



PSYCHOLOGY AND THE CHALLENGE OF GLOBAL ENVIRONMENTAL CHANGE

BY GABRIEL MOSER AND DAVID UZZELL



Children wearing protection masks against air pollution

Photo: Unep / Still Pictures

► **Environmental psychology is an unfamiliar subject to many people – the application of psychology is traditionally seen to be about individuals.** But while most people would not have a problem in seeing the importance of people in their social context, it quickly becomes apparent to them that it is highly appropriate if not essential to investigate people in their environmental and temporal context. We would argue that it is impossible to understand people without appreciating the environmental and temporal context in which they perceive, make sense and relate to the world. As Bernard Wilpert has recently argued: "Without wanting to minimise the importance of any of the cherished psychological disciplines: the intrinsic characteristic of psychological phenomena as being always related to the 'world of things' (Graumann, 1974) in its widest sense (physical or social givens) makes all psychological sub-disciplines appear like children in the embracing family of environmental psychology" (Wilpert, forthcoming).

Environmental psychology deals with the relationship between the individual and his/her life-space. This includes not only the environment to provide us with all what we need to survive, but also the spaces in which to appreciate, understand and act to fulfil higher needs and aspirations. The sub-discipline studies individuals and groups in their physical and social context, by giving a prominent place to environmental perceptions, attitudes, evaluations and representations and accompanying behaviour. Environmental psychology focuses on both the effects of environmental conditions on behaviour and how the individual perceives and acts on the environment. But physical and social factors are inextricably linked in their effects on individuals' perceptions and behaviour (Altman and Rogoff, 1987). In order to effectively achieve this, environmental psychology aims to identifying processes which regulate and mediate this relationship.

Environmental psychology, in referring as well to the relation to space in its physical and social dimensions, as to the cultural and temporal context of this relation, allows us to address global change by taking into account individual and societal approaches to these problems. Cultural and temporal context condition people's perceptions and

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FOCUS: ENVIRONMENTAL PSYCHOLOGY

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EDITORIAL

The papers in this Newsletter are a testimony of the challenge global environmental change represents to the discipline and of the complexity of the problems environmental psychologists face when dealing with the promotion of environmental friendly behaviour. Stern's paper shows that psychological science is able to contribute significantly to providing empirical checks as well as evidence to understand individual behaviours that are relevant responses to environmental change. Vlek and Steg's paper reveal that environmental psychology has developed a reasonably good understanding and reliable models to explain people's behaviour in the light of sustainability, David Uzzell points to the complex dialectic between the local and global in environmental matters, arguing that if people can understand and be concerned about climate change at the global as well as local level then we ought to be building behaviour change models that reflect this.

Ancuña Rivera argues that the risk analysis approach, surprisingly absent from sustainable development research, could be useful in providing alternative ways of thinking about sustainable development achievements; furthermore, risk analysis should take into account sustainability principles in order to have a greater impact. The interrelationship of environmental and cultural problems are well illustrated in the case of Misra and Singh's paper, drawing on research experience in India, discusses the exigencies of sustainable development in a country where population growth is placing extreme pressures on national resources and the increasing degree of consumerism and urbanization have aggravated the utilization of those resources. Cultural specificities along with environmental conditions and their influence on behaviour are also discussed in Moser's paper on water use in different parts of the world. This collection of papers is concluded by Pawlik who speculates on future global change research agendas and the implications of such work for the discipline of (environmental) psychology itself which, traditionally operating at the interpersonal and intergroup ambient levels, will need to accommodate to the macro-level requirements of global change research.



GABRIEL MOSER & DAVID UZZELL, GUEST EDITORS

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behaviour within any given environment. The environmental context in which perceptions occur, attitudes are formed and behaviour takes place, also implies to look at the temporal dimension: we cannot understand space and place without taking into account the people's history and their capacity to project themselves into the future.

There is a common perception that psychologists will be only concerned with micro-spaces, i.e., person – to – person interactions. The notion that psychologists could investigate issues literally at a global level seems implausible. Yet traditionally, environmental psychology deals with people-environment relations at various levels: from the micro-environment, the individual's habitat, through urban and natural environments to the global environment. At each of the levels addressed, people think and act with respect to others; one's own family in the private sphere, neighbours and citizens at the rural and urban level, and the global population at the planet level. Although the scope may be dissimilar at these different levels, the problems addressed are tightly interconnected, and the distinction between the local and the global level is in many ways only a theoretical and operational one. Environmental problems like global warming, desertification or water shortage are part of a general societal knowledge, whether at a local or global level, but while there may be awareness there is little understanding or appreciation of the potential for harm. Furthermore, while these problems cannot be dealt with only at the individual level or within local communities, neither can they solely be solved at government and international levels. It is evident that while the relationship between the local and the global can be distinguished on the plane of analysis, these distinctions become irrelevant when we speak of people's experience.

Beyond its specific and important role in building up scientific knowledge, environmental psychology is fundamentally an applied discipline, and this makes it highly relevant to contribute to environmental policy. Dealing with environmental problems needs evidence based policy-formulation, and environmental psychologists have a crucial role to play in this respect. In order to achieve this, environmental psychologists work in collaboration with other psychologists such as social, cognitive and occupational psychologists, as well as other disciplines and professions such as educationalists, environmental scientists, engineers, architects and planners. This is particularly important in environmental matters. Although technical assessment and knowledge have an important contribution to make to the resolution of environmental problems like climate change, food supply and waste management, these problems are the product of maladaptive environmental behaviour and thus also need the contribution of social scientists such as environmental psychologists. Only interdisciplinary approaches will provide effective strategies to address the major socio-environmental challenges of this new century.



GABRIEL MOSER & DAVID UZZELL

(see editorial on this page)

EXTENDING THE SCALE

Global Change as Heuristic Challenge to Psychology

BY KURT PAWLIK

► Traditionally, subjects of psychological research, both fundamental and applied, tend to be conceived at the individual level: the mind, conscious experience, or overt behavior are all studied in their characteristics and laws of functioning within a single person or organism. Many a researcher, from behaviorists like Skinner to clinicians and neuroscientists, has been emphasizing the individual person or organism as the „natural“ unit of analysis and theory development. This holds equally true of general experimental psychology and individual difference research, of developmental or social psychology. And starting the analysis from the level of the individual, rather than from larger social contexts, actually distinguishes social psychology from sociology or some of environmental psychology from social geography, for that matter.

In this way, methodological advances in the study of human behavior has remained somewhat „privatized“ within quarters of psychology, although advanced psychological methods of in-field or ambulatory recording of behavior (Fahrenberg & Myrtek, 1996), of time-series techniques for analysing behavioral development, or of multivariate analysis of multidimensional data arrays could also be useful for other environmental sciences.

It was only in the 1960s/70s that psychology began to expand more and more this heuristic scale, extending the scope of analysis from the individual to larger units of study: in organizational psychology, in research on mass media communication, or in such new approaches to ecological psychology as in prisoner-dilemma work on common goods (see Pawlik & Stapf, 1992, for an earlier summary). More recently, research on psychological dimensions of global (climatic and social) change has increased this challenge to psychology: to conceive of human perceptions and knowledge, attitudes and behavior in wider and more distal contexts of macro-environ-

ments (from regional to global levels). For example, agencies of behavior reinforcement that remain distant in time (over generations) and/or space (over continents), and input to human behavior that is no longer directly open to the senses but only comes in the form of mediated information (as on climate or demographic change) (cf. Pawlik, 1991, 1992). Environmental conservation, large-scale (i.e. trans- and intercontinental) migration, or the new forms of fundamentalism growing out of (or seeking justification in) religion may serve as examples.

In order to meet these demands on behavioral science, psychology will have and need the opportunity to expand its scales of analyses in the study of human cognition and action planning (executive functions) or in the range of antecedent and reinforcing variables operating on behavioral learning and maintenance and on attitude formation.

The contributions to this special IHDP Newsletter highlight some ways and means psychologists have been developing in this direction already. Not only will such expansions of psychology's traditional scale of study enhance the input the discipline can (and should) have on other social sciences working on global change – most likely they will also further theory development, in particular towards enhanced ecological validity, within the discipline itself.

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REFERENCES to this article are included on the IHDP website at www.ihdp.org/updatepsych04/references.htm

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UNDERSTANDING GLOBAL CHANGE

What Psychology Can Contribute

BY PAUL C. STERN

► **Psychological science and its insights have not been fully** utilized for understanding environmental change. Yet psychology can contribute in at least three ways: by providing empirical checks on armchair psychologizing, such as about the causes of environmentally destructive behavior; by providing theory and evidence to understand individual behaviors that are important for causing or responding to environmental change; and by contributing to analysis of inherently interdisciplinary human dimensions issues, such as the design of institutions and of decision support systems for environmental management and response.

CORRECTING MISCONCEPTIONS

Many widely held beliefs about how human behavior causes or might alleviate environmental degradation are only plausible commonsense propositions, accepted more on faith than evidence. Behavioral analysis and research give reason to revise several of these beliefs¹. Here are a few examples:

1. Individual choice. Although many people attribute environmental degradation to individual choices, the predominant proximate causes of most types of pollution are the actions of organizations, not individuals and households. Even for carbon dioxide emissions in the United States, which are so strongly associated with private motor vehicles, the direct contribution of individuals and households is slightly less than half.
2. Values and attitudes. The idea that to preserve the environment, people's attitudes must change, especially in the wealthy countries, is widespread among natural scientists². There are several problems with this belief. First, pro-environmental attitudes are already strong in most of the wealthy countries³. Also, the connections of values and attitudes to behavior are rarely strong because behavior also depends on a variety of other factors, such as the infrastructure, incentives, and institutions affecting the behavior, the difficulty of the behavior, and individuals' abilities and knowledge regarding performing attitude-consistent behaviors^{4,5}. In most cases, the key to behavior is its immediate context, not deeper values. Changing values may have a large influence on behavior in the long term, but mainly an indirect one, by affecting policies, institutions, or incentives that shape behavior.
3. Education. Some believe that education and increased awareness are the keys to solving environmental problems. Research shows, however, that educational interventions by themselves typically have little or no effect on behavior in the short term^{4,6}. Broader environmental education, such as the widespread recognition of the ecological effects of pesticides that followed the publication of Rachel Carson's *Silent Spring* in 1962, may have large effects, but little is known about why some major scientific findings lead to widespread changes in public understanding, social movement activity, and public policy, while others do not.

4. Motivation. Some believe that warning people of environmental disasters will motivate conservation behavior, but voluminous research on the persuasive use of fear appeals and vivid imagery questions this belief. Perceived threats tend to induce adaptive coping only when the threats are perceived to be severe and personal and when cost-effective responses are known and available. High threat without the perceived ability to cope leads to maladaptive responses such as minimizing the danger or unfocused emotionality. As with attitudes and education, the effects of efforts to motivate depend on other variables.

UNDERSTANDING INDIVIDUAL BEHAVIOR

Several kinds of individual behavior are significant in causing or responding to global change. They include political or social movement activism on environmental issues, non-activist behaviors in the public sphere (e.g., support for or acceptance of public policies), private-sphere behaviors (e.g., purchase and use of environmentally significant consumer products), and efforts to influence environmentally significant choices of organizations⁵. The great majority of research from psychologists has addressed everyday private-sphere behaviors such as household energy use, participation in recycling programs, and „green“ consumerism. It has drawn on various theories, including the theory of planned behavior⁷, theories of basic human values⁸ and of altruism⁹, and theories linking behavior to basic worldviews¹⁰⁻¹².

Controversy continues about the extent to which individuals' environmentally significant behaviors can be meaningfully analysed as a single class with a common set of determinants. Evidence is increasingly pointing to the conclusion that the relative importance of different determinants of behavior varies depends on the type of behavior. For example, a U.S. study of 17 self-reported behaviors and behavioral intentions revealed three distinct clusters: consumer behaviors, environmental citizenship (voting, writing to public officials), and policy support (expressed willingness to sacrifice economically to protect the environment). Activism, measured as participation in environmental demonstrations and protests, fell outside any of the clusters¹³. Further analysis indicated that a theory linking basic personal values (including altruism) and beliefs about the consequences of actions for valued objects to feelings of personal obligation to act (personal norms) accounted better for behavior across the non-activist clusters than three other theoretical accounts tested. However, none of these social-psychological theories provided a satisfactory account of environmental activism. There were significant differences across clusters in the best behavioral models, though, with personal pro-environmental norms being the only social-psychological element common to the best behavioral models of all three types of non-activist environmentalism. The evidence suggested the need both for a general theoretical account of sup-

port for environmental movement goals and for more specific theories to account for particular kinds of environmentally significant behavior. This study is far from the last word: research and controversy continue on which psychological accounts are most useful for explaining these behaviors and about how well particular explanations work across types of behavior.

There are obvious limits to how much of individual behavior can be explained as a function of values, attitudes, personal norms, and other social-psychological factors. Although research is still seeking coherence, it seems useful to distinguish several classes of determinants: attitudinal factors (including values, norms, and worldviews); personal capabilities (e.g., knowledge, skills, available time, literacy, social status); habits or routines; and contextual forces, including interpersonal influences, community expectations, advertising, laws and regulations, monetary incentives and costs, infrastructure (e.g., public transport, recycling systems), technological possibilities and constraints, and the broader social context (e.g., government responsiveness to public opinion, the world price of oil, interest rates in financial markets)⁵. Psychologists tend to emphasize the earlier items on this list, but all can be important, and their relative importance can depend on the behavior. Moreover, the causal factors may interact. For example, attitudinal factors can become more influential when contextual factors do not exert strong pressures on behavior¹⁴, and even strong financial incentives may fail to change behavior unless information is provided in effective ways¹⁵. For these reasons, conclusions about the causes of individual behavior are unlikely to generalize to contexts with very different infrastructures, institutions, or incentive structures. Psychology alone cannot produce adequate understanding of environmentally significant individual behavior. An interdisciplinary approach is needed in which insights and concepts from psychology are combined with those from economics, sociology, and other relevant disciplines.

DESIGNING INSTITUTIONS AND DECISION SUPPORT SYSTEMS

Psychology has contributed, and can contribute more, to the understanding of processes beyond the individual that are important to global environmental change. There is room here to outline only two examples.

The IHDP project on Institutional Dimensions of Global Environmental Change focuses on global, international, national, and local institutions and their relationships across scales. Although psychologists have not been heavily involved in that project, psychological research on cooperation in social dilemma situations can contribute by helping clarify the specific characteristics of individuals, situations, social groups, and institutions that predispose individuals to do their part, and the mechanisms by which these factors operate¹⁶. For example, communication among people experiencing a social dilemma consistently increases cooperation. Possible mechanisms include a sense of group identity or solidarity, which may be enhanced by efforts to decrease social distance among individuals, and the elicitation of commitments to cooperate or norms of reciprocity, which may be

strengthened by opportunities to sanction violators of commitments^{16,17}. Although these findings come from laboratory simulations, they are consistent with observational evidence and have implications for real-world institutional design. Experimental research can help determine which of the factors associated with contributing to resource maintenance in real-world situations are causally related to this behavior and can thus indicate the potential of various interventions to improve institutional effectiveness. Much more can be done to engage psychologists in testing hypotheses that emerge from observational research and to engage practitioners in implementing policies that have been demonstrated in controlled experiments to be efficacious.

A critical human dimensions issue, not now adequately addressed by any scientific body, is how best to inform adaptations and responses to global environmental change. This is not a simple matter of translating available scientific results into non-specialists' language and spreading the word^{6,18-20}. It requires social processes informed by social science knowledge. Effective and responsive information systems must take into account the information processing characteristics of decision makers^{21, 22}; understand and address all the implications of environmental conditions that decision makers consider important²³; cope with the fact that scientific uncertainties, disagreements, and unknowns breed multiple and conflicting messages^{18,19}; and organize two-way communication processes that encourage scientists to produce information that is decision relevant and enable citizens to participate meaningfully in collective decisions^{18-20,24}. Cognitive and social psychology are among the fields that provide knowledge bases needed to design the information and decision support systems required for effective individual, organizational, and governmental responses to global change.



REFERENCES to this article are included on the IHDP website at www.ihdp.org/updatepsych04/references.htm



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FROM LOCAL TO GLOBAL

A Case of Environmental Hyperopia

BY DAVID UZZELL

► Even though it was over thirty years ago when René Dubos coined the phrase ‘*Think Globally, Act Locally*’, we are now appreciating more than ever that not only do local environmental actions have profound global consequences, but local agendas are increasingly informed by global perspectives and processes.

The mass media play a critical role in structuring and defining reality and the crucial issues of the day by selecting, interpreting, emphasising and then publishing peoples’ reactions to the visually spectacular and dramatic nature of environmental disasters. High profile scientific and political conferences such as the 1992 *UN Earth Summit* in Rio de Janeiro and the 2002 *UN World Summit on Sustainable Development* in Johannesburg as well as the expanding membership of international organizations such as Friends of the Earth and Greenpeace have led to a growing ecological awareness and concern amongst the world’s population. Each of these communication forces has at least one important feature in common: intentionally or unintentionally, they emphasise the seriousness of global as opposed to local or even national environmental problems.

Notwithstanding this, it should not be assumed that a heightened environmental awareness of global issues will automatically lead to public adoption of more sustainable lifestyles¹. Psychological research suggests that people are more likely to worry about issues according to personal interests, experiences and group membership; inevitably these are more likely to be within their local social and place experience. It has been argued that people have difficulties understanding and assimilating complex, distant problems², and that individuals only see the environment in terms of what is immediate and local³ and where a threat is personal, direct and immediate⁴.

There has been comparatively little research on either the perceived impact of hazards on the environment compared with the self^{5,6,7} or the differential perceptions of local/global environmental problems and their effects⁸. Such a distinction, however, could be crucially important in terms of understanding the public’s perception and attitudes towards environmental problems as well as understanding their subsequent behaviour and feelings of responsibility for action. Dunlap *et al*⁹ found that when respondents in twelve industrialised countries were asked to rate the quality of the environment a) in their local community, b) in their nation, and c) of the world as a whole, 20.5% of respondents rated the quality of their local environment as bad or very bad, compared with 30.9% who rated the quality of the national environment as bad or very bad, and 79.3% who rated the quality of the global environment as bad or very bad. Dunlap *et al* also found that respondents from developing countries were far more concerned about local environmental problems than respondents from the industrialised nations.

As Bonaiuto *et al*¹⁰ point out, although environmental issues are increasingly seen as international in terms of extent,

impact and response, social psychological studies have traditionally treated them as decontextualised and locally centred. Not only has the local/global environmental dimension been minimised, but perhaps more significantly the local/global *social psychological* effects have also been minimised.

ANTIPODEAN PERSPECTIVES ON GLOBAL ENVIRONMENTAL PROBLEMS

Do people have a greater concern about environmental problems at the global level or can they only relate to the immediate and local? A programme of research has been undertaken at the University of Surrey (UK) seeking to answer this question. In the study reported here, students reading for degrees in geography, environmental studies, environmental sciences or environmental education were sampled in three very different parts of the world: England, Slovakia¹¹ and Australia. It could be reasonably assumed that this sample would be aware of local, national and global environmental problems. However, there is evidence that biases in environmental perceptions are not limited to the public; environmentalists and scientists display marked distortions in their estimates of risk¹².

Each group was asked about the seriousness of seven environmental problems (i.e., water pollution, atmospheric pollution, the effects of acid rain, global warming, noise pollution, deforestation and holes in the ozone layer) in terms of the seriousness of the environmental problems ranging from their impact on the individual, through the impact on their local area, the country, their continent and the world. Respondents were asked to rate the degree of seriousness on a five-point rating scale varying from 1 (extremely serious) to 5 (not at all serious) for each of the areal levels. The second part of the study sought to investigate the impact of these local/global environmental evaluations on feelings and attributions of responsibility for action.

The ‘headline’ finding from the study is that environmental problems are perceived as being more serious at the higher areal levels than the lower areal levels (Figure 1). Although there were no significant differences between perceptions of severity at the self and local area levels, there were significant differences between the remaining areal levels. Environmental problems were perceived as more serious at a global level than their effects at the continental, country, town or individual level. Similarly, problems at the continental level were viewed as more serious than at the country, town or individual level, and problems at the country level were viewed as more serious than at the town or individual level. This pattern held true for each nationality with the minor exception in the case of the Australian sample; for understandable reasons they made no distinction between the severity of environmental problems at country and continent areal levels.

It was found that perceived individual responsibility for the environment is greatest at the neighbourhood level and decreases as the areal level becomes more remote. There was a

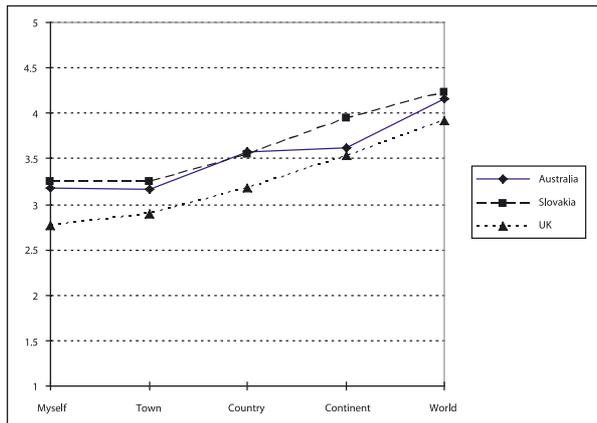


Figure 1:
Perceptions from Australia, Slovakia and the UK

similar hierarchical structure to respondents' conceptualisations of feelings of responsibility for tackling environmental problems, although in this case the relationship was reversed. Respondents considered themselves to be *least* responsible for solving global environmental problems, with slightly more responsibility being ascribed to the local community and environmental groups and more responsibility still to national governments and international agencies. There was a consensus amongst all three national groups concerning the relationship between level of responsibility and spatial scale. Ironically, then, although people feel that they are responsible for the environment at the local level this is precisely the level at which they perceive minimal problems. The areal level which they perceive has the most serious environmental problems is the areal level about which they feel least personally responsible and powerless to influence or act.

Although the public may express concern about the environment, responsibility for environmental destruction, degradation and remediation is seen in many cases as lying outside the control of the individual or even the community. One potential consequence of this is a perceived lack of control which may lead to denial, reduced feelings of self-efficacy¹³ and inaction. Another implication for public education is that statutory and voluntary organisations are trying to raise the public's level of environmental concern and change their behaviours at precisely the level which the public see as unproblematic.

EXPLAINING ENVIRONMENTAL HYPEROPIA

One might look to various theories in psychology to account for what I have termed environmental hyperopia – psycho-physiological, social learning, cognitive coping strategies, optimism bias, risk theories through to more social psychological perspectives such as social dilemmas and social representations; these are discussed elsewhere¹⁴. For example, direct experience of environmental changes at the human psychophysical level is unlikely because the physical signals of global environmental change are way below the thresholds of discernability of human sensory and memory mechanisms¹⁵. For example, temperature changes as a result of global warming are predicted to rise by 1.5°C – 4.5°C over 40 years, or by one tenth of a degree per year. Yet in a maritime country such

as the UK the diurnal variation in air temperature in the spring is about 9°C, and in the summer can be as much as 17°C. Pawlik refers to this as the low signal-to-noise ratio of global change, where the signal of global environmental change is small in value and slow in time, and the noise of observable changes due to circadian, seasonal and regional temperature changes is large.

Processes of global environmental change operate across considerable socio-spatial and socio-temporal distances; it is often the case that environmental problems are exported from one region to another. An individual who receives the benefits of an environmentally damaging action may neither suffer nor be aware of the consequences of it. As social learning is facilitated by the interpersonal proximity of the individuals involved¹⁶, learning, through feelings of responsibility and/or empathy with the victim will thus be inhibited¹⁵.

It is noteworthy that the issue of *scale* is a key analytical theme in IHDP's Institutional Dimensions of Global Environmental Change Project; i.e., to what degree do assumptions and mechanisms which influence and govern institutional use of human resources at the local level apply at the international level and vice versa? Is it possible to 'develop a unified theory of environmental governance that holds across levels of social organisation?' These questions are no less relevant to individual and community action. The fact that people relate to distant places and events and are moved to act in response to both acute disasters and chronic conditions means that they are able to translate across scales. The development of 'Fair Trade Towns' is a novel example of how whole communities are addressing global equity issues and seeing opportunities to identify with and help the less fortunate of the world (http://www.fairtrade.org.uk/get_involved_fair_trade_towns.htm).

Research has demonstrated that social cohesion and identity may be important drivers and conditions for a community-based acceptance of sustainability policies and practices¹⁷. Furthermore, social identity processes manifest themselves in place and national identity which in turn affect the perception and evaluation of environmental hazards such that people who are more attracted to their town or their nation tend to perceive their local and national beaches as being less polluted¹⁰. While one might address the problem of sustainability at an individual level, it would seem that any long-term environmental and sustainability strategy has to be located in the relationships which exist between people in the community and the relationship between those people – individually and collectively – and their environment at every scale. If change can come about through social and collective action that is grounded in identity processes and people's identification with place, then we need to devise social and political strategies that recognise these processes; this may involve educating for global identity.

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REFERENCES to this article are included on the IHDP website at www.ihdp.org/updatepsych04/references.htm

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HUMAN RESPONSE TO POPULATION GROWTH AND ENVIRONMENTAL CHALLENGES

The Indian Experience

BY TARA SINGH AND GIRISHWAR MISRA

► As one of the leading developing countries, India has been vigorously engaged in pursuing the goals of equality of opportunity, sustainable development and ensuring the quality of life for its rapidly growing population. While population growth is placing extra pressure on national resources¹, the forces of industrialization and urbanization have accelerated the exploitation of natural resources and demographic shifts creating a situation culminating in not only life threatening health hazards but also ecological imbalance^{2,3}. The situation is further complicated by the inequalities ensuing from the socio-economic features of Indian culture (e.g., caste, sub-cultural differences, pattern of land distribution) that often make the poor the main victims of development that suffer the most. The net result is that the rural-urban divide and gulf between the rich and poor has widened. Urban planning in India presents examples of the growth of uncontrolled settlements, inadequate provision of a necessary infrastructure and the absence of a long-term perspective⁴. One of the key questions is how one promotes the idea of sustainable development to a population that sees the West enjoying the benefits of consumerism but which at the same time is telling Third World countries that they should not enjoy the same benefits.

THE KEY CHALLENGES

India is the world's largest democracy and the world's fourth largest economy. It is also characterized by ethnic, cultural and linguistic diversity. However, despite its impressive pace of growth in almost all fields, the process remains incomplete and fragile due to the high rate of population growth, poverty and environmental degradation. India's population growth is much higher than the world standard; it has grown nearly four times during the last century from 238.4 million in 1901 to 1027 million in 2001. The overriding challenge must be to control population growth and lift some 300 million of its citizens out of poverty and to ensure equality of opportunity, sustainability of development and a satisfactory quality of life, notwithstanding the fact that these are becoming more complex and urgent in the context of global change.

The pressure on environmental resources as a result of the need to produce more food and environmental degradation as a consequence of the demands of high production are obvious consequences of unsustainable approaches to development. A large proportion of India's population is constantly exposed to environmental problems like inadequate housing, dirty and noisy surroundings, pollution, contamination of water, shortage of food, fuel, fodder, no or inadequate access to health, education and security services⁵. India is facing a resurgence of infectious diseases like malaria and hepatitis. At the same time, typically Western diseases of affluence such as cancer, heart disease and diabetes are also advancing rapidly and may reflect an unsustainable approach to development. Despite the high pace

of industrial production, the urban environment is deteriorating faster than ever and most Indian cities are facing severe environmental crises. Various kinds of disasters result due to the indiscrete use of natural resources, while development activities (e.g., dam construction) create additional human problems such as the uprooting of people and severe demands on resettlement plans.

POPULATION GROWTH AND ITS CONSEQUENCES

The high rate of population growth in India is directly linked to poverty, inequality, environmental degradation, and the quality of life of people^{6,7}. Rapid and persistent population growth has strained the country's capacity to address pressing environmental and social issues, leaving a large section in poverty and driving a downward spiral of economic misery¹. Increasing pressure on local resources, infrastructure and services is forcing people, especially the poor farmers, fishermen and labourers to over-exploit the fragile ecosystems with damaging results. Although population pressure is only one among many causes of environmental and social problems, by driving downward a spiral of poverty and as a key catalyst of poverty-led environmental degradation, it can make these problems much more difficult to solve. Also, by diminishing the share of services and natural resources, population pressure is ultimately forcing people to migrate to urban areas or elsewhere in search of opportunities for employment and livelihood. Although poverty is always attributed as cause of environmental degradation, there is evidence to show that environmental degradation in India has been the result of the combination of poverty, population increase, resource constraints and a lack of appropriate agricultural technology. Where population pressure on the land is not strong, livelihoods – albeit under poverty conditions – may be compatible with appropriate natural resource management. There are examples of poor people, especially tribal communities, who co-exist in harmony with their marginal environments. However, such examples are becoming fewer as population pressures strain against the boundaries of fragile lands. Therefore, poverty poses the most serious environmental threat because the millions of people who live near the subsistence minimum have to exploit natural resources to survive.

POPULATION GROWTH, POVERTY AND ENVIRONMENTAL DEGRADATION IN THE URBAN ENVIRONMENT

Population pressure is fuelling very rapid urban growth due to impoverished rural migrants' movement towards cities. The accelerated rate of urbanization is leading to dangerous, overcrowded and unplanned settlements, with poor sanitation, lack of clean water and serious air pollution. Thus, overcrowded Indian cities impose heavy burdens on the environment. The poor residents often lack adequate shelter, easy access to clean water, toilets, or electricity, inadequate sanita-

tion and water supply with recurring endemic diseases such as gastroenteritis, dysentery, diarrhoea and malaria, all of which have a devastating and long-term impact on the health of the urban poor and slum dwellers who live in grossly subnormal living and environmental conditions⁴. Paradoxically, due to the unavoidable conditions, slum dwellers do not perceive living in a slum as a problem, rather they perceive it „as a solution to their problems“⁶⁸. Psychological studies of slums and slum life can enhance our understanding of the relationship between the physical and social environment and its consequences for well-being; moreover, they can provide culture-specific responses to environmental problems⁹.

SURVIVAL IN A CHANGING RURAL ENVIRONMENT

The dynamics of population growth, poverty and environmental degradation in rural areas is somewhat different. The loss of traditional rights and control over natural resources due to new forest bill and environmental policies, draught, frequent floods, various kinds of socioeconomic deprivations, and new and acute problems created by the prevalent model of development challenge the very survival of villagers. The destruction of forests in India has meant the annihilation of the social, cultural, and economic life of the tribal people¹⁰. The new culture created by the cash economy has alienated people psychologically from their ecosystem. There is growing evidence that poverty generated and sustained by the prevalent economic system and the social structure^{6,7} has compelled the poor to live in impoverished and inhuman environmental conditions and to struggle to meet their bare minimum needs. Psychological studies on poverty in India have focused on its diverse consequences^{11,12} that make the life conditions of the poor dysfunctional. Such findings have logical implications for interventions at the individual and community levels¹³. Although there is a wealth of psychological research on poverty in India that sheds light on psycho-social mechanisms and outcomes, the social and physical aspects of the environment warrant concerted research effort¹⁴. Recently some psychologists,^{5,14,15,16,17,18} focusing on poverty and environmental issues in India, have seriously questioned the prevailing model of development¹⁹. Since poverty restricts the self-sustaining aspect of development, efforts must be made to overcome poverty conditions. Also, values sustaining inequalities have to be challenged and collective interventions have to be made to address the issue of poverty, population and environment.

THE COLLECTIVE RESPONSE

The efforts of a number of grass root voluntary organizations in India have shown some innovative ways that poverty alleviation can go hand-in-hand with achieving a better environment, allow the control of the rural poor over natural resources and enhance their capacity to engage in the sustainable management and use of available resources. Questioning the direction of development planning in terms of cost, benefits, sustainability and equity, organized movements are calling for a new model of development that guarantees benefits for all without stripping the environment and destroying the sources of livelihood especially of the poor. Although the activities of peoples' movements with an environmental vision are often in conflict with government plans and policies⁵, they have the potential to address the

issues of population, poverty and environment. As civil society in India has pioneered „public interest litigation“, Indian courts have become important players in environmental protection, partially filling the vacuum left by the State's indifference and inaction. However, environmental awareness and education is the first step towards any initiative against environmental degradation. As an individual's level of awareness largely depends on cultural and personal values^{20,21}, large scale studies are needed to examine specific values of Indians including policy makers and administrators⁵, as well as to examine the level of ecological awareness, attitudes and behaviours that may maintain and nurture pro-environmental endeavours. Environmental psychologists have a role to play in the construction of a „reality map“ of environment-behaviour relationships which in some ways recovers the symbiotic perspective of reciprocal influence, complementarity and connectedness rooted in and reverberating through the meaning systems and practices of Indian culture.

THE KEY QUESTION

In facing the twin crisis of environmental deterioration and unsustainable development, India strives to accord priority to care for its own environment and natural capital and is committed to play a crucial role in international efforts to establish an effective system of just cooperative management of these issues. However, one key question remains – how to encourage people to adopt the idea and practice of sustainable development? On the one hand the apparent glamour of stereotypical Western consumer lifestyles is irresistible, yet on the other the West is telling developing countries such as India that they should not aspire to the same lifestyles. In fact, India's efforts to make a transition towards a sustainable development pathway will depend largely on what the more industrialised countries do to reduce the disproportionate share of their impact on the environment through unsustainable patterns of consumption and production. The global ecological crisis needs to be solved in an equitable way through partnership and collaboration based on the principle of „common but differentiated responsibility“ (Rio Declaration). Thus, development goals, population control, poverty eradication, and provision for basic amenities should be the top priority, and environmental concerns need to be integrated into these development objectives. Also, there is need to change economic and social behaviour in order to save the environment and maintain its life nourishing qualities. It is the right time to listen to Gandhi who realized that nature has enough in its treasure to meet our needs but not our greed. In the wake of diminishing natural resources on the one hand and growing population on the other, we are left with no other option for survival.



REFERENCES to this article are included on the IHDP website at www.ihdp.org/updatepsych04/references.htm



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SUSTAINABLE DEVELOPMENT AND RISK ANALYSIS

Complementary Frameworks

BY MARCELA ACUÑA-RIVERA

► **Sustainable development has been advocated since the 1992 UN Earth Summit in Rio de Janeiro** (and arguably thirty years before with the publication of Rachel Carson’s Silent Spring in 1962) as an essential shift in the policies of governments globally in order to reduce threats to both human beings and the environment: development should be reconceptualised if a better quality of life is to be achieved both for present and future generations.

The ‘sustainable development’ and ‘risk analysis’ research literatures are typically distinct with little shared discourse. Even though sustainable development is usually conceptualised within a larger framework than risk analysis, in this paper it is argued that sustainable development has to incorporate a risk perspective in order to achieve its goals, since risky societies are unsustainable and unsolved threats impose more risks to present and future generations. Likewise, risk analysis scientists and decision makers need to take into account the philosophy and precepts of sustainable development in order to understand more holistically the causes and consequences of environmental threats and risk behaviours.

Sustainable development and risk analysis frameworks are reciprocally related and relevant (Table 1). Sustainability suggests that environmental threats ought to be analysed across their economic, environmental and social dimensions (UN, 1987). While one might see political processes embedded within the three pillars of sustainability it is instructive to separate out political factors as a fourth dimension because of the key role that governments and policy makers play in advancing or limiting sustainable development. Arguably, risk analysis has not considered thoroughly the political dimension.

Current governmental decisions seem to be driven by the economic dimension. As the Sustainable Development Commission in the UK asserts: the global economy has become an overarching system „within which... Human societies, communities, ecosystems, and habitats are all seen as subsystems... (SDC, 2003, p.2)“. Such a view implies a misunderstanding of sustainable development. Within the risk analysis approach such a misconception has been discussed, and

inter- as well as intragenerational consequences have been outlined (Ahearne, 2000; Okrent and Pidgeon, 2000; Belzer, 2000; Shrader-Frechette, 2000). However, new means of implementation have not been identified yet.

Part of the process of achieving more sustainable societies requires the identification of appropriate indicators to monitor change and progress. But one has to ask the question, how is it that developing countries are evaluated with same indicators as developed countries if they do not share same realities? Whose problems are taken into account to establish world priorities? According to World Trends (UN, 2002), it seems that the high standards of living that developed countries enjoy continue to have a serious and damaging effect on the global environment and impose new threats to life. It could be said that developed countries act as leaders and supervisors of environmental world trends, irrespective of their own performance or indirect environmental impact towards other countries.

Sustainable development recognises that global changes are largely caused by human action, and empowering people is a key issue. However, the psychosocial dimension has been approached with less attention and clarity than either the environmental or economic dimensions. This represents a challenge for psychologists and other social researchers who have the potential to make a significant contribution to sustainable development policies and programmes.

Theories and concepts that have been developed within the risk analysis framework might have equal applicability to the psychosocial dimension of sustainability. As an example we can cite the psychometric paradigm within risk perception (Slovic, 1987), the development of mental models (Bostrom et al, 1998), and the social amplification of risk (Kasperson, 1992).

The theoretical and methodological approaches adopted within sustainable development and risk analysis are different but complementary; it may be beneficial if the lessons learnt in one research domain were tried and tested in the other. Both frameworks focus on environmental threats and the consequences of human behaviour. Gray and Wiede-

	Sustainable Development	Risk Analysis
AIM	To meet present needs without compromising future ones, and to reduce and mitigate threats and hazards to human beings and the [natural] environment	To reduce uncertainty by risk assessment in order to mitigate vulnerability through risk management
Psychosocial	To promote responsible environmental behaviour	To encourage safety behaviours
Environmental	To use and conserve natural resources	To conserve natural resources and manmade environments
Economic	To allocate financial resources now to avoid present and long term threats	To allocate financial resources now in order to avoid or reduce present and medium term threats
Political	To support environmental decision making and policies and regulations	To foster democracy

Table I. Comparison between the sustainable development and risk analysis approaches

mann (199), for instance, assert that sustainable development is focused on benefits (a positive perspective) and centred on social and economic systems. Likewise, risk analysis is concerned with losses (the negative side) on individuals and groups. Both frameworks are future oriented, although at different scales (see Table 1).

In summary, decisions about the future health of the planet and the research that needs to inform progress have to take into account benefits and losses, the local and global, present and future, individuals and societies, natural and manmade environments, and so on. The cross-fertilisation of concepts and approaches between sustainable development and risk analysis may improve the scientific contribu-

tion social scientists make to policy and decision making to address environmental and social threats at all governmental levels and at different scales; it could also lead to improvements in theory and methodology developments for the benefit of the social sciences.

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REFERENCES to this article are included on the IHDP website at www.ihdp.org/updatepsych04/references.htm

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SOLID ENVIRONMENTAL POLICY NEEDS VALID ENVIRONMENTAL PSYCHOLOGY

BY CHARLES VLEK AND LINDA STEG

► As the science of human behaviour, psychology is indispensable to understand and manage global warming and climate change. Psychology is needed:

- to clarify the behavioural and social processes underlying greenhouse gas (GHG) emissions,
- to chart the effects of climate change on people's well-being and their everyday functioning,
- to specify effective behavioural strategies for reducing GHG emissions,
- and to assist policy-makers in securing the cooperation of different target groups.

Above all, psychologists may elucidate the perceptions and attitudes about environmental changes, maintained by different stakeholder groups as a basis for continued inertia,

for business-as-usual, or for strategic change and policy acceptance. To be effective, policy communication must be carefully tuned towards those perceptions and attitudes.

Psychology harbours different conceptions of man. These vary from an instinctive automat via a learning animal to a constrained decision-maker driven by personal and social values. Fully informed, deliberate utility maximization is a neoclassical economist's construction of the 'sovereign consumer' (or producer) which does not exist anywhere. Instead, psychologists know much about people's short-term orientation, their uncertainty about values and preferences, their susceptibility to persuasive communication, the pitfalls of human judgment and decision-making, the sensitive conditions for cooperation, and the relative effectiveness of different strategies for behavioural change. Overcoming people's natural focus on here-and-now safety, comfort and wealth is a major challenge for long-term government policy.

ENVIRONMENTAL PROBLEMS AS COMMONS DILEMMAS

Forced global warming is a 'commons' problem, i.e. of safeguarding collective resources against overexploitation by individual consumers (Hardin 1968). An example is the enormous growth of motorized transport worldwide, with its increasing demands on fossil energy resources and its destructive impacts on natural landscapes, urban living environments and the global atmosphere. Systematic protection of a common good requires: (I) problem diagnosis, (II) policy decision-making, (III) practical intervention, and (IV) effectiveness evaluation. Each of these may be subdivided into specific issues; see Table 1.

This indicates twelve interrelated topics for researchers and policy-makers alike. It suggests a coordinated task division among experts from different backgrounds. For example, problem diagnosis (I) requires a natural-science description of atmospheric processes and likely environmental impacts, as well as social-science analyses of human activities yielding GHG emissions. Similarly, practical intervention

I. Problem diagnosis

1. Assessment of collective risk, stress and annoyance
2. Analysis of behavioural factors and processes underlying risk generation
3. Assessing problem awareness, risk appraisal and actors' individual values and benefits

II. Policy decision-making

4. Weighing of collective risk against total individual benefits ('need for change?')
5. If 'risk unacceptable': setting risk-reduction objectives
6. Translation of risk-reduction objectives into behavioural objectives

III. Practical intervention

7. Focusing on target groups and optimising conditions for policy effectiveness
8. Specifying behavioural alternatives and selecting policy instruments
9. Target group-oriented application of strategic programme of behavioural change

IV. Evaluation of effectiveness

10. Designing a monitoring-and-evaluation programme
11. Comprehensive evaluation of effects and side-effects
12. Intermittent and post hoc policy feedback, possible revision of policies

Table 1. Twelve key issues about the management of commons dilemmas (Steg & Vlek, in press 2005)

(III) requires social-scientific insights in human behavioural change, adaptation and acceptability, as well as technical knowledge about physical installations and equipment, and the environmental effects of their regular use.

In any commons dilemma the central problem is to achieve a sustainable balance between individual and collective interests. Relevant conditions affecting people's dilemma behaviour are reviewed by Kopelman *et al.* (2002) and Steg (2003); Stern *et al.* (2002) summarize institutional knowledge and questions. Environmental resource characteristics, consumer perceptions and attitudes, institutional arrangements, and well-tuned interventions provide keys for explaining resource use and preventing resource depletion.

ILLUSTRATION OF KEY ISSUES

Let us go by issues nr. 1-4, 6, 8 and 11 in Table 1, to consider some of the things psychologists particularly know, would advise or would warn about; see also Stern (1992) and Vlek (2000).

Issue 1. Psychologists consider environmental risk as a multidimensional concept which is more strongly related to accident scenarios and perceived control than to estimated (past) relative frequencies of disaster. Safety often depends on the degree to which people's coping potential (their knowledge, means and abilities) weighs up to their threat appraisal, i.e., the demands an external situation is perceived to put on them. Large-scale environmental risks tend to be neglected because of much uncertainty about future consequences and because most people think they are uncontrollable.

Issue 2. Human behaviour is variously determined. What drives climate-relevant activities may be 'rational' cost-benefit deliberation, but it may also be the desire for status, and/or the need to belong to one's community and live up to its norms. Day-to-day habits are powerful behaviour mechanisms. For example, motorized transport was established and is being continued through repetitive reinforcement of initial transport choices yielding attractive individual and social rewards. Breaking bad habits requires sophisticated therapeutic design aimed at changing people's needs, their opportunities and their abilities.

Issue 3. Environmental problem awareness may be severely constrained by the exigencies of everyday life. The future is hard to imagine anyway. Presenting vivid scenario information may well work, provided that assumptions and extrapolations are plausible and consistent. Raising environmental problem awareness by itself may fail if this is not embedded in more-encompassing policies indicating the way to be followed and the goals to be achieved. People's policy acceptance and their willingness to change resourceful behaviours tends to co-vary with their problem awareness.

Issue 4. Weighing collective risks against the many individual benefits of resource use is a typical government task. However, strategic decision-making may easily suffer from limited problem definition, biased search for alternatives, discounting of non-immediate consequences, 'group-think' under external stress, and preference reversals due to different framing of choice dilemmas. Such peculiarities may be suppressed via proper procedures putting the decision



process in an open, multidisciplinary atmosphere focused on common interests.

Issue 6. Policies often get crippled when environmental goals are not clearly translated into behavioural objectives. People will want to know how certain GHG emission reduction goals are to be achieved behaviourally. Thus, an indication of behavioural alternatives is essential. Conversely, one will want to know whether behaviour change is effective for achieving adopted policy goals. One policy hump here is to design, explain and get going for long-term scenarios incorporating several sustainability goals at the same time (see, e.g., Swart *et al.* 2004).

Issue 8. The (further) specification of behavioural alternatives and of policy instruments constitutes a pivotal condition for behaviour change. Feasibility implies that people understand and can implement an alternative and believe this may be effective in improving environmental conditions. There is much psychological theory and methodology for application to environmental problem solving. Strategies may be technological, juridical, economic, educational and/or organizational. Some lessons are: every strategy holds specific assumptions about behaviour determination; smart combinations of strategies work better than single strategies alone; and any policy programme should be well tuned to the problem at hand and the relevant target groups (see also Ostrom 2004).

Issue 11. Systematic evaluation of policy effects is an art in itself which is often not well applied in practice. Obviously, sustainable-development policies should be evaluated in terms of economic, social and environmental effects and side-effects, positive as well as negative ones, for different groups of people affected. Policy evaluation may help understand why public acceptance is as high or low as it is, and what could be done to operate more convincingly.

These and other psychological propositions following Table 1 may be specifically applied to different activity domains, such as household consumption, motorized transport and tourism. It appears that technical solutions often fail either through customers' lack of knowledge and understanding, or through 'rebound': the intensification of activities that have become less resourceful per unit. Examples are increased driving in cleaner cars and greater illumination using low-energy light bulbs.

CLIMATE POLICY IS ABOUT BEHAVIOUR CHANGE

Forced global warming mostly occurs through the abundant burning of fossil fuels, made possible by an entire industry of worldwide importance. Despite all attempts at energy saving, making engines cleaner, and purifying factory

exhaust fumes, modern society increasingly is a fossil-fuel society. Due to the usefulness, comfort, pleasure and status associated to motorization (of most everything, not just transport), we tend to put less value on alternative energy sources, on non-motorized activities and on de-motorization in general. At the same time, many citizens and organizations get increasingly worried about the decline of environmental resources, their own living environment and natural ecosystems at large. This is a true commons dilemma in which responsible citizens confront themselves (and well-established provider organizations) as environmental resource consumers.

Obviously, however, you can't have your cake and eat it too. Unconstrained fossil fuel use will inevitably cease to be a civil liberty. Psychological analysis may:

- deepen people's insight in the dilemma of consumer freedom versus environmental and social quality protection,
- emphasize the importance of future quality of life (economic, social and environmental),
- indicate the need for and the nature of comprehensive environmental policies,
- and advise on the promotion of social coherence and trust to effectuate policies.

In addition, psychologists may warn against the evasive behaviour ill-conceived policies may elicit, and against the unintended arousal of social resistance; and they may indi-

cate ways to overcome 'rebound' in using environmental technology.

Modern psychology comprises a variety of behaviour theories, each implying a different conception of what drives people most. Thus inducing behaviour change for the common good is not easy. But this apparent disadvantage may be exploited advantageously if problem definitions and policy designs are elucidated psychologically in order that more sophisticated diagnoses and better-tuned policy strategies may emerge. For well-inspired psychological contributions to materialize, however, it is important that psychologists collaborate with other scientists and with (stable-minded) policy makers. This demands innovative work structures aimed at reducing professional isolation.

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WATER USE AND MANAGEMENT IN THE LIGHT OF SUSTAINABLE DEVELOPMENT

Social Representations, Ideologies and Practices in Different Societal Contexts

BY GABRIEL MOSER, EUGENIA RATIU AND BERRADETTE DE VANSAY

► **Water increasingly appears to be a finite albeit fragile** resource and unequally distributed at both global and national levels. Disparity of access to water, and particularly to high-quality water, depends on geo-climatic conditions as well as on the financial and technical resources of the water authorities – whether State or private – and individuals. Beyond a traditional egoistic behaviour in the face of limited resources typically referred to as the „tragedy of the commons“ (Hardin, 1968; Thompson and Stoutemeyer, 1991), the emergence and maintenance of relationships compatible with sustainable development are hampered or encouraged by individual, environmental, and cultural factors. Ecological responsibility cannot be taken for granted. Sustainability is widely recognized as desirable – if not necessary – by the majority of western populations, but in spite of this, individual behaviour is difficult to promote, particularly because people consider their action as inefficient or insufficient in the context of the problem's scale (Uzzell, 1997); such perceptions of helplessness or futility inevitably impact upon the adoption of new behaviours.

Very many individual, contextual, and environmental factors influence the adoption of pro-environmental behaviour.

Commitment to action compatible with lasting development depends, at an individual level, on age, gender, levels of education and income, as well as the fact of living in an urban environment (Arcury & Christianson, 1990). The relationship to water also depends on having suffered the effects of a shortage and on the perception of risk (e.g., individual or ecological) associated with it (Rogers, 1983; Gardner & Stern, 1996). This is influenced by social uncertainty regarding the perception of the behaviour adopted by others, and by environmental uncertainty concerning the perception of the degree of abusive use and deterioration of the resource (Biel & Gärling, 1995). Resource preservation behaviour is also linked to knowledge of the long-term effects and to the perceived efficiency of individual action, and will depend on whether people have a functional or an ecological representation of the environment (Dunlap & Van Liere, 1978; Stern & Oskamp, 1987).

Attitudes and values attached to environmental problems are not necessarily good predictors of the behaviour adopted towards natural resources; perceived control, personal commitment and the saliency of these environmental problems as well as having been physically and/or emotionally touched

by them, seem to be much more powerful in predicting behaviour (Grob, 1995). Perceptions, attitudes, and behaviour regarding the environment are shaped by environmental conditions and the societal context (Lévy-Leboyer & al., 1996). Representations of water in various cultural contexts constitute filters through which people interpret the reality, and are a means of orienting individual and collective behaviour. At a perceptual level, an interpretation-evaluation of the context comes into play, and perceive water according to certain activities, behaviours, or meanings (Gibson, 1979; Moser, 1984). Cultural theory (Douglas & Wildavsky, 1984) clearly identifies these factors by attempting to explain the relationship between individuals and environmental problems according to their representation of nature, social relations and preferred behavioural strategies. Four profiles, each being connected to a particular representation of „nature“, represent the preferences for a certain type of environmental management according to the perception of efficacy of control (individual or institutional) and personally perceived vulnerability. Individualists have a conception of nature as benign, consider it as a robust and resilient system which cannot easily be disturbed, and consequently resources are controllable and one does not need to commit himself; hierarchists have a conception of nature as a moderately vulnerable system, which implies the necessity for institutional regulation; egalitarians share the myth of an ephemeral nature. Nature is seen as a fragile and precarious system and as such resources are not controllable; and fatalists have a conception of nature as capricious, unpredictable and versatile. Fatalists consider nature neither manageable nor foreseeable.

How do these factors relate to each other in countries with fundamentally different environmental and societal conditions? An international comparative approach analysed the role of the cultural context, the marked contrasts between ways of accessing water and its management, and identified the effect of culture in terms of differentiating behaviours towards water.

WATER USE AND MANAGEMENT IN DIFFERENT SOCIETAL CONTEXTS

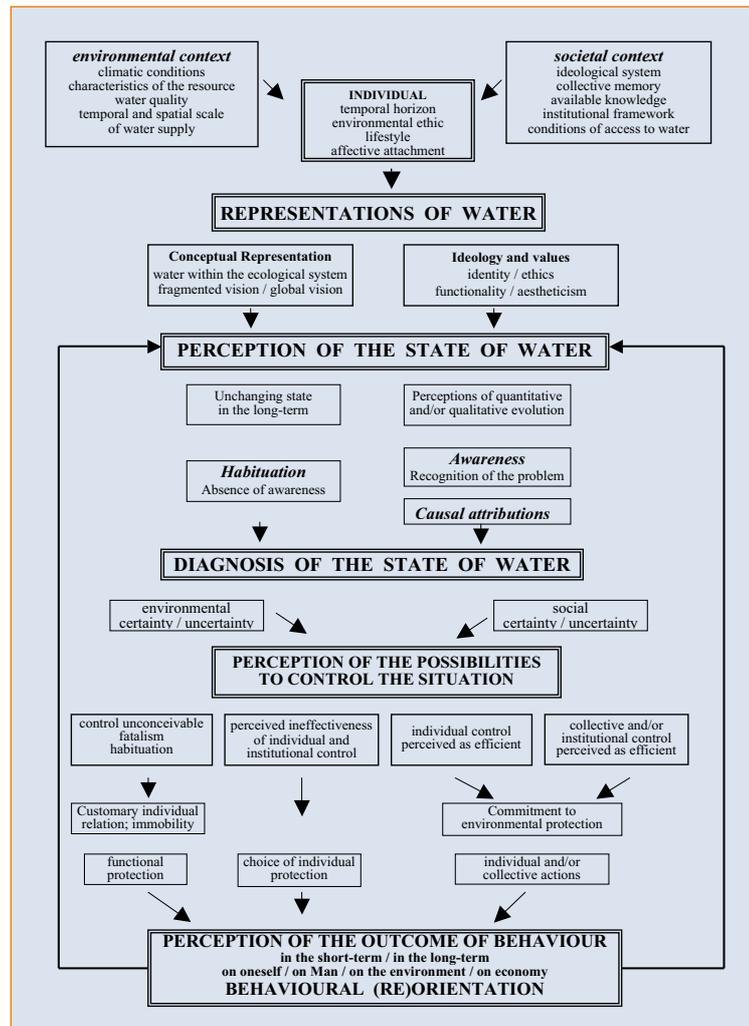
The research was undertaken in highly contrasting geographical, climatic, cultural and access conditions. Europe was represented by Munich, Madrid, Rennes, Limoges, Bordeaux, and Paris. In Asia, Jakarta and Osaka, represent diametrically opposed levels of development and lifestyles (the Japanese respect for hygiene is culturally opposed to traditional Indonesian behaviours). Ouagadougou, in Africa, is characterised by a growing population density and endemic water

shortage. Brasilia in South America, like Jakarta and Ouagadougou, is characterised by dramatic economic disparities affecting access to high quality potable water. Data were collected among a sample of water professionals in each country, public authorities, members of environmental associations, teachers and housewives with at least one small child. The interviews focused on various aspects of water: water as a heritage; domestic water and the associated public service; water as a product and its qualities; water as an element linked to health, well-being, and the living environment; water and its associated risks at a personal, local, national, and world level; and the uses of water and its

potential in generating conflicts (industrial and agricultural production as opposed to the supply of drinking water and the functioning of the ecosystem).

Relationships to water in different countries

The growing awareness of water-related problems is made easier by the perception of changes in water quality or water supply and of the seriousness of risks linked to these changes. This awareness is dominant amongst those who have a global, ecological vision rather than a fragmented one. A functional relationship to water dominates amongst the underprivileged and those affected by inequalities in the access to potable water and accustomed to precarious conditions, notably in the



developing countries (e.g., Ouagadougou, Jakarta, Brasilia). This type of relationship is accompanied by the adoption of short-term individual protection solutions. On the other hand, perception of the resource as abundant along with economic security leads to an over-consumption of water, justified by the preservation of comfort and personal pleasure (Brasilia). The perception of the effectiveness of control and of individual vulnerability, the competence and means to be able to act either individually or socially (i.e., level of development, financial means), environmental and social uncertainty (i.e., perception of the actions of others and of the presence of active minorities) – all of these interact and give rise to particular types of relationships to water.

A tentative model of relationships to water

Four successive levels of factors intervene as determinants of behaviour regarding water: (1) contextual characteristics and value systems, (2) representations of water, (3) recognition of environmental problems concerning water and a diagnostic analysis of the causes, consequences and appropriate response strategies, and (4) implemented behaviours (Figure 1). At the first stage, the environmental and societal contexts make up the framework on which the links between people and the water resource are constructed and developed.

Representations of water are established as a standard of comparison and an individual normative framework. Two types of representation can be identified: on the one hand a fragmented, factual vision broadly based on individual experience and dependent on temporal and spatial proximity; and on the other hand, an abstract, global ecological vision based on the perception of the interdependence between people and the environment, largely independent of the temporal and spatial immediate context.

The elaboration of a diagnosis of the state of water and its evolution is the first stage in the process of becoming aware of and identifying problems.

1. *Non-perception of change* leads to thinking of these states as „normal“ if they persist and/or may even be impossible to change. This non-perception can be habitual, leading to a lack of questioning concerning environmental problems, and this in turn, supports behavioural stability.
2. *The perception of an evolution* in the state of water is linked to a diagnosis based on temporal references resulting from a comparison between present and past situations.
3. *Awareness of problems* depends on the evaluation of the present state of the water resource and of comparison with a supposed future state, as well as the attribution of the causes of this situation. A factual representation of the causes of the state of water is embedded in and based on the daily practices of those concerned. The reference to processes, on the other hand, is accompanied by a global, long-term representation of the situation.

The conflicting nature of these different rationales is partly a product of their different time-scales: the very long-term of natural phenomena and the short-term nature of economic and political activity.

Actions people will undertake are a result of the perceived possibility and effectiveness of controlling situations. If control is perceived as impossible, this is often accompanied by inaction. Conversely, the perception that control is possible brings with it a variety of behaviours depending on the types of control envisaged (e.g., individual, institutional, or exercised by the social actors as a whole).

ALTERNATIVE APPROACHES TO THE PROMOTION OF SUSTAINABLE WATER CONSUMPTION

Following this analysis of the divergent representations of and relationships to water across nations and cultures, we put forward two alternative approaches to the promotion of sustainable water consumption based on whether we regard people either as essentially egoistic or capable of taking responsibility and improving their relationship with nature. The first position leads to the requirement for regulation at an institutional level through the setting up of coercive, normative and incentive measures in order to encourage and ensure conforming individual behaviour which do not harm the general interest and preserve resources in the long-term. This solution does not involve a deep individual commitment with regard to environmental problems and therefore does not ensure permanent pro-environmental behaviour beyond habit acquisitions. This may also mean that environmental behaviour is not generalised and thus learning and development does not occur. An alternative approach which encourages individuals to take responsibility and adopt and sustain behaviour that preserves the commons, has a more social orientation. This can be achieved through a process of raising people's awareness of environmental problems and transmitting pro-environmental values through the education system and within small groups and communities who then transmit these ideas, as well as appealing to a sense of morality and ethical principles (Gardner & Stern, 1996). A shift in representations towards a global vision, and the adoption of values linked to a less dominant position towards nature, the perception of control and of the effectiveness of the behaviour adopted, are all together likely to bring about a radical change in relationships to the environment and to commit the individual to developing lasting pro-environmental behaviour.

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REFERENCES to this article are included on the IHDP website at www.ihdp.org/updatepsych04/references.htm

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WE NEED NEW COHESIVE THINKING

Interview with Irene van Kamp

► **Irene van Kamp is a senior researcher at the Dutch National Institute of Public Health and Environment (RIVM). The RIVM conducts research into public health and environmental issues in the Netherlands. It also operates as the Office for Environmental Assessment.**

Q: *Can you describe your work and research areas?*

I'm working at the Centre for Environmental Health Research, a department within the National Institute for Public Health and Environment (RIVM). Most people here are epidemiologists who study health effects of environmental exposures.

I have a background in sociology, psychology and epidemiology and my work is in between all these fields. I have two prominent areas of work:

- 1) I am involved in environmental noise studies, i.e. around Schiphol Airport. I bring in my psychology knowledge on how people perceive noise, how it influences their activities, what the health effects and cognitive effects of noise on children are, and what processes play a role.
- 2) My other work area is in environmental quality in relation to well-being/ quality of life. It is primarily connected to the urban living environment. We develop strategies that could enhance urban living conditions, and in this way try to develop a broader view on the environment and how people perceive their environment.

We do all our studies to support policy making. Policy makers are particularly interested in indicators that monitor and investigate environmental quality in relation to human well-being. They expect these indicators to direct them towards a more sustainable way of dealing with urban problems. This broader and more integrated approach is relatively new for the institute. Also in this type of work I lean very much on environmental psychological insights.

Q: *Can you give me one practical example where your findings have influenced policy making?*

An example can be given from the field of noise research, where results from studies are directly aimed at improving living conditions in the areas around major noise sources. The most outstanding thing is that for a long time the policy call, i.e. around Schiphol as a major airport, has been aimed at minimizing the percentage of people who are extremely annoyed. So, the outcomes of the studies were directly used in policy making.

Other examples from the noise field are the school studies we participated in within the EU fifth framework context. The major aim of this project "RANCH" (Road traffic and aircraft noise exposure and children's cognition and health) was to provide knowledge on exposure-response relationships in schoolchildren between chronic noise, and annoyance and health, respectively. I am sure that on the basis of its results there will be a lot of discussion on where

we should build our primary schools, and what we can do to protect children from negative effects especially with regard to their cognitive functioning

Environmental psychology is a new field and it is only just beginning to influence decisions, especially in the field of risk assessment. The biggest gains are to be expected in the future.

The physical environment as well as the social environment of people at neighbourhood level, are very concrete. You can show what the effects of evidence-based policy making are on the environment and behaviour. With regard to global warming, on the other hand, it is much harder to prove that knowledge actually influences policy making or the behaviour of people.

Q: *What special contribution can psychologists make that is different from sociologists or geographers? What particular skills and perspectives do they have?*

What is characteristic for the field of environmental psychology, is that it operates at different scale levels – at the individual level, the neighbourhood level, the city level, the regional level, the national level, and the global level. The work of an environmental psychologist is always situated between these different scale levels. His or her work also requires collaboration between different disciplines. Typical is also that environmental psychologists produce knowledge aimed at different actors in the field like policy makers, organizations as well as citizens. So, a further characteristic of environmental psychology is that different groups of people are involved in the research process. There is a connective process between these groups. That is where environmental psychology really can offer an additive above sociological and geographical insights.

Q: *Is there international collaboration within this field of research? After all, environmental problems rarely respect national borders*

Even though awareness, perception and values are studied at a local level, international multi-centre studies would indeed allow for making comparisons. The urban environment has been an important topic in programmes of the EC and will be so in the future. However, in these studies the role of environmental psychology could be more pronounced.

International comparisons show that there is a common way of looking at environmental issues even though the



Irene van Kamp

context varies very much. A recent example of this is a study of WHO in eight EU cities on housing and health. Of course, it makes a difference where you live. But still people tend to value, make their judgements, and draw up a sort of cost-benefit analysis for themselves in a similar manner. Studies at the local level are needed to gain insight in how people look at their environments, what their priorities are, and what 'the environment' stands for.

Q: Can you elaborate on people's perceptions of the global environment?

Of course people feel more connected to their immediate environment. We also take that into consideration. People need some kind of comfort and space, and social ties. We are also involved in these kinds of studies – what do people value in their immediate environments, how do they evaluate their environments, how do they relate that to other people's environments etc.

An important finding at the global level worth mentioning here is that people think about global environmental change as something very problematic, yet they do not feel responsible themselves. At the local level, on the other hand, people think that things are fine. Yet, the local level is where they really could do something and act in favour of the climate. So it seems there is a coping mechanism happening – we cannot control the global situation but in our direct environment we deny that there are problems. That is a very interesting phenomenon. It is also an enormously important issue. It is a way to adapt to circumstances and deal with alarming messages.

Q: This behaviour seems to be typical for most people. The big question is: how to go from there?

We know enough about how people cope with information by now that this could be taken into account. But there is another issue that needs to be looked into – how do organizations and institutions view these global problems, how do they respond and do they actually use the same language in their approach, as do citizens or scientists? Also for us as scientists, and of course for policy makers, the big question is how we actually communicate with people who might use a completely different language to describe environments; how is knowledge about the environment shared? Often the message doesn't even land there where it is meant to because people do not get the message.

Another phenomenon is that the alarming news on e.g. global warming have been in the media so often that people do not believe it anymore. They think that this is just the agitation of a group of people who try to present a gloomy view of the world. That is also something worthwhile studying further. What is worrisome is that global change is quite obvious but apparently it does not really bother people yet. They say, ok, there are some changes but there have been changes in the past where temperature has dropped or risen.

Q: Now that you have collected some interesting data, do you have an idea what the next bigger step would be? What are

the challenges for the future for global environmental change research?

The idea of 'Think global, act local' has not shown to be of enormous value: people still drive cars for example. The current benefits outweigh the future losses, at least in their lifetime. It is a hard question. It is one thing to deal with individuals, it is another thing – and in Europe there is quite some attention to this in research initiatives – if we want to live together in these countries we need a new cohesion or solidarity. There might be opportunities in this new identity. As Moser writes: people care better about an environment they feel connected to. In this context the relationship between quality of life, social cohesion and sustainable behaviours is important. We are trying to initiate research into this direction. Some sociologists have written about this link at a more societal level but you can translate this to the individual level as well. If there would be an identity that goes beyond the group, neighbourhood or country, if there would be a shared interest in the rest of the world, or at least the rest of Europe, then people would start to take better care of the environment.

It is an interesting concept that if you want people to care about the whole world – climate change, animals and nature – people would need to identify with other places. Such cohesive thinking could lead to a significant change. But as you know we are still far from that. This concept is very idealistic and currently it seems as if people retreat more and more into their own little worlds, maybe because they feel powerless towards the bigger problems.

Q: Yet there is also another trend. It seems as if everywhere people are starting to think about cohesiveness, connectedness.

You are right. I notice this in my own surroundings. Specialized knowledge is important and needs to be further developed, but the future lies in interdisciplinary efforts, and a lot of professional people understand that. People in different disciplines are looking for each other at the moment, which is a very interesting development.

In our planned research regarding environmental quality, we emphasise the importance of including other actors (citizens, policymakers, planners etc.) and the formation of interdisciplinary teams. This is where insights from environmental psychology can be of enormous value. Another trend I can see in the work on environmental quality at RIVM is that where before air pollution was studied by air pollution experts, and noise was studied by noise experts separately you now see an increased interest in combined exposures en combined effects. This requires that studies are more of an interdisciplinary character, organised around themes such as traffic, safety or integration, with inputs from different expertise, fields and groups. That's a good thing.

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INTERVIEW BY ULA LÖW

The webpage of the RIVM is: www.rivm.nl

CLIMATE CHANGE AND THE SUSTAINABILITY TRANSITION

The Role of Communication and Social Change

BY SUSANNE C. MOSER

INTRODUCTION

► **Society faces the formidable challenge of navigating a** transition to a sustainable world. Stabilizing greenhouse gas (GHG) concentrations and adapting to unavoidable climate changes are important components of this transition. This societal transformation will require policy, production, and consumption changes, and ultimately involve nearly everyone in all sectors of society.

To date, the human dimensions community has directed well-placed attention on developing plausible scenarios of this transition, the role of science and technology, the necessary industrial transformations, and on the institutional dimensions of global environmental change. Much of the scholarship to date also recognizes – almost by default – the need for political will and value and consumption behavior changes in the larger populace in order to realize a transition to a sustainable world. While theoretical, philosophical and disciplinary schools differ on how in fact such political and larger societal changes can be brought about, I argue here that the human dimensions community can gain enormous leverage by complementing its well-established foci with greater attention to the role of social mobilization, social movements, and – more broadly – social change. Accepting that, questions arise as to what role communication, dialogue, and public deliberation can play in hindering or promoting it. The *Information and Communications* focus of the IT Core Project appears not to cover this question sufficiently.

Experience with past social movements suggests that to mobilize people – individual citizens to national-level policy-makers – for this important and increasingly urgent shift, requires a compelling vision, a well-communicated need for change, and useful, credible information to assist in moving forward. There is little evidence to date that the challenge, urgency, vision, or possible pathways have been adequately articulated to the public. There is thus a critical need for the HD community to focus more concerted attention on the communication/social change interface.

THE LINK BETWEEN COMMUNICATION AND SOCIAL CHANGE

Communication refers to the entire package of what is communicated, in what ways, by whom, to whom, through what channels, and how it is received and absorbed by target audiences. Social change can be broadly defined as the equally multifarious complex of processes involved in the transformation of values, thoughts, and behaviors of individuals, communities, and societies.

At least five obvious connections exist between communication and social change. Take climate change as an example. First, *what is not seen does not exist*. This constructivist-sounding shorthand is not to suggest that if we all looked away from the

overwhelming evidence for climatic change that the problem would indeed disappear. Instead, it points the enormously important role of detecting and naming of a problem for public discourse – the basis for public agenda-setting. Second, *what is not understood is dismissed, denied, or polemically discussed*. Communications research on people's perception and understanding of climate change has shown that those unburdened by some basic knowledge of the causes, impacts and solutions of climate change, are more likely to dismiss the problem's existence. They can more easily revert to deeply held beliefs and misconceptions, e.g., that individuals' actions cannot have an impact on a global scale. Thus, effective communication of climate change – using helpful mental models, engaging affective imagery, strategically-ordered arguments and appropriate messengers and channels – can facilitate a more informed public discourse about the problem and appropriate solutions. Third, *how something is framed predicates the response*. Whether climate change is discussed as a scientific, an environmental, economic, energy security, sustainability, or social justice issue greatly influences who feels addressed, who gets mobilized (on the pro and the con side), what counts as convincing evidence, and how the problem evolves as a political or policy matter. Thus, framing strongly influences the development of the „issue culture.“ Fourth, *what is not talked about exerts no political pressure*. Political leaders repeatedly argue that they feel no particular pressure to deal with climate change without more demand and pressure from their constituents (voting or otherwise politically active citizens, businesses etc.). Thus, more effective communication to the citizenry and from the citizenry to its elected representatives can form the link between public discourse and the political stage. Finally, *without accessible solutions nothing will be done*. Solutions to global climate change will likely involve a combination of technological changes, yet-untold innovations, and behavioral changes in consumption of energy and resources. Communication plays a key role in the development, spread, and adoption of these new production and consumption patterns. As scholars of innovations, social transformations, and other tipping phenomena have found, neither barriers nor incentives and interventions are absolute in guaranteeing the arrest or spread of a new technology, policy or behavior. Instead, how something is marketed, who conveys the message, what networks of communication exist, all influence the degree to which a transformation „catches on.“

Clearly, these principles point to the critical role the scientific community can play in communicating global environmental change, but also raises the question about who else might be important messengers in the sustainability transition. Moreover, beneath the generality of these statements remain many unanswered questions that call for empirical research and greater inclusion of findings in HD scholarship from disciplines that to date may have participated little in our field.

FIRST STEPS – PROMISING COLLABORATIONS

In June 2004, a group of over 40 scholars and practitioners met at NCAR in Boulder, Colorado, USA to discuss existing multi-disciplinary and practical insights and critical challenges at the communication/social change interface. The guiding question was „how to improve climate change communication in a way that helps facilitate individual and organizational/institutional change toward a more environmentally sustainable future.“ The first product of this three-day workshop is a forthcoming article in the December 2004 issue of *Environment*. An anthology of original papers contributed

by experts in a wide range of social science fields and the humanities as well as by local, state, business, and NGO leaders will be forthcoming in 2005. For further information, see <http://www.isse.ucar.edu/communication>.



REFERENCES for this article are included in the IHDP website at www.ihdp.org/updatepsych04/references.htm



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LOICZ II INAUGURAL OPEN SCIENCE MEETING

There is an emerging awareness that human activities affect the physical and biological functioning of the coastal zone, which, in turn, affects human welfare and future security and sustainability of all facets of industry, government and society. The scientific co-sponsorship of LOICZ by IHDP provides an exciting opportunity to develop new research specifically targeted at coupled human-environment systems. The LOICZ II Inaugural Open Science meeting aims to pave the future direction of this research structured around its five interrelated themes:

Theme 1: *Vulnerability of coastal systems and hazards to human societies.*

Theme 2: *Implications of global change for coastal ecosystems and sustainable development.*

Theme 3: *Anthropogenic influences on the river basin and coastal zone interactions.*

Theme 4: *Fate and transformation of materials in coastal and shelf waters.*

Theme 5: *Towards coastal system sustainability by managing land-ocean interactions.*

A call for abstracts is currently open until 14 February 2005 and contributions from the IHDP projects and community, including on scientific cross cutting issues, are sought.



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CANADA, CLIMATE CHANGE AND INDUSTRIAL TRANSFORMATION

Is Climate Change Capable of Inducing Industrial Transformation?

BY DAVID WEBER

1. INTRODUCTION

► Since its inception, the Industrial Transformation project of the International Human Dimensions Programme (IHDP-IT) has argued that broad system changes are needed to address the excessive burdens that modern societies place on the environment (Vellinga and Herb, 1999). Spurred by the pressing nature of many environmental problems, much study and theorising has been devoted to discovering how these system changes come about and what the possibilities are for inducing broad societal transitions to less environmentally burdensome paths (Vellinga and Wieczorek, 2003; Kemp et al., 1998; Geels, 2002; 2004).

A key element of this line of inquiry is how it is possible to generate support for, and action on, environmental issues. An interesting question can be asked in this regard about climate change: does the widespread threat of climate change give impetus for countries to move towards sustainable transitions in their economies? This article will examine this question as it relates to Canada's position on climate change and the actions Canada has taken towards mitigation. It uses as a framework the multi-level perspective on system innovations (Geels, 2002) and suggests that climate change represents a „landscape“ development for the many GHG emitting sectors of the Canadian economy – that is, climate change has altered the structural background against which technological, economic and social processes operate such that they favour a sustainable transition. The change in backdrop for decision making can be seen in the climate change policies that the Canadian government is currently enacting and also in the fact that large political obstacles were overcome in order to enact these policies. While these developments certainly do not mean that transition can now be expected, widespread action on climate change could force a „greening“ of many fundamental socio-economic processes in Canada. It is possible that this change in background could move Canada closer to industrial transformation.

2. MULTI-LEVEL PERSPECTIVE ON SYSTEM INNOVATIONS

A Multi-Level Perspective (MLP) has been developed by various authors as a tool for understanding how socio-technical transitions come about¹. This approach uses three levels to conceptualise a transition framework: landscape, regime and niche. The landscape level is the deep underlying structure on which all other socio-technical arrangements operate. The *landscape* is formed by long-term social, economic and physical factors and creates the macro context for action. It does change, but only over long periods of time and it cannot be influenced by individual actors.

The *regime* level is the next level down. Regimes are formed by a particular technology and the supporting, reinforcing, yet dynamic social practices associated with it. The car for instance is

linked with mobility patterns, the structure of the car manufacturing industry, the laws governing car use and manufacture and the accumulated technical knowledge used to build cars (Geels, 2002).

The *niche* level is the most specific level and refers to individual experiments and technologies. Niches are not fully incorporated into economic processes and are venues for learning about the potential of new technologies (Geels, 2002).

These levels are interdependent and in a situation of transition, changes in one level can ultimately ripple through the others to create a complete shift. A change in the landscape can cause changes in the way a regime operates or the efficacy with which it operates. This may in turn create opportunities for new niche technologies to take hold and come into wider use. One possible path to a sustainable transition, then, is that new „green“ niche technologies could replace current environmentally damaging regimes after a change in the landscape makes the niches more viable.

3. CLIMATE CHANGE AS LANDSCAPE CHANGE IN CANADA

The first step in such a transition would be a landscape change that forces changes in the regime and niche levels. Climate change may be creating such a shift. Since the anthropogenic sources of GHG are so diffuse, climate change mitigation will entail major efforts to transform fundamental production and consumption systems. Climate change, despite its effects being somewhat distant and uncertain, is also starting to „bite“. Many governments are taking climate change seriously and beginning to change their regulatory frameworks to force GHG emission reductions. Major reductions in emissions will necessarily involve the greening of a wide range of social and economic processes. Whether this can happen depends on how strongly new technologies are fostered and the demand they receive from the market. This is a function of the strength of the climate change policy frameworks that countries put in place, which in turn depends on how seriously climate change is being taken by politicians, industry and the public. Consequently, when considering if climate change constitutes a landscape change we must ask: is climate change a significant and lasting issue on national agendas? In Canada, the answer seems to be yes.

Canada and Climate Change

While it is difficult to come up with an exact metric of national commitment to climate change action, two factors may be instructive: the size of the constraints climate change action has overcome and the scale of policy and budgetary commitments directed towards it.

Canada is particularly instructive in the first instance. Many found it puzzling that in 2001, when the United States dropped

out of the Kyoto Protocol, other Annex 1 countries maintained their commitments to a significantly weakened piece of legislation. Without the world's largest GHG emitter, the potential effectiveness of the Protocol, already questioned by many, took another serious hit (Hovi et al, 2003). Canada was particularly affected by the US decision because of the close economic and political ties it has with its southern neighbour. Trade accounts for seventy-five percent of Canada's GDP and eighty percent of that trade is with the US. Even prior to the US withdraw powerful industry groups and the Canadian government itself had stated that concerns for competitiveness should put a stop to any Canadian Kyoto commitments if the US withdrew. Canada's deep devotion to multilateralism and its desire to play an international leadership role in the environmental area, however, won the day and in the end Canada did not back out (Bernstein and Gore, 2001). The commitment to reducing GHG emissions was reaffirmed in 2003 by the new Prime Minister Paul Martin who stated that Canada will act on the causes of climate change regardless of the status of the Kyoto Protocol (Drexhage, 2004). The Kyoto Protocol and GHG reductions were also included in the recent „Speech from the Throne“ – the priority statement of the Government of Canada. Since Russia's signing of the Protocol, the commitment is all the more significant.

This pledge was made despite a difficult domestic political situation rooted in Canada's federal structure. Environmental responsibilities in Canada are divided between the provincial and national levels and areas of jurisdiction are jealously guarded. The environment has typically been a source of conflict, despite being an area that benefits from a co-ordinated approach. Climate change is a particularly difficult issue in this regard because the costs of reducing GHG emissions will not be distributed evenly across the provinces. The fossil fuel producing provinces, especially Alberta, feel that they will carry a disproportionate amount of the abatement burden and so are strongly opposed to action (Le Prestre and Dufault, 2001). Furthermore, the western provinces have often felt alienated by federal policies and they feel that they are being trampled once again when the federal government ignores their opposition to GHG reductions. Kyoto thus irritates an already tense relationship.

Despite these and other difficulties, Canada has begun tentative steps towards reigning in its GHG emissions. In order to meet its Kyoto goals, Canada's plan will rely fairly heavily on cooperation from big industrial emitters in an emissions trading system. John Drexhage of the International Institute for Sustainable Development has pointed out that despite competitiveness concerns vis-à-vis the US, many industries within Canada are starting to accept the push for emission reductions: „The feedback from most in industry is that both the tone and substance of discussions with the government have appreciably improved since it began negotiations with industry“ (Drexhage, 2004; 17). While emissions trading legislation is still being negotiated and its framework is still under construction, there is a certain amount of momentum behind it. It seems then, that in many of Canada's largest industries, climate change and abatement policies are being taken seriously.

Transition?

While still some ways to meeting its Kyoto goal and implementing its Climate Change Plan fully, the Canadian govern-

ment has nonetheless sent a signal that it intends to move the country in the direction of a significantly less carbon-intensive economy. This in itself is a change in the landscape that could affect many of the production and consumption decisions in Canada. Using the multi-level perspective we can theorise that carbon intensive regimes (such as within transportation, manufacturing and energy) might come under pressure through changes in prices, consumer preferences or regulation as a result of the climate change threat. This may open opportunities for niche technologies, such as alternative fuels, to develop and improve their marketability. If alternative fuels continue to be favoured in comparison with carbon intensive regimes, then an upward spiral could begin leading to an eventual transition.

The Obstacles

When considering whether action on climate change could be a spur for industrial transformation, it is too simple to suggest that the government can do it alone. Government is one actor among many (Elzen et al., 2004). Other actors have the power to fight climate change actions and it is even the case that different ministries and levels of government promote or oppose climate change action. Rather than exercising a direct line of control then, the government should be recognized as one (fragmented) player among others, exercising power where it can.

Climate change must also contend with many competing issues. Climate change is one environmental problem among many and the environment is one policy area for the government. For industry, concerns such as competition and liberalization are still paramount and may supersede emission reduction efforts. While not always a zero-sum game, other concerns will inevitably take precedence over climate change no matter its importance.

4. CONCLUSION

Under these constraints it is misleading to suggest that government can simply push the radical changes that are needed for industrial transformation to occur. These constraints may also help to explain why the threat of climate change in Canada has not yet pushed it towards decisive emissions reductions. Considering the number and importance of the economic activities contributing to climate change, however, if serious efforts are made at mitigation in Canada, the outcome could be to significantly reduce the burden that the Canadian economy places on the environment. This shift, originating at the landscape level, could be one factor inducing a transition to environmental sustainability.

Thank you to Frank Geels and Anna Wieczorek for their helpful comments on previous drafts of this article.



REFERENCES to this article are included on the IHDP website at www.ihdp.org/updatepsych04/references.htm



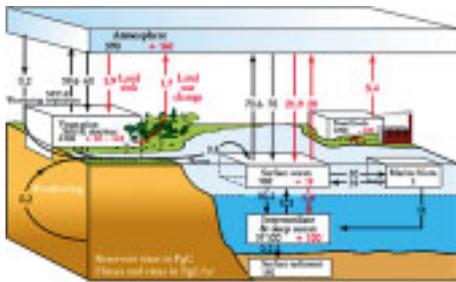
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REGIONS, CARBON, CULTURE, CITIES, CLIMATE, CHANGE AND CONSEQUENCES

The Global Carbon Project's RC6 Initiative

BY PENELOPE CANAN

► When the Global Carbon Project (GCP) was established as an Earth System Science Partnership for sustainable development several years ago, the scientific goal was to develop a complete picture of the global carbon cycle including its biophysical and human elements together with the interactions and feedback between them. This aim requires investigation of the spatial and temporal patterns and variability in carbon pools and fluxes as well as a search for determinants of carbon cycle dynamics.



Consensus that the human influence on the carbon cycle since the Industrial Revolution has been dramatic and dangerous leads to questions of historical developments that should be avoided in the future and current social arrangements that need to be changed if we are to depart from the dire projections of „business as usual“ or no intentional change. Rather, radical social change is needed. The scientific approach to what, where, when and how to intervene could depart from a number of theoretical places, ranging from macro to micro social dynamics, from individual psychology to abstract philosophy and ethics, from environmental history to technological innovation, from sectoral economic behavior to social movements, or from local politics to international regimes. All of these-and much more-comprise the human dimensions that are implicated in understanding the social drivers (and points of intervention) of the global carbon cycle.

OBJECTIVES

For coupling the physical and human dimensions of the global carbon cycle for the purposes of effective carbon cycle management, the GCP conceives of the „global“ as the collection of and interaction among local(e)s where social processes interact with the carbon cycle in real places, as well as in social space. Places vary in ways relevant to the carbon cycle in terms of their natural endowments, climate patterns, development histories, cultural traditions, social and environmental values, socio-economic conditions, and location in regional, national, and global systems of place stratification. How are the legacies connected to recent developments and current differences in the carbon footprints of human settlements – from village to city, from mountain slope to coastal zone, from the tropics to the deserts? Are there regional constellations of communities of varying size, location, natural

characteristics, and social organization that are more promising for a decarbonized future? How can RC6 science best contribute to sound carbon management policy making?

THE RC6 APPROACH-A WORK IN PROGRESS

The GCP is developing an Earth Systems Science framework for place-based carbon cycle research to facilitate learning the lessons critical for future regional development decisions. We call this effort the RC6 Initiative of the GCP. RC6 stands for „Regions, Carbon, Culture, Cities, Climate, Change and Consequences.“

Scope of the RC6

1. Ideal types of development legacies/political economies and current carbon footprints
2. Dynamic, historical, comparative, contemporary, and future orientations
3. Spatial „shells“
 - The city as entity (e.g., administrative borders) with a continuous array of cities with populations greater than 500,000.
 - „Hinterland“ or region (e.g., where most food, products, and labor exchanges occur)
 - Global footprint of embodied Carbon fluxes.
4. What are future Carbon trajectories (footprints) likely to be – locally, regionally and globally? What are possible effects of alternative development paths?
5. How are urban and regional carbon cultures, consumption/lifestyle patterns, risk perceptions, and environmental values related to the carbon cycle?
6. What analytical framework and methodological approaches best suit the goal of integrated place-based carbon cycle research? What can existing models and scenarios regarding the carbon cycle contribute to the framework?

ACTIVITIES

Activities in support of the RC6 that are underway at the GCP-Tsukuba office at NIES, the National Institute for Environmental Studies Japan, include an extensive literature review on urban and regional development typologies and indicators of sustainable development; an inventory of community development and carbon cycle case studies; and a comparison of efforts to model the carbon-human-climate cycle. We will conduct a framework scoping workshop in June 2005 and sponsor related sessions at the IHDP Open Meetings in Bonn in October 2005.



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Call for Papers will be open from February 1st – March 15th!

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Paper abstract submissions: 1 February 2005 – 15 March 2005

Poster submissions: 1 February 2005 – 15 March 2005

We warmly invite all interested participants to submit a paper or poster proposal for the 6th Open Meeting.*

More details, including information, application forms, timelines and deadlines, are now available at the **Open Meeting website, <http://openmeeting.homelinux.org>.**

*Please understand that because of the large amount of interested participants, we are only able to process applications, including session and paper abstract submissions, through the Open Meeting website.

NETWORKING AND CAPACITY BUILDING

Increasing IHDP's Visibility Around the Globe

► As part of the APN CAPaBLE (“Scientific Capacity Building and Enhancement for Sustainable Development in Developing Countries”) Programme, ‘Partnerships Creating Capacity’, the IHDP co-sponsored a *National Capacity Building Workshop on Global Change Research from 8-10 June 2004 in Islamabad, Pakistan*. Pakistan is a country, which has modest capabilities in scientific research mostly directed at the applied problems of the country, but very little by way of education or research in global change aspects. It is the first country to embark on such a capacity-building endeavour at the national level under this new APN Programme. This workshop brought together 50 young Pakistani scientists with the aim to increase their awareness of the importance of this research and activities at the global level. Two IHDP National Contact Points, Dr. Nasim Akhtar (Pakistan) and Dr. Aminur Rahman (Bangladesh) pushed forward the activities of IHDP and human dimensions research priorities for Pakistan. One of the major outcomes of this workshop was the capacity building of emerging and mid-career scientists through their enhanced sharing of knowledge, experience and scientific information. The workshop stimulated the participants to discuss relevant research topics on global change issues particularly for Pakistan and link them to the global change programmes. There is great potential for significant contributions to international science from countries like Pakistan. IHDP must continue to work with the global change programmes and regional networks like APN, IAI and START towards proactively building capacity in regions like Asia-Pacific and ensure that our Programme becomes more relevant for and more active in all parts of the globe. (*Excerpts taken from an article published in the July 2004 APN Newsletter by Linda Stevenson, Amir Muhammed and Will Steffen.*)

► The 2nd AIACC (*Assessments of Impacts and Adaptations to Climate Change*) Regional Workshop for Latin America and the Caribbean was convened from 24-27 August 2004 in Buenos Aires, Argentina. The workshop brought together investigators from six AIACC assessments underway in Central and South America, Mexico and the Caribbean, participants of other assessments in the region, public and private sector stakeholders, and members of pol-

icy and scientific communities of Latin America, the Caribbean and beyond. Discussions explored issues including observed climate trends, present day climate risks, projections of future climate change, vulnerabilities to climate change in agriculture, fisheries and estuaries, human health, and the flood-prone metropolitan areas of Buenos



Proactive capacity building for the region: participants of the APN Workshop in Islamabad

Aires. Also discussed were adaptation strategies, integration of adaptation into national development planning, and applying knowledge from vulnerability and adaptation assessments in decision-making processes. The messages emerging from the workshop suggest greater emphasis be given within the Climate Change Convention to adaptation and to building the capacity, partnerships and knowledge needed to support adaptation. START, the Third World Academy of Sciences and the UN Environment Programme jointly manage the AIACC, an international project funded by the Global Environment Facility. (*Contact Neil Leary, Science Director, AIACC, START Secretariat, nleary@agu.org, <http://www.aiaccproject.org>*)

► “The time seems right for the formation of a focus on the ‘human/social dimensions’ in Southern Africa that is led and driven by southern Africans”. This conclusion was reached at the *Southern African Regional Workshop on the HDGEC held in Richards Bay, South Africa from 15-17 September 2004*, co-funded by the IHDP, to ascertain the need for the establishment of a South African network or committee in the HDGEC. Research findings were presented on topics related to GEC including work on coupled human-environment interactions. The meeting served to compare approaches and research methodologies on HDGEC research

in southern Africa, assessing organization, coordination, gaps, needs for improvement, and served to promote collaboration, partnerships and communication of IHDP-related research in southern Africa. The role of an IHDP regional network for southern Africa could be to feed back into global research agendas those issues that southern African countries' researchers and others can engage in. A number of research programmes already conduct work on related issues. The opportunity for a new network for IHDP would be to help create synergies between these various programmes in a coordinated and intelligent fashion. An Interim Working Group has been established to open discussions with the NRF and the ICSU regarding the need for such a HDGEC network. (Contact Coleen Vogel, Wits University, Johannesburg, vogelc@geoarc.wits.ac.za and Hector Chikoore, University of Zululand, hectorchikoore@yahoo.com)

► The **Workshop on "Global Environmental Change: A New Scientific Agenda in the Brazilian Context"** was held from 20-22 October 2004 in Campinas, São Paulo, hosted by the Brazilian National Committee for the HDGEC and co-sponsored by the IHDP. With its new term in 2004 with renewed membership, and new leadership, the first activity of the Committee was to bring together national global change researchers from both biological and physical sciences to review the state of GEC research and brainstorm a four-year plan of action for the Committee. Attention focused on five leading issues: 1) the dynamics of GEC in recent years and future prospects, 2) Brazil's place in GEC, 3) Latin America's place in GEC, 4) the role of the Brazilian Academy of Science in national and international GEC research community, and 5) the definition of the specific mission of the Brazilian National Committee for the HDGEC. The concept of vulnerability to GEC has been selected as a leading focus of the Committee's future work, to focus attention to the human causes and consequences of environmental change. The suggestion for a joint IHDP/IGBP GEC Committee to be established was presented to the Brazilian Academy of Sciences with a 3-year workplan created at this workshop. (Contact Daniel Joseph Hogan, University of Campinas, hogan@reitoria.unicamp.br)

► How can one improve the interactions between national research and the international global change Programmes? This was the question addressed at the **Global Change Workshop held on November 4, 2004 in Oslo, Norway**, organized by the Research Council of Norway and with participation from all ESS-P* Programmes plus the International Institute for Applied Systems Analysis (IIASA). Norwegian scientists have shown particular interest to the IHDP-GECHS project, and Oslo will soon be the new location of GECHS' (Global Environmental Change and Human Security) international project office starting in 2005. Norway has a long and strong tradition for global change research, particularly with respect to polar, oceanic and climate research. Suggestions were made on how to strengthen

the links between the Norwegian global change research ongoing and particularly the ESS-P Programmes. The Research Council is now preparing to implement some of the suggestions though the establishment of a global change committee, which will be an important part of the work on improving the coordination and profile of the ESS-P Programmes in Norway. (Contact Inger-Ann Ulstein, The Research Council of Norway, iau@rcn.no)

► The **Russian Regional Workshop on the HDGEC, "Climate and Environmental Change in Russia and its Impact on Society, Economy and Humans"** was held from 10-12 November 2004 in Zvenigorod (Moscow region), Russia, bringing together leading Russian scientists from major regions in the areas of both social and natural sciences, engaged in the environmental and climate change research and the consequences embedded for economy, humans and society. Many Russian scientists are engaged in GEC research, however no organization exists to unite both physical and HDGEC researchers on the national and international levels for leading issues such as climate and environmental change and interaction of human-social aspects. The IHDP is viewed as the bridge to the gaps between the social and natural science communities and therefore the installation of a Russian National Committee for the HDGEC will take place in 2005. It will be hosted by the Institute of Geography of the Russian Academy of Sciences. (Contact Maria Ananicheva, Institute of Geography, RAS, cest@online.ru)

► The **3rd RUPSUR (Southern Pacific University Network, representing Chile, Ecuador and Peru) Meeting, "Biophysical and Socio-economic Impacts of El Niño on Marine and Terrestrial Ecosystems"** was held 11-12 November 2004 in Santiago, Chile. IHDP co-sponsored this event. The ENSO cycle and similar phenomena, as part of the variability of climate, were analysed. Scientists also discussed modern computer-based forecasting abilities, as well as traditional forecasting systems, for example utilized by farmers in the high Andes. Focus was also on impacts on different environments, such as subtidal communities, semi-arid zones, river flows in Colombia, Argentina and Paraguay. At the same time, ENSO impacts were analysed from the social and economic perspective, using both historical and economic models. The relatively recent implementation of insurance against climate risk in Chilean agriculture was also discussed. This third meeting opened RUPSUR to representatives from other countries within the region, including Argentina, Colombia, Paraguay and Venezuela. Researchers were also welcome from national institutes and NGOs to present research results. Plans are underway to invite scientists from Australia and New Zealand to become members. The next meeting is planned for Cali, Colombia in 2006. (Contact Alejandro Leon, University of Chile, aleon-a@uchile.cl)

► **All full-length articles to the abstracts above on 2004 regional workshops related to IHDP research are available on the IHDP Website (www.ihdp.org) under "National Committees"**

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*ESS-P: Earth System Science Partnership, between the four Global Change Programmes DIVERSITAS (the International Programme on Biodiversity), IGBP (International Geosphere-Biosphere Programme), IHDP and WCRP (World Climate Research Programme)

IN BRIEF

➤➤➤ **The IAI-IHDP 2004 Global Environmental Change Institute on Globalization and Food Systems Workshop** took place in Nicoya, Costa Rica from 24 October to 6 November 2004. The Scientific Workshop and the Science Policy Forum were a great success for the 24 participants from 21 countries, as well as for the organizers. Over the course of the two weeks the participants were introduced to general concepts of global environmental change, globalization and food systems. Representatives from the IHDP core projects and from the Food Systems project were invited to introduce their projects through the Food Systems and Globalization „lens“. Throughout the workshop the participants were working together in small working groups on specific questions at which they looked from changing perspectives, e.g. regional and disciplinary perspective. The Institute concluded with a Science-Policy Forum in which – in addition to the workshop participants – representatives from the regional science and policy community participated. The Science Policy Forum concentrated on a dialogue about the specific problems of Food Systems in Central America.

➤➤➤ **Hans-Joachim Schellnhuber**, Founding Director of the Potsdam Institute for Climate Impact Research (PIK) in Berlin, Germany, and Research Director of the Tyndall Centre for Climate Change Research in Norwich, UK, has received royal distinction. Queen Elizabeth II has appointed „John“ Schellnhuber an Honorary Commander of the Most Excellent Order of the British Empire. The award is granted in recognition of Schellnhuber’s exceptional commitment to climate research and to British-German collaboration in this field. Schellnhuber has received the Queen’s congratulations on the award during her fourth state visit to Germany in November 2004.



Photo: PIK

John Schellnhuber

➤➤➤ **The Journal of Industrial Ecology** – a peer-reviewed, international, English-language quarterly, owned by Yale University and published by MIT Press – has recently translated summaries (abstracts) of all its articles into Chinese. These translations are available at the Journal’s website <http://mitpress.mit.edu/jie/translations>. As the premier journal in the growing field of industrial ecology, the Journal of Industrial Ecology focuses on the potential role of industry in reducing environmental burdens throughout the life cycle of products and other topics related to the environmental aspects of production and consumption. A more detailed announcement is available at www.yale.edu/environment/popup/events/fall04/china.html

➤➤➤ **The 2004 Berlin Conference** on the Human Dimensions of Global Environmental Change took place from 3 to 4 December at the Free University of Berlin. The conference’s theme was: “Greening of Policies – Interlinkages and Policy Integration”. The conference was endorsed by the IHDP core projects Institutional Dimensions of Global Environmental Change (IDGEC) and Industrial Transformation (IT). It was organized by the Environmental Policy Research Centre (FFU) of the Freie Universität Berlin with support from the Berlin based Global Governance Project. The panel sessions were organized around the following main themes: Integration & Innovation, National & Regional, Indicators & Assessments, Agriculture, Biodiversity & Water, Resources & Waste, Energy & Climate Change, Interplay, Transatlantic Relations and Teaching. Plenaries took place with regard to: climate change and the greening of policies; teaching sustainable development; governance, institutions & interlinkages; and the greening of liberal-pluralist states – process and substance.

Some conclusions that can be derived from this conference: policy integration alone will not work – policy instruments and regulation remain crucial, and no measure or technique alone can bring about policy integration yet its development is crucial for sustainability; the general perception of “environment equals cost” holds back the process of successful policy integration, as does the ongoing lack of cooperation between individuals and between sectors; assessment indicators are often sectoral and so the outcome remains within sectors, instead of reaching across sectors. Working in integration does not lead to professional promotion or a ‘good name’, so for policy integration to become more successful, there also have to be incentives for the individual actors.

The environmental pillar has to be decoupled from the socio-economic ones in order to gain a standing and in order to achieve sustainability in high-consumption societies; the defensive environmental strategy of authorities has to be redefined, and green competencies have to be built. While environmental authorities should be challenged to pursue competitive strategies and become partners to business, business has to be given incentives to get eco-innovative; in the past, environmental policy may have led to environmental products, but in an unsustainable environment. Instead we could think of systems innovation as an outcome for environmental policy integration, this may help lead to a deeper shift of resources to alternative technologies.

Potential public-private institutional structures to move to a more adaptive policy making, forms of stakeholder participation, and development of more coherent and integrated mixes of policy instruments are interesting and promising concepts.

NEW BOOK

Environmental Policy in Europe: The Europeanization of National Environmental Policy*By Andrew Jordan and Duncan Liefferink (eds.)*

The continuing development of the European Union (EU) is transforming policy and politics in its member countries, and possibly in an even larger number of potential members. This book offers a detailed investigation of the Europeanization of national environmental policy in ten western European countries since 1970. By blending state of the art theories with fresh empirical material on the many manifestations of Europeanization, it sheds new light on the dynamics that are decisively re-shaping national environmental policy. It also offers an original assessment of how far Europeanization has produced greater policy convergence in Western Europe, while taking into consideration the highly variegated overall pattern of domestic change with some aspects of national policy converging more substantially than others. Throughout, the approach taken is genuinely comparative, drawing on the insights provided by leading country specialists.

Routledge, London, 2004, ISBN 415-33941-3, £50-00.

The International Handbook of Social Impact Assessment Conceptual and Methodological Advances*By Henk A. Becker and Frank Vanclay (eds.)*

Social Impact Assessment (SIA) is the process of analysing and managing the intended and unintended consequences on the human environment of planned interventions (policies, programmes, plans, projects) so as to bring about a more sustainable and equitable biophysical and human environment. This important Handbook presents an indispensable overview of the range of new methods and of the conceptual advances in SIA. It is an invaluable reference tool for both practitioners and scholars at different levels working in the fields of SIA and environmental studies (including both impact assessment and management).

Elgar, UK 2003, 352pp; ISBN 1 84064 935 6; price: £95.00 Hardback

Negotiating Environmental Change New Perspectives from Social Science*By Frans Berkhout, Melissa Leach and Ian Scoones (eds.)*

Major advances have been made recently in environmental social science but the context and importance of this research has also changed. Social and natural science studies of the environment have begun to interact more closely with each other and many analysts now agree that an understanding of environmental problems



often depends on an understanding of the attitudes and behaviour of people and organizations. Moreover, policy and public debates have also shown that many assumptions that underpin arguments about sustainable development need to be reconsidered and re-framed.

This book by leading researchers presents a critical review of debates in environmental social science over the past decade. Three broad areas are covered in ten chapters: the problems of scientific uncertainty and its role in shaping environmental policy and decisions; the development of institutional frameworks for governing natural resources; and the link between economic and technological change and the environment. The book begins with an overview essay examining how perspectives across environmental social science have shifted over the past decade and looking forward to the emergence of new research agendas.

Elgar, UK 2003, 320 pp; Hardback: 1 84064 673 X, price: £65.00; Paperback: 1 84376 153 X, price: £25.00

MEETING CALENDAR

▶▶▶ 16–20 January – San Diego, CA, USA

Chapman conference on the Science and Technology of Carbon Sequestration; www.agu.org/meetings/cc05acall.html

▶▶▶ 18–22 January – Kobe, Japan

Global Conference on Disaster Reduction; www.unisdr.org

▶▶▶ 24–28 January – Paris, France

International Conference on Biodiversity
www.recherche.gouv.fr/biodiv2005paris

▶▶▶ 28–29 January – Fort Collins, CO, USA

Institutional Analysis of Environmental Decision-Making: A Workshop
www.fort.usgs.gov/conferences/institanalysis/default.asp

▶▶▶ 16–19 February – Florence, Italy

3rd International Conference of the European Society for Environmental History; www.eseh.org/meeting_2005.html

▶▶▶ 21–22 February – Vienna, Austria

Conceptualizing the Socio-Economic Dimension of Long-Term Ecological Research; www.iff.ac.at/socec

▶▶▶ 23–25 February – Bonn, Germany

International Conference on Integrated Assessment of Water Resources and Global Change: A North-South Analysis
www.zef.de/watershed2005

▶▶▶ 1–5 March – Hawaii, USA

Dynamics of Politics: Capacity, Preferences & Leadership
46th Annual International Studies Association Convention
www.isafnet.org/hawaii/

▶▶▶ 13–16 March – Atlanta, GA, USA

Emerging Issues Along Urban/Rural Interfaces: Linking the Science and Society
www.sfw.su.auburn.edu/urbanruralinterfaces

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> IT

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> GECAFS

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> GCP

• Global Carbon Project

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> GWSP

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