

# Responding to Risk: Perception and Decision Making

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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](mailto: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.

## Keynote Address

# The Research Challenge from Global Risks

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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

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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](mailto:dooly_501@yahoo.com) [dooly252@gmail.com](mailto: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 km<sup>2</sup>) 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

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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

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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

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## 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

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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](mailto: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

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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)

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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

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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

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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](mailto: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.<sup>1,2</sup> and KADA Ryohei<sup>1</sup>

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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

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## 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

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## 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”

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## 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.

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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*

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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.

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