

Responding to Risk: Perception and Decision Making

Heinz GUTSCHER¹²³

1. *University of Zurich, Switzerland*

2. *Swiss Academy of Humanities and Social Sciences, Switzerland*

3. *Swiss Academy of Science, Switzerland*

Heinz Gutscher is professor emeritus of social psychology at the University of Zurich (UZH), Switzerland. Educational sojourns led him to the University of Michigan, Ann Arbor and to the University of Essex, Colchester. He got his PhD from the University of Zurich (1975, summa cum laude). He was a full professor of Social Psychology, Department of Psychology, University of Zurich (1990-2012). His major field of interests cover topics like forms, function and processes of social influence; social psychological aspects of sustainability issues; application of social psychological expertise in current fields such as energy, mobility, transport, consumption, waste and acceptance of new technologies; social capital, trust and confidence, change management; planning and evaluation of large scale interventions; risk perception, decision making under risk and risk communication. He currently serves as president of the Swiss Academy of Humanities and Social Sciences and as chair of ProClim, Forum for Climate and Global Change at the Swiss Academy of Science; he is a member of Future Earth Science Committee; he advises the scientific board of the Swiss Biodiversity Forum at the Swiss Academy of Science and he is a member of the Swiss Federal Energy Research Commission (CORE). His major publications include: Siegrist, M., Earle, T.C., Gutscher, H. (Eds.) (2007). *Trust in Cooperative Risk Management. Uncertainty and Skepticism in the Public Mind*. London: Earthscan. Kaufmann, R., Gutscher, H. (Eds.) (2001). *Changing things - moving people: Strategies for promoting sustainable development at the local level*. Basel: Birkhäuser. Rogers, D. S., Duraiappah, A. K., Antons, D. C., Munoz, P., Bai, X., Fragkias, M., Gutscher, H. (2012). *A vision for human well-being: transition to social sustainability*. *Current Opinion in Environmental Sustainability*, 4(1), 61–73; Siegrist, M., Gutscher, H. (2006). *Flooding risks: A comparison of lay people's perceptions and expert's assessments in Switzerland*. *Risk Analysis*, 26, 971–979; Siegrist, M., Earle, T. C., Gutscher, H., Keller, C. (2005). *Perception of mobile phone and base station risks*. *Risk Analysis*, 25, 1253–1264. heinz.gutscher@uzh.ch

Abstract

For most people the world has never been as safe as it is today. And yet, as we enter the Anthropocene, individuals and societies face new risks and more challenging risks than ever before. This presentation examines how humans “function” in the context of risk and hazards. It describes the basic strategies used to regulate exposure to hazards and how these strategies relate to ecosystem and livelihood risks. A hazard in general must first be perceived, i.e. it must be detected. Herein various evolutionary obstacles must be overcome. The identification of a potential hazard is followed by an assessment of its characteristics and its consequences before behavioral options like risk taking are determined. Effective risk communication requires understanding of the many idiosyncrasies, biases and limitations of human perception, human judgment and decision making. This presentation provides basic description of the psychological processes that are relevant to successful risk management and communication. It will focus on current understanding of cognitive processing of information and of the role of heuristics and emotions, especially as they relate to climate and ecosystem risks which are crucial to our individual and social existence.

The Research Challenge from Global Risks

Carlo C. JAEGER^{1,2}

1. *Global Climate Forum, Germany*

2. *Beijing Normal University (BNU), China*

Carlo C. JAEGER is co-founder and the chairman of the Global Climate Forum, leading GCF's Green Growth research process. He holds a Professorship at Beijing Normal University (BNU) and was Professor for Modelling Social Systems at Potsdam University in Germany and chair of the research domain 'Transdisciplinary Concepts and Methods' at the Potsdam Institute for Climate Impact Research. Developing climate impact research guided by stakeholder dialogues and using mathematics as a tool to meet conceptual challenges is the focus of his work. He was Professor at the University of Darmstadt and Head of the Human Ecology Department at the Swiss Federal Institute for Environmental Science and Technology. He is a member of the Scientific and Technical Council of the International Risk Governance Council, and has served on the boards of various scientific organizations. He holds degrees in economics (Ph.D., Frankfurt University, Germany), sociology (diploma, University of Bern, Switzerland), and human ecology (habilitation ETH Zurich, Switzerland) and has worked extensively on the interactions between technological progress and environmental problems, in particular the role of information technologies in urban development. He has also considerable research experience in the field of stakeholder dialogue. His current research interest focuses on the positive impact of climate policy on prosperity and growth and on the role of financial markets in managing climate change.

Abstract

Since the great fire in London 1666, modern societies have developed impressive ways to deal with the increasingly large risks to which they are exposing themselves. This has led to on-going progress combining advances in mathematics and economics with the development of new organizations and markets. The result may be called the rational actor paradigm in risk governance. It has allowed the development and implementation of technologies that would otherwise have been unfeasible, from modern medicine to car traffic and electric power systems. While still useful and often indispensable for modern life, this paradigm is presently reaching its limits. At least three challenges can be identified. First, the risks we are faced with today increasingly have a global dimension to them, but at the global scale suitable decision-making structures to deal with those risks are often missing. Second, we observe a tendency to postpone risks while amplifying them, a tendency that is hard to understand and even harder to reverse. And third, when disaster sets in, modern societies often are surprisingly helpless in dealing with the transition from normal life to situations of crisis, as can be seen from the cases of terrorism, financial crisis, or climate change. These challenges can and should be addressed by research on more localized risks, too. The RIHN symposium is an excellent opportunity for progress in this direction.

Resources Use of Coastal Fisheries in Sudan

Adel Mohamed SALEH¹, NAKAMURA Ryo², Moamer Eltaib Ali MOHAMAD³

1, 3. Red Sea University, Sudan

2. Research Institute for Humanity and Nature (RIHN), Japan

Adel Mohamed SALEH Graduated from the Faculty of Marine Sciences and Fisheries (FMSF) at Red Sea University. He received B.Sc Honors from the Department of Management & Coastal Development,(2002) and worked as a teaching assistant at FMSF, (2005). He received his Masters degree in biological oceanography (fish biology and fisheries) under the Stock Assessment and Fisheries Management in Abu-Qir Bay in Alexandria, Egypt (2010). He has been working as the head of Department of Management & Coastal Development at FMSF since 2010. His major field of interests are fisheries resources management (stock assessment), fisheries community, coastal area management, marine protect areas and marine environments. His recent achievement was to be a co-author of two papers in Bulletin of the National Institute of Oceanography and Fisheries, Alexandria, Egypt, in the topic of fisheries biology and management. He also has been participating as a researcher in the project between RIHN and Red Sea University in the Sudanese Red Sea coast, and participating in a joint fisheries field survey since 2011. dooly_501@yahoo.com dooly252@gmail.com

Abstract

This paper shows how resource use of coastal fisheries differ according to water depth in Dungonab Bay Marine Protected Area (MPA), Sudan. Dungonab Bay is the biggest bay (285 km²) along the Sudanese Red Sea coast. It was designated as MPA in 2005 for its geographical characteristics of semi-closed bay and rich ecosystems formed with coral reefs, sea grass bed, and mangrove (*Avicennia marina*) which make the habitat of diversified living species, including several rare species such as dugongs, marine turtles and manta rays.

By analyzing the location and water depth of each of 77 fishing grounds in the Dungonab Bay, it was clarified that 84 % of the fishing grounds (65/77) were less than 30 meters deep, and 70 % of the bottom sediments of the fishing grounds (54/77) were reef-building coral. Fishermen here tend to target the coral reef fishes in the shallow waters.

In this region, strong winds and the hot summer season (July and August) disturb fishing activities. Such natural conditions give a strict limitation to the fishing activities, suppressing over use of marine resource.

Most deepwater fishing grounds are around 40 to 50 meters deep and are located outside the bay. There fishermen catch *Nagil* (*Plectropomus maculates*), the most expensive fish. Although, the fishermen fish *Nagil* intensively during the spawning season (May and June), their use of hand-lines is uncertain and inefficient, and overfishing is unlikely. Though valuable marine resources are located in deeper waters, access is difficult for local fishermen with simple fishing methods.

We should be sensitive in the use of shallow water resources. Major concerns were overexploitation of sea cucumbers and dugong by-catch. Our study showed that the most common cause of by-catch were multifilament gillnets set in the shallow seagrass beds during the night. Dugongs have been eaten and their skins used as material for shields in this region. However, in recent years, fishermen do not like to catch dugong because its demand declined and dugongs damage expensive gillnets. We believe that discussion with local people can lead to agreements to suspend fishing activities when dugong are present and to eliminate the nighttime use of multifilament gillnets , and as a consequence, to minimize risk to people and dugong.

Current Status and Distribution of Dugongs (*Dugong dugon*) in Sudan

Badr eldinn Khalaf alla ADAM¹, ICHIKAWA Kotaro², Abdelmoneim Karamalla GAIBALLA¹, Moamer Eltayeb Ali MOHAMED¹

1. Red Sea University, Sudan

2. Research Institute for Humanity and Nature (RIHN), Japan

Badr eldinn Khalaf alla ADAM has received M.Sc in fish biology and physiology from the Marine Biology and Fisheries (FMSF) Department at the Red Sea University, where now he is a member of the faculty in the Department of Marine Sciences and Fisheries. His major achievement is in working with a dugong survey team in Sudan, the first team that has caught dugong in Africa and Arabic countries. He also works as a supervisor for many graduate student at the Red Sea University. *admbadr18@gmail*

Abstract

In coastal Sudan, local diets and livelihoods rely on reef fishing and an offshore conservation zone has been established to protect rich coral ecosystems. This new coastal regulation may instead endanger local livelihoods, as it will likely prohibit use of gillnets due to the fact that they can also entangle the endangered dugong (*Dugong dugon*). Distribution of the dugongs along Sudanese Red Sea coast was examined by boat-based visual transect survey. The survey was conducted from May 31 to June 3 for the transect line from Oseif to Port Sudan and on from June 6 to 8 for the transect line from Port Sudan to southern Suakin covering total of 415 km. During the visual transect survey, 10 dugongs were found and 4 dugongs were found dead due to by-catch. This suggests that the population status of the dugongs in the focal area is in severe condition. We also obtained GPS-based location data of 3 individual dugongs in Dugonab Bay, Sudan, in June, July and September in 2012, allowing analysis of the spatio-temporal overlap of fishing activity and dugong movement. These animals were equipped with an underwater recorder (AUSOMS-mini), a GPS logger (Mk10-F), a VHF transmitter (MM130B), and a time-scheduled releaser (RT-1-168). Each device was connected by a rubber rope and tethered to each individual. Location, temperature and depth of the tagged dugongs were obtained. A male dugong spent 96 % of its time in shallow waters (< 4 m). There were sudden deep dives (> 20 m) with the deepest dive at 40 m. The dugongs visited the capture site repeatedly after being released. This session will focus on integrated discussion of spatially-explicit data related to resource management and conservation in order to understand how such management schemes relate to local livelihoods.

Evaluation of the Invasion Strategic of Mesquite (*Prosopis juliflora*) and Risk Management in Eastern Sudan Using Remotely Sensed Technique

HOSHINO Buho¹, Mahgoub SULIMAN², YODA Kiyotsugu³, NAWATA Hiroshi⁴, Abdelaziz KARAMALLA², Mohamed ELGAMRI², Mohamed A. M. ABD ELBASIT⁵, YASUDA Hiroshi⁵

1. Rakuno Gakuen University, Japan

2. Sudan University of Science and Technology, Sudan

3. Ishinomaki Senshu University, Japan

4. Research Institute for Humanity and Nature (RIHN), Japan

5. Tottori University, Japan

HOSHINO Buho specializes in remote sensing and geographic information systems (GIS). He is professor in and director of the Department of Environmental and Symbiotic Science, College of Agriculture, Food and Environmental Sciences at Rakuno Gakuen University, Japan. He was born in Inner Mongolia, China in 1964. He received the M.S. and Ph.D. degrees (1995) in remote sensing and GIS from the Chinese Academy of Sciences, China. He has been a Postdoctoral Fellow with the Department of Earth Sciences, Hokkaido University, Japan, (1995-1996); and research professor (2001-2006) at the Hokkaido Institute of Environmental Sciences, Japan.

Abstract

In this study a remote sensing approach for the mesquite tree (*Prosopis juliflora*) risk management is proposed. The mesquite tree is native to South and North America and was introduced into Sudan in 1917. The tree is well known for its high adaptability to arid and semi-arid conditions and characterized by very high water use efficiency. Introduction of the mesquite has caused several environmental problems in Sudan. In Northern and Eastern Sudan area, the problem of desertification, land degradation and dust storm are still serious. Because, the invasive species Mesquite (*Prosopis juliflora*) has a high capacity to fix sand dunes, so mesquite trees was introduced into Sudan and planted in Khartoum and eastern Sudan. However, the tree was invaded both natural and managed habitats, including watercourses, floodplains, highways, degraded abandoned land and irrigated areas. The weed is more of a problem within central, northern and eastern Sudan. In this study a remote sensing approach for the mesquite tree control is proposed. To monitor mesquite water use efficiency the concept of a Normalized Difference Infrared Index (NDII), which is defined as the ratio of actual to foliar water content, have been applied and compared with the ground measurements of stomatal conductance ($\text{mmol. m}^{-2} \text{ s}^{-1}$), field spectral, volumetric soil water content. As results, on the base of the PALSAR L-band microwave polarimetric backscatter coefficient, the soil moisture and surface roughness could be estimated with a good accuracy for bare-soil surfaces.

Root System Development of *Prosopis* Seedlings under Different Soil Moisture Conditions

YODA Kiyotsugu

Ishinomaki Senshu University, Japan

Kiyotsugu YODA is a professor of the Faculty of Science and Engineering, Ishinomaki Senshu University. He received his Ph.D. in Natural Sciences at Kanazawa University (1993). He was Lecturer (1993~2001) and Associate Professor (2001~2013) at Ishinomaki Senshu University. His major field of interest is eco-physiology of woody plants. yoda@isenshu-u.ac.jp

Abstract

Prosopis juliflora is a useful 'multi-purpose' tree, but it invades rapidly in arid and semi-arid environments, becoming a threat to human subsistence. A rain pulse under drought conditions has been reported to be an important factor to promote plant invasion. The purpose of this research was to evaluate the effect of a rain pulse on the invading process of *Prosopis juliflora*, and to propose a feasible plan to control the expansion of this species in Sudan. Firstly, seed germination was examined under eight irrigation conditions, corresponding to 4 ~ 32 mm of rainfall. Most seeds imbibed in all the irrigation conditions, about half or more of seeds germinated in 30 ml (corresponded to 12.2 mm rainfall) or more of irrigation. Fifty ml (20.3 mm rainfall) or more of irrigation induced seed emergence. Secondary, initial growth of seedlings was examined under ten irrigation conditions (1 ~ 32 mm rainfall). Radicle elongated most vigorously in 60 ml irrigation (24.4 mm rainfall), and extended 20 cm in length within less than one week. These results indicate that a single rainfall of 12 mm and more facilitate seed germination, and a rain pulse over 20 mm promotes rapid radicle elongation. Based on these results, we propose that the timing to eradicate seedling population of *P. juliflora* should be within one to two weeks just after single large rain, which might be effective to control additional expansion of this species in Sudan.

Mesquite (*Prosopis spp.*) Water Uptake under Different Simulated Drought Conditions

YASUDA Hiroshi¹, YODA Kiyotsugu², PANDA Sudhindra Nath³,
Mohamed A. M. Abd ELBASIT⁴, J. HUANG⁵

1. Tottori University, Japan

2. Ishinomaki Senshu University, Japan

3. Tottori University, Japan

4. University of Johannesburg, South Africa

5. Yanagzhou University, China

YASUDA Hiroshi is an associate professor at the Hydrology Division, Arid Land Research Center, Tottori University. His major field of interest is development of water resources in arid lands. His major publications include: "Prediction of Chinese Loess Plateau Summer Rainfall using Pacific Ocean Spring Sea Surface Temperature", *Hydrological Processes* 23, 719–729 (2009); "The impact of plant water uptake and recharge on groundwater level at a site in the Loess Plateau of China", *Hydrology Research*: 44-1:106-116 (2012); and "Diurnal Fluctuation of Groundwater Levels Caused by the Invasive Alien Mesquite Plant", *Arid Land Research and Management* (in press). hyasd@alrc.tottori-u.ac.jp

Abstract

Groundwater use plays a significant role in arid environments due to scanty surface water availability. It is important not only for human consumption but also for the survival of vegetation. The present research established interactions between groundwater level and plant root growth in arid environments of China and Sudan. In the Loess Plateau of China, groundwater level near a Chinese willow (*Salix Matsudana*) indicated diurnal fluctuation (beginning with spring and ending in autumn) corresponding to incoming solar radiation. The fluctuation was due to dynamic and genetic characteristic of the plant root water uptake system during the growing season. In Khartoum (Sudan), similar phenomena were observed in the invasive alien plant species mesquite (*Prosopis juliflora*) which survives only on groundwater. The height of mesquite plants was 2 to 3 m, while the depth to groundwater was 23 m. This indicates the inherent and invasive characteristics of mesquite, with its deeply extended vertical root system that can access groundwater in order to survive. The groundwater level indicated diurnal fluctuation due to the peculiar nature of mesquite plant root water uptake system. We conclude that due to the mid-day depression characteristic of mesquite, water uptake diminishes and the groundwater level recovers for a few hours. The present study will help the land managers in arid environments of China and Sudan to develop optimum managerial policy for the maintenance of natural resources.

Political Economy of Extreme Events: Storms and Floods in Northern Finland

Monica TENNBERG

University of Lapland, Finland

Monica TENNBERG is a research professor and leader of the sustainable development research group at the Arctic Centre, University of Lapland, Finland. She has recently studied climate change adaptation in Finland and Russia from the perspective of adaptation governance (Tennberg ed. 2012 *Governing the Uncertain: Adaptation and climate in Russia and Finland*). She is the member of the pan-arctic research consortium Community Adaptation and Vulnerability in Arctic Regions (CAVIAR).

Abstract

Extreme events, such as storms and floods, are considered to be among the future threats in the Arctic due to warming climate. Currently, both storms and floods are mostly discussed in technical terms, as assessment of damages caused by them and development of preparedness and response to tackle them better. This “depoliticisation” of societal problems and governance makes issues like storm and flood preparedness free from public debate and participation. By challenging the technical discourse on storms and floods, the political economy approach provides “us with an improved and less bounded sense of who governs and on whose behalf, how they govern and the implications of those practices of governing, in social and environmental terms” (Newell 2008, 528). The political economy approach seeks to explore the ways in which particular discursive practices are embedded within broader relations of political and economic power and governance. In this particular Finnish case study, the question is the emergence of neoliberal practices of governance as private flood insurance and better storm preparedness by citizens.

Flood Risk and Migration in the Republic of Sakha (Yakutia)

FUJIWARA Junko

Research Institute for Humanity and Nature (RIHN), Japan

FUJIWARA Junko is a cultural anthropologist. She received a doctoral degree in arts and humanities in Osaka University of Foreign Studies (2005). Now she is a senior project researcher of Research Institute for Humanity and Nature (RIHN). She is interested in social and climate change in Siberia, religion in contemporary Russia and Russian folklore. In RIHN she is a member of the research project, entitled “Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments”. Her recent publication includes the book “Cursed Natasha: Ethnography of Magic in Contemporary Russia” (2010, in Japanese), “Siberian Russian People” in H. Takakura (ed.) “Living in Siberia, A Land of Extreme Cold: Reindeer, Ice and Indigenous Peoples” (2012, in Japanese). pujiro@goo.jp

Abstract

The Republic of Sakha (Russian Federation) is one of the coldest places on the earth, but the influence of global warming can also be seen here. Various types of flood (floods caused by spring ice jams, floods due to permafrost fusion, and floods caused by heavy rain) have become a particularly big problem in the Republic. There have been floods in Sakha from olden days and they were even necessary for the subsistence of the inhabitants. Now, however, flood risk is increasing and flooding occurs more frequently than in the past and has become a problem. In some areas, migration is being considered by the leadership of the government of the Republic.

In this paper, I discuss the migration process based on interviews in government offices, fieldwork in villages to which emigration is considered, and mass media information. I would like to show the difference between the interests of the inhabitants on the one hand and those of the government on the other, and how they found a point of compromise after negotiations.

Climate Change in the Eyes and Actions of the Northern Native Peoples of Sakha

Valentina I. DMITRIEVA

North-Eastern Federal University, Russia

Valentina I. DMITRIEVA graduated from the Yakutsk State University with specialization in physics (1975) and increased her qualification at Anchorage, Pittsburg and California Universities (1993-1996). She was a research associate at the Institute of Physical-Technical Problems of the North, Siberian Branch of the Russian Academy Science (1977-1992), The Yakut Institute of Agricultural Science (1994-1998), head of Department of Ecological Education, Ministry of Environmental Protection of the Republic Sakha, Russia (1998-2002). Her major field of interests is environment, public ecological activity, and biotechnology. Her public activity includes managing projects of the NGO "Eye" Environmental Education Center. Her major publications are in environmental education and the technology of utilization of organic wastes. She took part in a number of scientific international conferences on ecological education (NAAEE), and vermiculture and biodynamic agriculture. Her last major achievements: Award-2012 for the Best Social Project in Russia, Russia Prize *EcoPozitiv-2011.dvi52@mail.ru*.

Abstract

Climate changes are especially noticeable in areas where long-term permafrost is widespread. The average annual temperature has risen by 3 degrees in Central Yakutia in the last 30 years. This factor has caused significant changes in local climate, but most importantly, it has caused more intense thawing of permafrost, which has led to a variety of negative consequences.

An ecologically-aware public can increase a population's knowledge of scientific research, assist scientists in monitoring climate changes, improve understanding of natural phenomena and environment, directly conduct sociological and monitoring research, and direct a new style of thinking by local authorities in order to suggest viable adaptation actions under changing conditions. Sociological research was conducted among inhabitants of the arctic and central Yakutia zone. Elderly residents whose activity is connected with the nature – hunters, fishermen, reindeer breeders— participated in deep interviews and focus groups. Our research shows that inhabitants observe considerable changes in climate, flora and region fauna. Respondents consider that changes in climate have begun to influence the everyday life of northern inhabitants, and are reflected in human health and on traditional lifestyles. They notice that climate changes have influenced local ways of life only for the last 5-10 years. In order to form a public observers network local participants were organized, engaged in training sessions and a monitoring system was developed. Choice of place, time, research parameters, and the system of collecting and analysis of data were determined.

Environmentalists have made large efforts in the field of fire-prevention and resource-energy saving at municipal schools. In addition, we have introduced energy saving programs that, since 2010, have achieved considerable economy on utilities at schools and reduced the quantity of energy consumed and carbon dioxide emitted.

Adaptation Strategies for Risk and Uncertainty: The Role of an Interdisciplinary Approach including Natural and Human Sciences

OKUMURA Makoto¹²

1. *Tohoku University, Japan*

2. *International Research Institute of Disaster Science (IRIDeS), Japan*

OKUMURA Makoto is a professor at Tohoku University. He is a Director Associate of the International Research Institute of Disaster Science (IRIDeS), and also in charge of the Center for Northeast Asian Studies (CNEAS), and the Department of Civil and Environmental Engineering. He received his Dr.Eng in Civil Engineering at Kyoto University (1991). He was a research associate and lecturer at Kyoto University (1987-1995), associate professor at Hiroshima University (1995-2006), and professor at CNEAS, Tohoku University (2006-2012). His major interests are intercity transportation and regional development, disaster mitigation and social response to natural disasters, humanitarian logistics, and evacuation transport. He is also interested in the effects of global warming on ice and water environments and social responses in Siberia and Bolivia. His major publications include: "A transportation telecommunication media split model considering complexity of interaction", in K. Kobayashi, T.R.Lakshmanan, W.P. Anderson (eds) *Structural Change in Transportation and Communications in the Knowledge Society* (2006); "Business Service Production Responsive to the Spatially Dispersed Stochastic Demands: Optimal Stock Location Model Approach", in Irene Bernhard (ed.) *Uddevalla Symposium 2008: Spatial Dispersed Production and Network Governance* (2008); "A rank-size rule of a firm, produced from a hierarchical branch office location model", *Review of Urban & Regional Development Studies*, Vol.22, 73-88 (2010). mokmr@m.tohoku.ac.jp

Abstract

The human and social response in Eastern Siberia to the possible changes induced by global warming is the main theme of the RIHN Siberia Project. This presentation explains why we must use an interdisciplinary approach including natural science and human sciences in order to tackle this theme.

The behavior of local society and ordinary people, especially indigenous peoples, is not directly based on the knowledge of modern natural science, but on local empirical knowledge or social norms, which also may have been collected, conceptualized and investigated by human and social scientists. Such empirical knowledge and social rules were not the product of theoretical thinking or optimal design, but of the accumulated pile of tacit knowledge inductively obtained and tested through interactions with other people in the society, other societies, and natural environment in a "trial and error" manner through time. If the effectiveness of such knowledge and rules has been tested only within the range of past environmental change, then we cannot be certain of their effectiveness and applicability in the future, especially in relation to the possible climate changes associated with global warming or to large changes in the social environment, for example in demography. In other words, empirical knowledge can be interpolated, but cannot be extrapolated.

In comparison, natural sciences such as mathematics and physics have a wider range of applicability and extrapolability. Even in novel case settings, we can simulate possible situations. When we execute a simulation, however, we must determine the range and step of time and space. At that time, natural scientists usually want to establish consistency and fit with the observed data. As a result, they pay attention only to the interpolation of known phenomena and exclude the possibility of never experienced or unexpected phenomena.

In order to investigate a society's capacity to adapt, we must encourage all scientists to take the risk of extrapolation. Natural scientists need not propose an accurate expectation in a certain setting, but should clarify the range of oscillation of nature and include the possibility that new phenomena will appear. Human and social scientists should investigate whether local knowledge includes any insight into the appearance of new phenomena or not.

Food and Health Risk and Watershed Management in South Asia

Roberto F. RAÑOLA Jr.^{1,2} and KADA Ryohei¹

1. *Research Institute for Humanity and Nature (RIHN), Japan*

2. *University of the Philippines Los Baños, the Philippines*

Roberto F. RAÑOLA, Jr. is a Professor of the Department of Agricultural Economics, College of Economics and Management, University of the Philippines Los Baños (UPLB). He received his Ph.D. in Agricultural Economics from the University of Minnesota (1984) and Masters in Development Economics from the Australian National University (1978). He was also a former UPLB Vice Chancellor for Administration (2005-2011). He served as Research Fellow of the International Rice Research Institute (1982-83) and Visiting Research Fellow of the Research Institute for Humanity and Nature, Kyoto, Japan (2013). His major research interest is in resource economics. Three of his related publications include “Land Use Options for Smallholder Farms in Philippine Grasslands”, *Journal of Agricultural Economics and Development*. Vol. XXVI Nos. 1 & 2, January-July, 1998 (ISSN 0300-1717), “Willingness to Accept Payment in Forest Management of Upland Farmers in Northwest Mountainous Region of Vietnam”, *Philippine Agricultural Scientist*, Vol. 94, No 1:46-53 (March,2011), “*Estimating the On-site Costs of Soil Erosion in the Philippines: The Opportunity Cost Approach*”, *Grassland Society of the Philippines Journal* 1(2):1-17.

KADA Ryohei is currently a professor at the Research Institute for Humanity and Nature. He joined RIHN as leader of the Food and Health Risk Project in July 2010. He also teaches at the Graduate School of Environment and Information Sciences, Yokohama National University. During 2001 and 2004, he served as Policy Research Coordinator at the Policy Research Institute, Ministry of Agriculture, Forestry and Fisheries (PRIMAFF), Japan. He has a long career of research and teaching at the Graduate School of Kyoto University, teaching agricultural and environmental economics and international food policy. Receiving B.S. and M.S. degrees in agricultural economics from Kyoto University, he obtained a Ph.D. degree from the University of Wisconsin-Madison in 1978.

Abstract

Laguna de Bay and its sub-watersheds in the Philippines provide a host of services vital to the communities living in and around its surroundings. However, as in many cases, natural and artificially induced disasters severely disrupt the way of life of the people living within the lake and its sub-watersheds. Similarly, the rate of ecological degradation heightens the risk of more flooding in already flood prone areas; introduce new flooding to areas previously not flooded; proliferation of infectious water-borne diseases in the communities and; induce massive eradication of marine biodiversity and aquaculture. As a result, agricultural food production-including aquaculture- centers and its subsequent supply chain are interrupted, while health related risks in the middle and low income classes are aggravated.

The major objective of the present study is to evaluate the effects of environmental degradation on food security among members of the communities in the Laguna Lake watershed areas that are dependent on its resources and the importance of managing environmental risks in watershed planning. It discusses the households' biophysical, socio-economic and other institutional circumstances with respect to utilization of land-based resources. It also looks into the incidence of household food insecurity and the major coping strategies employed by households to address their situation. The last part discusses the households' perceived risks from environmental degradation and the long-term adverse consequences on their family and the community as a whole.

Economic Development, Environmental Degradation and Public Health: The Case of Langat River Basin, Malaysia

Wai-Ching POON¹, Ashutosh SARKER¹, MASUDA Tadayoshi², Gamini HARATH¹,
and KADA Ryohei²

1. *Monash University Sunway Campus, Malaysia*

2. *Research Institute for Humanity and Nature (RIHN), Japan*

Wai-Ching POON is a senior lecturer at Monash University, Malaysia. She has 12 years of teaching experience. Her research interests include applied economics, Malaysian economy, inflation targeting, stock return volatilities, and oil price issues, E-services, E-Learning, and corporate governance. She has published in more than 40 refereed international journals. She has also authored two books about the Malaysian economy. She serves in the Editorial Reviewer Board of *Corporate Governance: An International Review (CGIR)*. She has served on the research grants assessment committee in Monash, and was honoured to serve as research grant expert for the Malaysia Competition Commission (MyCC). She has received 9 research and 5 teaching awards, including: i) Best Reviewer Prize Award 2012 for CGIR; ii) Best Research Paper Award in the International Congress on Innovation and Regional Economic Development 2012; iii) Best Paper Award in The Academy of International Business 2010; iv) PVC's Award for Excellence in Research in 2012 ; and v) Dean's Commendations Award for Best Publications in 2008 in Multimedia University, Malaysia. In recognition of her contribution to teaching and research, she has received numerous certificates of achievement in teaching excellence, including: i) Department of Economics Teaching Award for Outstanding Unit Evaluations for Managerial Economics in 2009 & 2011 by Monash University Australia; ii) honoured 5 rounds of Pro-Vice Chancellor's (PVC) Award for Excellence in Teaching, 2009-2011. poon.wai.ching@monash.edu

Abstract

Environmental degradation has become a central issue of discussion among economists and environmentalists. Food and health security are vital and linked components of human wellbeing. Misuse or overuse of human activities, such as discharge of industrial and household effluents into rivers contaminates water and aquatic resources, cause food-health security problems. This study examines the linkage between water, food and health security issues in Langat River Basin, Malaysia. We explore the extent to which degradation of river water quality and fish quality can influence food security. Results suggest that awareness of the relation of food security to water quality is not high, especially among people in the rural areas. Food security and water pollution should be emphasized in the agenda of National Key Economic Areas of Malaysia. There is a need to enhance knowledge on food security and water quality through education of the less literate low income groups in Malaysia.

The Effects on Household Food Security and Health of Transient Displacement due to Flooding Events in Communities in the Silang-Santa Rosa Sub-Watershed Area: A Venue for Trans-Disciplinary Management

Noel R. JUBAN¹, Amiel Nazer C BERMUDEZ², Leah A PALAPA²,
Nikolas Leandro R DAGUNO², Paul Jeshimon L de LEON²

1. *University of the Philippines Manila, the Philippines*

2. *Health Futures Foundation, Inc., the Philippines*

Noel R. JUBAN is a professor in the Department of Clinical Epidemiology and the Department of Family and Community Medicine at the College of Medicine of the University of the Philippines (UP), Manila. He received his undergraduate degree in Psychology at UP, Diliman in 1981. Subsequently, he received his medical degree and Master of Science in Epidemiology (Clinical Epidemiology) degree at UP, Manila in 1986 and 2000, respectively. He received numerous post-graduate trainings, in and out of the country, on various fields related to epidemiology such as disease surveillance and screening, narrative-based medicine, and evidence-based medicine. He served as Director of the Institute of Clinical Epidemiology at the National Institutes of Health (2003 - 2013) and as Chair of the Department of Clinical Epidemiology of the UP College of Medicine (2004 - 2013). He is involved in various research projects with local and international agencies, specifically those related to health programs, health policies, and health systems. One of his latest research projects is the Lake HEAD Project ("Managing Environmental Risks for Sustainable Food and Health Security in Watershed Planning in Lake Laguna Region") with the Research Institute for Humanity and Nature, UP Los Banos and the Laguna Lake Development Authority. His most recent papers include: "Use of community development process in developing post-disaster assessment tools", co-authored with Lam and Go, *The Southeast Asian Journal of Tropical Medicine and Public Health*, vol. 40, Supplement 1 (2009); and "Knowledge, attitudes and practices of person with Type 2 Diabetes in a rural community: Phase 1 of the community -based Diabetes Self-Management Education (DSME) Program in San Juan Batangas, Philippines", co-authored with Ardena, Paz-Pacheco, Jimeno, Ang and Paterno, *Diabetes and Clinical Practice*: 9(2),(2010). noeljbn@yahoo.com

Abstract

The direct and indirect health effects of extreme climactic conditions can illustrate the linkage between the environment and human health, including changes in food availability and food access, increasing incidence of communicable diseases and injuries, and exacerbation of chronic illnesses. In the Philippines, 28 flooding events affecting 244,956 households were reported in 2010 alone. This paper addresses changes in food security and common illnesses in households displaced by flooding events. Baseline and post-disaster data were obtained from 360 households in 11 communities randomly selected based in the Silang-Santa Rosa Sub-watershed area. The prevalence of food insecurity at baseline and post-disaster were 34.17% and 19.44%, respectively. From 237 (65.83%) households that were food secure at baseline, 33 (13.92 %) became food insecure post-disaster. From 123 (34.17%) households that were food insecure at baseline, 37 (30.08%) remained food insecure while 86 (69.92%) became food secure post-disaster. These changes were statistically significant for both groups, implying the food security status changed significantly post-disaster. Thirty-four households (or 9.44%) were displaced after the flooding event. Food security status changed significantly when households were stratified according to displacement. Of the 11 displaced households that were food secure at baseline, one became food insecure post-disaster. Of 23 displaced households that were food insecure at baseline, 13 became food secure post-disaster. Most common illnesses among displaced households include cough (5, 1.30%), fungal infections (5, 1.30%), upper respiratory tract infection (3, 0.78%), fever (2, 0.52%) and diarrhea (2, 0.52%). The relatively low prevalence of illnesses and the apparent improvement in food security status may be associated with improved and integrated disaster preparedness and response local and national management plans already in place. Further, with information from geospatial analysis of exposures, resources and outcomes, and the concept of ecological diseases, response strategies can be developed with another perspective on causality, risks, and of course, mitigation.

Yaman ng Lawa Social Action Agenda: The “Yankaw Fish Garden Sanctuary”

Rogelio N. CONCEPCION¹, KADA Ryohei², Eufrocino GUERERRO³, Cynthia BUEN⁴, Benjamin Franco GAON⁵ and Roxanne BANALO⁶

1. *University of the Philippines Los Baños and “Yaman ng Lawa” LakeHEAD Project, the Philippines*
2. *Research Institute for Humanity and Nature (RIHN), Japan*
3. *Calamba City Agriculturist Office, the Philippines*
4. *Calamba City Agriculturist Office, the Philippines*
5. *Calamba City Yankaw Fish Garden Project, the Philippines*
6. *Calamba City Yankaw Fish Garden Project, the Philippines*

Rogelio N. Concepcion is a professorial lecturer at the University of the Philippines. He received his MPS (Soils) and PhD (Agronomy and Landscape Architecture) at Cornell University, Ithaca, New York (1979-1981). He is currently a consultant in various climate change projects of the World Bank, GTZ, and FAO in the Philippines. He was formerly the director of the Bureau of Soils and Water Management, Department of Agriculture (1996-2007), regional advisor El Nino Project (2001-2001), philippine focal person of the U.N. Convention for Desertification and Drought (1994-2007). His major publications include: “Coping with El Nino for Stabilizing Rainfed Agriculture: Lessons from Asia and the Pacific”, Co-edited with Shigeki Yokoyama, CGPRT Centre, Monograph 43, (2002); “Philippine Strategy on Climate Change”, Sectoral Report for Agriculture, ACCBio Project, GTZ, (2010); “Sustainable Fertilization Management of Croplands: The Philippine Scenario”, FAO, (2002); “A quantitative land evaluation technique for rainfed agriculture in a developing country (the Philippines)”.

Abstract

The Yaman ng Lawa (YNL), or “Blessing of the Wealth in the Lake”, is a social action validation research for making traditional knowledge science-based. The YNL Yankaw Fish Garden Sanctuary Project is a participatory grassroots action research conducted by LakeHEAD, leaders of 10 fishing villages, local government offices of Calamba City and the Laguna Lake Development Authority. The Yankaw Fish Garden Sanctuary established 24 individual “bubo” (habitats), each serving as artificial reef made from branches of a leguminous tree locally known as camachile (*Pithecellobium dulce*). Researchers reported that camachile contains tannin which calms some fish and can induce spawning. Recorded data includes: a) weekly measurements of DO and ORP (August, 2013) of 90 water and sediment samples; b) record of fish harvest from Yankaws; c) daily open water fish catch measurements over six months, as a project bench mark; and d) recorded colonization of Yankaw by lake plants digman (*Hydrilla verticillata*), the first bio-signal for clean waters and restored fish habitat. The project has laid the basis for sustainability of the Yankaw Fish Garden Sanctuary by developing community-based tools for restoring lake habitat to improve fish populations and harvest as stop-gap measure to restore fishing livelihood and income losses. An early warning system for fish kill is not yet developed for use by the local communities.

CHAIRS & RAPPOTEURS

*alphabetical order

ABE Ken-ichi

ABE Ken-ichi is a professor at RIHN. His areas of specialization are Asia Area Studies and Environmental Anthropology. Based on repeated fieldwork, he has written and edited a number of books, including “Extreme Conflicts and Tropical Forests” (2007, Springer), and “Good Earths: Regional and Historical Insights into China's Environment” (2009, Kyoto University Press). He has been the head of the Communication and Production Unit since he joined RIHN in 2008. *abek@chikyu.ac.jp*

HIYAMA Tetsuya

Prof. HIYAMA Tetsuya's specialties are ecohydrology and hydrometeorology. At the Research Institute for Humanity and Nature he is the project leader of the research project entitled “Global Warming and the Human-Nature Dimension in Siberia: Social Adaptation to the Changes of the Terrestrial Ecosystem, with an Emphasis on Water Environments”. He is interested in vulnerability assessment of shallow groundwater, especially in permafrost regions affected by global warming. He is also interested in Atmospheric Boundary Layer (ABL) meteorology and terrestrial-climate interactions, especially energy/water/carbon exchanges. Eastern Siberia is the most important region for his field research, and he has conducted field observations of the ABL over several regions including Eastern Siberia for around twenty years.

Hein MALLEE

Hein MALLEE is a social scientist with a Ph.D. from the Leiden University, the Netherlands. He has been with the Research Institute for Humanity and Nature since March 2012. He has worked in development research and practice in different Asian contexts since 1997. He has been a Senior program specialist with Canada's International Development Research Centre from 2004 to 2012, working on rural development, poverty, community-based natural resources management and ecohealth in Southeast Asia and China. Prior to joining IDRC, he worked with the Netherlands government and the Ford Foundation on poverty alleviation in China. He has published about migration and rural development, migration policy, and natural resources management.

MASUDA Tadayoshi

MASUDA Tadayoshi is a senior project researcher at RIHN and serves as sub-leader in the international and trans-disciplinary research project “Managing Environmental Risks to Food & Health Security in Asian Watersheds.” Through the project he has conducted several analyses including cost-benefit analysis of multi-crop agroforestry system and impact evaluation analysis of food-health risk. He also coordinates researchers from different disciplines and communicates closely with local stakeholders in order to facilitate the project. His research interests include the global food chain as well as the role of agribusiness in contributing to regional welfare, and his work has been published

in academic journals. Dr. Masuda acquired a Ph.D. in Agricultural & Resource Economics from the University of Hawaii (2007), M.A. in Food Research/International Development Policy from Stanford University, CA (2001) and B.S. in Agricultural and Forestry Economics from Kyoto University, Japan (1989).

Steven R. MCGREEVY

Steven R. MCGREEVY is an assistant professor at RIHN and has a background in agriculture and rural sustainable development from Kyoto University (PhD. 2012). His research focuses on novel approaches to rural revitalization that utilize local natural resources, sustainable agrifood and energy transition, and the relinking of patterns of food consumption and production in local communities. He is an executive member of the Japan Biochar Association and has been supporting Carbon Minus Projects— multi-stakeholder schemes that involve the eco-labeling of produce grown on agricultural lands applied with biochar, sequestering carbon in the process. He is currently proposing a RIHN Feasibility Study for an Initiative-based project entitled “Lifeworlds of Sustainable Food Consumption: Agrifood Systems in Transition.” Notable publications include: *Lost in Translation: Incomer organic farmers, local knowledge, and the revitalization of upland Japanese hamlets* (Agriculture and Human Values 2012); *A Rural Revitalization Scheme in Japan Utilizing Biochar and Ecobranding: The Carbon Minus Project, Kameoka City* (Annals of Environmental Science 2010; co-authored with Akira Shibata); and “Mobilizing biochar: A multi-stakeholder scheme for climate-friendly foods and rural sustainable development” (*In Geotherapy: Innovative Methods of Soil Fertility Restoration, Carbon Sequestration, and Reversing CO² Increase*, ed. By Tomas Goreau, Ronal Larson, and Joanna Campe; co-authored with Akira Shibata).

Moamer Eltayeb Ali MOHAMED

Moamer Eltayeb Ali MOHAMED is an assistant professor in the Faculty of Marine Sciences and Fisheries (FMSF), Red Sea University. I received my M.Sc and Ph.D in Environmental Studies at the University of Khartoum (1997 and 2011). I was teaching assistant at the Red Sea University (1997-2001), lecturer at the Red Sea University (2001-2009), assistant professor at the Red Sea University (2009-2013), and finally dean of the Faculty of Marine Sciences and Fisheries, Red Sea University (2006-to present). My major field of interest is marine ecology and climate change. My recent publications include “Management and Conservation of Marine Biodiversity in Sudan”, *Marine and Coastal Ecology* ((2012), “Fish Trade Related Activities” (2012), “Vulnerability & Adaptations to Climate Change in the Sudanese Red Sea Coast” (2011), “Coastal Zone Adaptation Issues in the Sudanese Red Sea Coast” (2011), “Coastal Vulnerability to Climate Change Impacts in Sudanese Red Sea Coast” (2010), “Living Marine Resources, Economics and Marketing” (2010), “Key Problems Associated with Climatic and Socio-Economic Changes in the Red Sea Coast of Sudan” (2010). *moamerb@yahoo.com*

Mahgoub Suliman MOHAMEDAIN

Mahgoub Suliman, MOHAMEDAIN is an assistant professor at the College of Forestry and Range Science, Sudan University of Science and Technology. He received his PhD in forestry and remote sensing application in 2009. His major field of interest is remote sensing and GIS for natural resources management. His major publications include “Estimation of forest variables using remote sensing

and GIS: case study of nabag forest-South Kordofan, Sudan”, J. Agric. Soc. Sci., 8: 62–64 (2012); “Case study of Darfur crises” presented at World Food System –A Contribution from Europe- September 14 - 16, 2010, Zurich, Switzerland, (2012); “Evaluating the invasion strategic of the mesquite (*Prosopis juliflora*) in Eastern Sudan using remote sensing techniques”, Journal of Arid Land Studies; 22-1, 1-4, (2012). *mahgoubsul@yahoo.co.uk*

MORI Soichi

MORI Soichi is a policy analyst for research and development at the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and also a visiting professor at the Research Institute for Humanity and Nature (RIHN) and Graduate School of Environmental Studies at Tohoku University. He worked for the OECD Nuclear Energy Agency on the issues following the Chernobyl Nuclear Accident as a secretariat for the committee on probabilistic risk assessment. He was also involved in establishing the Earth Science and Technology Organization and worked as director for planning in the post-COP3 years. Immediately after the Great East Japan Earthquake, he joined in MEXT's National Institute of Science and Technology Policy as senior fellow. He has a wide and clear perspective on issues relating to environment and sustainability based on his trans-sectorial carrier and experience as governmental administrator and science policy maker/researcher.

NAWATA Hiroshi

NAWATA Hiroshi is a professor of Akita University. He received his PhD in Human and Environmental Studies (Cultural Anthropology) at Kyoto University (2003). His major field of interest is cultural anthropology in the Middle East and Africa. His major publications include: “Meeting point of the Yellow belt and the Blue belt: Coastal zone of the arid tropics as corridors of early human dispersal out of Africa”, in Environmental History of the Yellow Belt, Y. Sato. and M. Taniguchi, eds., Koubundou, Kyoto, Japan (2013, in Japanese); “A view at the top of oil era: What have we lost and what should we preserve?”, and “A viable future lifestyle without oil”, in Human Resource and Engineering in the Post-Oil Era: A Look at Viable Future Societies in Japan and Oil-Rich Countries, S. Ishiyama and H. Nawata, eds. RIHN series. Showado, Kyoto, Japan (2013, in Japanese). *nawatahiroshi@hotmail.com*

Daniel NILES

Daniel NILES is a human-environmental geographer (Ph.D. Clark University 2007). With initial research interest in what people mean, and the landscapes they envision, when they talk about ‘sustainable agriculture’, he has more recent research interest in the concepts, tools and spaces that can enable transformation in interactions between humanity and nature. Early fieldwork took place largely in southern Mexico but he has broadened his horizons since serving as visiting researcher at the National Museum of Ethnology (Osaka, Japan) in 2008, and as assistant professor at RIHN. His most recent publication is *Asia: proving ground for global sustainability* (with T. Yasunari, M. Taniguchi, and D. Chen, in Current Opinion in Environmental Sustainability, 2013).

OTSUKA Kenji

OTSUKA Kenji is senior research fellow in the Environment and Natural Resource Studies Group at the Interdisciplinary Studies Center, Institute of Developing Economies (IDE), JETRO, Chiba Japan. He received his MS in environmental science at Tsukuba University. His research interests are in the fields of environmental issues, policies, and social change in China. He has been organizing a joint research project on environmental governance in China for many years and conducted a pilot research project of community roundtable meetings to promote dialogue among local residents, enterprises and government in Taihu Lake Basin with his counterparts from 2008 to 2011.

Sudhindra Nath PANDA

Sudhindra Nath PANDA currently works as a visiting professor at the Arid Land Research Center in Tottori University. He received his M.Tech (1982) and Ph.D. (1992) in soil and water engineering at Punjab Agricultural University (PAU) in Ludhiana, India. He has been working as a professor in the agricultural and food engineering department at the Indian Institute of Technology (IIT), Kharagpur, India since 2004. His research interests are in systematic approaches to integrated land and water resources planning and management, rainwater conservation and reuse for sustainable rainfed agriculture, application of geo-informatics and software computing tools for watershed/ flood management, climate forecasting and catchment simulation modeling, and DSS for rainwater management and flood frequency analysis. *snp@iitkgp.ac.in or sudhindra.n.panda@gmail.com*

Bam H.N. RAZAFINDRABE

A forest engineer by training, Dr. Bam H.N. RAZAFINDRABE has worked for the University of Antananarivo and the Geographical Information and Environmental Sciences Training Centre in Madagascar. He came to Japan for his postgraduate studies in 2000. After completing his Ph.D in 2007 (Disaster Risk and Watershed Management), he has worked for various organizations in Japan, including Kyoto University, Yokohama National University, and the Research Institute for Humanity and Nature. He is currently Associate Professor at the University of the Ryukyus, Japan.

SATO Tetsu

SATO Tetsu is a professor and Deputy Director-General at the Research Institute for Humanity and Nature (RIHN), Japan. He received his Doctor of Science degree from Sophia University, Tokyo (Behavioral Biology, 1985). He was an associate professor at Department of Biology, University of Malawi, Republic of Malawi (1997-), conservation director of WWF Japan (2001-), a professor of ecology and environmental science at Nagano University (2006-), a professor at RIHN (2012-present) and Deputy Director-General at the RIHN (2013-present). His major field of interests is creating scientific knowledge bases for sustainable development and community-based management of ecosystem services. He also led a project to create a network of local scientists producing Integrated Local Environmental Knowledge, and is currently serving as the project leader of RIHN initiative-based project entitled "Creation and Sustainable Governance of New Commons through Formation of Integrated Local Environmental Knowledge (ILEK project)". His recent research publications relate to the scientific bases for community-based management of local social-ecological systems. *tetsu@chikyu.ac.jp*

TAKAKURA Hiroki

TAKAKURA Hiroki is a social anthropologist whose main concerns are human-animal relationships, indigenous affairs, and climate change. Now he engages with the cross-cultural visual exhibitions and disaster recovery projects related to the March 11 Tohoku Earthquake. His recent publication includes the book *Arctic Pastoralist Sakha: Siberian ethnography of evolution and micro-adaptation* (in Japanese, 2012) and “The shift from herding to hunting among the Siberian Evenki”, *Asian Ethnology* (2012). Dr. Takakura received his Ph.D. in social anthropology from Tokyo Metropolitan University (1999). He was a visiting scholar at the Scott Polar Research Institute, University of Cambridge (2003-2004), and now Professor at Center for Northeast Asian Studies, Tohoku University. *brk@m.tohoku.ac.jp*

Sander VAN DER LEEUW

Sander VAN DER LEEUW received a B.A. in history, an M.Litt in medieval history and prehistory, and a Ph.D. in prehistory from the University of Amsterdam. He has held two Fulbright scholarships as well as visiting positions at Australian National University, the Universities of Paris, Chicago, Modena (Italy), the Santa Fe Institute, and most recently at the Research Institute for Humanity and Nature in Kyoto, Japan.

He is the founding director of the School of Human Evolution and Social Change at ASU, and he has just resigned as the dean of Arizona State University's School of Sustainability, the first of its kind, where he turned interdisciplinary theory into use-inspired research. He is currently co-director of ASU's Complex Adaptive Systems Initiative.

Prior to joining ASU, van der Leeuw conducted archaeological and environmental studies in the Near East, the Philippines, Syria, Holland, France, and Mexico. An expert in complex adaptive systems, he coordinated a series of interdisciplinary research projects on socio-environmental co-evolution and human-nature interactions in all the southern countries of the European Union. Van der Leeuw's interests currently focus on the role of invention, innovation and sustainability in societies around the world. He investigates how invention occurs, what the preconditions are, how the context influences it, its role in society, and how it leads to sustainability challenges.

A native of Holland, he is a corresponding member of the Royal Dutch Academy of Arts and Sciences and an external professor at the Santa Fe Institute. In 2012, the United Nations Environment Program named van der Leeuw the “Champion of the Earth for Science and Innovation” for his work on human-environmental relations.

YASUNARI Tetsuzo

YASUNARI Tetsuzo is Director-General of the Research Institute for Humanity and Nature. He received his D.Sc. in Meteorology & Climatology at Kyoto University in 1981. He is a distinguished scientist in the fields of meteorology, climatology, and climate systems studies. He served as a member of the Joint Scientific Committee of WCRP. He has been working as SSC member of the ESSP/MAIRS (Monsoon Asia Integrated Regional Studies), now serving as vice-chairman. He is a council member of the Science Council of Japan, and chairman of the joint Japan national committee for IGBP, WCRP and DIVERSITAS. He has just been elected a member of the first Science Committee for Future Earth, and a chairman of Future Earth committee under the Science Council of Japan. He has published about 200 scientific papers and books.