Collaboration between scientists and stakeholders at the scene of environmental issues

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Realization of the "science for the society" has become pressing subject after frequent incidences of environmental issues. Future earth as a solution-oriented science display collaboration with stakeholders as an important target. However, there are many complicated subjects, such as hierarchy of stakeholders, conflict on interests, relationship between decision maker and stakeholder, and so on. This session will be discussed the role and position of scientists in the society through case studies, in order to get clues of careful consideration under serious environmental issues our facing to.

Keywords: scene of environmental issues, scientist, stakeholder, future earth

Transdisciplinary science toward the adaptive watershed governance: Biodiversity-driven nutrient cycling and human well-being

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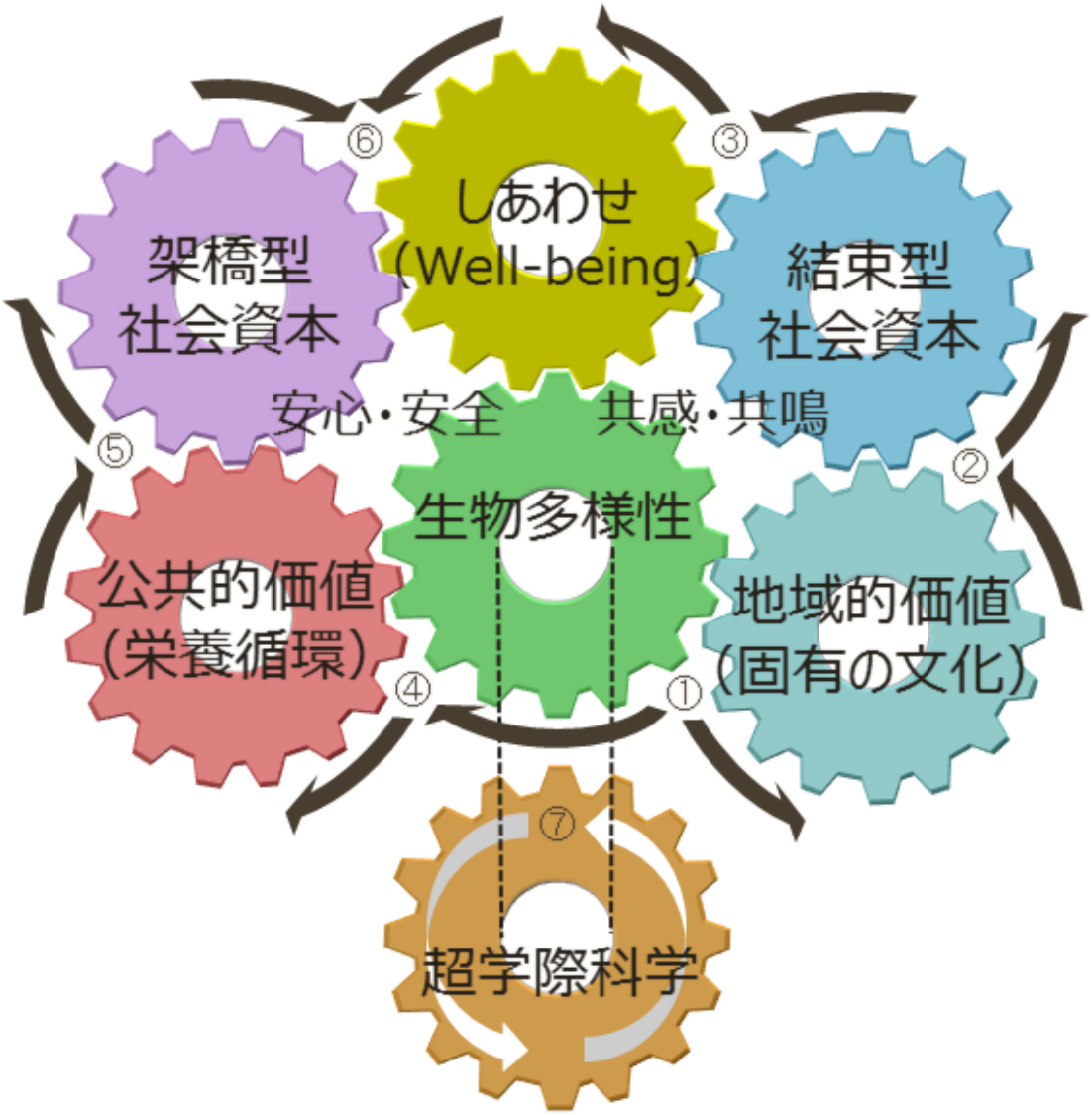
1. Research background and objectives
Technological innovations in the use of nutrients, such as nitrogen and phosphorus, to produce food contributed to the great global increase in population, life expectancy, and economic prosperity experienced in the twentieth century. Overexploitation of nutrient resources, however, causes disturbance of natural biogeochemical cycles, accounting for serious eutrophication in many watershed ecosystems around the world. Such nutrient imbalances are a main driver of biodiversity loss on a global scale, leading to deterioration of its ecosystem functions and services. It is now recognized that nutrient imbalances and biodiversity loss are prevalent throughout the planet, posing a risk to sustainable human development. In order to solve these problems related to nutrient imbalances and to ultimately ensure sustainable social-ecological systems, we have to enhance nutrient recycling on watershed scales.
Under such a background, we aim to facilitate cross-linkage of the multi-level governance, in which governments and researchers with a systemic view intend to solve nutrient imbalance-derived issues on the regional and global scales, while civilians want to solve social and environmental issues in the context of their life and livelihood. For such watershed governance to be successful, local and scientific knowledge must be shared and integrated by a variety of stakeholders to reconcile conflicts and interests emerging on different scales. Here I will develop a framework for the adaptive watershed governance, in which civilians are empowered for nature conservation, resulting in enhancement of their well-being, while scientists show how biodiversity enhances nutrient recycling through their conservation activities.
2. Hypothesis
Our hypothesis is that human activities affect biodiversity through alteration of nutrient balances, while biodiversity affects human well-being through alteration of social capitals. A working hypothesis is proposed to explain how the well-being is enhanced through the nature conservation (Fig. 1). First, local communities will be empowered for the nature conservation when they valuate biodiversity whose wise and sustainable use has been fostered by local knowledge for indigenous culture (Fig. 1-1). If bonding social capitals are accumulated through sharing of the indigenous cultural values among the community member (Fig. 1-2), the well-being will be enhanced (Fig. 1-3). If scientific knowledge showing that the community activities contribute to enhancement of biodiversity-driven nutrient recycling, which ensures public values for sustainability of social-ecological systems, is shared among a variety of stakeholders in the watershed society (Fig. 1-4), the community activities will be supported by non-community members directly or indirectly through social evaluation of public values produced from the biodiversity conservation (Fig. 1-5). A shift from bonding to bridging social capitals will also enhance the well-being (Fig. 1-6). These processes will be driven by transdisciplinary science (Fig. 1-7).
3. Methods
To test this hypothesis, my research project will practice the adaptive watershed governance in two extreme systems, the Lake Biwa Watershed and the Laguna de Bay Watershed, in Asia: the former is infrastructure-oriented low-loading society and the latter high-loading developing society. Finally, I want to find the fundamental framework of the adaptive watershed governance applicable to a variety of society.

4. Perspectives
In developed societies, establishment of infrastructure, such as sewage treatment and tap water systems, has reduced eutrophication, making human life more comfortable and convenient. However, environmental consciousness has been distant from the nature of wetlands as lifeworld. So, what enhances human well-being? Is it enhanced by the infrastructure? We want to seek answers to these questions.

Keywords: Nutrient imbalance, Social capital, Biodiversity, Transdisciplinary science, Human well-being, Watershed governance



Attempt at Clinical Volcano Disaster Studies

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Disaster prevention is a major area of collaboration with the society for earth science communities. One example is volcano eruption disaster mitigation and management. The eruption of Mt. Ontake in central Japan revealed that local governments and other stakeholders are not able to sufficiently take initiative and effectively collaborate for volcano disaster management, though there are many governmental organizations contribute for mitigation and management. This presentation introduces the MEXT-J funded research project for local disaster management support (“Clinical Volcano Disaster Studies”) focusing on three volcanos in central Japan to solve the above mentioned problem, in collaboration among local governments and natural science/policy study researchers. This project is an application of a university’s institutional trial of trans-disciplinary research called “Clinical Environmental Studies,” to volcano disaster management. The presentation elaborates Clinical Environmental Studies.

Keywords: volcano disaster, Clinical Environmental Studies, transdisciplinary

Land use and vulnerability of atoll nations in the Pacific and Indian Oceans

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Atoll nations established on cays on coral atolls in the Pacific and Indian Oceans face the potential risk of future sea level rise. This paper reports the status of disasters based on field research in the atoll nations, and then discusses the relationship between disaster and geomorphology/land use based on the examples of Tuvalu, Kiribati, and Maldives.

In Tuvalu, half of the national population of ~10,000 lives on the capital island, Fongafale, located on the Funafuti Atoll. The traditional settlements are located on the beach ridge beside the lagoon at a height of ~2 m. New settlements and facilities such as power plants are built on the lowland between the windward storm ridge and the beach ridge and suffer flooding during the spring tide.

In Kiribati, 34,000 (one third of the national population) people live in the capital, South Tarawa. The elevation of a traditional settlement is 2 to 3 m above Mean Sea Level. The new residential areas including a school, small factories, and shops, are built on the lower part of the cay. In addition, many reclamation activities by residents are observed along the lagoon coast in South Tarawa.

In Maldives, 154,000 (one third of the national population) people live on the capital island, Malé, which has an area of ~2 km^2. The area of Malé Island has been doubled by landfills and surrounded by breakwaters.

The fully equipped island is recognized as a safe from coastal erosion due to sea level rise and tsunamis. Therefore, the population of such an island increases and advances the urbanization on that particular cay. The vulnerability of atoll nations should also be considered from the point of view of the uneven distribution of the population owing to the rapid migration of people as well as from that of the measures taken against sea level rise.

Keywords: Atoll Nation, Land Use, Settlement, Sea Level Rise

Surprising, Learning and Encouraging: Interaction researcher and local people on the field of desertification study in the Sahel

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In this presentation, I will discuss the similarity and differency of scientific knowledge and indigenous knowledge through the case of scientist's intervention to farmars for improvement of land degradation (desertification) in Sahel area such as Niger and Burkina Faso. To considering this topics, I will use the notion of "etic" and "emic" which are used in cultural anthropology.

Keywords: Etic and Emic, Scientific knowledge and indeginous knowledge, Conbat against desertification

Co-designing local water resources management with stakeholders

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The concept of Integrated Water Resources Management (IWRM) was first proposed in the 1990s, during an increasing worldwide environmental awareness, and has been recognized as a fundamental principle for comprehensive water resources management, involving various sectors and many stakeholders. However, IWRM implementation in local communities and effective assessment of the influence of human activities on the water environment is yet challenging. Therefore, this study aimes to present water resources management at the local level, which is the foundation of IWRM, to be a social implemented, and to develop the knowledge structure and ability for implementing this management among the concerned parties. In particular, we considers a management structure that reflects the relationship among various water users. Based on this specific content and the necessary conditions for establishing the management structure, this study aims to suggest desirable local water resources management guidelines through co-operation between science and society.

Keywords: collaborative actions with stakeholders, Local water resources management, Social learning

Transdisciplinarity surrounded by a common goal for sound hydrologic cycle in Inbanuma watershed.

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An idea of "Future Earth," decadal international initiative on environmental changes, is the establishment of transdisciplinarity through collaboration between scientists and stakeholders. The subject should be solution-oriented one, and participants will make collaboration for achievement of solution being common goal.
Inbanuma is a closed lake located in Tokyo metropolitan area, and serve as a water resource of Chiba Prefecture. The water quality, however, keeps the worst one recently. To improve water quality and attain good region, Chiba Prefecture founded a council for sound hydrologic cycle in Inbanuma watershed in 2001. The activity includes collaborations of many stakeholders in different sectors. This is one of the realization of transdisciplinarity, the is the idea of future earth initiative.

Keywords: sound hydrologic cycle in Inbanuma watershed, future earth, transdisciplinarity, stakeholder

Attitude of collaboration between scientists and stakeholders in nuclear disaster

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Who is the stakeholder in nuclear disaster? Government is one of the stakeholders, and local government, local residents, evacuees, all are also stakeholders. Stakeholders in the nuclear disaster has hierarchy, likewise other disasters. There are divergent views, and even conflict. The evacuees are stakeholder and also the victims in offender-victim relationship. Who is the stakeholder scientist should collaborate in this circumstance.

Keywords: FUKUSHIMA, nuclear disaster, scientists and stakeholders

Issues of Stakeholders "or" Stakeholders on Co-operarion among them - Position of Science and its Exellence

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After the "modern", the science tightened its subject and methods; we have established a system of as each academic discipline and field. At present, the systemizing reached throughout the education program, it seems to be a tacit agreement in between the researchers, that there is, or there can be, no point that can have a bird's-eye view of the whole science. However, on the other hand, as is notably reflected in Future Earth (FE) program, the
establishment of fusion and interdisciplinary area of the field has been exalted to be a top priority in the "science". In case that in science "and" society it wants to be built a relationship, what standing position will "scientist", who bears of science, and what kind of relationship will "scientist" constitute.
In this presentation, I would like to refer to the material for future discussion about co-operation between stakeholders and scientists, by tracing the genealogy of the concept and term of stakeholder, being based
on discussion of the history of science, and the presenter's experience on the field.
1) Current situation of science - from the discussion of A. Bloom -
2) Encounter with the "scientists" - from the field in the experience -
3) Expert in science and amateur on the field

Keywords: Scientist, Field, Stakeholder

Collaboration between local people and other stakeholders in the case of desertification issue

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Desertification is hard environmental problem to solve since it is primarily caused by activities related to basic human survival and daily livelihood, such as cropping, livestock herding. To solve this problem, it is necessary to study the resource use of local people, to provide a solution based on their knowledge and livelihood value, and to share the decisions making process. This presentation aims to introduce some case studies of coping with desertification in arid land and to examine the relationship between scientists and local people from the experience of environmental field work in African arid land.

Keywords: Desertification, Africa, Fieldwork, Local people

Collaboration between scientists, forest volunteers, goverment staff and public at the Forest Health Check activity in the whole Yahagi River Basin

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Planted forests, which occupies 40 percent of the Japanese forest was mostly planted in 1955-70 and is left unmanaged because of a wood import liberalization, a strong yen rate, wood demand decrease, lack of a forestry practitioner. Such forests is dark, consists of tall and thin trees, no undergrowth, a raindrop erosion occur, water holding capacity is weak, and tends to collapse. But no one can grasp correctly by how much percentage such forest exists by the river basin scale including a specialist. A forest volunteer takes the leading part and has begun "Forest Health Check Activity" from 2005 with a researcher in the Yahagi River basin. General citizen, guided by a skillful forest volunteer, enter a mountain, and check the health condition of a planted forest by a scientific and handy method. The data is analyzed by a researcher and shares a result by participants and also proposes for forest administration officers. An implication to the scientist's role in the society and the state of the scientist's participation to a problem solution is considered from an outcome of having a Forest Health Check Activity which is continued and has ended in 2014 for 10 years from 2005.

Keywords: Planted Forest, Forest Health Check Activities, Yahagi River Basin

The gaps on the way of thinking between scientists and local stakeholders -A case study of Hakusan Tedorigawa Japanese Geopark-

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Introduction

Recently, scientists have been encouraged to carry out social contributions, and their cooperation with the local stakeholders are increasing. Geoparks, mostly lead by the local governments, have employed scientists as practical staffs. It can be said as a pioneer of a contact point between science and society. Most of them sit beside the local government staffs in their offices daily, and also they have opportunities to cooperate with citizens such as guides. However, there is a gap on the way of thinking between the scientists and these local stakeholders, which causes a variety of conflicts and troubles.

This paper will report the present situation and extract the issues, in cooperation between scientists and local stakeholders, through the cases of Hakusan Tedorigawa Japanese Geopark, focusing especially on geotours.

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Gaps between scientists and local government staffs

Geotourism is one of the main geopark activities. Many geoparks train guides and conduct geotours. Geotours are expected as a method to get incomes from outside the area. Regarding the tourism promotion, its aim is to attract tourists from the outside. However, the methods are hard to say as effective.

In our geopark, the main method to attract tourists are flyers. Until a little while ago, most of them had been distributed inside the area. Geoparks are mostly managed by the local governments, which cooperates mostly with internal bodies such as community centers, road side stations, accommodations or tourist facilities. But if it is outside the area, under other local governments, local government staffs find it hard to take cooperation with the bodies.

However, considering objectively, if the aim is to attract tourists from outside, we should distribute most of the flyers outside. In this case, the objective and the method is not matching.

In addition, as a background, we can point out that the local government staffs do not have many opportunities to train the cycle of Introduction - Methods - Results - Discussions, like scientists as in the process of presentation at academic meetings or scientific articles.

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Gaps between scientists and citizens

Although geoparks are training some citizens as guides, in many cases, the age group of guides are based in the elderly. Since they can survive by the pensions, they are not eager to get incomes as guides, and tend to be volunteers.

In 2015, our geopark has conducted a monitoring of the geotours by college students. From this monitoring, many issues came to the front such as “There was no advance notice on dresses in a woodland tour, and I was the only one wearing town clothes.” “Guide was only explaining to specific participants”.

The guides were not malicious, and were just under their “common sense” which can be said as “guiding the children of relatives.” However, the guides are not guiding “the children of relatives” but “customers” which they receive the fee, and it is necessary to adjust to the “common sense” of “customers”.

Scientists could have opportunities to receive others’ opinions through academic meetings and

objectively view themselves, but citizens scarcely have such opportunities. It is quite difficult to break this “common sense” that has been cultivated over the years. In order to let the guides view themselves objectively, there is no choice but to repeat the dialogue over time.

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Conclusion

Scientists fortunately have opportunities to train the cycle of Introduction to Discussions, and also to objectively view themselves. Whatever their discipline is, scientists can be said as specialists of logical thinking. On the other hand, local stakeholders scarcely have such opportunities. Scientists should understand the way of thinking of their partners well, and take the approach adaptive for their partners, in order to cooperate with the local stakeholders.

Keywords: scientists, local government staffs, citizens, geoparks, cooperation

Collaboration between Local Farmers and Scientists towards Introduction of Flood- and Drought-adaptive Cropping Systems

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1. Introduction
For the effective tackling of environmental issues through sustainable development in rural areas, one of the important factor is how to share the information about natural resources and their ecosystems among stakeholders, especially local people and scientists, and create a ‘new’ framework for natural resource use. A technical cooperation and research project named “Flood and drought adaptive cropping system to conserve water environments in semi-arid regions” has been implemented in northern Namibia by Japanese and Namibian scientists since 2012 to 2017. This project aims to develop “Flood- and drought-adaptive cropping techniques (rice-millet mixed cropping)" which can preserve water resources and produce staple foods to cope with the yearly fluctuation of flood and draught through the use of seasonal wetlands. The aim of this presentation is to examine the possibility of harmonizing scientists’ knowledge and farmers’ perceptions to create the ‘new’ mixed cropping system related with the use of seasonal wetland environments.
2. Methods
A field survey was conducted in three villages in northern Namibia and data on physical conditions of seasonal wetlands such as precipitation, surface water fluctuations and vegetation were collected. To understand the farmers’ perceptions on seasonal wetlands, interviews were conducted with the households’ heads (or household members) who have the seasonal wetlands in their own farm land. Besides, information on local knowledge regarding mixed-cropping was collected through interviews, and the participants’ remarks were also recorded. We also observed the farmers’ perceptions on the ‘new’ mixed-cropping system suggested by the project at the workshops.
3. Result and Discussion
(1) The study area is located in the Cuvelai system seasonal wetlands (CSSWs). Numerous pan-shaped seasonal ponds (known as ondombes) are formed on the slight upland area. As the results of field surveys, ondombes are categorized into various types based on their differences in physical conditions such as vegetation types, patterns of water fluctuation and soil conditions.
(2) Local farmers recognized the differences of the various types of ondombes by some indexes of water fluctuating patters and vegetation types.
(3) In this area, local people didn’t use the seasonal wetlands for crop cultivation. In the process of the introduction of the rice- millet mixed cropping system by the project, farmer’s recognitions of wetland environment have changed and created the ‘new’ local knowledge of wetland environment.
(4) Various gaps among the farmers’ perceptions and practices and the scientists’ knowledge regarded as ‘new’ and indigenous mixed-cropping techniques were observed. There were some differences between the scientists’ initial knowledge and the farmers’ perceptions at the beginning of the project, so it was important for the scientists to understand the causes of such gaps and modify the project framework to co-create the ‘new’ mixed-cropping system harmonized with natural environments.

Note: This study has been supported by JST/JICA SATREPS ‘Flood- and Drought-adaptive Cropping Systems to Conserve Water Environment in Semi-arid Regions.’

Keywords: Participatory approach, Mixed cropping, Local knowledge, Wetland uses, Arid land

Evolving socio-ecological policy formulation and field dialogue for sustainable development: A role of in-house scientist of UNU-IAS OUIK, Ishikawa, Japan

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In Ishikawa prefecture, centered in Japan, there are several international designated areas such as Globally Important Agricultural Heritage System (GIAHS) in Noto peninsula, UNESCO Creative Cities (Craft & Folk art) in Kanazawa city, UNESCO Biosphere Reserve in Hakusan city. UNU-IAS OUIK located in Kanazawa city has contributed to these related municipalities in the international designations in order to formulate local conservation policy of biocultural diversity since 2008.
In this paper, I aim to discuss on the role of scientist on policy formulation in the context of international conservation activities of natural and cultural resources and sustainable development through the case of UNU-IAS OUIK.

The scientists should be expected for finding something new not only in the paper-based research but also in the social implementation such as policy formulation.

The scientists can be an information focal point in terms of academic skills and critical thinking.

The scientists can organize and promote a field dialogue among international organizations, national governments, local governments such as prefectures and municipalities, local residents.

The scientists can support interactive communications between global community and local society with communication tools.

Keywords: Multi-stakeholders, Academic skills, Local empowerment, Global contribution

