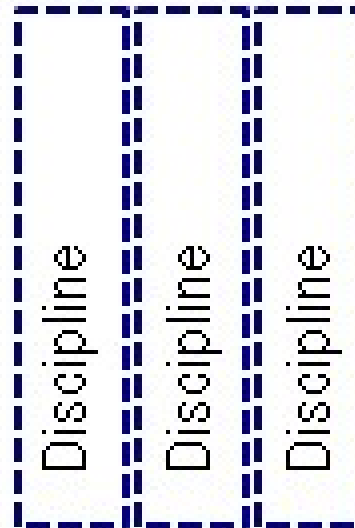
Principal idea is to link S&T with society.



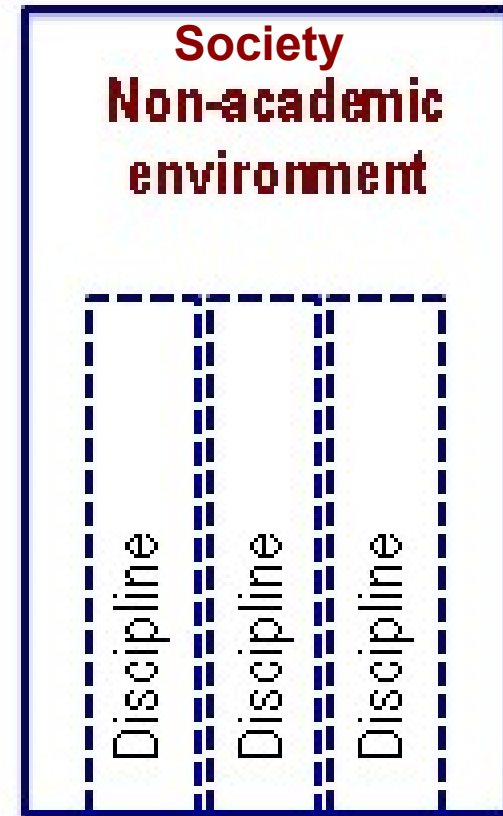
MONO



MULTI



INTER
(within & beyond
fields of science)



TRANS

Future Earth Research Themes



And cross-cutting issues: Observing systems, models, theory development, data management, research infrastructures

SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD



United Nations (UN) adopted the 17 SDGs of the 2030 Agenda for sustainable development in September 2015, and it entered into force in January 2016.

The Sustainable Development Goals (SDGs)

- A. 17 SDGs and 169 targets
- B. All UN countries including developing and developed countries
- C. Indicators and monitoring framework in each country
- D. Monitoring by UN
- E. In Japan, Prime Minister's Office leadership in promoting SDGs

ST&I may play a vital role in promoting SDGs.

Common aspects among SATREPS, Future Earth and SDGs

@ Addressing global sustainability

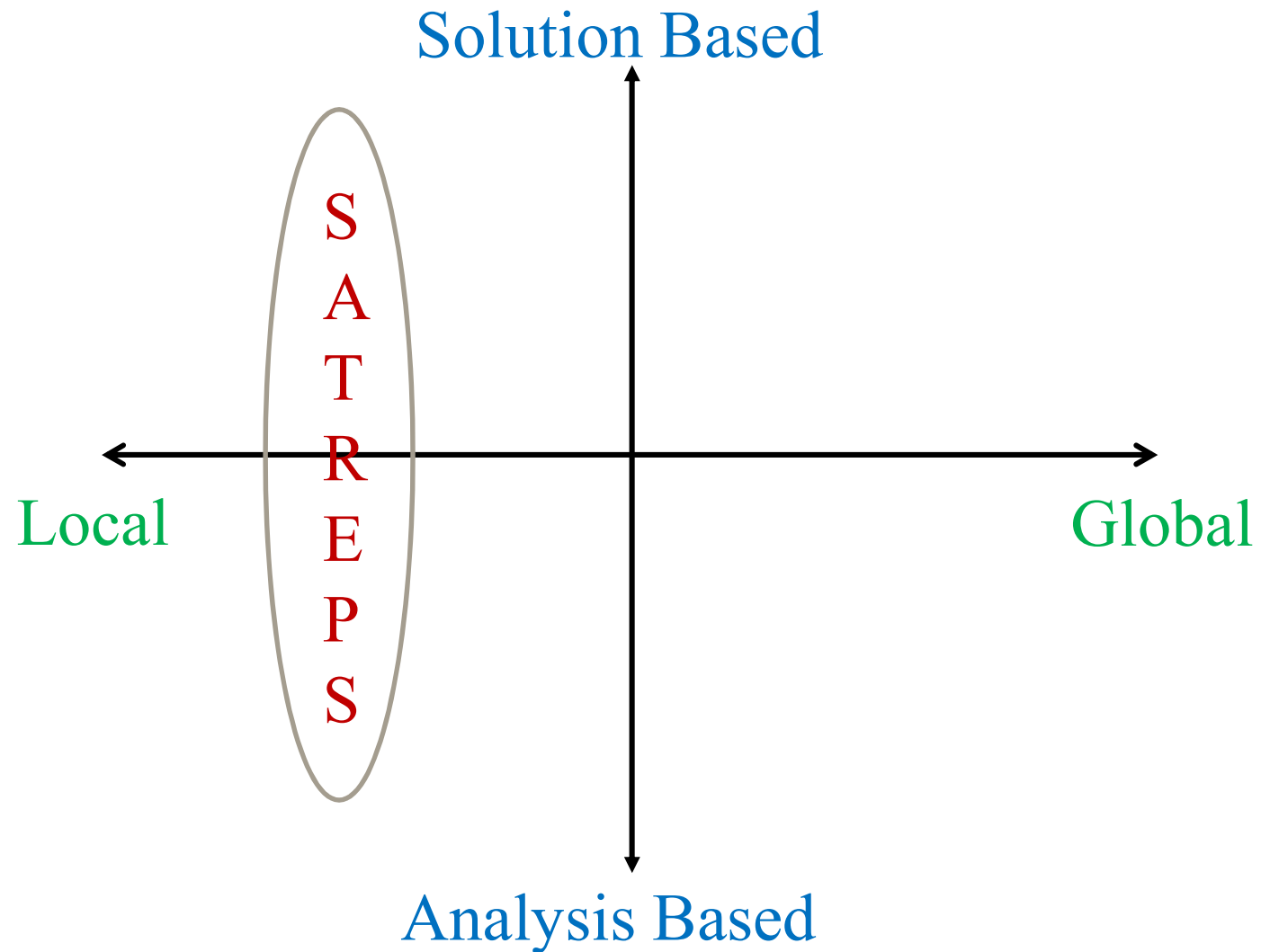
@ Solution oriented approach

@ Social implementation

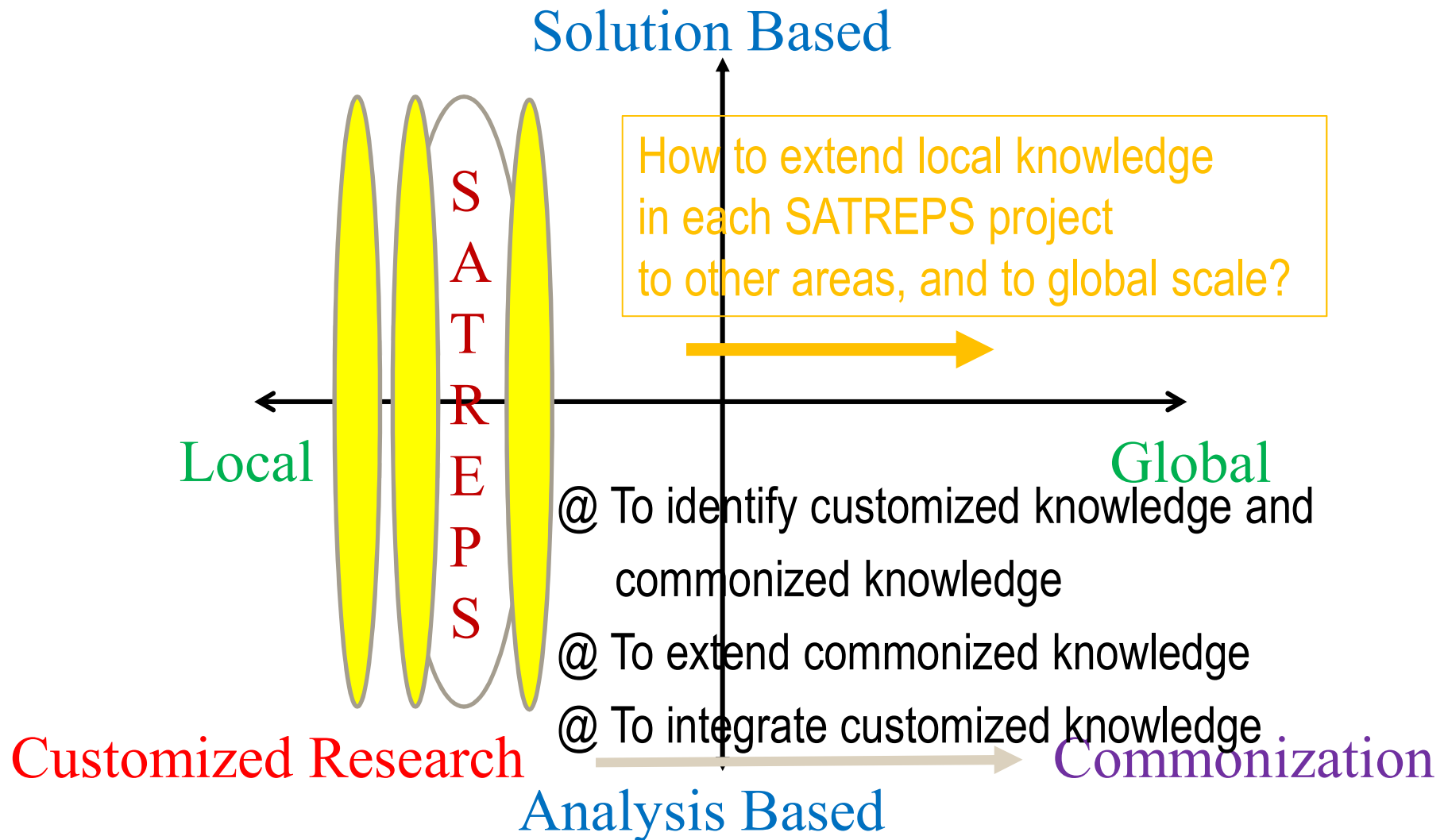
@ Stakeholders involvement

@ SATREPS and FE; in Academia
SDGs; not limited to Academia

Global and Local Aspect in **SATREPS**



Extension of SATREPS Local Knowledge to Global



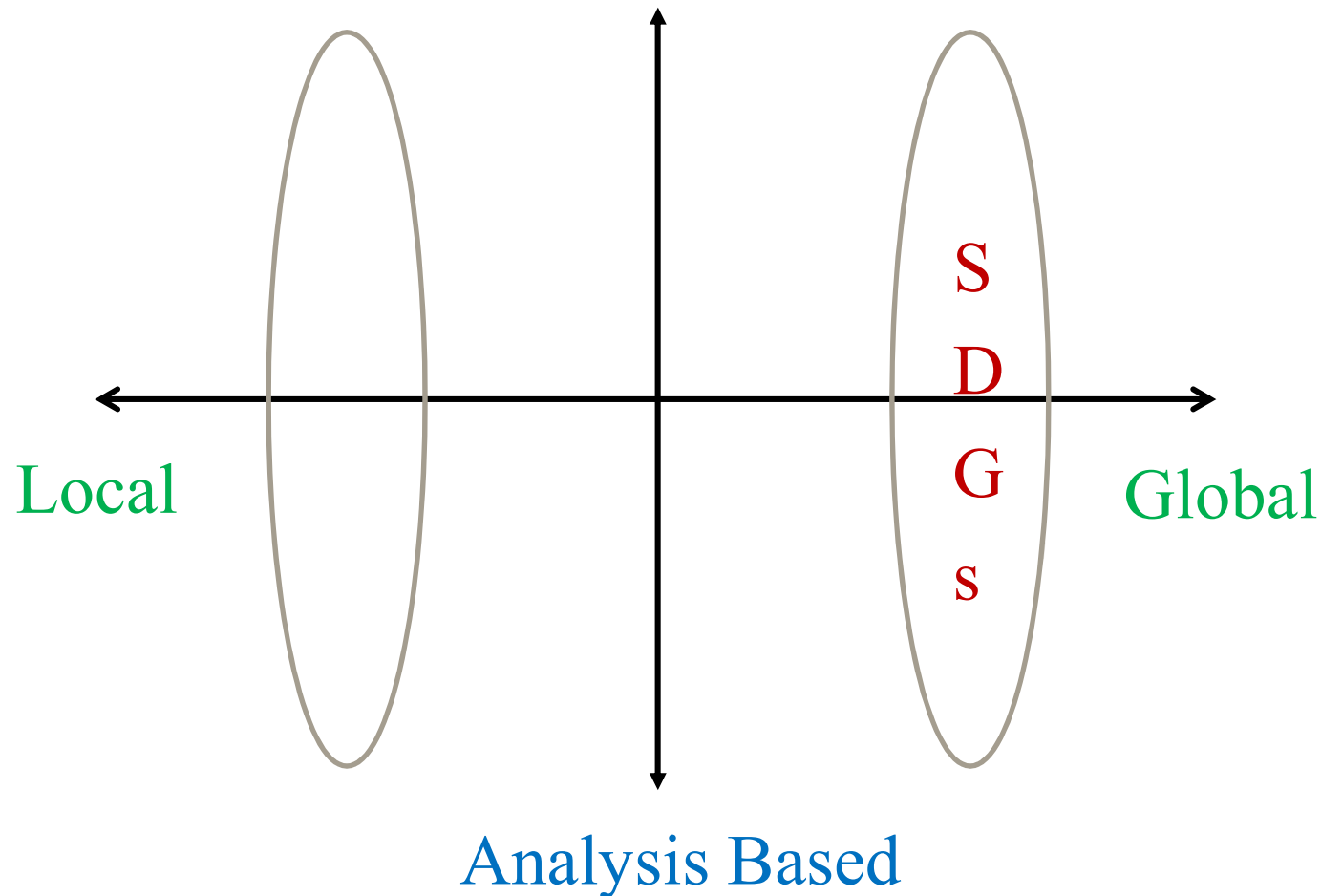
Customization of Country Level Criteria in SDGs

Customization

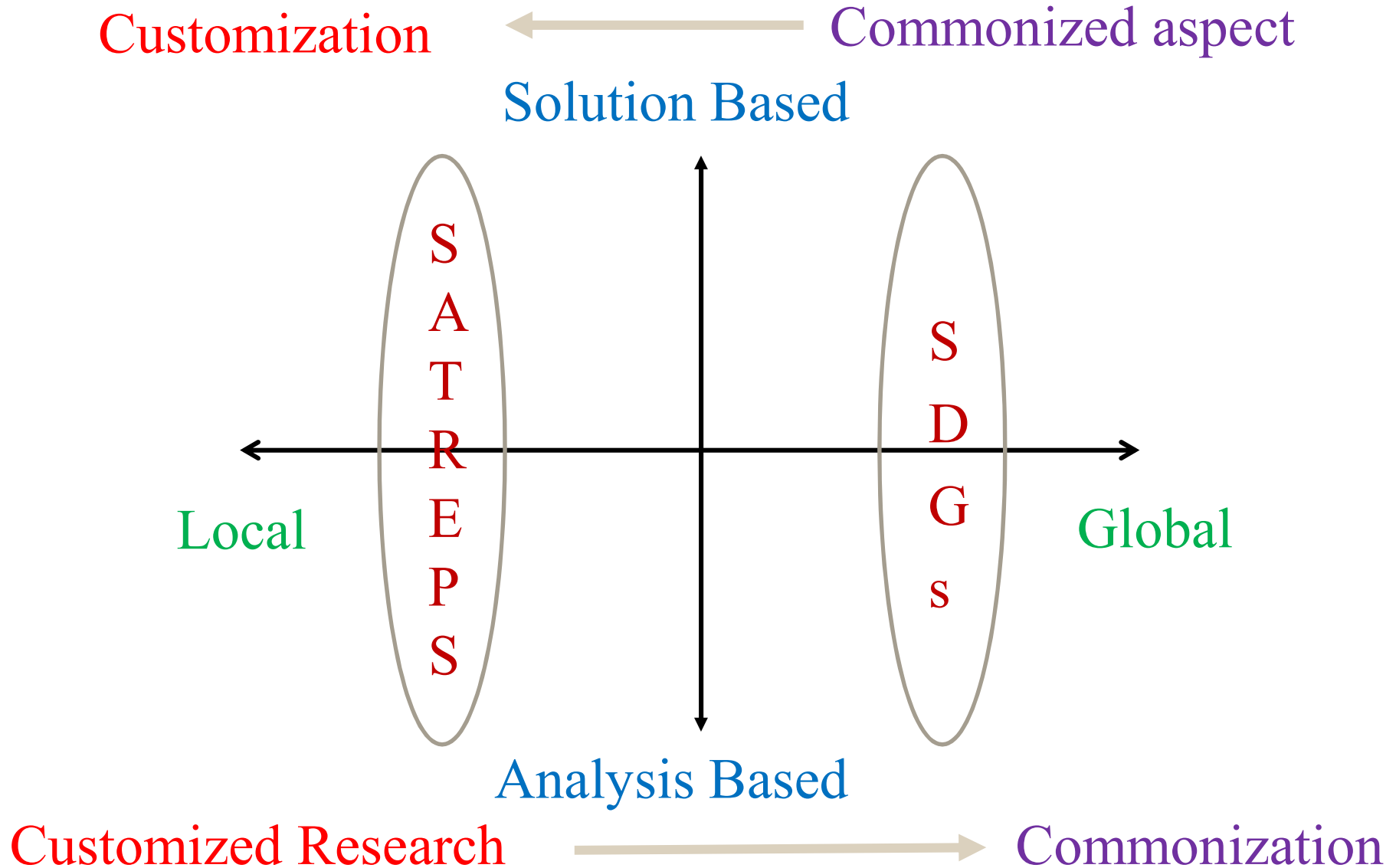


Commonized aspect

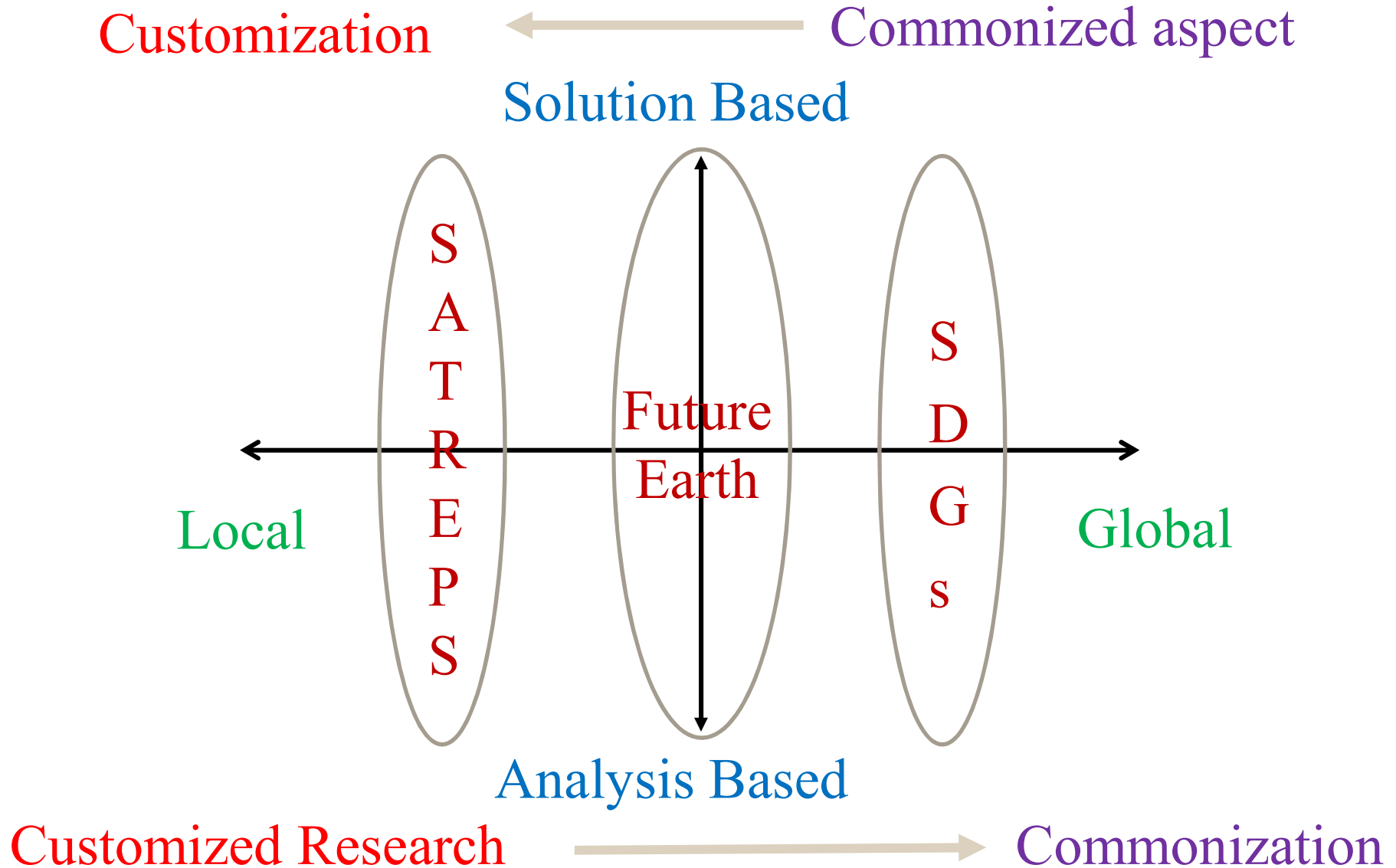
Solution Based



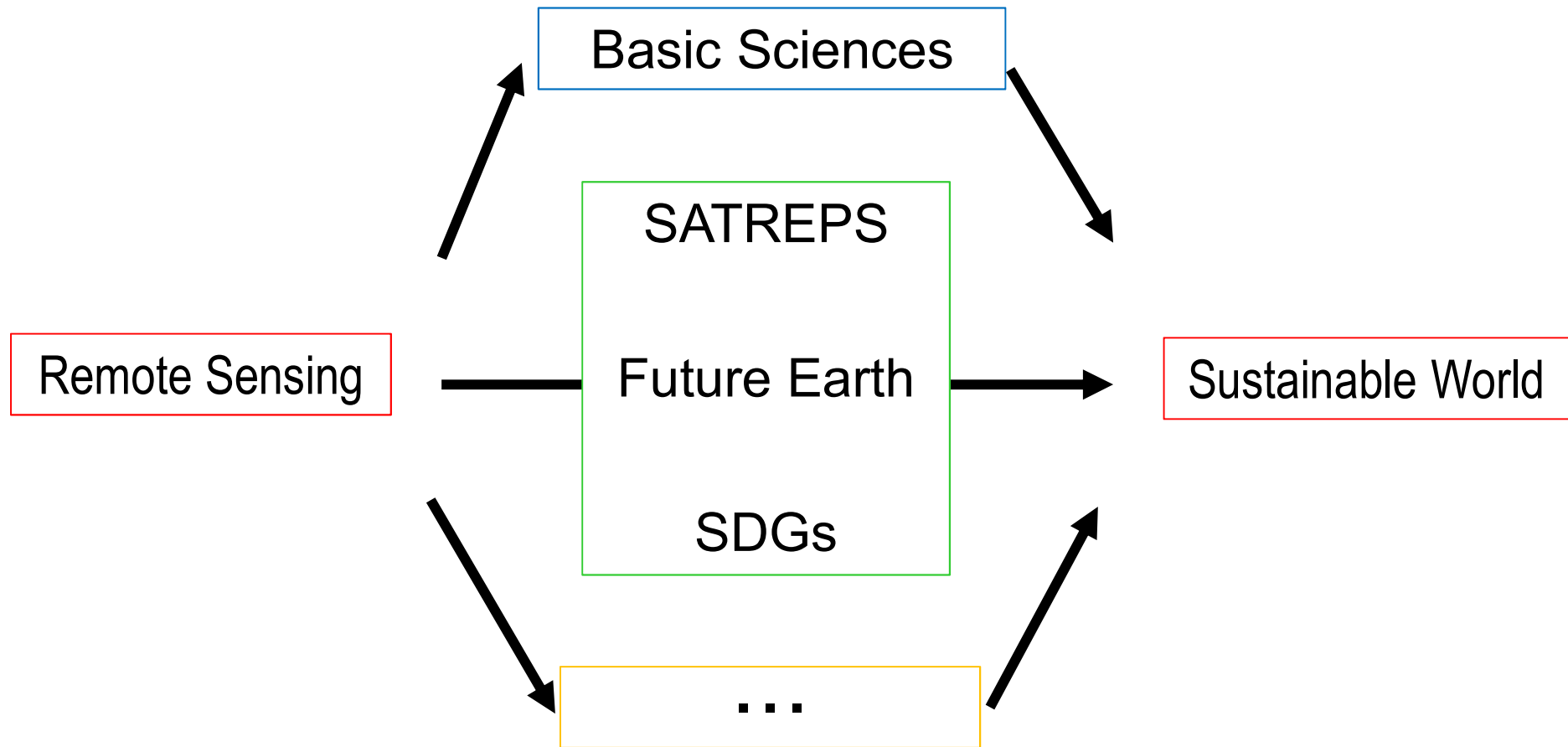
Customization and Commonization in SATREPS and SDGs



Customization and Commonization in SATREPS and SDGs



Pathways from Remote Sensing toward Sustainable World



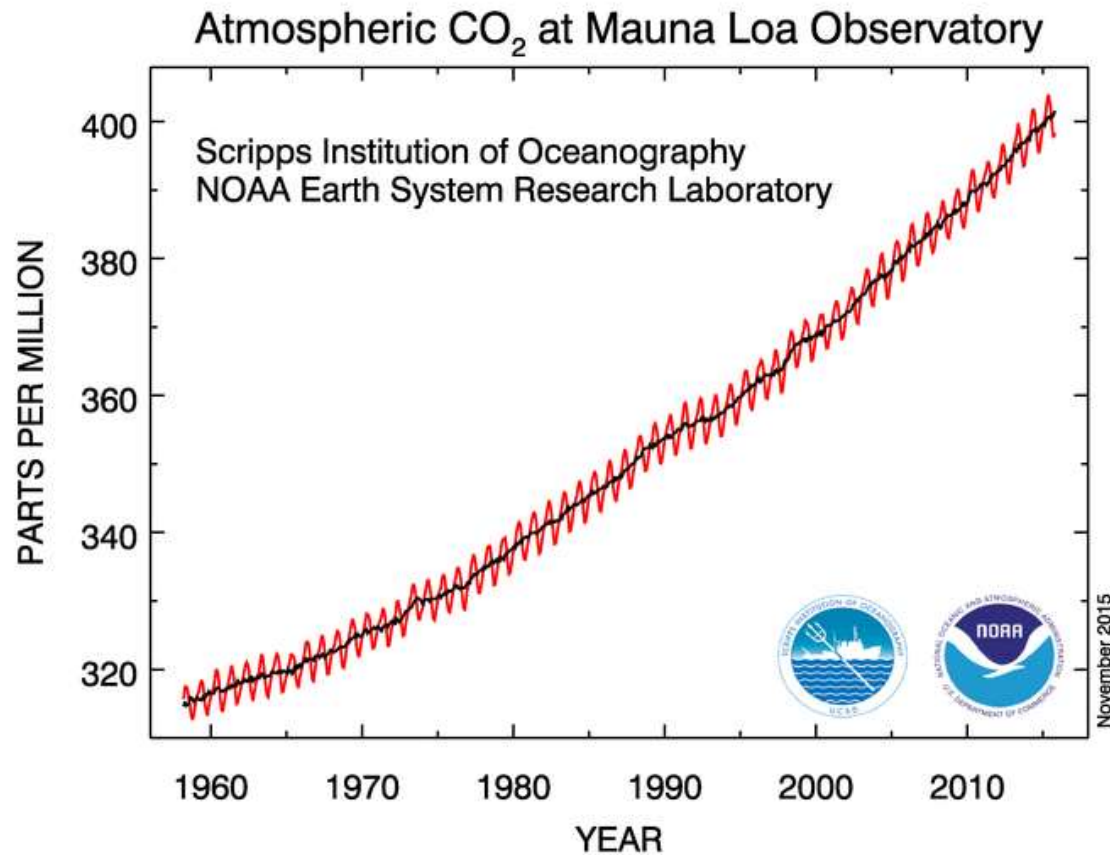
SATREPS, Future Earth and SDGs are all international programs addressing global sustainability.

Topics

@ SATREPS, Future Earth and SDGs

@ Social implementation of REMOTE SENSING

Increase of CO₂ concentration observed at Mauna Loa

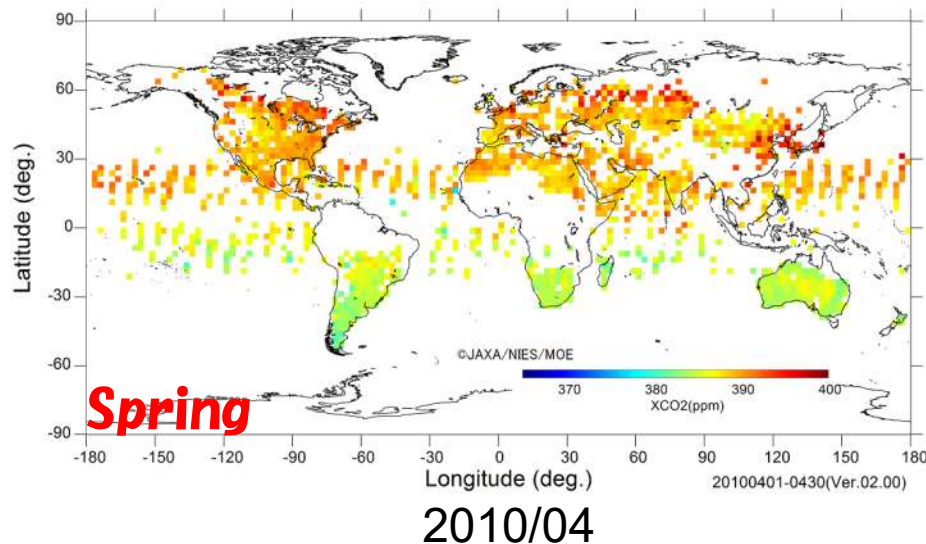
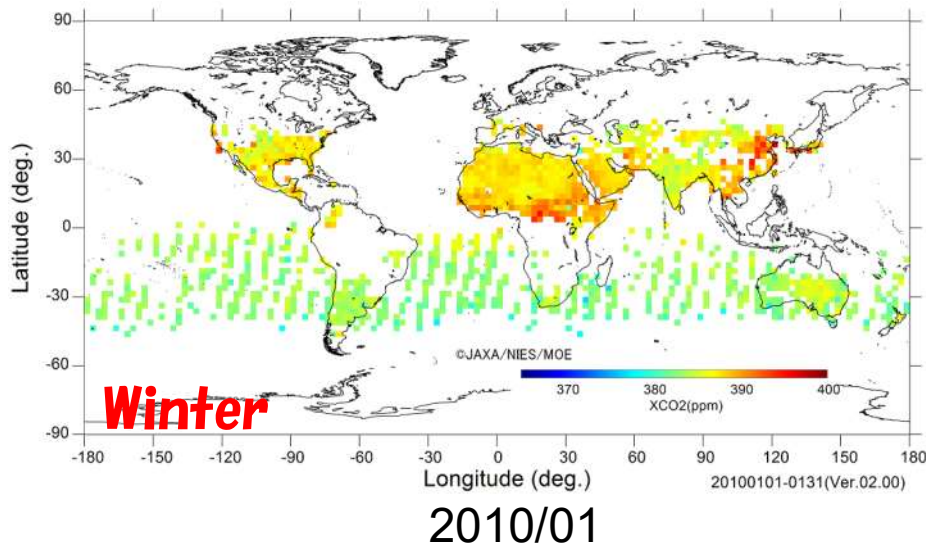
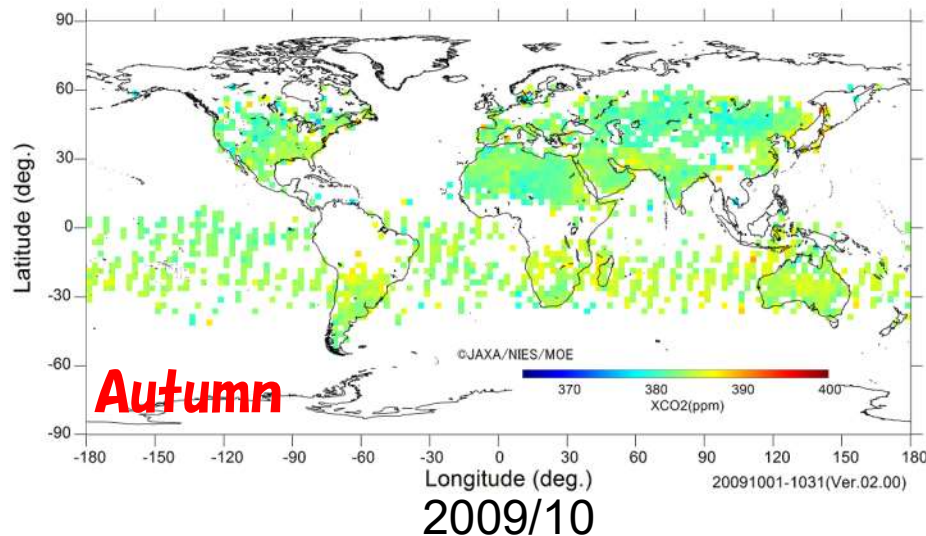
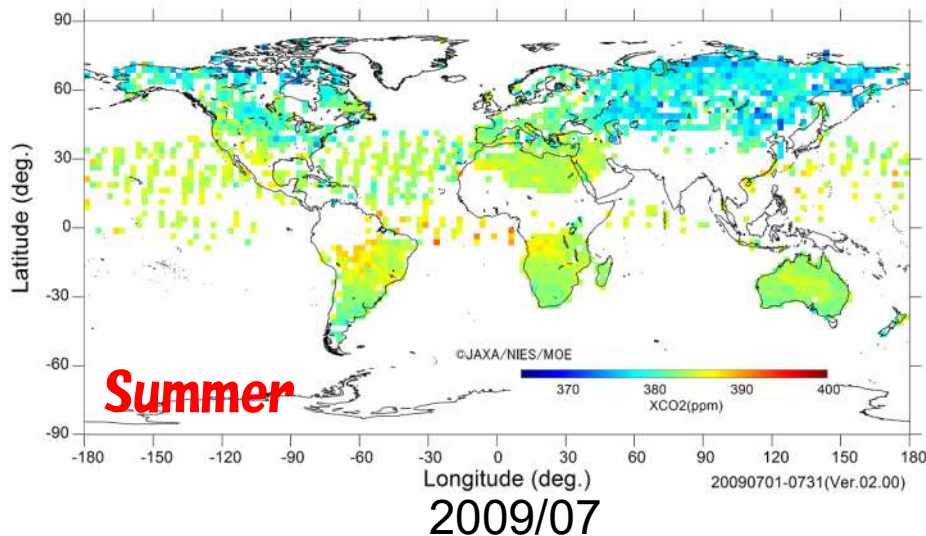


Keeling Curve
(Mauna Loa Observatory)



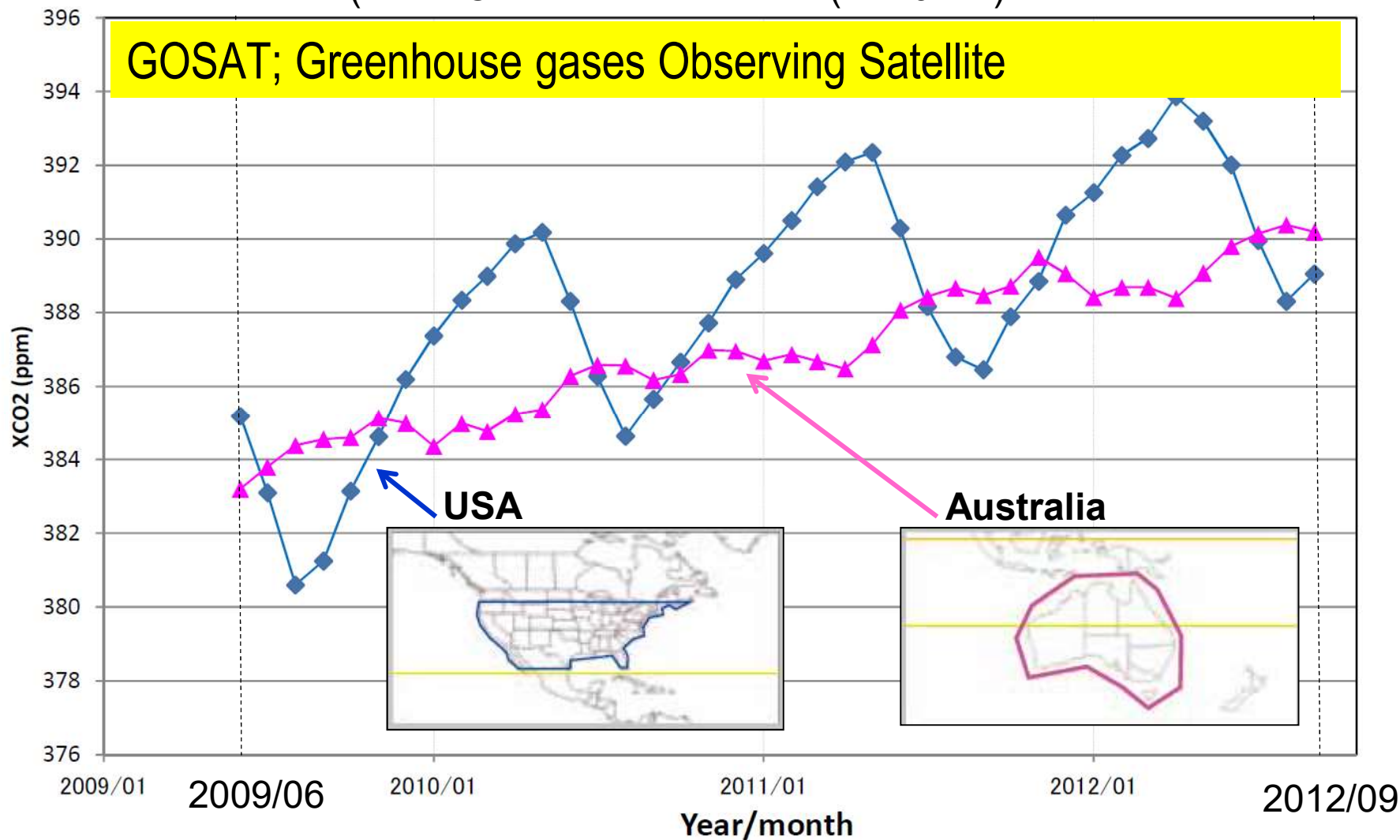
Seasonal Variation of CO₂ Distribution Observed by GOSAT (Ibuki)

2.5 ° mesh average map of CO₂ column (Ver.02.00)



Comparison of monthly average XCO₂ (CO₂ column density) over US and Australia

(TANSO-FTS SWIR Level 2 (Ver.02.**))

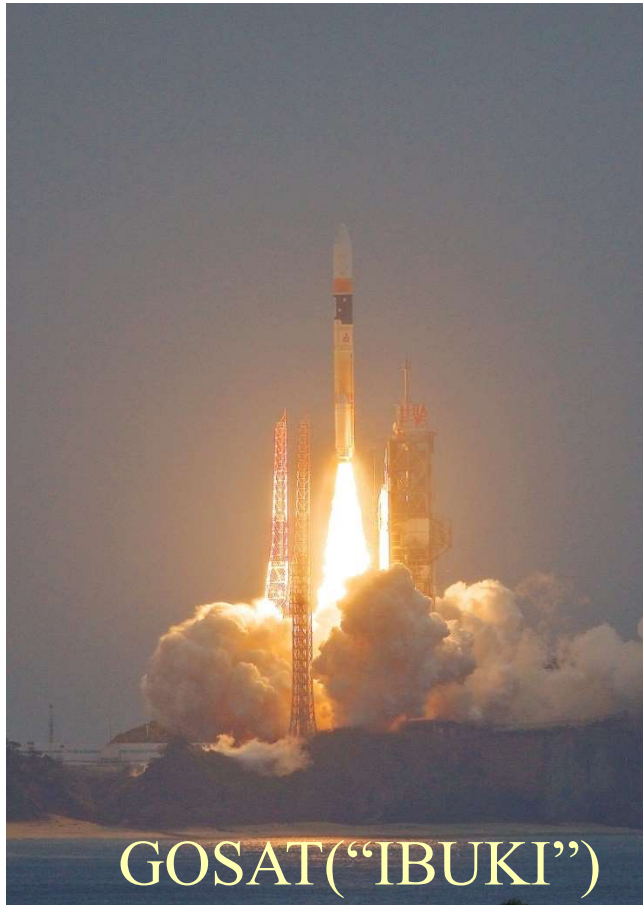


Mitigation tools for global warming

- @ Electric car (EC) & Fuel cell vehicle (FCV)
- @ Solar power generation system & Wind power generation system
- @ etc.



Integration of different science and technologies

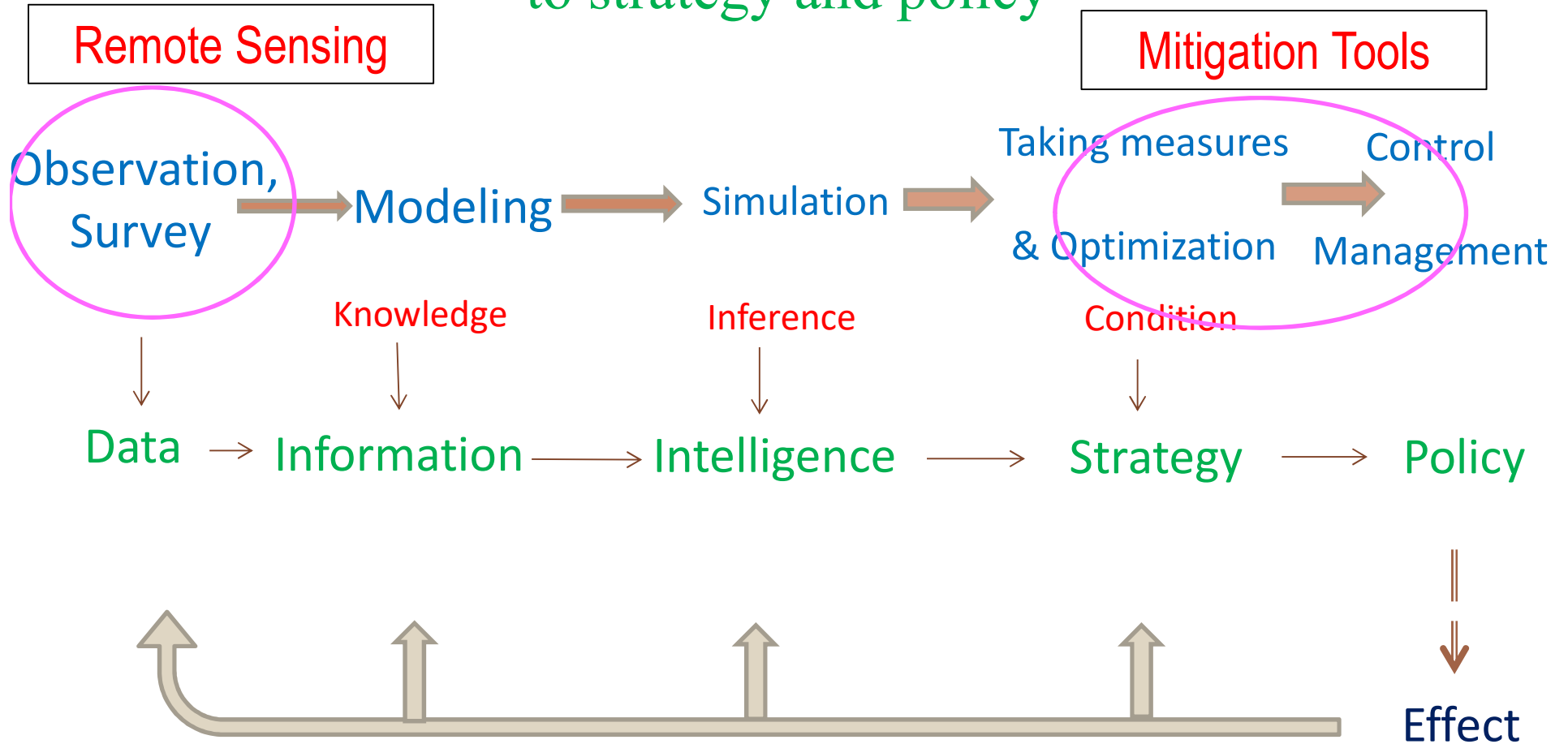


How to
integrate?



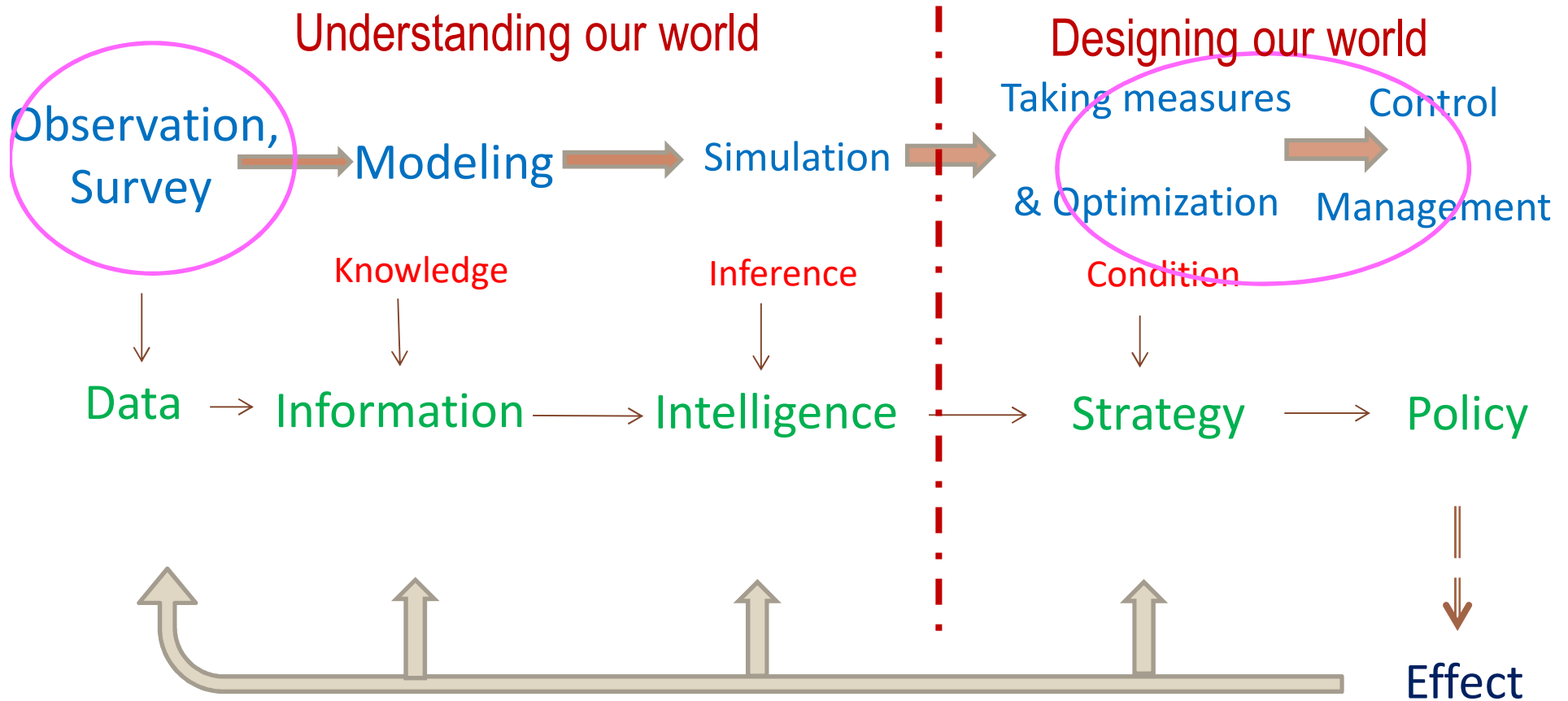
@ **Climate change** is an urgent threat to us.

From data, information, intelligence to strategy and policy



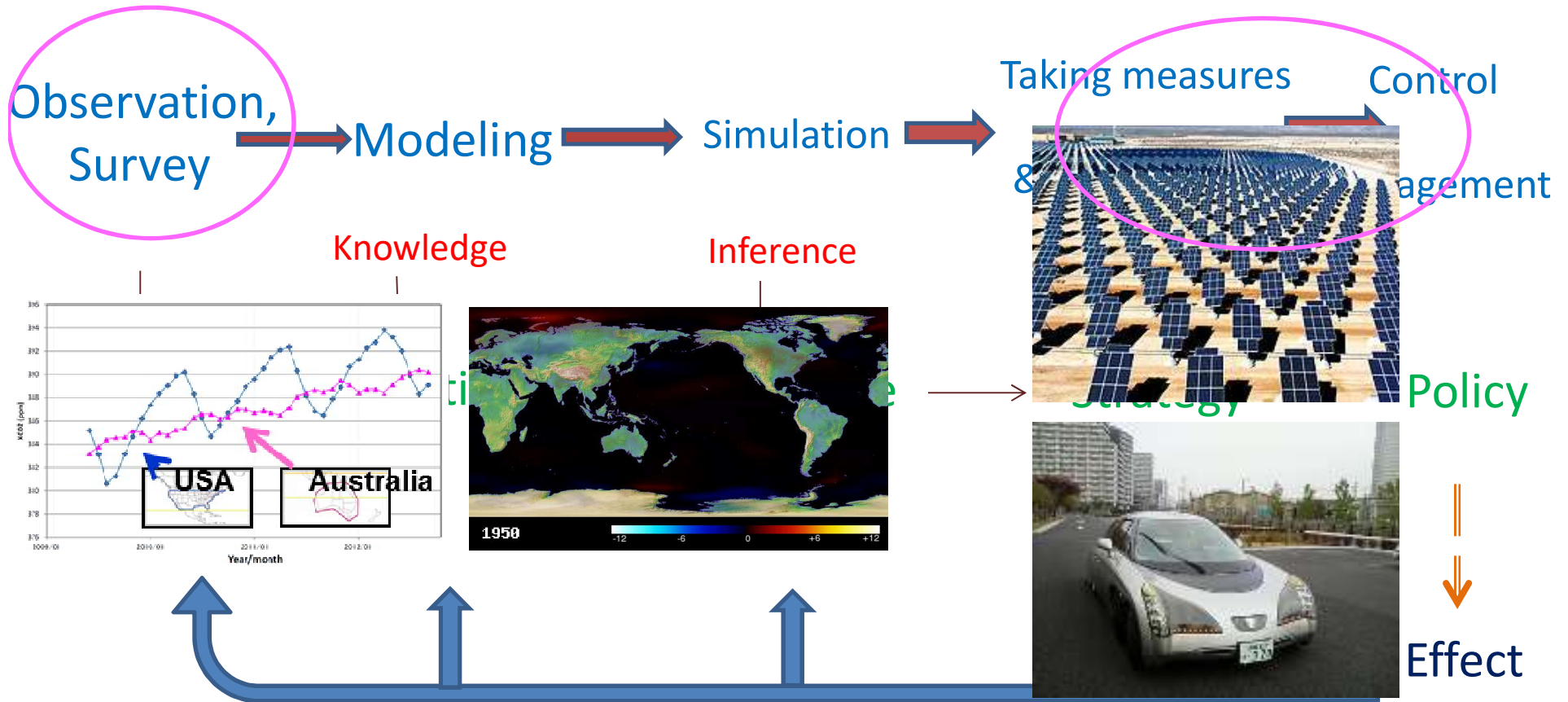
Observation and evaluation of impact and effect of policy

From data, information, intelligence to strategy and policy



Observation and evaluation of impact and effect of policy

From data, information, intelligence to strategy and policy



“Observation to policy, and to observation” cycle is needed.

Pathways from remote sensing to sustainable world

Remote sensing is a part of earth observation

Earth observation is a part of understanding our world

Understanding of our world is a part of improving our world

Improving our world is a part of realizing sustainable world

Common framework in any other S&T

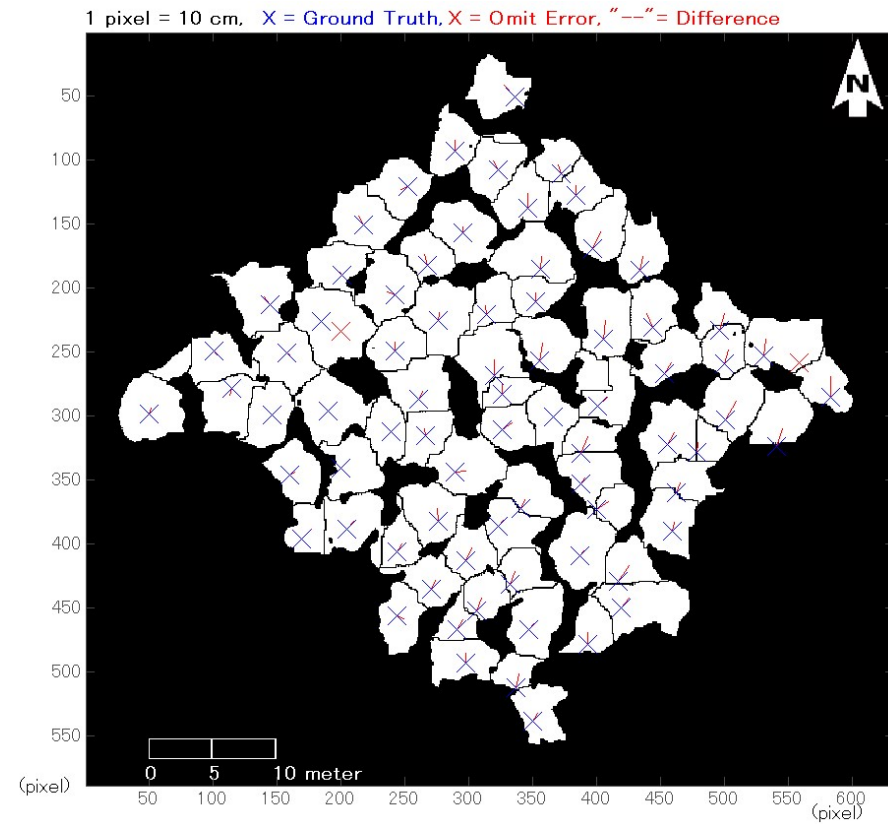
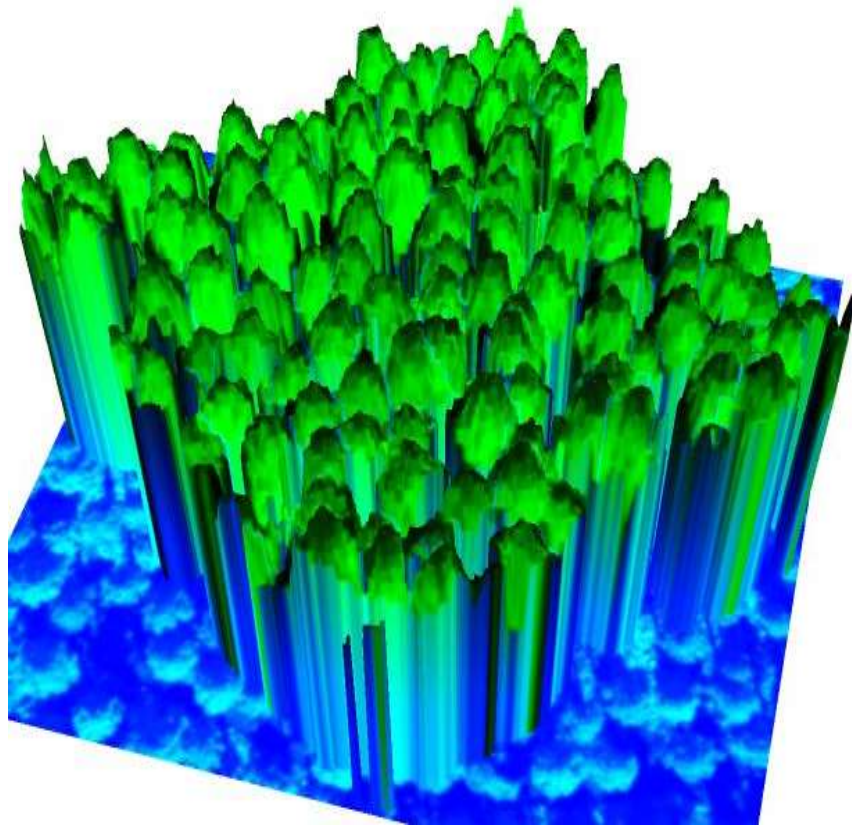
Social
Implementation



Amazon Forest at AMPA ZF2 site
in Brazil (SATREPS Koushima Pr.)

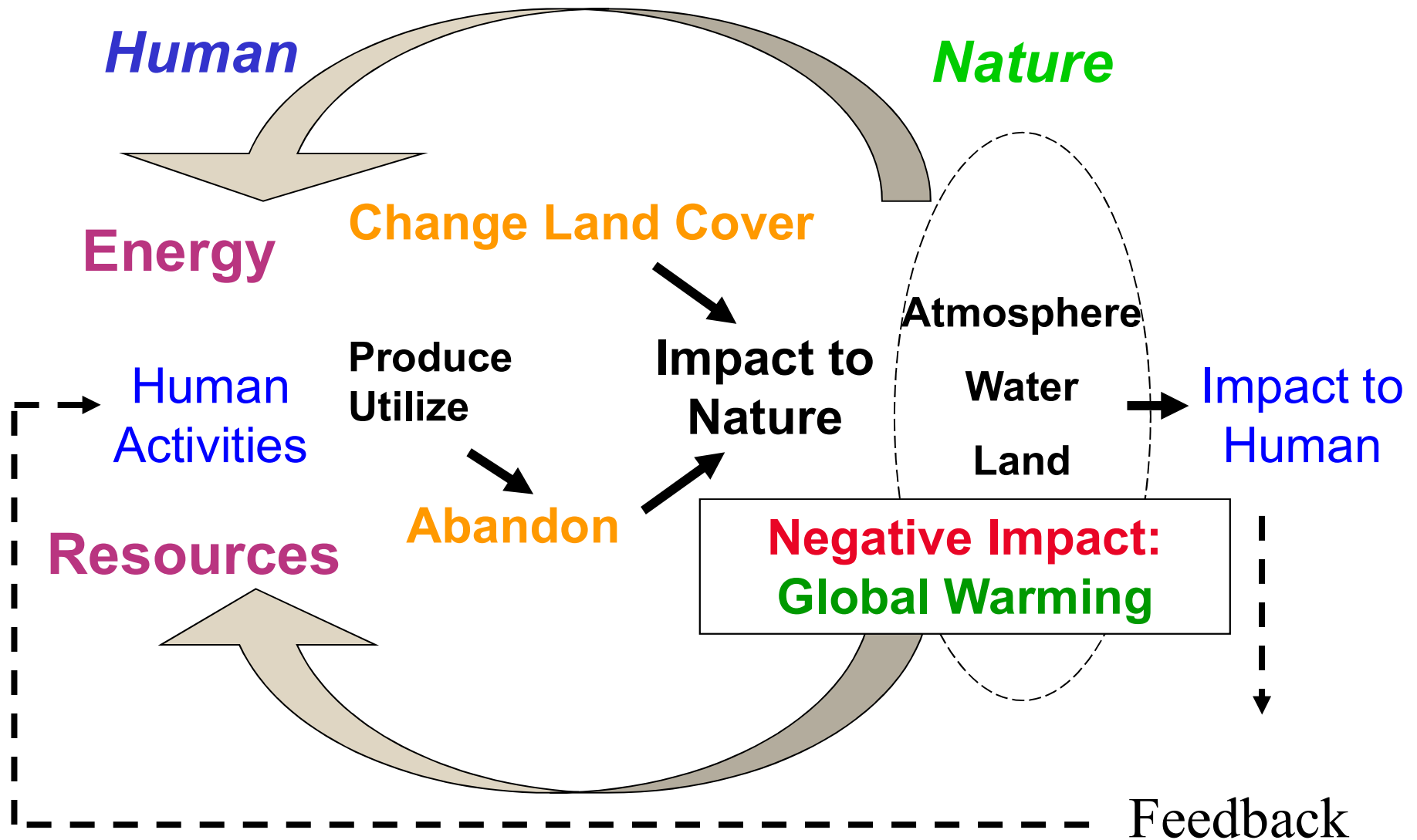
21 March, 2017

Tree Distribution observed by Airborne LIDAR



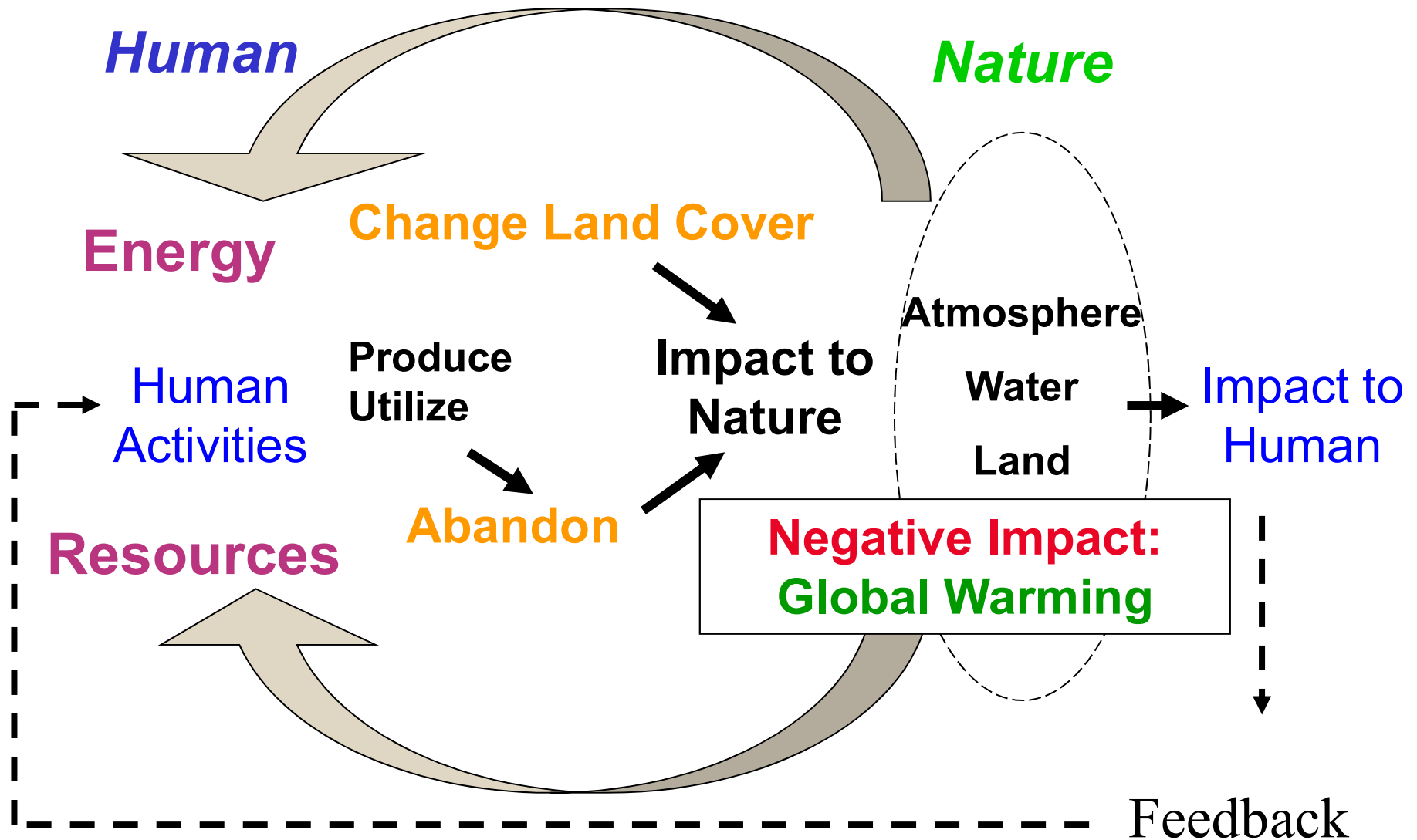
Aomori, Japan

Toward Sustainable World



If this cycle works well we may say it is **sustainable** !

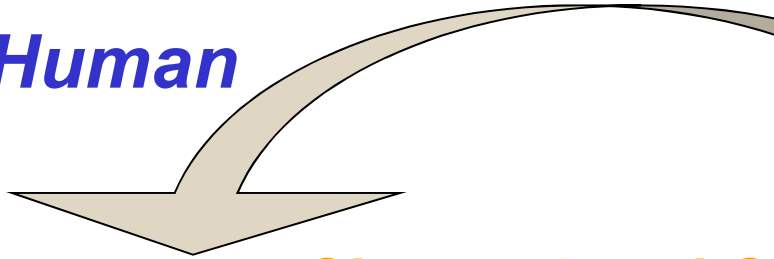
Toward Sustainable World



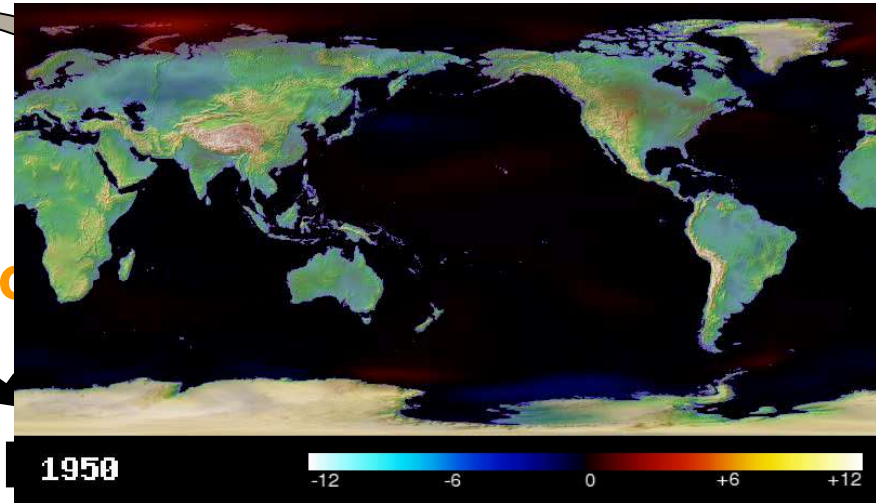
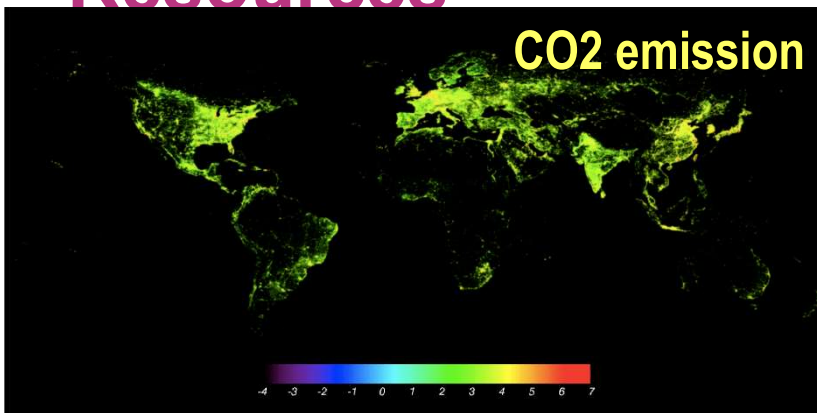
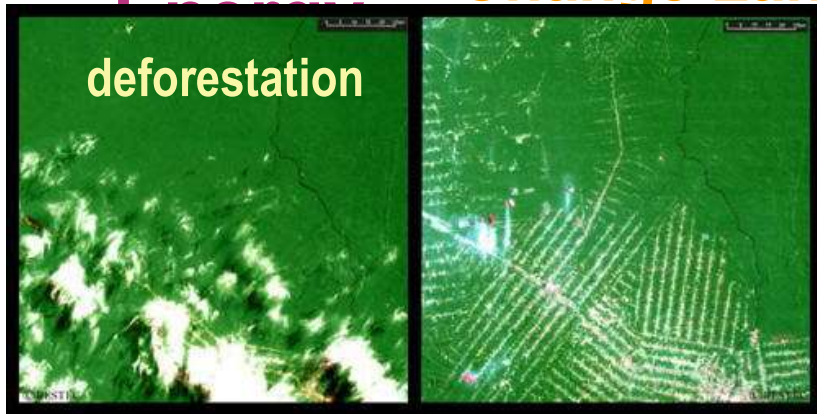
Need to observe, elucidate, model, predict, assess and manage processes, and to reduce negative impact.

Toward Sustainable World

Human



Change Land Co

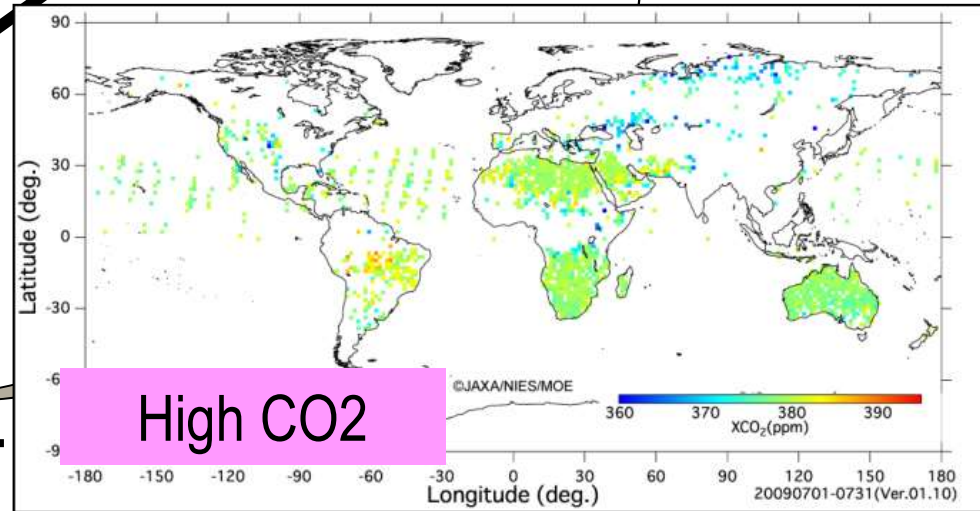


Im

Nature

Land

Human



If this feedback works well

we may say it is **sustainable** !

Pathways from remote sensing to sustainable world

Remote sensing is a part of earth observation

Earth observation is a part of understanding our world

Understanding of our world is a part of improving our world

Improving our world is a part of realizing sustainable world

Social
Implementation