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Role of the research standpoint in integrating global-scale and local-scale research

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ABSTRACT: Climate change research is hampered by the gap between 2 styles of research, raising fundamental issues of standpoint. Interpretive-style researchers see themselves as at the center of the environment, experiencing it from within; their involvement is what allows them to gain knowledge. Descriptive-style researchers see themselves as outside the environment they analyze; their distance is what allows them to gain knowledge. This fundamental difference in standpoint indicates that attempts to meld the 2 styles of research in articulating global-local links are unrealistic and doomed to failure. Instead, we should look for complementarities and attempt to bring the differently achieved knowledge to bear on global problems.

KEY WORDS: Interdisciplinary research · Global-local links · Social sciences

Many histories can be written of the role of the social sciences in global climate change research. One such history might start, not with social science, but with Arrhenius's identification of the so-called greenhouse effect, continue with the research into the physico-chemical processes by which carbon dioxide and other gases play a role in regulating the Earth's climate, then turn to investigations into the economic-energy activities that result in greenhouse gas emissions, then (finally) arrive at the recognition of so-called human dimensions as an important strain of climate change research. Another history might begin with George Perkins Marsh's work 'Man and Nature' (1864, reprint 1973), which was subtitled 'or Physical Geography as Modified by Human Action,' follow that thought through the concept of the noosphere as a biosphere organized by human activity, then highlight early contributions of social scientists in research in the field of climate and society that focused mainly on direct human accommodation to the hazards of natural climatic extremes and indirect economic effects of climate. Gradually, however (this version of history continues), mainstream science organizations such as the International Geosphere-Biosphere Program (IGBP), despite paying lip service to the importance of social science research, marginalized such research in add-on organizations or discounted research studies as too localized.

It is not the intent of this paper to discover the true history—if indeed that is even possible. Rather, this paper seeks to examine major sources of difference in research frameworks that prevent climate change scientists from integrating various kinds of knowledge about a complex problem. We will use our experience in developing an assessment of social science relevant to global climate change issues as a starting point.

It seemed ambitious, but straightforward: we would gather material that had been widely scattered into an organized and comprehensive assessment. Parallel in scope to the assessments of the Intergovernmental Panel on Climate Change (IPCC), our assessment would survey the current social science research,

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delineate the state of the art, and show the relevance of social science research to policymaking. Of course they would be different, but our assessment would sit on bookshelves alongside the IPCC assessment; the two would be complementary, comprehensive references.

Some funny things happened on the way to the assessment. We thought that, because we all believed in the purpose and importance of what is now 'Human Choice & Climate Change' (Rayner & Malone 1998b), our assumptions about what should be in the book would converge, to a great extent. We thought the split we had to worry about was between physical science approaches and social science approaches. We thought that perhaps the reason social science research has not been used more in crafting climate change policies is that physical scientists had seized the opportunity to conduct their kind of research and report it to policymakers, crowding out the voices of social scientists.

What we found was that our social science team was neither so agreeable nor united in approach as we expected. We found a tension, shading into hostility at times, between scientists in the mainstream of current climate change analysis (e.g., part of the IPCC process) and those whose perspective has been based on questioning mainstream assumptions, methods, and results. What was surprising was how quickly the differences became occasions for polarization, for characterizing opposing views as extreme (and, therefore, wrong). 'How can we help policymakers deal with the climate change problem?' asked the first set, while, 'Defining climate change as THE problem is already a problem – perhaps we should be talking about another problem,' was a rallying cry of the second set. Mainstreamer then accused Questioner of obstructionism, unhelpful relativism, and post-modernism. Questioner in turn derided Mainstreamer's simplistic assumptions that people act as individuals and as rational beings. The social science tennis game was often at deuce, neither willing to learn from the other.

To some of us, the assertion that 'truth' is an ongoing creation determined by societal beliefs about physical realities is not only well established but also extremely useful in crafting effective policy. To others, that assertion seemed to deny the existence of even the plainest of facts as well as to preclude any meaningful, effective action.

We began to question our own assumptions about the usefulness of social science research that relates to values and meanings in a policymaking context that values quantitative and descriptive analysis. In the United States, for instance, it is a Washington, DC, truism that the person who shows up with the numbers wins the debate, whether or not those numbers can be shown to be accurate and relevant. In such a context, what is the value of qualitative research? What is the relationship between qualitative and quantitative research? Sure, it's great to talk about integrated research, but can an integrated approach be shown to be possible, let alone useful?

With these questions in mind, a third version of history—social science within the IPCC process—will perhaps illustrate the beginnings of an answer.

In the late 1980s tension was beginning to emerge over political definitions of the climate change issue as perceived by the industrially developed nations, on the one hand, and the newly industrializing and less-industrialized world, on the other. Traditional concern for the environment in the so-called northern countries (including Australia and New Zealand) grew out of concerns about resource scarcity, the threat posed by unlimited economic growth to the dwindling global resource base and the earth's absorptive capacity (Meadows et al. 1972, for example). Hence, climate change was perceived essentially as an environmental issue. However, in the so-called south, northern concerns about climate change were beginning to be viewed as a potential added burden to be carried on their already difficult development path.

This was the context within which the carefully named Intergovernmental Panel on Climate Change (IPCC) first met in Geneva in November 1988. The panel was established largely on the initiative of the northern governments, although nominally under the auspices of the United Nations Environmental Programme and the World Meteorological Organization.

The IPCC consisted of 3 working groups: (1) science, (2) impacts, and (3) response strategies. Although logically one might expect the balance of natural and social science participation to invert between Working Groups 1 and 3 with roughly equal participation in Working Group 2, in fact, the participation of social scientists in the entire process at this stage has been summarized as 'lamentable' (Redclift 1992, p. 34). Where the IPCC was able to reduce the climate change issue to mass-balance analyses in atmospheric chemistry, climatology, and ecology, it was able to demonstrate remarkable success. The 1990 Scientific Assessment of Working Group 1 achieved a remarkable level of consensus and is widely recognized as a paragon of the highest quality international scientific collaboration.

However, as the IPCC ventured into the realms where impacts on social institutions, perceptions of risk, and issues of fairness that are central to decision making begin to impinge on the thermodynamic considerations, the appropriateness of its approaches and the quality of its work proved controversial. Certainly, the establishment of the IPCC and its scientific success failed to extinguish the view that climate change is

essentially a moral and political rather than primarily a scientific and technical one. At the IPCC meeting in Sweden in August of 1990, several of the developing countries led by Brazil and Mexico

> 'tried to prevent the report on IPCC activities from being channeled through the international climate change 'mechanism' and the responsible organizations, the World Meteorological Organization and the United Nations Environmental Programme. Instead they insisted that it should be directed to the General Assembly of the United Nations. In the view of these countries, global warming needed to be placed within the context of discussions on the New Economic Order, which were largely concerned with questions of trade, aid and development.'
>
> (Redclift 1992, p. 36)

The subsequent reorganization of the working groups for the Second Assessment continued to reflect the tension between the scientific and technical conceptualization on the one hand and the ethical and political on the other. While Working Group 1 continued its original mission, impacts and mitigation were combined into Working Group 2, with a predominantly science and engineering focus leavened by some economic analysis. Working Group 3, entitled Cross-Cutting Issues, was tasked with reporting on policy instruments, decision making, and equity. However, in so doing it is generally considered to have confined itself to a somewhat narrow strain of economics. Indeed, the logic for establishing the IPCC in the first place, of insulating climate change policy from broader international development issues, militates against a holistic social science analysis. In the process for the Third Assessment Report, a conscientious effort was made to include social scientists of every stripe, with mixed and sometimes contentious results.

What are we to make of this? Despite a general recognition that tough equity and institutional issues await scientific analysis, mainstream research continues to focus on physico-chemical processes and impacts, with social science largely relegated to the secondary roads of 'human dimensions.'

Some or all of this sidelining of social science research is surely attributable to the differences in research styles, with important implications for questions of scale. Two very different traditions have developed very different ways of thinking about and doing science. One tradition emphasizes the physical and chemical processes of Nature, the repeatable laboratory experiment, and the objectivity of the neutral observer. The other tradition emphasizes meaning and order in Nature, the interpretation of quantitative and qualitative data, and the observer as a part of the observed world. The different aims, methods and standpoints of these 2 research styles give rise to results and conclusions that are incompatible—not opposed (with the idea that they could be reconciled), but of different genera.

Furthermore, this is not simply a difference that forms a cleavage between the 'hard,' natural/ physical sciences and the 'soft' social sciences. These 2 styles rub elbows, sometimes very uncomfortably, within the social sciences. The descriptive approach refers to research that has as its basis descriptions of social systems based on natural science metaphors, e.g., in terms of mass balances, thermodynamics, or stocks and flows. In contrast, the interpretive approach refers to the analysis of the values, meaning, and motivation of human agents. This distinction between approaches allows an increased understanding of the history of social science research within climate change research.

Early sociologists, for instance, were concerned to establish sociology as a *science* and thus sought to delineate methods analogous to those of physical scientists. Using the Enlightenment model of Newtonian physics, they posited the social world as being capable of being understood through discovering universal laws, leading to the human creation of a better, more rational world. The changes resulting from industrialization were viewed as progress. The unit of analysis was the individual, with a society defined as an association of individuals. This thread was taken up in the logical positivist ideal of a context-free, unified science, which includes both physical and social sciences. The search for a metalanguage for this unified science went from mathematics to physics to find a way to pure denotation, an escape from subjectivity.

A counter tradition in sociology grew out of the conservative reaction to the Enlightenment. Sociologists in this tradition are concerned with values, tradition, religion, imagination, and emotion. Society is viewed as more than the sum of its individuals, and change as a threat to the social order, particularly the changes from industrialization and urbanization. This 'interpretive turn' is based on an openness to the past and to the future as holding many—although not infinite—possibilities for theory:

> 'Interpretive social science seeks to replace the standing distinction between the social sciences as descriptive disciplines and the humanities as normative studies with the realization that all human inquiry is necessarily engaged in understanding the human world from within a specific situation.'
>
> (Rabinow & Sullivan 1987, p. 20–21)

Thus the 2 traditions within the social sciences tend towards highly disparate scales and standpoints, as shown in Fig. 1. The descriptive researcher sees herself as the objective observer, like the overseer in Bentham's Panopticon or the camera looking down from space onto Planet Earth. This standpoint lends itself to

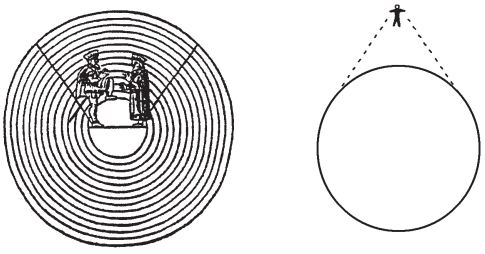

Fig. 1. Local (typically interpretive) and global (typically descriptive) standpoints (source: Ingold 1993)

research at the macro end of the scale, to global analyses based on large data sets and aggregated numbers. The interpretive researcher, on the other hand, sees himself as situated within the world he is investigating, a participant-observer of society. This standpoint lends itself to micro-level research, to richly detailed local analyses that are difficult to generalize from.

Of course, every research study involves elements of description *and* interpretation. And the distinction is not necessarily the difference between using numerical data or not (i.e., quantitative vs qualitative approaches). Some interpretive social scientists have developed methods to quantify social properties, and many data-rich studies rely primarily on interpretive analysis. Quantities in a descriptive analysis may be based on quite qualitative assumptions, and data on 'low,' 'medium' and 'high' values can easily be converted to numbers and manipulated as if they were higher-order data. Similarly, the descriptive/macro and interpretive/micro pairs are tendencies only, not clear divisions. It has been argued, for example, that the 'rational actor' found in economic and game theoretic models is a micro actor treated at a macro scale (Jaeger et al. 1998).

The distinction is perhaps better captured in the descriptive researcher's basic belief that relationships, causes and meaning are stable, consistent quantities and the interpretive researcher's belief that societal characteristics cannot be regarded as unambiguous, consistent functions. This fundamental distinction relates to the deep-seated difference between analysis *of* the policy process (the positive/descriptive 'what is') and analysis *for* the policy process (the normative 'what should be') (Hogwood & Gunn 1984). Scientists with the former worldview can take empirical evidence at face value, while scientists with the latter worldview continually question how empirical evidence is constructed as such and what it means.

Social scientists who wish to study global climate change in the context of major international scientific research programs have found themselves strongly encouraged to extend the descriptive framework already established by the natural sciences, reproduced in Fig. 2. The framework consists of a 4-box conceptual model: quantified emissions of greenhouse gases, atmospheric chemistry, climate and sea level, and ecosystems (Watson et al. 1996). Social science contributes to the 2 lower boxes. In the emissions box, social scientists, principally economists, provide highly aggregated data on human activities leading to greenhouse gas emissions. These data can be used to project future emissions paths and drive natural science models of global atmospheric chemistry and physics. In the impacts box, natural scientists aim to model climatic impacts on managed and unmanaged ecosystems upon which humans depend. With this information, social scientists can project the outcomes of these changes for large-scale patterns of agricultural and industrial activity, stimulating macroeconomic and technological responses, which, in turn, may eventually alter anthropogenic emissions estimates. The findings of such research address such questions as the following: What are the changes in agricultural output likely to be? What is the damage function associated with different degrees of climate change? The same framework shapes the bulk of research undertaken within the international social science programs of climate and global change research, such as the Human Dimensions Program of the International Social Science Council, which emphasizes stocks, flows and driving forces of change.

The descriptive style of social science emphasized in these programs seems quite compatible with the cyclical framework postulated by the natural sciences. The use of quantitative data, equations and modeling (such as demographic and economic data) fit well within the 4-box model. Moreover, this compatibility is further emphasized by the global scale of the research effort and by the outside-observer stance.

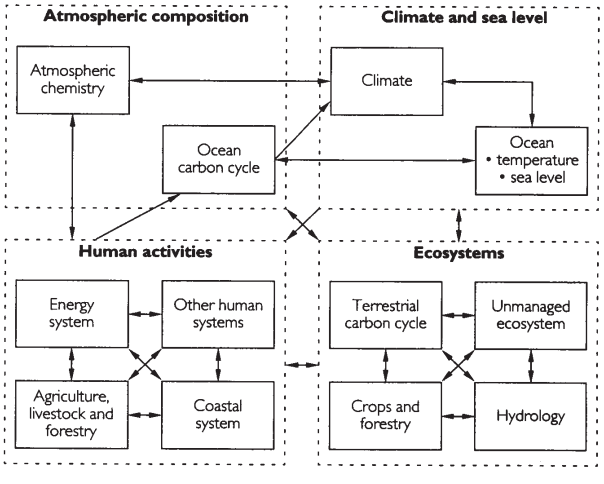

Fig. 2. A descriptive view of the elements of the climate change problem (source: Watson et al. 1996)

However, this is not the only research approach that has been used in analyzing environment-human issues, even if the environment is taken as the focus, as it is when scientists speak of the 'human dimensions of climate change.' Literature based in the sociology of science comprises analyses of the development of global science and its implications for the question of whether or not a scientific consensus about climate change exists. Cultural anthropologists have examined the claims and worldviews of government, science, and indigenous peoples in environmental disputes. In contrast to macro-level theory about international relations, political scientists have studied the ways in which individual actors form networks and epistemic communities. Whole literatures focus on behavioral changes in energy and technology use, as well as how technologies come to be adopted. Social scientists investigate how real-world public policy and industry decisions are made, as opposed to idealized models of rational actors, and analogues demonstrate societal responses to climatic changes in the past.

But these interpretive literatures and research studies have not penetrated very deeply into mainstream climate change science—the result, we would suggest, of the differences in style, scale, and standpoint. Although rhetorical calls for linking the local and the global in studies of climate change are many, middle-level research efforts are few and micro-level research is largely unintegrated with macro-level studies. One of the results of this imbalance is that the scientific community is not prepared to address issues of vulnerability and adaptation, which require a robust interpretive research component and which are receiving increasing attention, e.g., in the IPCC's Third Assessment Report.

Perhaps the 2 styles cannot be integrated in the ordinary sense without doing violence to both of them. That is, the poor understanding of the articulation of human behavior at the local level to the behavior of the global social and economic system may be in the nature of the approaches used at different levels. Linking the local and the global cannot be achieved simply by increasing the scale and quantifiability of interpretive analysis to meet a more thickly textured descriptive analysis as it attempts to accommodate lower levels of aggregation. The gap between the 2 approaches is not merely spatial but raises fundamental issues of what kinds and sources of knowledge we value as analysts.

The immediate issue that *can* be addressed is that both descriptive and interpretive analysts assume that their approaches are the only true legitimate ones and that the other approach is irrelevant. The descriptive method aims to analyze and control climate change through technical modifications/adjustments to the system. The interpretive method suggests that, if society decides to deal with climate change, knowledge of the climate, demographic, and economic systems will be superfluous. In the climate change debate, descriptive analysts will prefer estimating potential energy savings and theoretical technological fixes, or they may attempt to model aggregate consumption preferences along with financial incentives to change energy-efficient behaviors. Interpretive analysts will call for people to adopt 'green' values and change their lifestyles, or push for institutional reform. These different approaches also resonate with political preferences for more analysis before implementing policy and the demand for action now.

But in fact neither approach is sufficient—an obvious truth, though we do not seem to heed it in practice. An illustration may help clarify the situation: What might effect a change in the direction of a busload of tourists on a holiday? The technical knowledge of how a bus works and the tour system provides no basis for a change in a vacation destination; the intentions, commitment, and cooperation of the tourists are as much a part of the equation as the brake lines and steering wheel. Conversely, no matter how much the tourists may want to turn the bus around, they have to be able to brake and steer. Externalities such as an outbreak of rioting or food poisoning at the original holiday destination can be described in terms of scope and severity and interpreted as dangerous; but without both description and interpretation, the bus will not change direction.

Redressing the disconnect in style, scale, and standpoint within the social sciences will at least require bringing together the descriptive and interpretive methods—not melding them: that is probably impossible and would seriously distort both. One strategy is to use multiple mechanisms (see Table 1), both mainstream and emerging, to establish more robust and credible results. For example, the rational actor paradigm is a poor tool in itself for risk analysis, but embedded in a social-rational framework it can help to guide efficient and effective implementation of policy to address risk (see Jaeger et al. 1998). Energy models can be greatly enriched or complemented by social-psychological energy analysis, which explores why people choose certain energy services and not others, cost being only one factor (Shove et al. 1998, Weyant & Yanigisawa 1998).

Researchers may use a multidisciplinary or interdisciplinary approach to integration. In the former, scientists from various fields work together on a problem that has been defined within the framework of one particular discipline. A problem focus may provide a framework in which many different kinds of research can be brought to bear. A truly interdisciplinary

Table 1. Social science tools for climate change. Adapted from Rayner & Malone (1998a)

Mainstream social science tools for climate change research	Emerging social science tools for climate change analysis
Cost-benefit analysis	Vicious circle model
Economic analysis of markets	People as 'intentional systems'
Energy models	Sociotechnical landscape matrix
Simulation-gaming	Social-psychological energy analysis
Rational actor paradigm	Industrial ecology
Analogues	Vulnerability analysis
Integrated assessment	Myths of nature
	Map of human values/tripolar policy space
	Science and technology studies
	Policy network analysis
	Social rationality

approach involves people from different fields working on a problem that they have defined together in a way that it cannot be defined from within any single discipline. Interdisciplinary research often yields insights otherwise not attainable.

Perhaps the strongest reason for exploiting the complementarity between the 2 approaches is the nature of the climate change issue. The dimensions of climate change simply cannot be adequately addressed without using both approaches. Furthermore, strong linkages between scientific approaches can provide a further bridge to rich resources outside the sciences that can also help to deal with fundamental issues such as social justice.

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