

# The Common Property Resource Digest

NO. 73 QUARTERLY PUBLICATION OF THE INTERNATIONAL ASSOCIATION FOR THE STUDY OF COMMON PROPERTY June 2005

This issue of the CPR Digest presents a **Regional Beat** on the **Circumpolar North**. The information presented is drawn from recent activities of “Working Group 10,” of the Second International Arctic Science Planning Conference, as members prepared a “research plan” for review by conference attendees and the greater community. The focus of Working Group #10 is the problem of rapid change in the Arctic and recent efforts to understand sustainability through an analysis of resilience and vulnerability of social-ecological systems. Members of IASCP may recall that the problems of northern common property were previously highlighted at the second IASCP conference in Winnipeg, Manitoba (1991), and the fifth IASCP conference held in Tromsø (1995). As readers will find in these pages, many of the issues in managing the Northern commons are today similar to those previously discussed, although significant new issues facing the North require new ways of approaching research.

We would like to draw your attention to an announcement of the passing of **Dr. Phaniel Mugabe**. Dr. Mugabe was, until this year, the chair of the University of Zimbabwe’s Centre for Applied Social Sciences (CASS) and an instrumental figure in commons resource management and research in Southern Africa.

We also announce the Eleventh Biennial Global Conference of the International Association for the Study of Common Property: Survival of the Commons: Mounting Challenges and New Realities, June 19-23, 2006, Bali, Indonesia. Hope to see you there. **Enjoy!**

CONTENTS	
<b>CPR FORUM: Arctic Research Planning</b>	
<b>Arctic Regional Beat</b>	
<b>A Research Plan for the Study of Rapid Change, Resilience, and Vulnerability in Social-Ecological Systems of the Arctic.</b> <i>Gary Kofinas</i> .....	<b>1</b>
<b>Dr. Phaniel Mugabe</b> .....	<b>5</b>
<b>Recent Publications</b> .....	<b>11</b>
<b>Announcements</b> .....	<b>14</b>

## REGIONAL BEAT Arctic CPR FORUM COMMENTARY

### **A Research Plan for the Study of Rapid Change, Resilience and Vulnerability in Social-Ecological Systems of the Arctic**

**Gary Kofinas**

**University of Alaska Fairbanks (USA)**

**Chair, Working Group 10, Second International Arctic Science Planning Conference**

### **International Arctic Research Planning**

How can research best address the challenges of Arctic sustainability in a world of rapid change? What determines the limitations of adaptation when a system is approaching a critical threshold? What are the social-ecological consequences when critical thresholds are crossed and new conditions emerge? How best do we frame the analysis of vulnerabilities? How can we best structure human institutions and social organization to build resilience and facilitate adaptation in conditions of rapid change? And how should Arctic residents engage in this research?

These questions reflect a broad set of issues that motivated our group to gather in Vancouver, Canada this past April, 2005, and begin developing an international research plan to explore issues of rapid change and

# The Common Property Resource Digest

*Published with support from  
the Ford Foundation*

*Editor*

Douglas Clyde Wilson  
*Assistant Editor*  
Alyne E. Delaney



## International Association for the Study of Common Property

### Current Officers

President: Narpat Jodha  
President Elect: Owen Lynch  
Immediate Past President: Erling Berge

### Council

Doris Capistrano Ruth Meinzen-Dick  
Leticia Merino Calvin Nhira  
Dianne Rocheleau Andy White

<b>Executive Director</b>	Michelle Curtain
<b>CPR Digest Editor</b>	Doug Wilson
<b>Information Officer</b>	Charlotte Hess

### Conference Coordinators

#### 2005 Regional Meetings

Pacific Region John Sheehan

© 2000 IASCP

[WWW.IASCP.ORG](http://WWW.IASCP.ORG)

sustainability through an analysis of resilience and vulnerability of Arctic social-ecological systems. We are one of several working groups preparing for the upcoming Second International Conference on Arctic Research Planning (ICARP-2), scheduled to take place in Copenhagen in November 2005. Our draft research plan, modified for this issue of The Digest, is intended to stimulate discussion among the northern researcher community and arctic residents about the key themes worthy of study.

Our definition of the Arctic is aimed at capturing the social, economic, political, and ecological processes that are critical properties for the functioning of the Arctic System. Thus, we do not limit the definition of Arctic to more restrictive definitions, such as that region north of the Arctic Circle or north of tree line, but view it as a region integrated within the Global System.

### A Rapidly Changing Arctic

Our concern for rapid change in the Arctic is hardly novel. Indeed, change has been a central theme in Arctic research for decades. Much of the research in the North during the post WWII era focused on social and environmental change, and was related to the impacts on northern society. In retrospect we note how centralized institutions controlled by governments to the South and with policies of colonialism, promoted an open access view of the Northern Commons, putting Arctic resources and people at risk. In many respects, these colonialist views contributed to the dramatic transformation of northern indigenous cultures and modified the Arctic environment during the last five decades. Ironically, early social anthropology of the Arctic of this era (and before) highlighted the highly adaptable characteristics of traditional indigenous Arctic cultures, through their geographic mobility, opportunistic forms of subsistence hunting and gathering, and flexible forms of social organization. Today the characterization of Arctic Indigenous Peoples as exceptionally resilient persists, yet the forces for change and overall conditions in the North of today suggest the need to move beyond the focus on people as adaptive, and focus on the co-evolution of social systems and ecosystems to understand the implications of rapid change.

Today in most regions of the North, permanent human settlements have replaced hunter-gather nomadism, rigid political boundaries delineate jurisdictions where soft borders were once the tradition, local mix cash-subsistence economies are well integrated and highly dependant upon central government transfer payments,

and processes of economic globalization extend to the most remote settlements. These conditions are also coupled with a suite of relatively new regional- to international-level institutions that in some cases convey significant local control in governance, a voice in international affairs, and a strong and growing sense of indigenous identity. What is novel in the current situation is a suite of unprecedented and mostly external drivers of change currently observed throughout the Arctic. These include climate change, extensive changes in human land-use, as well as political, cultural, and economic change. In spite of these changes, most Arctic rural residents retain a close relationship with land and resources and remain highly dependant on them for food resources.

Three recent international summary reports highlight the extent of change in the Arctic, each developed as projects of the Arctic Council, an international body that coordinates Arctic initiatives and makes policy recommendations on key northern issues. Of these reports, The Arctic Climate Impact Assessment (ACIA) was based on the contributions of 178 scientists, and focused on the accentuated effects of climate change and increased ultraviolet radiation in the more northern latitudes (see <http://www.acia.uaf.edu/>). Climate trends in the North show a dramatic increase in mean annual temperature from 3 to 4 degrees centigrade in some regions, which is nearly twice that of other regions of the world. Gross-level landscape responses include the melting of permafrost and glaciers and changes in hydrological processes that are affecting ground cover vegetation, humans exploration for hydrocarbons, and some regional economies. In several cases, climate change has shifted the distribution of some keystone species (e.g., moose and some fish), making hunter access to traditionally used resources more risky and difficult, while making other species more available. Climate change has also been shown to extend the life cycle and geographic range of certain parasites affecting wildlife, and more importantly, has caused some species, such as polar bear and Peary caribou to be at serous risk.

A warmer and dryer North is also associated with an overall increase in the number of wildfires with implications to ecosystem services to those dependent on the northern forest, and increased storm surges in coastal areas. The current rate of coastal erosion has already forced some Alaskan residents to begin assessing options for costly village relocation. The most dramatic issues raised in ACIA come from model projections of an ice-free Arctic for the coming decades. An ice-free Arctic would open new northern shipping trade routes (e.g., The Northwest Passage), bring significant economic activity to

coastal regions both on the sea and the land, and create new risks (e.g., oil spills) and a potential need for Arctic marine protected areas. Such areas would likely lead to internationally contested claims for property and struggles to assert local harvesting rights. And while the impacts of a rapidly warming Arctic are important to the North, they also have implications to the Global System, by modifying ocean salinity and currents and reducing current rates of uptake in global greenhouse gases.

A second report The Arctic Human Development Report (AHDR) complemented ACIA by examining conditions of human well being throughout the Circumpolar North and providing a review of the region's diverse and complex geopolitical and social economic dimensions (see <http://www.svs.is/AHDR/index.htm> ). Overall, the Arctic remains a region of sparse population (~4 million people total), with relatively strong indigenous cultures, pristine ecosystems, and a narrowly based economy. As noted in AHDR , the continued interest in exploitation of northern resources is bringing an increase in human infrastructure, an expansion of the human footprint; and in many cases, this comes with inadequate environmental policies for assessing impacts and land- and sea-use planning. Human in and out migration trends show a modest overall increase in population of the North and a greater urbanization, with an increase in outflow of residents and shift in several regions from the tundra dwelling to cities. If the current trend of urbanization continues, it is likely to lead to an increased demand for harvested fish and wildlife resources and thus, future challenges to rural and indigenous subsistence harvesting rights. The trends also show an ongoing loss of indigenous language and an overall transformation of former traditional ways of living.

In Russia where about 15,000 people continue to live a nomadic way of life, the problems of rapid change are striking. The collapse of the Soviet Union highly centralized political system reduced and in some cases eliminated support for residents in northern hinterland regions, leaving many residents in dire conditions with limited opportunities for improvement. In many parts of Arctic Russia and other regions, northern people struggle with poor living conditions, limited political rights for self determination, and problems associated with general social dysfunction, such as alcoholism and suicide. However, the Arctic also provides a multitude of examples of institutional innovation through devolution and community tate power sharing, such as the many long-standing co-management regimes for Marine Mammals in Alaska, the newly implemented system of governance for

Nunavut in Canada, and the implementation of Home Rule in Greenland. In spite of these innovations, AHDR recommends the need to study more carefully the effectiveness of these institutions in the face of rapid change. Perhaps one of the most striking statements of AHDR is its attention on global-to local level processes, and its concern that global environmental and social changes may overwhelm efforts to implement regional initiatives successfully.

A third report, *Reindeer Herding and Hunting Economies, and the Status and Management of Wild Reindeer/Caribou Populations*, presents a summary on social-ecological change and its feedback effects as related to a particular resource (see <http://www.sami.uit.no/srh/>). The report shows that the collapse of the Soviet Union eliminated many of the government maintained markets for reindeer meat, which reduced traditional herding activities, and later led to an increase in wild reindeer populations. These conditions contrast with Alaska where an increase in the Western Arctic Caribou herd led to an expansion of the herd's range, which overwhelmed domestic reindeer on the Seward Peninsula and dramatically affected the viability of commercial herding. What is noteworthy about both of these cases is how social and ecological feedbacks contributed to the crossing of critical thresholds, which in turn, dramatically transformed the system and led to a new set of problems.

What emerges from all three of these reports is an image of the Arctic as highly dynamic and closely coupled to the external (non-Arctic) environment. Moreover, we suggest that the current rate and direction of change raise questions about how various forces for change will interact and affect the capacity for human adaptation. These conditions also point up questions regarding which variables ultimately govern the fundamental properties of the Arctic System and what is the potential of humans and or climate change to modify those processes in an environment of low biological diversity, limited human and material resources, and limited political and economic autonomy.

### **Social-Ecological Systems as Units of Analysis**

Addressing these questions clearly requires that ecological, economic, and social dimensions be considered in an integrated fashion. The IASCP has for years been on the forefront in developing interdisciplinary approaches in the study of common property systems and sustainability, yet the challenges of doing research in conditions of rapid change in the Arctic (and in other regions) make for special analytical problems and a rethinking of several commonly held assumptions, such as conditions of equilibrium, linearity of change, immediate systemic response.

In our effort to achieve sufficient holism in the analysis of rapid arctic change, we considered how the idea of coupled "social-ecological systems" may serve as our primary unit of analysis, and an interdisciplinary program of northern research can be initiated that builds on recent theoretical development in resilience theory. Here, the focus on social-ecological systems is an effort to make explicit the linkages between human societies and ecosystems. Using these ideas, we argue the need to identify the feedbacks among social and ecological aspects of the system, understand the complex properties that govern these processes, anticipate possible surprises, and appreciate better the implications of rapid change and its novel conditions to human well-being.

We also embark on this enterprise with the assumption that sustainability is a dynamic normative construct that is inextricably tied to human purposefulness and human-defined targets. Recent research in North American Arctic communities identified five sustainability goals including: 1) Use of, and respect for, the land and animals in their homelands; 2) A cash economy that is compatible with, and supports, continued local use of the land, sea, and animals; 3) Local control and responsibility for what is done in village homelands and what happens to resources used by the community; 4) Education of younger people in both traditional knowledge and western science, and education of the outside world about community goals and ways of living; 5) A thriving culture that has a clear identity, is based on time on the land and respect of elders. Similarly, interviews conducted by the Russian Association of Indigenous Peoples of the North (RAIPON) of 400 indigenous residents throughout the Russian North, Siberia, and Far East identified five dimensions of sustainability, including spiritual, social, economic, environmental, and legal elements. While the underlying values and targets of sustainability may differ among individuals and culture groups, and may change through time, Arctic residents are highly dependent upon ecosystem services, which in turn are critical to human development. For this reason, it is important to clarify human values and to ascertain the interrelated links between sustainable ecosystems services, human development, and social institutions that foster resilience. While focusing on social-ecological systems and their relationships to resilience may provide insights for successful adaptation, we must also break new theoretical and methodological ground to understand better the processes of social learning, the limits to mitigation, and the time scales and rates of change that are critical.

## Key Concepts in the Study of Resilience and Vulnerability of Arctic Social-Ecological Systems

The focus of our working group on resilience, vulnerability, and adaptation follows from recent contributions by interdisciplinary scholars who approach questions of sustainability with the assumption that systems have inherently complex and on-going dynamic processes (see The Resilience Alliance, [http://www.resalliance.org/ev\\_en.php](http://www.resalliance.org/ev_en.php)). Resilience is defined here as the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity and feedbacks. A resilient social-ecological system can withstand shocks and rebuild itself, and may undergo those changes incrementally and or through dramatic modifications. Thus, the concept of resilience provides a way of studying how systems persist, transform themselves, or collapse. While several studies have applied resilience theory to northern case studies, a systematic and comprehensive application in Arctic research has not been undertaken.

The boundaries of coupled social-ecological systems are defined by the specific problems and subsystems being addressed in research. For example, the analysis on the effects of rapid change on subsistence in local communities would include global climate trends and their effects on ecosystems, those ecosystems from which subsistence resources flow, hunting and herding patterns and access to resources, the community's wage economy and its contribution to the support of hunting along with its impacts of ecosystems, a group's sense of identify as hunters and herders, their local knowledge of resources, institutions that support the tradition of sharing, the

### *In Memory of Phanel Mugabe*

**Phanel Mugabe** died the 10th of July 2005. He obtained his B.Sc degree in Political and Administration Studies at the University of Zimbabwe, his PhD in Rangeland Ecology and Management (Texas A & M University, 1999), and had an extensive career in government before joining the Centre for Applied Social Sciences (CASS) at the University of Zimbabwe in 1994. 1999-2005 he was CASS chairman, during which time CASS hosted the IASCP conference at Victoria Falls. He offered technical assistance to rural communities on generating incomes through wildlife conservation with projects in ecotourism and safari operations and he carried out research in Southern Africa on common resource management. During the last few years of his life he strove to maintain the regional and international networks that CASS had cultivated over the years in the face of socio-economic and political challenges that Zimbabwe is currently is facing. He is survived by a wife and a son.

protection of species, and the communities' interactions with state agencies charged with jurisdiction over shared resources. Social-ecological systems represent an interaction of processes occurring at multiple scales and within and across scales to manifest a unique complex of emergent conditions. In this respect, this approach to resilience is distinct from that of engineering applications, which assume a rebounding to previous conditions.

Whiteman et al 2004 provides illustrations of some of the key factors to be considered in any social-ecological system. Future theoretical development will require that the system in consideration make the links between the Arctic and other global components more explicit.

A focus on resilience also suggests that a social-ecological system has a set of properties that determine a *domain of attraction* in which the system remains constant in its functionality. Thus, a social-ecological system may have multiple states with critical thresholds that can modify governing properties, be transformed, and result in the emergence of a new state.

The concepts of *adaptability* and *transformability* are helpful in this discussion as well, with adaptability being the capacity of actors to influence resilience and transformability being the capacity to create a fundamentally new system (Walker et al 2004). Another key idea of resilience theory is the *adaptive cycle*, which describes sequential patterns of growth or exploitation ( $r$ ), conservation ( $K$ ), collapse or release ( $\omega$ ), reorganization ( $\alpha$ ). Critical in the assessment of social-ecological systems and their transformation is the identification of "control variables," which are typically slow to change and which regulate key systemic properties (e.g., building of trust relations among social groups, nitrogen levels in soil, permafrost, rate of lichen growth). How well do the ideas of resilience as presented above work when considering the sustainability of the Northern Commons? The adaptive cycle model is probably best applied with closed systems, and may need to be further modified to address the Arctic as a recipient of more global forces for change. For example, the Arctic ecosystem is a global sink in the long-range transport of contaminants, its population is highly transient in and out of the Arctic, and many Arctic residents depend on migratory species. In this way, the current ideas of resilience may need to accommodate better the "Waves of Arctic exploitation" model, presented by Sugden and others.

We suggest that the concept of vulnerability is complementary to resilience considerations, by forcing clarity in a system's sensitivity to various types of change and their consequence while concurrently accounting for the system's capacity to buffer against change.

Vulnerability is therefore a function of the exposure to effects of change on a social-ecological system plus the capacity of that system to deal with that exposure. In this respect vulnerability is measured not only by exposure to hazards alone, but also resides in the resilience of the system experiencing the hazard. The literatures of resilience and vulnerability have for the most part been segregated. Several researchers have developed frameworks for the analysis of Arctic vulnerability, with Chapter 11 of ACIA being one example. A focus on vulnerability, especially when approached using scenario analysis, provides an excellent basis for assessing the likelihood and implications of change and possible surprise. But the considerations of vulnerability here raise the question of whether resilience and vulnerability can be considered an inverse relationship, whereby an increase in resilience results in a decrease in vulnerability. We believe that an integration of these two streams of analysis represents an area ripe for intellectual development.

### **Linking Resilience and Vulnerability with Policy**

Since many of the key control variables that determine the properties of high-latitude ecosystems are undergoing rapid directional change, it is virtually certain that the current properties of these systems will continue to change and that efforts to keep the Arctic in its current state are doomed to failure. Given the directional change already underway, policies aimed only at preserving the system, such as reducing greenhouse emissions, are by themselves less likely to be successful if they are not related to enhancing resilience and adaptive capacity. To address this issue, we suggest the examination of human strategies and their effectiveness in dealing with the potential effects of rapid change. Here is where members of the IASCP can best contribute.

Formal and informal institutions for governance have been framed in functionalist terms to explore if and how "rules of the game" serve social collectives to economize transaction costs, monitor environments (including humans), resolve conflicts, network parties, and allow for local self organization while coordinating decision making at greater scales (e.g., local-decision making bodies to regional and national level processes of governance). In the past, many studies of institutions of the Arctic have included a strong emphasis on periphery-core power relations, the effectiveness of power-sharing or co-

management arrangements, and the socio-cultural and psycho-social benefits of self determination. The current conditions of rapid change suggest the need to explore more carefully adaptive systems of Arctic governance that promote social learning and build resilience by providing adequate responsiveness between local groups who are close to resources and regional, national, and international level entities.

One of the overarching hypotheses explored in the discussions of Working Group 10 is that vulnerability can be reduced by maintaining a focus on local communities, with attention to complex systems phenomena such as levels and linkages. An additional hypothesis is that communities with the capacity to slow key elements of change are more likely to cope and maintain the ecosystems on which they depend. Much evidence indicates that institutions that are close to the resources, flexible, diverse, and receptive to feedback from the environment stand a better chance of success in responding to change than top-down, centralized management systems. A community-based focus helps build grounded theory and practice, and at the same time, helps develop a more sophisticated understanding of how cross-scale linkages and external drivers shape interactions. "Adaptive co-management," in which social learning is explored in the context of well-integrated decision-making is clearly worthy of more study in the North.

It should be pointed out that although the strengths of a resilience approach is in addressing issues of scale, non-linear effects, surprise, and complexity, it generally does not adequately address issues of equity. Like the study of sustainability, any study of social-ecological change must include explicit mention of the questions, "Resilient for whom and to what?" Yet as suggested above, a balance in the distribution of power in decision making potentially enhances the resilience. The diversity of arrangements of common property arrangements in the Arctic and the prominent role of Indigenous Peoples of the North will provide a strong basis for this research. But this work can not be passive in its approach. To make meaningful links between research and policy will require inclusive methods of involving stakeholders and decision makers in all phases of the research process. Given idealized notions of adaptive management in which policy decisions serve as experiments, such partnerships are critical to the success of the program.

### **Key Questions and Research Themes**

To help focus our research, Working Group 10 identified a general set of research questions. They include:

- 1) How do we best characterize patterns of rapid social-ecological change in the Arctic?
- 2) What are the attributes of social-ecological sub-systems and their linkages to the Arctic System that are vulnerable or resilient to rapid change?
- 3) What are the critical thresholds of change, domains of attraction, recurring patterns?
- 4) What are the factors that account for variance in systems and subsystems?
- 5) How, if at all, should the study of resilience and vulnerability inform public policy?

1) Characterizing the patterns of rapid change: Descriptions of rapid change in the Arctic are often presented with little specificity regarding the temporal and spatial pan arctic scales. Rapid change measured at a regional scale may be revealed as a mosaic of heterogeneity with high variability. Rapid annual change may be determined to be insignificant when portrayed at a decadal or multi-decadal scale. As well, change is experienced and perceived by different people in different ways. Indigenous perspectives on rapid social-ecological change in the Arctic are often based on long-term relationships with land and animistic views of nature. Such perspectives are likely to be in tension with those deriving from short-term and quantitatively based data and western science.

Therefore, we encourage systematic studies of the characterization of forces for rapid change in the Arctic that include quantitatively based analyses of trends coupled with cultural perspectives and psycho-social considerations. Excellent work has been initiated in this area but more is needed. Climate studies show how trajectories of rapid warming are accompanied by increased variability and extreme weather events. Other studies suggest the possibility of abrupt changes due to climate. How do we compare rates of change of urbanization, climate, and land use? How do they interact and how do rates of their change affect those interactions? At what point do we move from modest to rapid rates of change? How should we portray multiple and interacting forces for change in research, and thus begin the analysis of cumulative effects? To what extent is rapid change in the Arctic internally and or externally driven? To what extent is rapid change the result of individual choice or collective action?

2) Identifying attributes of resilience and vulnerability: What are the vulnerabilities of Arctic communities to the onset of a cash economy, large-scale resource

development, external boycotts of marine mammal products, shifts in national policies relating to transfer payments, and other forces for change? What are local communities' sources of resilience? Working Group 10 suggests that social-ecological systems are typically endowed with assets that contribute to their resilience while also being vulnerable, depending on their context and forces for change. For example, a social-ecological system may have high landscape diversity fostering ecological adjustment, while having low species diversity that can lead to large shifts in biological communities. Its residents may have jack-of-all-trades skills that allow for adjustment to a range of employment opportunities, while being relatively unskilled and thus unable to capture high-end salaries.

How are the attributes of resilience modified in conditions of rapid versus more gradual change? Rapid change generates a unique type of stress because of the constraints it places on a system(s) response time, learning, and adaptation. It is suggested by some that resource management systems that operate at maximum levels of production, such as those currently employed in some "rationalized" fisheries programs, leave less room for adjustment, while precautionary approaches allow more error. The relationship between resilience and vulnerability attributes considered across social, ecological, economic, legal, and even spiritual dimensions is worthy of exploration. Given these complexities, we propose a line of research that identifies the attributes of various social-ecological subsystems, elaborating on the conditions in which they are resilient and or vulnerable. This work needs to be explicit about how to quantify and recognize resilience and vulnerability. For example, research could analyze patterns of change to determine which response variables changed to a greater extent (vulnerable) or lesser extent (resilient) than the rates of changes in drivers. Empirical research is also needed to test the hypothesis that slow variables of the Arctic are the most critical in the assessment of resilience. Similar analyses could be done with response to multiple stressors, to look for potential interactions.

We further propose that extensive work be undertaken to identify key indicators of resilience and vulnerability. This work can be undertaken in the development of on-going observation systems, currently proposed for the Arctic and should be initiated at various scales of analysis. It will also require extensive comparative analysis to tease out the extent to which indicators are context specific and are transferable across several social-ecological systems.

3) Understanding thresholds, domains, and patterns: This area is perhaps the most challenging because it requires the identification of key drivers and development of simulation models that identify tipping points at which systems are transformed into a new domain of attraction. To date, much of the resilience theory has been metaphorical in its approach (e.g., the adaptive cycle). To make such theories operational, we propose an extensive retrospective analysis of cases (e.g., resilience of small fishing communities of the north, vulnerabilities of subsistence-based communities that face rapid industrial development in their village homelands) that is coupled with simulation modeling. This line of inquiry would include an assessment of irreversibility-- those conditions in which points-of-no-return emerge and pass (e.g., the loss of keystone species, loss of indigenous language). The study of critical thresholds should also include an analysis of unanticipated incidents and their outcomes (i.e. "the study of surprise").

4) Accounting for variance in social-ecological systems: Why do some local communities develop strategies that lead them to successfully negotiate problems and/or learn from experience while others repeatedly fail? Why have some regions prospered economically and maintained their natural capital while others flounder and repeatedly fail to engage in commercial activities? What are the strategies for mitigating the negative impacts of rapid change? To what extent are differences related to the drivers of change, the rates of change, or the properties of the systems undergoing change? The great diversity of conditions found across the Arctic would serve this research program as a set of natural experiments and thus, facilitate comparative studies that lead to more generalized principles.

5) Informing Policy: Working Group 10 identified the need for research to break with past traditions that separate science and decision making, and to work more directly with policy makers and local stakeholders in the formulation, implementation, and evaluation of public policy. The members of Working Group 10 suggest this objective with great humility and considerable caution, recognizing the history of problems of past efforts by science to shape public policy. That being said, this approach differs from past efforts by promoting local stakeholder involvement in all phases of research and viewing studies as part of an adaptive co-management process. Thus, we believe that research can contribute to the policy process without prescribing specific policy choices (helping to create a program in which policy outcomes are examined later as experiments). Moreover, given current rapid rates of change, it is prudent to

incorporate improvements in understanding into policy as expeditiously as possible.

### Research Approach and Philosophy

How research is undertaken in the Arctic is critical to its success, especially given the strong traditional cultures and the history of colonialism in the North. We propose a set of operating principles and a general methodological approach to guide the research program. We propose that the program:

- Be interdisciplinary, meaning that research seek to address questions that require the integration of social, economic, and ecological perspectives on sustainability. Significant progress has been made in recent years in the development of interdisciplinary research methods, yet institutional incentives (e.g., conventional university settings) generally do not reward those working in this arena. Interdisciplinary research therefore must be conducted by the support of funding agencies and employers of researchers.
- Be organized for the co-production of knowledge by involving Arctic residents, Indigenous Peoples, agency management practitioners, and academic researchers. The co-production of knowledge is recognized as a complex process that might come with vulnerabilities related to co-option of knowledge by the more powerful players. Key in the success of this process is an open discussion about those hazards and formalized agreements that protect community knowledge holders so that they are appropriately compensated and have a key role in the research process.
- Develop innovative methods that facilitate cross-scale and cross-cultural comparisons, integration, and synergies. For example, use satellite imagery with local indigenous knowledge of environmental change as a means of prompting exchanges between resource users and researchers. This area is ripe for further development in the Arctic because of its position as a recipient of forces for change from the global context.
- Foster the training of young scholars in the skills of multi- and interdisciplinary collaborative research and in the skills of building partnerships with Arctic residents. We propose that a network of universities offering graduate studies at the PhD level be established to facilitate the sharing of methods and exchanges between students. This program could function independently or as a component of the University of the Arctic.
- Foster the direct participation of arctic residents in all aspects of research, including the collection of data and interpretation of findings, and use research as a means of building the human capital of arctic communities. The development of human capital and organizational capacity should be an additional objective of all arctic research in the study of rapid change.

- Have direct links to decision makers so the process and products of research are policy relevant. Improved methods for linking research and the policy process are needed, and we anticipate that work in this area could represent a significant contribution.

Members of Working Group 10 also noted that there are significant cultural differences among scientists in their approach to arctic research, with some ecologists assuming a more experimental approach and others utilizing a more naturalistic or descriptive method. These differences have created difficulties in past international research collaborations, but those difficulties are not insurmountable. We conclude that a comparative approach for international research on rapid change would help to overcome many of those issues and lead to more commonality for future studies.

Below are specific practical steps, research organization, and infrastructure to be considered in this initiative.

- Establish coordinated and integrated arctic observation systems that focus on social, biophysical, and ecological dimensions and include local- to global-scale monitoring. These Arctic observation systems need to have a balance of effort in all dimensions. If appropriately coordinated, they could ultimately be the foundation for an interdisciplinary research program in social-ecological systems. Arctic observation systems will also need to make data available quickly so they can support rapid appraisal of regional differences on an on-going basis and support the construction and development of computational simulation models and their on-going validation and modification. The process of indicator identification and evaluation is integral in this process, since indicators of change reflect basic a priori assumptions about the system's behavior. The process of indicator identification should be highly participatory and the evaluation of indicators should be an on-going and critical component of Arctic observation systems.
- Build up a database of case studies with a standardized format and common set of key variables. Case studies provide detailed descriptions of change and adaptation and opportunities for holistic and intensive monitoring. Combined with simulation models, they can provide opportunities to focus on key variables and the critical dynamics of generalized social-ecological systems. The database source would include both descriptions and analysis, and be quantitative and qualitative in content. It must be accompanied with a strong database management program to ensure its legacy for future research programs.
- Develop rule- and quantitatively-based simulation models that represent the dynamics of key social-ecological systems. The development of models should be undertaken in two ways. First, a set of simple models would serve the purpose of rapid prototyping — to address emerging questions and explore new relationships. A second a set of models would be more elaborate and refined as informed by the observation system for the on-going testing of specific hypotheses. The transparency of models and interdisciplinary collaboration in their construction will make them more accessible to policy makers and facilitate the links between research and decision making. Other aspect of this work should be aimed at addressing the problems of spatial and time scale through in models and in determining the level of detail needed for models to be helpful in the research- policy process.

- Develop and use scenario analysis and vulnerability frameworks to develop decision-support tools that link research and decision making. These activities, along with components of model development described above, would serve as the primary means by which this program informs the policy process. This work would require active participation by decision makers. If undertaken with inter-local and inter-regional collaboration, they could cultivate a strong awareness of broad patterns of change and the means by which various groups are coping with and mitigating change. It cannot be understated that the development of trust relations between all parties in this type of research process is essential for research findings to be considered creditable by stakeholders and policy makers.

## Related Organizations, Initiatives, & Research Networks

**Resilience Alliance** – a consortium of academic researchers interested in theoretical issues of resilience and adaptation of systems <http://resalliance.org>

**International Arctic Science Committee – (IASC)**  
<http://www.iasc.no/>

**International Arctic Social Science Association (IASSA)**– Increasingly interested in social-ecological approaches; we hope our work will stimulate new research.

<http://www.iassa.gl>

**International Polar Year (IPY)** – is proposed as a period of intensive international cooperation from 2007-2008. Several IPY initiatives have been proposed to address the “Human Dimensions” theme.

<http://www.ipy.org>

**SEARCH** – Study of Environmental Arctic Change, a new initiative of the US National Science Foundation; interdisciplinary in scope and interested in the establishment of a network of arctic observation systems.

**BOREAS** – International research initiative and funding program coordinated by the European Science Foundation, which encourages interdisciplinary studies that have a strong social science and humanities component.

**Initiative on Science and Technology for Sustainability** – an international network to facilitate information exchange and discussion among the growing and diverse group of individuals, institutions, and networks engaged in the field of science and technology for sustainability.

<http://sustsci.harvard.edu/index.html>

**International Geosphere-Biosphere Programme (IGBP)** – established by the International Council for Science (ICSU) in 1986 to help meet the challenge of global sustainability.

<http://www.igbp.kva.se/>

**IHDP** – International Human Dimensions Programme on Global Environmental Change - an international, interdisciplinary and non-governmental research program, aiming at “the development and integration of research on the human dimensions of global environmental change”.

<http://www.ihdp.uni-bonn.de/>

### Conclusion

The study of rapid change in the Arctic is critical given the extent to which various stressors may transform the Arctic System and how changes in the Arctic may in turn affect the Global System.

In spite of these issues, resilience as a frame for understanding the sustainability of social-ecological systems seems to offer several analytical advantages. First, resilience helps provide an integrated approach consistent with trends in the vulnerability and hazards literature to evaluate holistically the impacts of all the shocks and stresses that act on the system. Resilience as an organizing concept provides an approach to carry out a comprehensive analysis by avoiding the artificial divide between biophysical vs. social systems. Second, resilience puts the emphasis on the ability of a system to deal with change. It allows for the multiple ways in which a response may occur, including the ability of the system to absorb the disturbance, or to learn from it and to adapt to it, or to reorganize following the impact. Resilience thinking is in many ways consistent with a worldview of constant change and evolution, and is also consistent with indigenous conceptualizations of the universe. By emphasizing uncertainty and constant change, and by looking at change as an opportunity, resilience thinking challenges widely held notions about stability and incentives that originate outside the Arctic, at higher levels of political and economic organization. Third, because resilience deals with the dynamics of response to change, resilience is forward-looking and helps explore policy options for dealing with uncertainty and change. As Tompkins and Adger (2004) note, building resilience into human-environment systems is an effective way to cope with change characterized by future surprises or unknowable risks. Resilience provides a way of thinking about policies for future environmental change, an important consideration in a world characterized by unprecedented hazards and transformations.

A focus on resilience may also contribute to the long debates on whether or not Northern ecosystems are “fragile” and/or robust in their response to human activity (e.g., oil and gas development.) To date, many of these debates have been primarily rhetorical. A social-ecological systems approach with a focus on resilience

applied to the study of rapid change promises better analytical precision and depth.

The ideas expressed in this research plan will be presented at the Second International Arctic Science Conference (ICARP-2) this November. Those interested in commenting on the plan are invited to visit the ICARP-2 web site (<http://www.icarp.dk>) or contact the chair of this working group, Gary Kofinas.

E-mail: [ffgpk@uaf.edu](mailto:ffgpk@uaf.edu)

Further reading:

Walker, B., C.S. Holling, S.R. Carpenter, and A. Kinzig. 2004. “Resilience, adaptability, and transformability in social-ecological systems.” *Ecology and Society* 9(2):5. URL: <http://www.ecologyandsociety.org/vol9/iss2/art5/>

### Working Group 10 of the Second International Conference for Arctic Research Planning and Co-authors of the Research Plan

**Gary Kofinas** (Working Group Chair), University of Alaska Fairbanks (USA)

**Bruce Forbes** (Working Group Co-chair), University of Lapland (Finland)

**Hugh Beach**, University of Uppsala (Sweden)

**Fikret Berkes**, University of Manitoba (Canada)

**Matthew Berman**, University of Alaska Anchorage (USA)

**Terry Chapin**, University of Alaska Fairbanks (USA)

**Yvon Csonka**, University of Greenland (Greenland)

**Kjell Danell**, Swedish University of Agricultural Science (Sweden)

**Gail Osherenko**, University of California at Santa Barbara (USA)

**Tamara Semanova**, RAIPON (Russia)

**Joe Tetlich**, Vuntut Gwitchin First Nation (Canada)

**Oran Young** (Liaison to ICARP2 Steering Committee), University of California at Santa Barbara (USA)

**Dawn Magness** (Student recorder), University of Alaska Fairbanks (USA)

# RECENT PUBLICATIONS

## Charlotte Hess

### Books

- Agrawal, A.** 2005. *Environmentality: Technologies of Government and the Making of Subjects*. Durham, NC: Duke University Press.
- Huck, S., ed.** 2004. *Advances in Understanding Strategic Behaviour: Game Theory Experiments and Bounded Rationality: Essay in Honour of Werner Güth*. New York: Macmillan.
- Lyon, T., and J. Maxwell.** 2004. *Corporate Environmentalism and Public Policy*. New York: Cambridge University Press.
- Maskus, K., and J. H. Reichman, eds.** 2005. *International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime*. Cambridge, UK: Cambridge University Press.
- Nkonya, E. et al.** 2004. *Strategies for Sustainable Land Management and Poverty Reduction in Uganda*. Washington, DC: International Food Policy Research Institute.
- Pierce Colfer, C. J., ed.** 2005. *The Equitable Forest: Diversity, Community, and Resource Management*. Washington, D.C.: Resources for the Future.
- Saruchera, M., ed.** 2004. *Securing Land and Resource Rights in Africa: Pan-African Perspective*. Bellville, South Africa: Programme for Land and Agrarian Studies, School of Government, University of the Western Cape.

### Articles

- Abegaz, B.** 2005. "Persistent Stasis in a Tributary Mode of Production: The Peasant Economy of Ethiopia." *Journal of Agrarian Change* 5:199-333.
- Adams, M.** 2004. "Negotiating Nature: Collaboration and Conflict Between Aboriginal and Conservation Interests in New South Wales, Australia." *Australian Journal of Environmental Education* 20:3-12.
- Adhikari, B.** 2005. "Poverty, Property Rights and Collective Action: Understanding the Distributive Aspects of Common Property Resource Management." *Environment and Development Economics* 10:7-31.
- Akpınar, N., I. Talay, C. Ceylan, and S. Gündüz.** 2004. "Rural Women and Agrotourism in the Context of Sustainable Rural Development: A Case Study from Turkey." *Environment, Development and Sustainability* 6:473-486.
- Alberini, A., P. Rosato, A. Longo, and V. Zanatta.** 2005. "Information and Willingness to Pay in a Contingent Valuation Study: The Value of S. Erasmo in the Lagoon of Venice." *Journal of Environmental Planning and Management* 48:155-175.
- Ali, A.** 2005. "Homegardens in Smallholder Farming Systems: Examples from Bangladesh." *Human Ecology* 33:245-270.
- Alix-Garcia, J., A. de Janvry, and E. Sadoulet.** 2005. "A Tale of Two Communities: Explaining Deforestation in Mexico." *World Development* 33:219-235.
- Allan, J. A.** 2005. "Water in the Environment/Socio-economic Development Discourse: Sustainability, Changing Management Paradigms and Policy Responses in a Global System." *Government and Opposition* 40:181-199.
- Alvarez, C., J. Cancela, and M. Fandino.** 2005. "Characterization of Irrigated Holdings in the Terra Cha Region of Spain: A First Step Towards a Water Management Model." *Water Resources Management* 19:23-36.

- Alvarez, J.** 2005. "Cuba's New Sugarcane Cooperatives Ten Years Later." *Postcommunist Economics* 17:125-136.
- Amaro de Matos, J., and P. P. Barros.** 2004. "Social Norms and the Paradox of Elections' Turnout." *Public Choice* 121: 239-255.
- An, L. et al.** 2005. "Exploring Complexity in a Human-Environment System: An Agent-Based Spatial Model for Multidisciplinary and Multiscale Integration." *Annals of the Association of American Geographers* 95:54-79.
- Ananda, J.** 2004. "Implementing Participatory Approaches in Formulating Regional Forest Policy." *International Journal of Sustainable Development* 7:398-409.
- Anderson, J., and I. Skinner.** 2005. "The European Union's Approach to Reducing Greenhouse Gas Emissions." *Journal for European Environmental and Planning Law* 2:92-100.
- Anderson, R. B. et al.** 2005. "Indigenous Land Rights in Canada: The Foundation for Development?" *International Journal of Entrepreneurship and Small Business* 2:104-133.
- Andreoni, J., and R. Petrie.** 2004. "Public Goods Experiments Without Confidentiality: A Glimpse into Fundraising." *Journal of Public Economics* 88:1605-1623.
- Backeberg, G. R.** 2005. "Water Institutional Reforms in South Africa." *Water Policy* 7:107-123.
- Batabyal, A. A.** 2005. "Necessary and Sufficient Conditions for the Equivalence of Economic and Ecological Criteria in Range Management." *Journal of Economic Behavior and Organization* 56:423-436.
- Benbrahim, K. F., M. Ismaili, S. F. Benbrahim, and A. Tribak.** 2004. "Land Degradation Caused by Desertification and Deforestation in Morocco." *Secheresse* 15:307-320.
- Bene, C., and A. E. Neiland.** 2004. "Empowerment Reform, Yes but Empowerment of Whom? Fisheries Decentralization Reforms in Developing Countries: A Critical Assessment with Specific Reference to Poverty Reduction." *Aquatic Resources, Culture and Development* 1:35-49.
- Benkler, Y.** 2004. "Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production." *Yale Law Journal* 114:273-359.
- Berkes, F.** 2005. "Commons Theory for Marine Resource Management in a Complex World." *Senri Ethnological Studies* 67:13-31.
- Blomquist, W., and E. Schlager.** 2005. "Political Pitfalls of Integrated Watershed Management." *Society and Natural Resources* 18:101-117.
- Breemer, J. D.** 2004. "What Property Rights: The California Coastal Commission's History of Abusing Land Rights and Some Thoughts on the Underlying Causes." *UCLA Journal of Environmental Law and Policy* 22:247-300.
- Bretz, H. L., K. Fisher-Vanden, H. Jacobs, and C. Schary.** 2005. "Trust and Communication: Mechanisms for Increasing Farmers' Participation in Water Quality Testing." *Land Economics* 81:170-190.
- Brooks, A. C.** 2005. "Does Social Capital Make you Generous?" *Social Science Quarterly* 86:1-15.
- Brown, G., B. Berger, and M. Ikiara.** 2005. "Different Property Rights Regimes in the Lake Victoria Multiple Species Fisheries." *Environment and Development Economics* 10:53-66.
- Brugiere, D., D. Sakom, and A. Gauthier-hion.** 2005. "The Conservation Significance of the Proposed Mbaere- Bodingue National Park, Central African Republic, with Special Emphasis on its Primate Community." *Biodiversity and Conservation* 14:505-522.

- Butzer, K. W.,** and D. M. Helgren. 2005. "Livestock, Land Cover, and Environmental History: The Tablelands of New South Wales, Australia, 1820-1920." *Annals of the Association of American Geographers* 95:80-111(32).
- Carlsson-Kanyama, A.** 2004. "Collaborative Housing and Environmental Efficiency: The Case of Food Preparation and Consumption." *International Journal of Sustainable Development* 7:341-352.
- Carpenter, J.,** P. Matthews, and O. Ong'ong'a. 2004. "Why Punish?: Social Reciprocity and the Enforcement of Prosocial Norms." *Journal of Evolutionary Economics* 14:407-429.
- Carr, A.,** and R. Wilkinson. 2005. "Beyond Participation: Boundary Organizations as a New Space for Farmers and Scientists to Interact." *Society and Natural Resources* 18:255-265.
- Casari, M.** 2004. "Can Genetic Algorithms Explain Experimental Anomalies? An Application to Common Property Resources." *Computational Economics* 24:257-275.
- Cason, T. N.,** T. Saijo, T. Yamato, and K. Yokotani. 2004. "Non-Excludable Public Good Experiments." *Games and Economic Behavior* 49:81-102.
- Chan, L.,** and S. Costa. 2005. "Participation in the Global Knowledge Commons: Challenges and Opportunities for Research Dissemination in Developing Countries." *New Library World* 106:141-163.
- Chess, C.,** J. Burger, and M. Hughes McDermott. 2005. "Speaking Like a State: Environmental Justice and Fish Consumption Advisories." *Society and Natural Resources* 18:267-278.
- Coombes, B.,** and S. Hill. 2005. "'Na whenua, na Tuhoe. Ko D.o.C. te partner': Prospects for Comanagement of Te Urewera National Park." *Society and Natural Resources* 18:135-152.
- Correia, D.** 2005. "From Agropastoralism to Sustained Yield Forestry: Industrial Restructuring, Rural Change, and the Land-Grant Commons in Northern New Mexico." *Capitalism Nature Socialism* 16:25-44.
- Coskun, A. A.** 2005. "An Evaluation of the Environmental Impact Assessment System in Turkey." *International Journal of Environment and Sustainable Development* 10:47-66.
- Cremers, L.,** M. Ooijsvaar, and R. Boelens. 2005. "Institutional Reform in the Andean Irrigation Sector: Enabling Policies for Strengthening Local Rights and Water Management." *Natural Resources Forum* 29:37-50.
- Cunningham, B. M.,** P. J. Alexander, and N. Adilov. 2004. "Peer-to-Peer File Sharing Communities." *Information Economics and Policy* 16:197-213.
- Danby, R. K.,** and D. S. Slocumbe. 2005. "Regional Ecology, Ecosystem Geography, and Transboundary Protected Areas in the St. Elias Mountains." *Ecological Applications* 15:405-422.
- Danchev, A.** 2005. "Social Capital Influence on Sustainability of Development: Case Study of Bulgaria." *Sustainable Development* 13:25-37.
- Daniel, G.,** M. Arce, and T. Sandler. 2005. "The Dilemma of the Prisoners' Dilemmas." *Kyklos* 58:3-24.
- Danne, A. P.** 2004. "Customary and Indigenous Law in Transitional Post-Conflict States: A South Sudanese Case Study." *Monash University Law Review* 30:199-228.
- Davenport, D. S.** 2005. "An Alternative Explanation for the Failure of the UNCED Forest Negotiations." *Global Environmental Politics* 5:105-130.
- Davey, W. J.** 2005. "The WTO Dispute Settlement System: The First Ten Years." *Journal of International Economic Law* 8:17-50.
- Davis, J. G.,** E. Subrahmanian, and A. W. Westerberg. 2005. "The 'Global' and the 'Local' in Knowledge Management." *Journal of Knowledge Management* 9:101-112.
- Decker, C.,** and R. Reuveny. 2005. "Endogenous Technological Progress and the Malthusian Trap: Could Simon and Boserup Have Saved Easter Island?" *Human Ecology* 33:119-140.
- deKoninck, V.** 2005. "Joint Management of Banteng (*Bos javanicus*) in a Contested Cultural Landscape: Observations and Implications." *Human Dimensions of Wildlife* 10:123-135.
- Dingwerth, K.** 2005. "The Democratic Legitimacy of Public-Private Rule Making: What Can We Learn from the World Commission on Dams." *Global Governance* 11:65-83.
- Doukkali, M. R.** 2005. "Water Institutional Reforms in Morocco." *WaterPolicy* 7:71-88.
- Dyke, J.** 2005. "An Analysis of the Aegean Disputes under International Law." *Ocean Development and International Law* 36:63-117.
- Eder, J.** 2005. "Coastal Resource Management and Social Differences in Philippine Fishing Communities." *Human Ecology* 33:147-169.
- Faysee, N.** 2005. "Coping with the Tragedy of the Commons: Game Structure and Design of Rules." *Journal of Economic Surveys* 19:239-261.
- Fernandez, L.** 2005. "A Diversified Portfolio: Joint Management on Non-Renewable and Renewable Resources Offshore." *Resource and Energy Economics* 27:65-82.
- Fischer, M.-E.,** B. Irlenbusch, and A. Sadrieh. 2004. "An Integration Common Pool Resource Experiment." *Journal of Environmental Economics and Management* 48:811-836.
- Fonjong, L. N.,** Ngwa N. E., and C. C. Fonchingong. 2004. "Rethinking the Contribution of Indigenous Management in Small-Scale Water Provision among Selected Rural Communities in Cameroon." *Environment, Development and Sustainability* 6:429-451.
- Forsyth, T.** 2005. "Enhancing Climate Technology Transfer through Greater Public-Private Cooperation: Lessons from Thailand and the Philippines." *Natural Resources Forum* 29:165-176.
- Gautam, A.,** and G. Shivakoti. 2005. "Conditions for Successful Local Collective Action in Forestry: Some Evidence From the Hills of Nepal." *Society and Natural Resources* 18:153-171.
- Gelcich, S.,** G. Edwards-Jones, M. J. Kaiser, and E. Watson. 2004. "Using Discourses for Policy Evaluation: The Case of Marine Common Property Rights in Chile." *Society and Natural Resources* 18:377-391.
- Giannakas, K.,** and M. Fulton. 2005. "Process Innovation Activity in a Mixed Oligopoly: The Role of Cooperatives." *American Journal of Agricultural Economics* 87:406-422.
- Gibson, C. C.,** J. T. Williams, and E. Ostrom. 2005. "Local Enforcement and Better Forests." *World Development* 33: 273-284.
- Gunther, P. M.,** and J. Winfrey. 2005. "Biodiversity Issues for Road Construction Adjacent to a River with a Federally Listed Threatened Fish Species." *Impact Assessment and Project Appraisal* 23:17-27.
- Hamstead, M. P.,** and M. S. Quinn. 2005. "Sustainable Community Development and Ecological Economics: Theoretical Convergence and Practical Implications." *Local Environment* 10:141-158.
- Hansen, W. L.,** N. J. Mitchell, and J. M. Drope. 2005. "The Logic of Private and Collective Action." *American Journal of Political Science* 49:150-167.
- Harada, K.** 2005. "Local Use of Agricultural Lands and Natural Resources as the Commons in Gunung Halimun National Park, West Java, Indonesia." *International Journal of Sustainable Development and World Ecology* 12:34-47.
- Haro, G. O.,** G. J. Doyo, and J. G. McPeak. 2005. "Linkages between Community, Environmental, and Conflict Management: Experiences from Northern Kenya." *World Development* 33:285-299.

- Hatcher**, A., and D. Gordon. 2005. "Further Investigation into the Factors Affecting Compliance with U.K. Fishing Quotas." *Land Economics* 91:71-86.
- Hearne**, R. R., and G. Donoso. 2005. "Water Institutional Reforms in Chile." *Water Policy* 7:53-69.
- Herrmann**, T. M. 2005. "Knowledge, Values, Uses and Management of the *Araucaria araucana* Forest by the Indigenous Mapuche Pewenche People: A Basis for Collaborative Natural Resource Management in Southern Chile." *Natural Resources Forum* 29:120-134.
- Lawn**, P. 2004. "How Well are Resource Prices Likely to Serve as Indicators of Natural Resource Scarcity?" *International Journal of Sustainable Development* 7:369-397.
- Lawn**, P. 2004. "The Sustainable Development Concept and Indicators: An Introductory Essay." *International Journal of Environmental and Sustainable Development* 3:199-234.
- Lawn**, P. 2004. "Using the Fisherian Concept of Income to Guide a Nation's Macro-Investment Policy." *International Journal of Environment and Sustainable Development* 3:339-352.
- Lawrence**, A. et al. 2005. "Local Values for Harvested Forest Plants in Madre de Dios, Peru: Towards a More Contextualised Interpretation of Quantitative Ethnobotanical Data." *Biodiversity and Conservation* 14:45-79.
- Lawton**, A. 2005. "Public Service Ethics in a Changing World." *Futures* 37:231-243.
- Lazer**, D. 2005. "Regulatory Capitalism as a Networked Order: The International System as an Informational Network." *The Annals of the American Academy of Political and Social Science* 598:52-66.
- Lemos**, M. C., and B. J. Morehouse. 2005. "The Co-Production of Science and Policy in Integrated Climate Assessments." *Global Environmental Change* 15:57-68.
- Lertzman**, D., and H. Vredenburg. 2005. "Indigenous Peoples, Resource Extraction and Sustainable Development: An Ethical Approach." *Journal of Business Ethics* 56:239-254.
- Lise**, W. 2005. "A Game Model of People's Participation in Forest Management in Northern India." *Environment and Development Economics* 10:217-240.
- Lotsmart**, F., E. Ngwa, and C. Fonchingong. 2005. "Rethinking the Contribution of Indigenous Management in Small-Scale Water Provision among Selected Rural Communities in Cameroon." *Environment, Development and Sustainability* 6:429-451.
- Lucero**, L. A. 2004. "The State of the Natural Resources Literature: The 'Tragedy of the Community'." *Natural Resources Journal* 44:907-915.
- Maliondo**, S. M. S. et al. 2005. "Tree Species Composition and Potential Timber Production of a Communal Miombo Woodland in Handeni District, Tanzania." *Journal of Tropical Forest Science* 17:104-120.
- Massoud**, M. A., M. D. Scrimshaw, and J. N. Lester. 2004. "Integrated Coastal Zone and River Basin Management: A Review of the Literature, Concepts and Trends for Decision Makers." *Water Policy* 6:519-548.
- McCann**, L. et al. 2005. "Transaction Cost Measurement for Evaluating Environmental Policies." *Ecological Economics* 52: 527-542.
- McCarthy**, J. 2005. "Commons as Counterhegemonic Projects." *Capitalism Nature Socialism* 16:9-24.
- McCarthy**, J. 2005. "Between Adat and State: Institutional Arrangements on Sumatra's Forest." *Human Ecology* 33:57-82.
- McDonald**, A. D. et al. 2004. "Inferring a Biopolitical Consensus View of Stochastic Dynamics for Management of a Transboundary Fishery." *Natural Resource Modeling* 17:467-488.
- McPeak**, J. 2005. "Individual and Collective Rationality in Pastoral Production: Evidence from Northern Kenya." *Human Ecology* 33:171-197.
- Menon**, V., A. Paul, and K. N. Nair. 2005. "Dynamics of Irrigation Institutions: A Case Study of a Village Panchayat in Kerala." *Economic and Political Weekly* 40:893-904.
- Mensah**, J., and E. F. Antoh. 2005. "Reflections on Indigenous Women's Organisations in Sub-Saharan Africa: A Comparative Study in Brong Ahafo Region, Ghana." *Singapore Journal of Tropical Geography* 26:82-101.
- Moseley**, W. G. 2005. "Global Cotton and Local Environmental Management: The Political Ecology of Rich and Poor Small-Hold Farmers in Southern Mali." *The Geographical Journal* 171:36-55.
- Musha**, T. 2004. "Development Policy of Residential Areas in Matsumoto City and the Roles of Agricultural Cooperatives." *Geographical Review of Japan* 77:421-440.
- Naidoo**, R., and W. L. Adamowicz. 2005. "Biodiversity and Nature-Based Tourism at Forest Reserves in Uganda." *Environment and Development Economics* 10:159-178.
- Nepal**, S. K. 2004. "Indigenous Ecotourism in Central British Columbia: The Potential for Building Capacity in the Tl'azt'en Nations Territories." *Journal of Ecotourism* 3:173-194.
- Nie**, M. 2004. "Administrative Rulemaking and Public Lands Conflict: The Forest Service's Roadless Rule." *Natural Resource Journal* 44:687-742.
- O'Brien**, D. J., S. K. Wegren, and V. V. Patsiorkovsky. 2005. "Marketization and Community in Post-Soviet Russian Villages." *Rural Sociology* 70:188-207.
- Orebech**, P. 2005. "What Restoration Schemes Can Do? Or, Getting it Right Without Fisheries Transferable Quotas." *Ocean Development and International Law* 36:159-178.
- Pamo**, E. 2004. "Community Production Practices and Desertification in the Sahelo-Sudanian Region of Cameroon at the Turn of the Millennium." *Environmental Monitoring and Assessment* 99:197-210.
- Paudel**, S. K., and C. L. Chowdhary. 2005. "Managing Rattan as a Common Property: A Case Study of Community Rattan Management in Nepal." *Journal of Bamboo and Rattan* 4:81-91.
- Paul**, A. 2005. "Rise, Fall, and Persistence in Kadakkodi: An Enquiry into the Evolution of a Community Institution for Fishery Management in Kerala, India." *Environment and Development Economics* 10:33-51.
- Plack**, N. L. 2005. "Agrarian Individualism, Collective Practices and the French Revolution: The Law of 10 Games June 1793 and the Partition of Common Land in the Department of the Gard." *European History Quarterly* 35:39-62.
- Porro**, R. 2005. "Palms, Pastures, and Swidden Fields: The Grounded Political Ecology of 'Agro-Extractive/Shifting-Cultivator Peasants' in Maranhao, Brazil." *Human Ecology* 33:17-56.
- Richland**, J. B. 2005. "What Are You Going to Do with the Village's Knowledge? Talking Tradition, Talking Law in Hopi Tribal Court." *Law and Society Review* 39:235-272.
- Robinson**, A. J., and J. Meaton. 2005. "Bali Beyond the Bomb: Disparate Discourses and Implications for Sustainability." *Sust Dvlpmnt* 13:69-78.
- Ruben**, R., and Z. Lerman. 2005. "Why Nicaraguan Peasants Stay in Agricultural Production Cooperatives." *European Review of Latin American and Caribbean Studies* 78:31-48.

# ANNOUNCEMENTS

Rudel, T. K. et al. 2005. "Forest Transitions: Towards a Global Understanding of Land Use Change." *Global Environmental Change* 15:23-31.

Saleth, R. M., and A. Dinar. 2005. "Water Institutional Reforms: Theory and Practice." *Water Policy* 7:1-19.

Sammy, J., and C. Opio. 2005. "Problems and Prospects for Conservation and Indigenous Community Development in Rural Botswana." *Development Southern Africa* 22:67-85.

Sancassiani, W. 2005. "Local Agenda 21 in Italy: An Effective Governance Tool for Facilitating Local Communities' Participation and Promoting Capacity Building for Sustainability." *Local Environment* 10:189-200.

Srinivasan, J. T. 2005. "State Regulation versus Co-Management: Evidence from the Cochin Estuarine Fisheries in India." *Environment and Development Economics* 10:97-117.

Stanley, D. L. 2005. "Local Perception of Public Goods: Recent Assessments of Willingness-to-Pay for Endangered Species." *Contemporary Economic Policy* 23:165-179.

Stewart, C., G. Gil-Egui, and M. Pileggi. 2004. "The City Park as a Public Good Reference for Internet Policy Making." *Information, Communication and Society* 7:337-363.

Thao, N. 2005. "Maritime Delimitation and Fishery Cooperation in the Tonkin Gulf." *Ocean Development and International Law* 36:25-44.

Thompson, C. B. 2004. "International Law of the Sea/Seed: Public Domain versus Private Commodity." *Natural Resources Journal* 44:841-866.

Tisdell, C. 2004. "Property Rights in Non-Captive Wildlife and Biodiversity Conservation." *International Journal of Global Environmental Issues* 4:195-208.

Toly, N. J. 2005. "A Tale of Two Regimes: Instrumentality and Commons Access." *Bulletin of Science and Technology* 25:26-36.

Trigg, D. J. 2004. "Patenting the Sun: Enclosing the Scientific Commons and Transforming the University-Ethical Concerns." *Drug Development Research* 63:139-149.

Virtanen, P. 2005. "Community-Based Natural Resource Management in Mozambique: A Critical Review of the Concept's Applicability at Local Level." *Sustainable Development* 13:1-12.

Walters, B. B. 2005. "Ecological Effects of Small-Scale Cutting of Philippine Mangrove Forests." *Forest Ecology and Management* 206:331-348.

Walters, B. B. 2005. "Patterns of Local Wood Use and Cutting of Philippine Mangrove Forests." *Economic Botany* 59:66-76.

Walters, B. B., C. Sabogal, L. K. Snook, and E. de Almeida. 2005. "Constraints and Opportunities for Better Silvicultural Practice in Tropical Forestry: An Interdisciplinary Approach." *Forest Ecol & Mngmt* 209:3-18.

Walton, B. K., and C. Bailey. 2005. "Framing Wilderness: Populism and Cultural Heritage as Organizing Principles." *Society and Natural Resources* 18:119-134.

Warren, C. 2005. "Mapping Common Futures: Customary Communities, NGOs and the State in Indonesia's Reform Era." *Development and Change* 63:49-73.

Webb, J., and M. Foddy. 2004. "Vested Interests in the Decision to Resolve Social Dilemma Conflicts." *Small Group Research* 35:666-697.

Wiber, M., F. Berkes, A. Charles, and J. Kearney. 2004. "Participatory Research Supporting Community-Based Fishery Management." *Marine Policy* 28:459-468.

Wolford, W. 2005. "Agrarian Moral Economies and Neoliberalism in Brazil: Competing Worldviews and the State in the Struggle for Land." *Environment and Planning* 37:241-262.

Young, O. R. 2005. "Governing the Arctic: From Cold War Theatre to Mosaic of Cooperation." *Global Governance* 11:9-15.

**Send Letters and Announcements** to Doug Wilson, Editor, CPR Digest, The Institute for Fisheries Management, North Sea Center, PO Box 104, DK-9850, Hirtshals, Denmark. dw@ifm.dk Tel: 45 98 94 28 55 Fax:: 45 98 94 42 68

**For membership, dues, back issues, and missing copies** Michelle Curtain, P.O. Box 2355 Gary, IN 46409 USA Tel: 01-219-980-1433 Fax:: 01-219-980-2801 iascp@indiana.edu

**For questions** about IASCP papers and research contact Charlotte Hess, Information Officer, IASCP, 513 N. Park, Bloomington, IN 47408 USA iascp@indiana.edu Tel: 01-812-855-9636 Fax:: 01-812-855-3150

## Nominations for 2006 IASCP Officers

Nominations for the 2006 election of President-elect and Executive Council will soon begin. Ballots will be sent to membership in early 2006. Members will vote for President-elect and two Executive Council members.

According to IASCP bylaws, candidates may be nominated for elected offices upon written petition from one percent of the membership. Candidates must be eligible for office, members in good standing, and have given written consent to the nomination to the President. The President must receive such nominations no later than four months before the General Meeting.

Nominations may be emailed **no later than February 15 2006** to any member of the Nominating Committee:

Susan Hanna, Chair	susan.hanna@oregonstate.edu
Rucha Ghate	ghates_ngp@sancharnet.in
Isilda Nhandumbo	isildan.iucn@tvcano.co.mz
Calvin Nhira	calvinnhira@yahoo.com
Dianne Rocheleau	DRocheleau@clarku.edu

## Call for Papers

### The IASCP Europe Regional Meeting

#### Building the European Commons:

#### From Open Fields to Open Source

#### Brescia - Italy - March 23-25, 2006

### Conference Themes and Sub-themes

•Long-enduring Common-pool Resources on the European Continent •New Common-pool Resources •Non-European Commons

### Panel and Paper Submission Guidelines

Abstracts (max 500 words) should be in English and submitted by the **15th of September 2005**. Complete papers must be submitted by the 31st of January 2006.

All applications in electronic format (.doc, .pdf or .rtf files are all acceptable) should be sent to iascpEurope@eco.unibs.it. Please, send along the following information:

Name	Email	Affiliation	Phone
Mailing Address		Fax	Country

For further information, please visit our website

<http://iascpEurope.eco.unibs.it/>

or e-mail: iascpEurope@eco.unibs.it

**Call for Papers**  
**The Eleventh Biennial Global Conference of**  
**The International Association for the Study of**  
**Common Property**

**Survival of the Commons: Mounting Challenges &**  
**New Realities**  
**June 19 – June 23, 2006**  
**Bali, Indonesia**

**Abstract Submission Guidelines**

A panel, paper, or poster abstracts of 500 words, or less, should be submitted in word or word perfect format, as an e-mail attachment, to the conference secretariat at: [iascp06@indiana.edu](mailto:iascp06@indiana.edu), by **November 15, 2005**.

The following form **MUST** accompany your abstract submission:

**IASCP 2006 Abstract Submission Form**

**Surname**  
**First Name**  
**Mailing Address**  
**Country**  
**Email**  
**Phone Number**  
**Fax Number**  
**Funding Needed(Indicate Yes or No)**

**Indicate theme if applicable**

The conference secretariat will notify individuals of acceptance by January 15, 2006. The final papers should be submitted by April 15, 2006.

Panel proposals are limited to 2-4 papers (max. 4). Panel proposals should include an abstract and abstract submission form for each paper.

Funding for Participants The FORD Foundation, IDRC, and the Christensen Fund have supported travel to past IASCP conferences. We are hopeful that they will be able to partially fund a small number of conference participants at IASCP2006. **Please indicate on your abstract submission form if you will need partial funding to attend the conference.**

**Visit [www.iascp.org](http://www.iascp.org) for information regarding Multiple Submission Guidelines and for the full conference announcement.**

**Contact Information:**

IASCP2006 Conference Committee  
 Email: [iascp06@indiana.edu](mailto:iascp06@indiana.edu)  
 Website: <http://www.iascp.org>

**Conference Sub-themes**

- 1.1 Contemporary analytical tools and theoretical questions
- 1.2 Conservation policy and the commons
- 1.3 Culture, identity, and survival of the commons
- 1.4 Local resource rights and management institutions
- 1.5 New frontiers (the new global commons)
- 1.6 Privatization
- 1.7 Resurgent commons within public or private property
- 1.8 The commons and the fate of agriculture, forestry, and fisheries
- 1.9 The state, legal reform, and decentralization

**Special Panel Series: “The International Journal of the Commons”**

A selection of papers presented at this series of panels will be published in the very first issue of the “International Journal of the Commons,” January 2007. Papers that provide an update of findings related to inshore fisheries, irrigation systems, pastoral systems, digital commons, and forestry would be of major assistance in helping summarize for all of us where we are. Synthesis articles on the impact of the size of a group, its heterogeneity, the kinds of rules in use, the level of governance arrangements, and other major issues are also encouraged.

**JULY 1, 2004 - JUNE 30, 2005 IASCP MEMBERSHIP CARD**

Renew your membership now and you will not miss any of your membership benefits; including: subscriptions to The CPR Digest; discount registration at our nearly annual meetings; conference abstracts, and the opportunity to contribute to the growth of the IASCP. Contact the IASCP office for additional information or visit our web site.

**MEMBERSHIP INFORMATION:** Renewal  New  (Please check one)

Last Name First Name Middle

Address:

City State/Province: Postal Code/Zip: Country:

Email Address:

**INDIVIDUAL MEMBERSHIP\***

**CHECK MEMBERSHIP YEAR(s):**

\$50,000 or more.....US \$60.00	<input type="checkbox"/> July 1, 2004- June 30, 2005
\$20,000 - 49,999.....US \$40.00	<input type="checkbox"/> July 1, 2005 - June 30, 2006
\$19,000 and less.....US\$10.00	<input type="checkbox"/> July 1, 2006 - June 30, 2007
Total dues payment @US \$60.00.....\$_____	
Total dues payment @ US \$ 40.00.....\$_____	
Total dues payment @ US \$ 10.00.....\$_____	

\*Institutional membership fees are a suggested flat rate of US \$120.00.

**PAYMENT INFORMATION:**

You can return this card to IASCP with:

A check payable to IASCP  
 MasterCard  Visa  Discover | Card Number \_\_\_\_\_

For either individuals or institutions, if your financial situation prevents you from making a full payment at this time please indicate that and we will contact you.

Signature \_\_\_\_\_ | Exp. Date: \_\_\_\_\_ OR Email, phone or fax the information to:

**THE INTERNATIONAL ASSOCIATION FOR THE STUDY OF COMMON PROPERTY**

P.O. Box 2355 Gary IN 46409 USA Phone: 219-980-1433 Fax: 219-980-2801 e-mail: [iascp@indiana.edu](mailto:iascp@indiana.edu) <http://www.iascp.org>

**Common Property Resource Digest  
International Association for the  
Study of Common Property  
P.O. Box 2355  
Gary IN 46409 USA**