SOCALLY CONSTRUCTED
PROCESS FOR GLOBAL CHANGE
RESEARCH PROGRAM

Toshihide Takeshita
Azabu University, Dept. of Environmental Policy, Kanagawa, Japan
Global Change as Nature-Society Relations

Global change is composed from natural changes/variability and human induced changes, concurrently.

Here, global nature predominates over human activities, under the dynamic interactions between them, e.g. global circulation studies.

Therefore, much of the global change researches are in natural science areas, where social activities are inducing inputs or parameters to the studies.

However, there are significant parallel studies are formulated from social science aspects and for boundaries between them.

Problem areas for global change as nature-society relations can be structured as boundary works between the conceptual elements of nature-society relations and each areas have their own uncertainty and rationality conditions.
Conceptual Structure for Nature-Society Relations for Global Change

- Each of natural changes/variability and social dimensions for global change is separated into two spaces from the closeness to nature or to society.
- 1st space: Much of the global circulation and bio-geochemical cycles together with natural hazards are positioned to be most remote from human interventions.
- 2nd space: Such like C and N cycles and much of ecosystems are going to be appropriated and dominated by human activities.
- 3rd space: In social dimensions, human life is supported by various natural resources and ecosystem services.
- 4th space: Most of the social activities are in the areas of political, economic and cultural activities.
Conceptual Structure for Nature-Society Relations for Global Change---Figure

Natural reality
---
Global circulation and biogeo-chemical cycle

Nature appropriated by human activities

Human support by ecosystems and resources

Political, economic, and culture space

Societal dimensions
Problem Areas at the Boundaries between these Four Spaces

At each boundary between these spaces, there are problem specific and interdisciplinary characters of global change research.

Problem area 1: Natural science studies for earth system are to be performed by cross cutting and integrating concerned disciplinary studies. Human activities are treated as boundary conditions.

Problem area 2: This interface is providing energy, food, and other ecosystem services for human life. Impacts of land use and energy system change becomes crucial for sustainability, which requires integration of natural science and social science widely.

Problem area 3: Political, economic, and social studies on global change concerning distribution of these resources and fulfillment of social needs become the subject area of studies.
International and National Research Activities concerning Global Change Areas

Many natural science studies are well organized and promoted in the programs such as IGBP, the United State's Global Change Research Program (at present CCSP), and Japanese Frontier Research System for Global Change, and much of IPCC activities.

For the problem area 2, IHDP activities and millennium ecosystems assessment are typical examples. As is stated in UN, each WEHAB targets requires vast study endeavors under long term goals. The required integration of researches and practices are performed in integrated assessment or under “sustainability science”.

Political, economic, and social studies on global change are very diverse and meet difficulties for integration between them because of the diverse approaches and differences in their world views.
Interfaces or Boundaries Between the Above 3 Problem Areas

- Boundaries between the above 3 problem areas have diverse subject areas for further investigation as interdisciplinary studies.
- Risk and vulnerability studies to society under global change and natural hazards are immediate regional and local concerns, at the interfaces between problem areas 1 and 3.
- Technology development for global change extends from energy, food, and resource systems to far beyond to global commons and to global public goods like various aspects of ecosystem management which link the problem areas of 1, 2, and 3.
- Political ecology is an approach concerning distributional conflicts of global ecosystem services and natural resources, and cultural discourse analysis on nature and society, which covers between the problem areas 2 and 3.
Difference and Basis of Rationality in these 3 Problem Areas

- Each problem area has developed the intrinsic and different cultural background and rationality basis.
- The study of problem area 1 is based intrinsically on physical perspectives and has developed logical scientific rationality with disciplinary reductionism analytic model.
- Major principle in the problem area 2 can be named as ecological rationality, which is pursuing long term balanced relations between nature and society.
- The problem area 3 has a basis in perspectives on human societies with socio-economic objectives. The rationality here is considered to be socially constructed for conflict resolution with the interactions with scientific, cultural, and ecological conditions.
Problem Areas and Difference on the Basis of Rationality

- Global circulation and bio-geo-chemical cycle
- Nature appropriated by human activities
- Human support by ecosystems and resources
- Political, economic, and culture space

Problem area 1: scientific rationality
Problem area 2: Ecological rationality
Problem area 3: Constructivist rationality
Coupling of Ecological and Constructivist Rationality in Economics

V. L. Smith (2003) investigates in the games of trade that there exists two types of rationality. One is constructivist rationality that applies reason to the design of rules and institutions based on trust and reciprocity. Another is ecological concept of rationality that is an emergent order based on cultural and biological evolutionary processes.

In social interaction and markets, initial constructivist arrangements for exchange must have survival properties in the long run, accommodating to environmental challenges, and with social mind.

This means that these two types of rationality are working in parallel, with close interactions between them. Understanding of nature-society relations in the same ways give us valuable insights.

Constructivist and Ecological Perspectives in Visual Systems

J. Norman (2002) presents a theory that awareness to the world is perceived by the coupling of and through the cross-talk between constructivist and ecological aspects. The constructivist process works through the ventral system with visual perception for spatial recognition and linked with higher brain functions of memory and interpretations. The ecological perspective functions through dorsal system with visual perception mainly getting information on the environment ecologically and guiding behavior and motion. These dual processes work concurrently and is considered to be coupling and integrating two perspectives synergistically at prefrontal cortex.

Three Perspectives, Rationality and Discourse Formations

- Coping with each problem areas for global change leads to the formation of scientific, ecological and social (mainly interest-based) discourses, with legitimacy based on individual rationality.

- Discourses on sustainability science are newly emerging as boundary works linking natural science and social science.

- Global change with potential impacts on human activities such as climate change and degradation of ecosystems are inducing conflicts between these three discourses.

- Technology developments with significant or uncertain intervention to nature are also causing discourse conflicts.

- Scientific, ecological and social perspectives are functioning concurrently for global change, within the uncertain overwhelming capabilities of the earth system, asking to accommodate to discovering ecological rationality in the long run.
Uncertainties and Conflicts in Each Problem Areas

? Major challenges for each problem areas come from the uncertainties confronting with tensions between nature-society relations. Different discourses are formed for coping with these uncertainties, guided by each concept of rationality.

? For socially coping with uncertain risks and sustainability, conflicts between risk-based approach and precautionary approach are coming out from the difference in the cultural and regulatory schemes.

? Ecological uncertainties concern significantly with future uncertainties of social and economic development scenario. Especially developing countries’ future is at stakes.

? Dynamics of earth systems as a whole with complex feedbacks are in great uncertainties into the future, together with ecosystem resilience, which make accommodation of human activities critical.
Strategies for Coping with These Uncertainties and Conflicts

? For physical uncertainties of earth system, basic strategy becomes observation and learning. It is adaptive management to human societies for coping with these uncertainties, perpetually revised according to new analysis and insights.

? For uncertain social and technological futures, scenario writing reflecting diverse future world views become critical. Here, diverse values have to be reflected openly into alternatives scenario, and not controlled by policy preferences.

? For conflicting values with lack of consensus, the strategy becomes at first discursive discussions accompanying problem structuring with following negotiation processes.

? When the problem is adequately structured, the strategy becomes rule making with participation of relevant actors and stakeholders.
Rule Making for Nature-Society Relations

? Nature-society relations in the 21st century will expand in the trend of world globalization. The ideas and common conceptions to the future shape global public space with relevant rule structures.

? Basis rules for nature-society relations will be ecological rules which govern sustainability of global commons supported by researches and governance structures for these resources.

? The multilateral rule structures for environment and development will assure transparency and accountability with democratic decision processes. Importance of epistemic communities are well recognized, together with NGO and business circles, which will expand civil society qualifications.

? National rules have two functions. One is to implement international rules into domestic situations, and another is much more local conditions for sustainability to be assured.
Thank You for your Attention

This study has been supported by grant-in-aid for scientific research of Ministry of Education, Culture, Sport, Science, and Technology (MEXT).

I appreciate very much for valuable discussions with Dr. R Pielke Jr., Dr. D. Cash, Dr. R Moss, Dr. P. Stern, Dr. G Symmes, Dr. T. J. Baerwald, Dr. N. Beller-Simms, Dr. S. Thurston, Dr. H. S. J. Hill and Dr. J. C. Houghton concerning global change studies.