

Research Articles

This Must Be the Place: Underrepresentation of Identity and Meaning in Climate Change Decision- Making

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Introduction

Climate change is presently causing disruption to social and ecological systems, and major disruptions in the future are likely given even the most optimistic of emission reduction scenarios. Climate change puts at risk a wide range of phenomena that people value, ranging from ecosystem services, species, and economic sectors to landscapes, homes, and human health.¹ In much of climate and related science there is an implicit assumption that climate change only becomes important to society when it affects material aspects of well-being, those most easily summarized in economic costs. In this article we suggest that the utilitarian notions implicit in this science underrepresent at least half the story: cultural and non-material impacts, including irreversible loss of nature, are of equal and potentially growing importance. Yet the interface of science with the social world seems dominated by the material paradigm. Hence we argue for the need to demonstrate that alternative issues and framings are important, not least for the instrumental reasons that cultural impacts have traction and meaning to people and can induce action.

The scientific discourse around undesirable and irreversible impacts of climate change has focused on deriving measures of what constitutes dangerous

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1. IPCC 2007.

anthropogenic interference in the climate system, as enshrined in the UN Framework Convention on Climate Change (UNFCCC). While there are now identifiable thresholds in the impacts of climate change, and the lexicon of danger has moved center-stage,² the science has quickly abutted against the inevitably normative judgments about what is valuable and significant to a society.³ Thus Pachauri, for example, argues that dangerous climate change “is no doubt a question that must be decided on the basis of value judgment: what is dangerous is essentially a matter of what society decides,” and that a fundamental principle of such a decision “is, of course, universal human rights.”⁴

In this article we argue that localized material and symbolic values have hitherto remained undervalued in the standard political and welfare economic calculus of climate change policy and science. We do this through considering the risks climate change poses to valuable and unique places. We focus on places as a means to highlight the “emotional, symbolic, spiritual, and widely perceived intrinsic values of the environment.”⁵ A focus on places highlights the local material and symbolic contexts in which people create their lives, and through which those lives derive meaning.

We argue that climate change policy underemphasizes, or more often ignores completely, the symbolic and psychological aspects of settlements, places, and risks to them.⁶ We suggest that legitimate and fair implementation of climate change policy is impeded by the use of common decision-making frameworks that reduce all risks to aggregate measures of human welfare. Highlighting the risks climate change poses to place and identity poses a challenge to notions of fairness in adaptation. The critique in this article is therefore aimed at both the scientific assessment and the predominantly economic arguments for climate change policy. Both of these rely on material and instrumental reasons for acting on climate change. Focus on place and identity gives greater force to alternatives to such arguments, based on precaution, rights, or wider notions of well-being and what people care about.

The article progresses by reviewing evidence on the impacts of climate change on two important, valued and unique places: the Arctic region, and Pacific small island atoll nations. The scientific evidence strongly suggests that climate change will result in the loss of many of the unique natural and cultural components of these places. We then explore two major and related challenges these cultural losses and issues of identity and place present to climate change negotiations and policy: the problem of managing the risk of irreversible loss; and the problem of reconciling the non-market and non-instrumental components of place with the economic metrics used in decision-making about cli-

2. Oppenheimer and Petsonk 2005.

3. Oppenheimer 2005.

4. Pachauri 2006, 3.

5. Brandenburg and Carroll 1995.

6. See also Agyeman, Devine-Wright, and Prange 2009.

mate change. We then suggest ways forward for climate change decision-making based on the principles of human rights and justice.

Places at Risk

Places, in the context here, are spaces that have been given meaning by people associated with them (though not necessarily residents). They are manifestations of economic, ecological, and cultural resources and meanings.⁷ Recognizing that social processes and relations define place does not mean that the physical characteristics of an area are unimportant. Just as the meanings attached to a place may be transformed through changes in the social and political context, proposed changes to the physical environment may lead to the articulation of new meanings, and actual changes to the physical environment may contribute to the renegotiation of meanings. For example, the degradation of the Barmah-Millewa Forest and floodplain in south-eastern Australia has led sections of the local community, previously unaware of the environmental requirements of the ecosystem, to develop an interest in the ecology of the area and subsequently to re-emphasize the river as being of genealogical and cultural significance.⁸ Thus, it is not just changing social relations and context that change the meaning of places; changing environments—as is occurring due to climate change—can also change meanings.

Places and their constitutive elements are valued in various ways by various groups. As Hess and colleagues suggest, places are “localities within which people and communities have particular affective relationships.”⁹ It is not surprising, then, that many people have a strong stake in the management of particular places.¹⁰ The failure of the resource planning and management process to include the range of meanings of places, and its singular focus on environment as a set of biophysical characteristics, can lead to conflict. Harvey argues that a consideration of environmental issues is almost impossible without (at least at some point) confronting the idea of place: “some of the fiercest movements of opposition to the political-economy of capitalistic place construction are waged over the issue of the preservation or upsetting of valued environmental qualities in particular places.”¹¹ Disputes may also arise in response to changes in the environmental conditions and associated meanings of places due to climate change.

Because places are unique and valued by people, managing them often entails trade-offs between some degree of conservation and some degree of development. The ways in which societies manage places and conservation-development trade-offs reveal much about their values; for example, some man-

7. Rodman 1992; and Jackson and Penrose 1993.

8. Ellemor 2003.

9. Hess, Mallilay, and Parkinson 2008, 468.

10. Gill 1994.

11. Harvey 1996, 303.

agement regimes are inclusive of people and others are exclusive. Some seek economic growth while others seek conservation, some seek short-term rewards while others seek to serve future generations, and some are responsive and adaptable to change while others resist it. The ways in which places are managed and the constraints to management options are important determinants of their vulnerability to climate change. At the same time, growing awareness of risks and climate change induce individuals to detach themselves from places that will have decreased utility in future and which they may eventually have to leave.¹² Locally experienced climate is a direct part of the psychological conception of place.¹³

Places are symbols, products, and containers of the various cultures that value them.¹⁴ By culture we mean what people think, what they do, and the material products (and landscapes) they produce; culture is shared, learned, symbolic, cross-generational, adaptive, and integrated.¹⁵ In North America and Australia the idea of wilderness has deep resonance and great political power, at least for settler cultures.¹⁶ At the same time, human-dominated landscapes such as the terraced rice paddies of Bali, the Yorkshire Dales of England, and the forests and lakes of Sweden are highly valued as manifestations of the cultures that produced them. Equally, the built environments of cities such as New York and Tokyo are valuable not just as homes and nodes of power, but also as products of the cultures that create and recreate them. Other sites of cultural significance, such as caves with prehistoric paintings in France or Northern Australia and ancient cities in Cambodia, Sri Lanka, and Peru, are highly valued as powerful embodiments of culture. All of these places are valued by those with cultural associations to them, such as the descendants of farmers, indigenous peoples, and former civilizations, as well as the various inhabitants of cities and iconic landscapes. There are also those who have had no direct experience of these places worth keeping, but who nevertheless value their existence.¹⁷

In the past thirty years growing environmental consciousness, coupled with an increasingly pervasive media, has heightened awareness of the importance of iconic places. Television and newspapers carry stories and pictures of places at risk that must be saved in some way. Whether these places are saved depends on a number of factors, including the ability of place-savers to demonstrate the universal qualities of the place such that a broader community agrees that it is worth saving. Indeed, icons such as the Great Barrier Reef in Australia, the snows of Kilimanjaro, and polar bears in the Arctic¹⁸ are used to great effect

12. Agyeman, Devine-Wright, and Prange; and Crate 2008.

13. Knez 2005.

14. Ellemor 2003.

15. Salick and Ross 2009.

16. On wilderness, see Langton 1998.

17. Bonyhady 1993.

18. Polar bears have been listed as 'threatened' under the US Endangered Species Act by the US Fish and Wildlife Service, with the primary threat to the species coming from shrinking sea ice due to climate change (US Fish and Wildlife Service 2010). This raises the possibility of litigation in the

to represent the risks of climate change to places and species that are valued well beyond their proximate human populations.¹⁹ In advanced technological cultures, most environmental changes, including climate changes, are now experienced through so-called technological nature: virtual environments, television, and other media. Psychologists suggest that the distancing of experience from the natural world is detrimental to the physical and psychological well-being of people.²⁰

Many subsistence and indigenous societies retain traditional ecological knowledge of their environments, enabling them to monitor, observe, and manage environmental change. By traditional ecological knowledge we mean systems of practice and belief of how the natural world works. This knowledge is often integral to a traditional community's culture, and is a large part of its repertoire of habits, skills, and styles from which people construct their livelihoods. Berkes argues that such knowledge is manifest not only through people's knowledge of land, animals, and plants in their particular environments, but also through higher levels of interaction: through rules about governing resource management systems and through worldviews about the place of humans within the natural world.²¹ These levels of ecological knowledge may overlap, change over time, and interact with each other. Worldviews and religious beliefs, for example, inform what new knowledge is legitimate and can be absorbed into resource management practices. Social and religious sanctions and taboos on food, hunting and farming practices and on sacred places are widely observed as mechanisms that promote sustainable and resilient social and ecological systems building on traditional knowledge.²² Traditional ecological knowledge is an important resource for guiding adaptation to climate change, and there are numerous examples of how this knowledge is used to manage water resources, predict weather, and forecast the onset of periodic climatic events such as El Niño.²³

Cultural heritage is vulnerable to global forces and trends. In the industrialized era there has been an overall decrease of cultural diversity with the rise of larger forms of social organization and their appropriating and displacing tendencies. Numerous languages are threatened or have become extinct in the Asia Pacific region through processes of settlement and migration and the subsequent creation of translocal communities. Sutherland has shown that the proportion of the world's languages at risk is larger than the proportion of bird and mammal species at risk.²⁴ Isolation of language speakers, for example in remote islands, appears to reduce the risk of extinction. Thus climate change, if it re-

US against states that by their actions are causing climate change and thereby threatening this species.

19. Slocum 2004.

20. Kahn, Severson, and Ruckert 2009.

21. Berkes 1999.

22. Elmqvist et al. 2007.

23. Orlove and Straus 2003; and Lefale 2003.

24. Sutherland 2003.

duces the viability of human populations on small remote islands, could have impacts on cultural and linguistic diversity.

In summary, societies value places and their cultures and environments, yet we argue in sections below that risks to both cultural and natural heritage appear to be undervalued in scientific and policy considerations of the costs and benefits of climate change. To elucidate our arguments here about valued places and cultures we examine two places that are at risk from climate change—atolls in the South Pacific and the Arctic high latitude regions.

Pacific Atolls

Dramatic changes associated with climate change pose serious risks to low-lying-island nations and their cultures. Atolls, in particular, are unique places: they contain unique biophysical systems and species; they sustain unique material cultures, social orders, diets, stories, languages, habits, and skills; they are the homes of peoples; and they are at risk from climate change. That they are small in every way and distant from the world's centers of political, economic, and cultural power, does not make them any less unique or valuable.

Foremost among these are the atoll islands of the South Pacific. There are 261 atolls in the Southwest Pacific Ocean. By country, the largest number of atolls (77) is found in French Polynesia. The only Pacific Island countries and territories that do not contain atolls are the Commonwealth of the Northern Marianas, Guam, Vanuatu, Wallis and Futuna, and Samoa. Four Pacific Island territories (Kiribati, the Marshall Islands, Tokelau and Tuvalu) are comprised entirely of atolls. There are also uplifted atolls (*Makatea*) across the region, including Nauru, Niue, and islands in Tonga and in the Cook Islands. These share many of the environmental and social constraints of other atolls, if not their low topography.

Analysis of climatic data show that there has been a slow warming trend in the South Pacific region of between 0.6 to 1.0°C in the area southwest of the South Pacific Convergence Zone (SPCZ) since 1910, with more rapid decadal increases of between 0.3 and 0.5°C per decade since 1970 in the areas northeast of the SPCZ.²⁵ There has also been a significant increase in the number of hot days and nights and a significant decrease in the number of cool days and nights, but no clear regional trends regarding rainfall.²⁶ There is also, as yet, no clear evidence of changes in tropical cyclones, although many older Pacific Islanders perceive that cyclones have become more intense over the course of their lifetimes.

Pacific Islanders have become increasingly aware of changes in the natural environment. These changes include multiple seasons without mangos (due to high rainfall in periods when mangos flower), withered yams that cannot be

25. Salinger, Renwick, and Mullan 2001; and Folland et al. 2002.

26. Manton et al. 2001.

harvested at the usual time, smaller and less appetizing breadfruit, coastal erosion and inundation on low lying islands, and changes in the migratory patterns of tuna. It is difficult to attribute these changes to climate change per se, although in some instances—such as changes in the movement of tuna—there is a strong confluence between traditional knowledge, the knowledge of commercial fishing captains who have been fishing in the South Pacific for decades, and formal scientific assessments.²⁷

Climate models consistently predict that surface air temperatures in the South Pacific will increase as a result of climate change by 1 to 3 °C by the end of the century. Annual rainfall is not expected to vary greatly (between a 14 percent decrease and 14 percent increase relative to the period 1961–1990); however, an increase in intense rainfall events and decrease in the number of days with rain is possible.²⁸ There is evidence to suggest that tropical cyclones may become more intense in the future—meaning that such cyclones may last longer, exhibit higher wind speeds, and have more intense rainfall.²⁹ Sea levels are projected to rise by 1–7 mm per year, and a sea-level rise of 14–32 cm by 2050 is very likely.

There is general agreement among a wide range of scientists that these are the most vulnerable of all countries to climate change.³⁰ The adaptation options of these countries are limited by their small land area, high population densities, limited economic resources, economic marginalization due to isolation, and generally low levels of human resource development. There is little that can be done to adapt to incremental sea level rise. There is no land to which atolls people can retreat—short of international emigration—should severe coastal erosion occur. In the worst-case scenario, the carrying capacity of atolls may be significantly or completely reduced (either progressively or suddenly) by climate change and its associated impacts such as increasing mortality and morbidity, decreasing growth, and, means permitting, increased outmigration.

While there is little doubt that atoll peoples are *prima facie* vulnerable to climate change, many features of life in such small island nations suggest significant ability to implement adaptation and change. First, there is a relatively high degree of reciprocity among people, communities, and neighboring islands, especially in non-urban areas.³¹ This facilitates the kinds of exchanges of materials and information that assists in coping with surprises. Second, atoll communities have a long history of exposure to short-term environmental perturbations, and have various strategies that enable learning and adjustment.³² Third, there is in most atoll societies a high degree of traditional ecological knowledge, and hence there are opportunities for building on traditional resource management institutions.

27. Barnett and Campbell 2010; and Lehodey, Chai, and Hampton 2003.

28. Lal, Harasawa, and Takahashi 2002.

29. Walsh 2004.

30. Nurse and Sem 2001; Hoegh-Guldberg et al. 2000; and Barnett and Adger 2003.

31. Connell 1993.

32. See Hooper's (1990) account of cyclone impacts on Tokelau.

While island nations are clearly at risk, cultures are adapting to new locations and situations and transforming in ways that weaken older cultural forms and render them less visible. In Niue and the Cook Islands, for example, large-scale migration has resulted in more islanders living in New Zealand than in the islands, yet the cultures of New Zealand-based islanders have not been wholly displaced, nor have the cultures of the islands themselves. In both Niue and the Cook Islands, however, reciprocal exchange has been weakened through diverse and sometimes simple processes such as deep freezers curtailing the distribution of fish among households (which would otherwise be shared for immediate consumption); the dominant use of English (such that a conscious effort is made in both countries to sustain the languages of *Vagahau Niue* and *Cook Islands Māori*); the disinterest of youth in traditional ecological knowledge; and the replacement of many traditional food procurement strategies by supermarkets and local shops.³³ These changes problematize the identities of Cook Islanders and Niueans and are lamented, particularly by older generations who most keenly feel the loss of many traditional ways.

Traditional ecological knowledge in atoll cultures varies among island groups and tends to be less influential in places that have been most modernized (such as the populous islands of Majuro and Ebeye in the Marshall Islands). Nevertheless, in more remote and undeveloped atolls such as in Kiribati, Tokelau, and Tuvalu, traditional ecological knowledge underpins most resource management practices. This knowledge is vast and is integral to the governance of atoll societies. It includes techniques for growing swamp taro, knowledge of fish locations and fishing techniques that are finely attuned to seasonal and wind patterns, and knowledge of plants and birds and their temporal and spatial patterns. It also consists of systems of conservation, including controlling access to or banning resource extraction in some *motu* and fishing areas when abundance seems low or when species appear unhealthy (often after cases of *Ciguatera* fish poisoning) and banning of certain fishing techniques at time scales ranging from selected days to multi-year periods.³⁴ These kinds of practices may or may not have useful resource management functions, and they cannot be understood merely as cultural devices to achieve beneficial material outcomes; rather, they are intrinsic to culture irrespective of their outcomes. Thus, while traditional ecological knowledge often has considerable instrumental value, it also has cultural value. In turn, then, if climate change impacts resource abundance and distribution, this will challenge both the form and the function of those many aspects of atoll cultures that are tied up with the land and seas.

In recent times there have been many initiatives to implement sustainable resource management that build on traditional knowledge and traditional institutions in atoll societies. Many of these concern fishing. For example, in Aitutaki (Cook Islands) there has been successful implementation of an Individual

33. Barker 1994; UNDP 2002; and Sissons 1999.

34. Adams 1998.

Transferable Quota (ITQ) Scheme on trochus harvesting. The scheme is based on an initial reserve area established by the Island Council, which later implemented the ITQ system with the assistance of the Cook Islands Ministry of Marine Resources. This system of management, which blends modern and traditional techniques, has produced a resilient fishery.³⁵ Also in the Cook Islands, a lapsed traditional system of customary prohibition—the *Ra'ui*—has been re-implemented by traditional chiefs with the assistance of the World Wide Fund for Nature (WWF) and the Ministry of Marine Resources. This system, which is also based on customary practices, has resulted in higher densities of coral and fish inside the restricted areas. In Kiribati and Niue alike, island councils have restricted the use of certain fishing techniques, restricted the access of outsiders to fishing grounds, and placed prohibitions on fishing in certain areas.³⁶ These and many other practices across the atoll islands suggest that, while climate change poses grave risks to the critical coastal environments that are atolls, atoll cultures have some capacity to respond, and this capacity is the product of interactions across international, national, and local institutions using both traditional and contemporary forms of knowledge.

The potential abandonment of sovereign atoll countries and impacts on unique cultures can be used as the benchmark of the “dangerous” change that the UNFCCC seeks to avoid. This danger is as much associated with the narrowing of adaptation options and the role of expectations about the impacts of climate change as it is with uncertain potential climate-driven physical impacts. The challenge for adaptation research and policy is to understand the adaptation strategies that have been adopted in the past and which may be relevant for the future.

The Arctic

Like the Pacific atolls, the Arctic is at the frontline of the impacts of climate change—not because the land will physically disappear, but because it will fundamentally transform to land-and-seascapes that local residents have never experienced in their thousands of years of residence in these places. The Arctic is the belt of treeless terrestrial ecosystems and adjoining seas that extend around the circumpolar North. The striking differences in culture and connections to the land and sea between the Arctic of North America, Europe, Siberia, and the Russian Far East indicate a diverse range of adaptations to these ecologically distinct regions. In this section, we focus on the North American Arctic, although many of the generalizations apply more broadly. The Inuit people of arctic North America are linguistically and culturally related groups extending from Greenland to Alaska. Most communities are situated on the coast, enabling people to access subsistence resources from both the land and sea. Ice-dependent

35. Hoffman 2002.

36. Thomas 2001.

marine mammals have been particularly important to Inuit livelihoods and identity.³⁷ Caribou, waterfowl, berries, and other plant and animal resources form important ties to the land.

In many senses, people are what they eat. Hunting, gathering, and food preparation have been essential for survival and structure gender roles and social relationships within communities. Hunting and gathering provide opportunities to strengthen kinship and other social bonds, as elders mentor youth and people share in labor-intensive activities. For example, hunting whales requires a team of hunters and processing the meat engages most of the community. Similarly, berry picking is a group activity that broadly crosses age groups.

Hunting and gathering provide opportunities to share stories and experiences that maintain ties to the land and sea. Elaborate sharing networks distribute and redistribute food and other goods within the community. Often 30 percent of the hunters harvest 70 percent of the food, with elaborate systems of reciprocity. These subsistence activities and stories depend upon and maintain an ethic of respect for the land and sea and for the animals and plants that give “themselves” to harvesters. This ethic views the Inuit as an integral component of this social-ecological system. In this framework, if people fail to show respect, they are unlikely to be successful hunters in the future, and nature is more likely to treat them badly. In an environment as harsh as the Arctic, this often translates into a difference between death and survival. In summary, the Inuit view themselves as an integral component of the land and sea, bound to it by an ethic of respect and reciprocity and dependent on it for food and survival.

The Arctic is warming as rapidly as any place on the planet—twice the global average warming rate.³⁸ This warming is most pronounced in western North America and Eastern Eurasia, with increases of 2–3°C in mean annual temperature in the past 50 years. Warming in these regions occurs in all seasons, especially in winter. Sea ice has become thinner (40 percent in the last half-century) and less extensive (9 percent per decade), with the record summer minimum in 2007 being 40 percent lower than the long-term average. That year, the ice edge retreated north of continental shelf break, causing walrus, which usually use ice floes as feeding and nursing platforms, to abandon the ice and move ashore in western Alaska for the first time in recorded history. Polar bears, another ice-dependent mammal, have been listed as a threatened species in the United States due to warming-induced loss of habitat. Loss of sea ice and increased intensity of winter storms interact to accelerate coastal erosion. This directly threatens life and property of many coastal villages. For example, several Alaskan villages are eroding into the sea and are being forced to relocate, just as on Pacific atolls. There are currently no government agencies with the mandate or authority to address climate-induced relocation, so relocation has not yet been possible, despite loss of homes and other infrastructure to coastal ero-

37. Nuttall 2005.

38. Correll 2005; and Anisimov and Vaughan 2007.

sion.³⁹ Their situation illustrates the institutional challenge of adapting to climate change.

On land, snowmelt occurs earlier by about 1.5 days per decade, and the permafrost has warmed 2–4°C, causing uneven subsidence of the ground surface, formation and enlargement of thaw lakes, and changes in landscape structure that disrupt both infrastructure and habitat.⁴⁰ Vegetation is becoming more shrubby, shading out the lichens, which are the primary winter food of caribou.⁴¹ Wildfire, which was rare historically in tundra, occurs more frequently, further reducing lichen abundance because of lichens' slow (about 80-year) recovery time. Most caribou herds in North America are declining in population, a trend strikingly different from the regional asynchrony in previous population trends.

Inuit hunters, who spend much of their lives on the land and sea, are keenly aware of and concerned about these changes.⁴² Their observations are generally consistent with the scientific observations of environmental and ecological change described previously but provide greater detail.⁴³ Hunters report that weather is more variable and less predictable, often with more extreme weather conditions. Consequently, past indicators of impending weather no longer work.⁴⁴ River and sea ice are thinner and less safe for winter travel. This presents hunters with difficult choices when migratory animals such as walrus and whales, on which the community depends, are available only during brief and sometimes dangerous periods of the year. Species are arriving that were never observed before. Some of these, such as moose migration into tundra riparian areas or salmon migration into rivers, represent new subsistence opportunities. Others, such as beaver-borne giardia and the salmon parasite *Ichthyophonus*, are clearly problematic. In still other cases, new arrivals such as trees, muskoxen, and red fox interact with locally important species, with uncertain implications for the subsistence resources on which people depend. One thing is certain, however: the land and sea are rapidly changing from the place with which the Inuit have long identified.

Because of the long residence time of CO₂ in the atmosphere, past greenhouse gas emissions commit the Arctic to at least another half-century of anthropogenic climate forcing, with warming rates in the coming decades likely to be similar to or more rapid than what has occurred to date.⁴⁵ Many of the physical and ecological processes described previously respond nonlinearly to warming. For example, as sea ice thins its spatial extent declines more rapidly than its thickness; as ice and snow cover decline, the reduction in albedo

39. Bronen 2008.

40. Chapin, Berman et al. 2005.

41. Sturm, Racine, and Tape 2001.

42. Krupnik and Jolly 2002.

43. Huntington et al. 2005.

44. Krupnik and Jolly 2002; and Wenzel 2009.

45. IPCC 2007.

(reflectance of incoming solar radiation) causes greater heating of the land and sea and therefore an acceleration of high-latitude climate warming and its attendant ecological and societal consequences.⁴⁶

These trends and projections present dilemmas for indigenous societies in the North. Over the past few decades, for example, Inuit communities in the North have been forced to adapt, switching species and adjusting hunting practices in the short term.⁴⁷ Experienced Inuit hunters, dealing with changing ice and wildlife conditions, adapt by drawing on their traditional knowledge to alter the timing and location of harvesting and to ensure their personal survival. Young Inuit, however, do not have the same adaptive capacity. Ford and colleagues attribute differences between the generations to reduced participation in hunting among youth and consequent reduced transmission and development of traditional knowledge in recent decades.⁴⁸ Ford and colleagues report that elders and experienced hunters, who act as an institutional memory for the maintenance and transmittance of traditional knowledge, perceive that the young are not interested in hunting or traditional Inuit ways. The incorporation of new technology in harvesting such as GPS, snowmobiles, and radios represents technological adaptation but has exacerbated the perception among young Inuit that modern technologies are more important than traditional ecological knowledge.

The sources of adaptability among arctic Inuit are strikingly similar to those of Pacific Islanders. Like the islanders, arctic Inuit show a high degree of reciprocity among people within and among communities, buffering individuals and communities against resource shortages and surprises. They also maintain a high dependence on the traditional ecological knowledge that has enabled them to cope with short-term environmental perturbations throughout their long history. The Inuit are proud of their ability to adapt and recognize the importance of traditional knowledge and wisdom as an essential ingredient of their resilience.

Although the details differ among countries, governments sought during the twentieth century to provide modern housing, infrastructure, education, and health services to Inuit communities, often moving communities to new locations. This well-intentioned policy of assimilation into Western society undermined language, culture, and ties to the land and sea and seriously challenged the resilience of Inuit culture. This led to reduced interest among the youth in subsistence and culture, loss of language, greater use of store-bought food, migration from villages to urban areas, and a host of social problems. More recently, the recognition and negotiation of indigenous land rights has revived a sense of local empowerment which, in some cases, has led to the teaching of

46. Correll 2005; and Chapin, Sturm et al. 2005.

47. Krupnik and Jolly 2002; Berkes et al. 2005; and Wenzel 2009.

48. Ford, Smit, and Wandel 2006.

language and culture in the schools and greater involvement of youth in traditional activities. This resilience varies substantially among communities and often depends on leadership by local elders.

In addition to the renewal of informal institutions associated with subsistence, sharing, and culture, new institutions have arisen to address new challenges. For example, subsistence harvest by Inuit communities has been challenged not only by climate change but also by imposition of regulations such as hunting regulations that constrain the timing and amount of harvest that a community is permitted. Co-management arrangements have been devised that enable communities to work with government agencies to manage local harvests.⁴⁹

In part out of frustration growing out of disempowerment by national governments, Inuit people from across North America organized in the Inuit Circumpolar Conference (ICC) to present their concerns on the international stage. Indigenous groups are represented on the Arctic Council with the same status as the national governments of the eight arctic nations. This body has been constituted to address the environmental challenges facing the Arctic through activities such as the Arctic Climate Impact Assessment.⁵⁰ The ICC and groups representing other indigenous peoples have been effective in pushing their agenda, resulting in improved scientific understanding of many of their sources of concern including climate change and contaminants.⁵¹ The ICC has also taken its concerns before the United Nations, affirming the right of the Inuit to be cold. They claim that greenhouse gas emissions, largely by non-arctic peoples, are equivalent to genocide because of their catastrophic impacts on the land, livelihoods, and culture of the Inuit. The first Indigenous Peoples' Global Summit on Climate Change, held in 2009, developed a declaration and a set of demands to address these infringements of their rights. Given the absolute limits to adaptation by traditional societies to the massive changes that are occurring, there are likely to be unique lifeways, inhabited settlements, and cultures that will be lost unless aggressive action is taken to reduce rates of climate change.

In summary, the impacts of climate change can alter and are altering patterns of resource use in various regions of the world; some of these changes can and do disrupt institutions and ecological knowledge that have evolved independently of modern economies and science. These changes are apparent in frontline regions such as the Pacific islands and the high-latitude North. Climate change is likely to impose irreversible change on the cultures and environments of unique and valued places.

49. Kofinas, Chapin, Burnsilver et al. 2010.

50. Nilsson 2007.

51. Arctic Climate Impact Assessment 2005.

The Policy Challenges of Places at Risk

The preceding discussion has demonstrated that the impacts of climate change are real and observed, and that the risks of change are significant in particular places. These impacts pose challenges for: defining dangerous climate change; for policy analysis of climate change as a global public good; and for justice and equity. How does climate policy account for the risks to places and their cultures and environments? The answer appears to be—not at all. There are two major and related problems. The first is the problem of reconciling perhaps incommensurable non-market and non-instrumental aspects of place with the economic metrics actually used in decision-making about climate change. The second issue is that of managing the risk of irreversible loss. We deal with each in turn before examining alternative perspectives on justice that offer means by which factors relating to place and identity potentially can be included in the framing of decisions

The first issue that limits global analysis of climate policy is incommensurable values around environmental and social change and progress. Incommensurability arises because some of the values that should be considered in climate change decision-making cannot be compared meaningfully using any common metric. Nor is it obvious that they can be ranked on a universal ordinal scale of value. In climate change, objections about such procedures have already been raised with respect to the problem of valuing human life. In a situation where there is no possible way to compare two or more entities—either on an ordinal or a cardinal scale—these entities can be said to be incommensurable.⁵² Thus, standard techniques in welfare economics such as cost-benefit analysis or contingent valuation, which were developed to compare micro-level decisions and which require standard metrics of value, are of little use when such metrics are unavailable. To reduce the problem of impacts on and losses to places and their cultures and environments into any such decision-making framework is to fit philosophically incomparable values into inappropriately technical procedures.

In welfare-economic terms, the lack of appropriate compensation means that any decision taken on the basis of winners and losers implies that “some individuals have the right to cause [uncompensated] damage to others.”⁵³ If this is not an acceptable position and the loss of place cannot be compensated, then decision-making must proceed on the basis of rights, precaution, or other principles. Hence, we argue that decisions on global climate policy must be made according to a formal conception of justice rather than merely an equitable distribution of burdens.

In neo-classical welfare economic analysis, the risk of irreversible loss has often been handled through adjustments to the discount rate or imposing sustainability rules onto standard economic analysis.⁵⁴ In the analytics of strong

52. O’Neill 1993.

53. Azar 2000.

54. Perrings and Brock 2009.

sustainability, such as outlined in ecological economics, anything that is beyond price should not enter the calculus of trade-offs and should be protected at all costs. In ecological economics these assets are sometimes referred to as critical natural capital. But the history of economic development shows that preservation of critical natural capital is not a guiding principle. Neo-classical welfare economists have pointed out that that nothing has true infinite value; there are always trade-offs, and hence implicit values. The reality of the current global inaction on climate change is, in effect, that neither non-market values associated with changes in places nor the issue of their irreversible loss is incorporated explicitly into climate policies.⁵⁵ In effect, decisions are taken that affect places as if their value were zero rather than infinite.

The ability of economics in general to deal adequately with non-market and other issues of value in the context of climate change has been brought into sharp focus by the Stern Review on the Economics of Climate Change, the most comprehensive and explicit analysis of the global economics in this area.⁵⁶ Stern addresses the limit to such analysis caused by non-market valuation through estimating a global damage function in terms of the equivalent loss of GDP and attempts to incorporate non-market impacts on human mortality and on loss of some environmental values into the report's underlying model. The review also incorporates irreversible catastrophic losses, such as sea level rise from loss of Greenland ice sheet, as expected values and weights them with low discount rates. Ultimately, Stern concludes that "We have conceptual, ethical and practical reservations about how non-market impacts should be included, though there is no doubt they are important."⁵⁷ Neumayer, Sterner and Persson, and Weitzman variously argue that non-market issues and the risk of catastrophic change could and should be brought into the equation.⁵⁸ Baer provides a critique of the incorporation of non-market impacts and risks of catastrophic change, concluding that "Stern is wrong that cost benefit analysis should determine whether we try to stay below a 2 °C threshold [i.e. meet a stringent global target for climate change]."⁵⁹

The issue of irreversible loss of places or their components also raises the issue of responsibility. One of the basic principles of almost every system of law is that loss that is brought about by others, whether intentionally or inadvertently, should in some sense be compensated. Baer argues that future adaptation to climate change by the most vulnerable countries should be funded through a compensation mechanism paid by the polluters who have caused climate-related losses.⁶⁰ But the nature of compensation in the context of irreversible loss will always remain contested. It is indeed highly questionable that

55. Toman 2006.

56. Stern 2007.

57. Stern 2007, 187.

58. Neumayer 2007; Sterner and Persson 2008; and Weitzman 2009.

59. Baer 2007, 2.

60. Baer 2006.

compensation exists as a general principle of international law, and even if it were, mechanisms of enforcement will be inadequate in the face of liable countries' assertion of their sovereign rights. Instead, international law works through establishing legitimate norms generated by multilateral dialogue in which moral arguments are important, but nothing is sacrosanct.

The second problem for climate policy is accounting for places at risk. Economic losses may be calculated, but ecological, cultural, and psychological losses are effectively not amenable to monetary valuation. This is a statement about both the practical difficulty of accounting for loss and the moral problem of whether such losses are in any sense commensurate with monetary values. The loss of a place and its psychosocial and cultural elements (the loss of a "world") can arguably never be compensated with money. The difficulties of sufficient compensation for loss of land and the cultural and economic impacts that ensue are evident in ongoing tensions over land rights and self-determination in post-colonial countries such as Australia and New Zealand.

In neo-classical welfare economics, the loss of natural system integrity is important only for its impacts on human welfare. These impacts are measured through reduced resource production, loss of future options, the creation of hypothetical markets to reveal some monetary value, a decline in related market value (for example using hedonic pricing), and other measures of loss of welfare. Such impacts on human welfare are often termed use and non-use values of the environment. Much of environmental economics within the welfare paradigm argues that real or hypothetical monetary metrics are important and that such "better" and standardized forms of valuation will result in "better" decision-making, with prices internalized to decisions. But the assumption that better values lead to more rational decisions is based on the idea that prices and values are independent and emerge autonomously.⁶¹ The reality is that real demand and hence the economic value of resources is constructed through the rules and institutions that delineate rights to use or not use those resources.⁶²

Hence, prices and economic values are in general a poor guide for decision-making concerning irreversible loss of natural systems or cultural assets, particularly in the context of climate change.⁶³ They cannot accurately capture the things that most matter about places. They may be able to price the replacement cost of damaged houses, but not the loss of "home"; they may be able to price the cost of replacing a destroyed museum, but not the loss of the heritage items it contained; they may be able to price the cost of relocating island populations, but not damage to the traditions of the cultures they sustain. In 2004, Cyclone Heta destroyed Niue's national museum and its contents. The building will be replaced, but the collection of lost and irreplaceable artifacts is a significant loss to Niueans' cultural heritage.

61. See Vatn and Bromley 1994

62. See Vatn 2005.

63. Sterner and Persson 2008.

Justice Perspectives

If standard, instrumental means of assessing climate change fail to account for place, identity, and loss, are there alternatives? Schneider and colleagues have proposed five irreducible metrics for assessing climate change: market costs, human lives lost, distributional effects, changes to quality of life, and people displaced.⁶⁴ These metrics could be used to assess losses across the human and natural systems affected by climate change, but suggest that outcomes can still be measured independently and in isolation. Nor do such metrics resolve the issue of what level of loss is acceptable or fair. Consequentialist theories of justice focus on the outcome of actions—who wins and who loses—and utilitarian versions of this approach suggest a supreme good to which all other goods are reducible. Justice, in this framework, is therefore a matter of fair distribution of this good. Deontological theories of justice, in contrast, suggest that justice is about the application of rules and rights. Some theories suggest that justice is not necessarily universal, but rather that it is complex, dependent on context, and a product of the relationship between irreducible elements such as health and material well-being (applying principles such as desert and need).⁶⁵

Applications of these theories in the area of climate change have primarily focused on present responsibility for action to reduce greenhouse gas emissions.⁶⁶ For climate change impacts, the issues of incommensurability and irreversibility outlined previously suggest that cultures can never be compensated satisfactorily for the loss of their physical bases. Caney makes the case that this set of equity issues around climate change can be framed as the right “not to suffer from dangerous climate change.”⁶⁷ He argues that climate change impacts jeopardize fundamental interests of individuals in their life and livelihoods (such as impacts on disease burden, malnutrition, and food security): rights to life, health, and subsistence as a minimum set. He also discusses a right “not to be forcibly evicted”⁶⁸ as a potential additional undeniable right. These fundamental interests are sufficiently significant and universal to warrant obligations on others, even without recourse to the polluter pays principle. As Caney points out, the strong case for rights in this area is amplified if consideration is given both to persons (such as in the future) who are not currently represented and to the interests of the natural world.

International treaties define more formal benchmarks of climate justice based on rights. For example, the Universal Declaration of Human Rights states that “everyone has the right to a nationality” (Article 15.1), and that “no one shall be arbitrarily deprived of his [sic] property” (Article 17.2). The United Nations Covenant on Civil and Political Rights states that “in no case may a people

64. Schneider, Kuntz-Duriseti, and Azar 2000.

65. Adger et al. 2006.

66. Page 2006.

67. Caney 2008, 537.

68. Caney 2010, 83.

be deprived of its own means of subsistence" (Article 1.2). In the case of the effects of climate change on atoll and Arctic countries, these basic rights are at risk, reinforcing the danger that climate change poses to these countries and cultures. For international decision-making on climate change, consideration of just actions should seek to incorporate these existing laws and norms.

At the international scale, difficulties concerning the meaning and practice of justice are at their most complex. The constituencies include at least all states, if not all people, and the problem requires some standardization across diverse issues. The meaning, let alone practice, of international justice therefore remain elusive.⁶⁹ The international system, built on the sovereign rights of states, frequently struggles to reconcile sovereign rights with human rights, and at present the rights of states are largely upheld at the frequent expense of the rights of particular groups, including indigenous peoples. For example, the Inuit people of the Arctic are already experiencing the impacts of climate change. These impacts are, in effect, breaching the rights of individuals, groups, and nations to an environment safe from anthropogenic harm. Inuit residents are already making this claim of harm. In 2005, the Inuit Circumpolar Conference sought to invoke the 1948 American Declaration on the Rights and Duties of Man against the United States to make this case.⁷⁰ They claim that native peoples of North America and Eurasia are bearing the brunt of climate change. The case being brought by the indigenous communities raises fundamental issues of the rights of cultural groups, particularly the oppressed and marginalized, compared to those of nations.⁷¹ The indigenous minorities of northern Europe and the Americas are not alone in facing climate change impacts that threaten lifestyles and cultures.

The islanders and indigenous peoples of the world may face the necessity of relocating, given current and projected climate change impacts. To them, however, this may not constitute a viable adaptation to climate change in any meaningful sense, as it means leaving behind the places that sustain them and their cultures. Barnett goes further and argues that if adaptation constrains people's legitimate rights to development, then it cannot be considered to be "successful."⁷²

There has already been discussion of the possibility that sea-level rise will make it impossible for human populations to remain on specific islands. There would be enormous economic, cultural, and human costs if large populations were to abandon their long-established home territories and move to new places. In the present international order, each country is granted considerable autonomy in controlling its borders and in setting policies on immigration. It

69. Brown 1997.

70. Sheila Watt-Cloutier (2009, 24–25) suggests that the petition is not confrontational but rather "a 'gift' from Inuit hunters and elders to the world" and "an act of generosity from an ancient culture deeply tied to the natural environment to . . . an industrialized and modern culture that has largely lost its sense of place and position in the natural world."

71. Kymlicka and Norman 2000.

72. Barnett 2005.

would be unprecedented if countries began to encourage all their citizens to emigrate. If islanders were free to migrate, rates of international migration from island countries threatened with climate change may pass a critical threshold that constitutes danger for a society.⁷³ This result may arise through increasing dependency on remittances or aid rather than domestic production for income, or through the adverse effects on culture arising from migration.

The examples of Niue and the Cook Islands (where individuals hold New Zealand passports and are free to migrate to New Zealand) offer some insights into the kinds of cultural and economic problems that arise when large-scale migration occurs. Resource-dependent communities, especially in island nations, have used migration as a strategy for sustainable resource use and risk management for millennia. Historically, patterns of migration are determined initially by available transport routes and then maintained through social networks.⁷⁴ Migration in the small-island context has, therefore, contributed to maintaining a sustainable resource base and social structure. Ultimately, however, a threshold may be reached that pushes the social system from previously sustainable rates of international migration into complete abandonment—a situation that is of great concern to the Government of Niue at present.⁷⁵

There has also been discussion of compensation to affected countries in the form of rights to migrate to polluting countries.⁷⁶ The recent example of New Zealand's Pacific Access Category of migrants from Tuvalu in response to concerns about climate change is instructive. The scheme allows for up to 75 people from Tuvalu to migrate each year. Since it began in July 2002, however, fewer than half of the available places have been filled, suggesting that even in Tuvalu, where there is widespread concern about climate change, people are not eager to leave their homelands. This points to the need for policies and measures that enable people to adapt to climate change in ways that allow them to continue to lead the kinds of lives they value in the places they call home, rather than simply to foster migration. As the climate change officer for Kiribati said in 2000, "I think of emigration as being the stage where you know you're losing the battle. We're nowhere near that."⁷⁷

Conclusions

We have argued that non-material impacts, such as those associated with place, are undervalued in the present geopolitical calculus of response and non-response to climate change. In line with Hulme, we suggest that both climate-

73. Bronen 2008.

74. Baylis-Smith et al. 1988.

75. Barnett 2008. The 2003–2008 Niue Integrated Strategic Plan (*Niue Ke Monuina—A Prosperous Niue*) identifies that "The declining population has created difficulties in maintaining adequate public services but more importantly threatens the existence of Niue's cultural heritage and sovereignty." Government of Niue 2003, i.

76. Byravan and Rajan 2006.

77. Cited in Pearce 2000.

change science and economics have a “globalizing instinct” in their practices, methods, and discourses that render invisible human-scale patterns and loss.⁷⁸

Initial physical impacts and ecological responses of anthropogenic climate change are already apparent. Yet the growing social awareness of impacts is likely to come about, we argue, through change experienced in local places and lives. While the risks of climate change are particularly acute in Pacific atolls and the Arctic, the dangers of climate change are no less real for many other places around the world. The rights of nonstate places, the differences in climate risks they face, and the resulting cultural ramifications are largely ignored within international debate and negotiation.⁷⁹

The case for a human-rights approach to these issues, while compelling, is difficult to implement given realities of the geopolitics of climate change. The case is a complicated one, since rights soon come up against issues where sacrosanct (and even basic) rights are often in conflict. The important issues, therefore, are institutions and political processes rather than the assertion of rights. In the end, it is institutions and laws that create the space and mechanisms by which values in identity and sense of place can be incorporated into the calculus of climate change.

We also suggest in this analysis that there are limits to adaptation options for places and their cultures. For example, there are limits to what money and engineering skills can do in atolls that lack available land for retreat from sea-level rise, or in the Arctic where ice and snow cannot be remade. There are limits to the idea of adaptation, too—changes such as migration may ostensibly be adaptations, but cannot be considered successful if they result in damage to people’s traditions, knowledge, social orders, identities, and material cultures.

We argue, therefore, that there is a need for more geographically and culturally nuanced risk appraisals that allow policy-makers to recognize the diverse array of climate risks to places and cultures as well as to countries and economies. Such analysis brings its own benefits. As Hess and colleagues argue, “a focus on place promotes resilience” because identity and sense of place are central to community resilience, public health, and well-being more generally.⁸⁰ Indeed, they argue that disturbance of place can contribute to psychological disorder in individuals. There is a need for decision-making based on a politics of principle that takes seriously these alternative risk appraisals, rather than the shallow politics of national interest. This is, in effect, a call for a new precautionary science of decision-making at the global scale that seeks to promote sustainable adaptation to the inevitable consequences of climate change on diverse places.

We do not, therefore, offer here specific recommendations on how the global climate regime should or could incorporate place and identity. Inevita-

78. Hulme 2010.

79. Mace 2006.

80. Hess, Malilay, and Parkinson 2008.

bly, adaptation to a changing climate is place- and context-specific. Mechanisms for transfer of funds or technical assistance to developing countries will need careful assessment if the solution is not to be as bad as the problem. More generally, communities require processes that give them some locus of control over their destinies as part of a recognition of identity and place.

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