

# Chapter 13

## Science and Climate Change Policy Making: A Comparative Network Perspective

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### 13.1 Introduction

When the author was conducting field work on environmental politics in Japan (1978–1981), he and his family (wife, son 1, daughter 3) lived in a small mountain farming village in Oita Prefecture, Kyushu, Japan. In this area, terraces of rice paddies held up by hand-built stone walls stepped down the mountainsides. Hundreds of years ago, the residents had hand-chipped a tunnel through a kilometer of mountain rock to bring water from the river on the other side over to water their mountain rice paddies. The water still flows through this tunnel, and then down through channels (*mizo*) along the sides of rice paddies with little gates to let it in when permitted. The residents carefully shared this precious resource, with a village committee deciding when each farmer could periodically get enough water to plant the rice seedlings in the spring, and to keep them growing in the summer. In this way, the village had survived for hundreds of years (Broadbent 1998).

Over these centuries, this careful management had become a deeply habituated norm of collective responsibility. Most people did not question it. In the spring, for instance, we worked as a group to clean out the water channels and afterwards celebrated with tea and cookies together. Of course, not everyone always followed their duty. But those who failed were punished by social ostracism – in the past a harsh punishment indeed in this small and interdependent world. The acknowledged mutual dependence, collective enjoyment, and occasional punishment kept the system going.

In the same way, building a sustainable society and world, including stabilizing and reducing the threat of global climate change (CC), will depend upon a careful and fair disbursement of resources so that no one starves, no one takes too much, and each one can have a decent life if they work hard. But world society, for all that we refer to it as a community, is in fact very far from this normative vision of cooperation.

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We still live in an age of barely-moderated harsh global competition for resources, prosperity and dominance. To govern earth systems and reduce world output of greenhouse gases, we need the same kind of cooperative norms as found in the village, based on the duty of sharing of both benefits and burdens. We all depend upon the same limited resource – a temperate planet derived from caring for our collective atmosphere. But how can we, as global humanity, build such cooperative and responsible norms on a global scale? We distrust each other, sometimes with good reason. Here indeed we are as babies, just learning to take our first steps.

Former U.S. President Bill Clinton has called global climate change “the greatest challenge of our era” (Giddens 2009). If we think about the next 50–100 years, on a business-as-usual trajectory, the planetary ecosystem will continue to warm and disasters will continue to intensify. If nothing is done to control the root cause – increasing concentrations of greenhouse gases (GHG) in the global atmosphere – efforts to adapt, to fend off disaster by building dikes or planting new crop varieties, or to help those most hurt by early disaster, will eventually be overwhelmed by the increasing scale of the disasters (IPCC 2007). This threat cannot be met piecemeal by a few countries. To respond effectively humanity must develop new, effective ways to collectively manage the earth’s ecological systems as carefully as the Japanese farmers do their water supply. Unfortunately, this kind of global governance, while long the dream of a few visionaries, has so far eluded substantial realization. The image of the Earth from space, a blue–white pearl floating in infinite darkness, gave new impetus to the idea. Just as Europe has gone from warring kingdoms, to larger nations, and now to the European Union, there is also hope for planetary cooperation. But never before has all of humanity had such a sword hanging over its collective neck to punish its failure in this daunting task.

Mitigating global climate change (by stabilizing and then reducing average atmospheric concentrations of GHG over the next century) will require enormous local, national, regional and global cooperation. Successful mitigation of CC will require both technological innovation, willingness to change habits, and finding better ways to inspire and ensure national mitigation efforts and willing cooperation to meet the goals of an international treaty. However, it has proven very difficult to find workable arrangements that can overcome the mutual distrust of persons and states and bring about such cooperation for the long-term global good. Yet, if based on a sufficient understanding of how society and politics works in these situations, we may be able to discover ways to overcome these barriers and craft effective agreements. The Compton project – Comparing Climate Change Policy Networks – is dedicated to finding such principles through the use of social scientific research as explained in this chapter. In particular the Compton project focuses on finding the basic social principles that explain why political societies (populations bounded by a state political jurisdiction) have differed so greatly in their responses to CC up to the present and into the near future. Through this research we hope to contribute to knowledge about the conditions and arrangements that facilitate positive and effective action to mitigate CC.

Until recently, social scientists concerned with global environmental problems including CC have paid their main attention to the design of international agreements

(or regimes) (Schneider et al. 2002; Helm 2005; Speth and Haas 2006; Young 2002). But the relative weakness of many of these, especially the failure of many nations that ratified the Kyoto Protocol to attain their targets during the current commitment period (2008–2012), has turned attention toward the factors within countries that affect their responses (Evans et al. 1993; Jacobson and Weiss 1998; Schreurs 2002, p. 261; Weidner and Janicke 2002, pp. 430–431). Building on their accomplishments, the Compon research project is designed to take the next step in this direction. The Compon project will test hypotheses about basic social and cultural factors that help or hinder national responses to mitigating climate change, including the stimuli coming from the relevant international agreements and regimes. The Compon project is collecting empirical data to test these hypotheses through rigorous cross-national comparative analysis. The findings are intended both to develop sociological and political theories and case studies of such reaction processes, and also to contribute to the design of better national and international regimes for climate change mitigation. The project focuses on the issue of mitigation, rather than adaptation, because without mitigation, over the coming decades the resulting disasters will only increase in intensity and eventually overcome adaptive efforts (IPCC 2007).

The Compon project is a collaborative effort among teams of scholars in 16 societies<sup>1</sup> and at the international level so that it directly brings in many of the voices comprising the debate and the world carbon system. The currently participating societies include China, South Korea, Japan, Taiwan, New Zealand, Canada, the United States, Brazil, the United Kingdom, Germany, Sweden, Austria, Greece, Russia, Lithuania and India, plus the international level of negotiations about the post-Kyoto climate change regime. These national societies represent a variety of conditions (developing/developed; democratic/authoritarian; large/small) that affect their responses to the task of mitigating climate change. This collaborative and comparative project will contribute to understanding the social principles crucial to the successful mitigation of climate change at national and international levels. The enormous task of constructing a new, inclusive and successful international climate change mitigation regime has only just begun; it must be based on solid knowledge of such motivating principles.

As a formal method, the Compon project uses cutting edge but well-tested methods appropriate to the complexity of the social and political processes under investigation. The discourse and policy network methods allow the researcher to gather fine-grained but systematic information on the interactions among the ideas and organizations that make up processes of social and political change. This method allows researchers to peer into the inner workings of social and political processes at the middle level, and trace out how they operate as a society-wide system of relations among organizations engaged in influencing society and shaping national policy. For instance, the method provides empirical data on the different types of exchanges of information, political

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<sup>1</sup>This term for the unit of analysis or case avoids thorny debates about the case of Taiwan. However, as the term *cross-national comparison* is very well know, the project will sometimes use the term nation for summary reference.

support, trust and reciprocity and other influences among the engaged organizations (and also significant individuals). This new level of detailed information permits the precise formulation and testing of a new class of hypotheses about complex political and social processes.

## 13.2 Explaining National Responses to Climate Change

Since 1988 the Intergovernmental Panel on Climate Change (IPCC), established by the United Nations, has provided the world with increasingly certain *scientific information* concluding that climate change is real, caused by humans and disastrous in its consequences. The 1992 United Nations Framework Convention on Climate Change (UNFCCC), signed by virtually every country, established a new global *norm* – that all nations and areas should contribute to reducing atmospheric levels of GHG. The 1997 Kyoto Protocol, currently in its goal-attainment phase (2008–2012) represents humanity’s first attempt at *regulation*, to secure binding commitments to reduce GHG emissions from industrialized countries. International agreements impinge on nations and other actors with these three stimuli: information, norms and regulations. However, nations differ widely in their responses.

Up to now, national responses to climate change have been haphazard. The Kyoto Protocol obligates the signing countries to an average reduction in their GHG emissions of 5% below their total 1990 levels. This 5% burden is distributed very unevenly, with some of the poorer countries given the right to increase their emissions by a great deal, with others have to reduce by much more than 5%. Of course, the Kyoto Protocol mainly included the more prosperous and highly industrialized countries. It explicitly excluded developing countries such as China and India that still needed to burn fossil fuels in order to grow and meet basic needs. Therefore, though the Kyoto Protocol takes path-breaking steps towards global governance of climate change, it is in fact a multilateral treaty among the limited set of ratifying nations. The fragility of this bold experiment was shown by the withdrawal of the United States from the treaty, on the grounds that it might hurt the US economy. All of the signing countries had such worries, and among them some had little intention to achieve the goals of the treaty. Since the initiation of the Protocol, some nations have made visible progress in reducing their greenhouse gas emissions levels, but others have not (see Fig. 13.1) (United Nations Framework Convention on Climate Change 2007). Figure 13.1 adds other large emitters to indicate the diversity of response to the problem itself. The new post-Kyoto regime currently under negotiation will have to include all large emitters and sinks, making compliance even more difficult.

The kind of variation in performance shown in Fig. 13.1 is likely to continue as the world tries to shape a post-Kyoto climate change agreement including all the significant GHG polluters and sinks. Unless a new, more inclusive treaty can elicit greater national compliance, it will fail to stabilize or reduce atmospheric GHG levels.

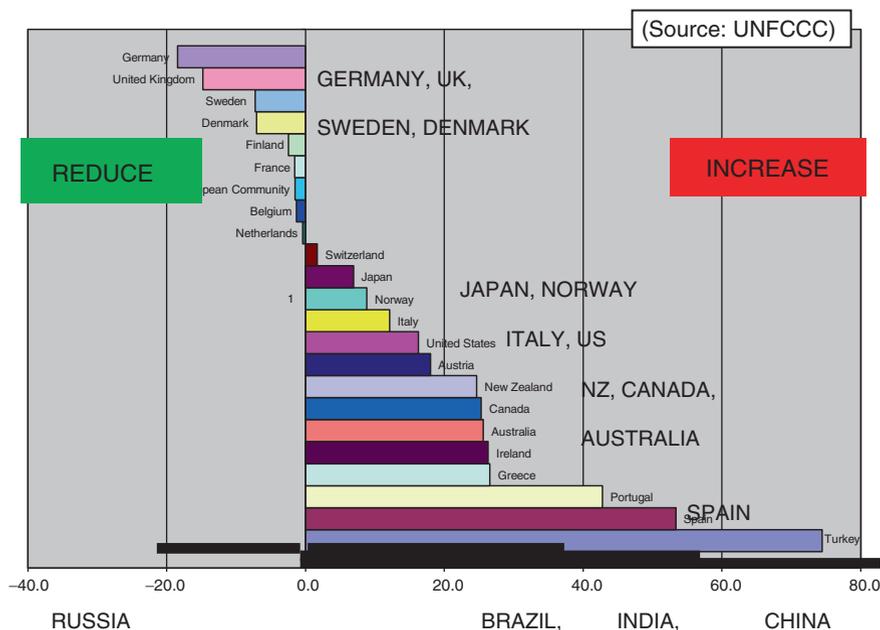


Fig. 13.1 Percentage GHG change (1990–2004)

Therefore, explaining variation in national response holds the key to successful global governance of this looming global problem.

National response to global climate change is a very complex process involving many interacting factors. The relevant factors can be broadly modeled as two dynamic fields – *discourse* and *action* – operating on a more stable background of *context*: basic social conditions (variously referred to by different schools of social science as institutions, structures or systems) that constrain, facilitate and channel the possibilities for discourse and action. The field of discourse represents the distribution of perceptions (beliefs, “knowledge”) and interpretations (evaluations, frames, meanings) about climate change prevalent in a society.<sup>2</sup> The field of action represents the behavior of actors – individuals, organizations, states – as they interact to promote or oppose change. Both fields are social phenomena; that is, they are more than the sum of individual discourses and actions. They both have their own systemic dynamics and properties. Depending on the nation in question, contextual factors can make the dynamics of either field more or less solid and enduring or fluid and volatile. The more fluid the system, the more that actions interact with

<sup>2</sup>The concept of frame refers to how a person or organization places moral and normative meaning upon a given phenomenon, be it economic downturn, racial segregation, or change in the climate (Snow et al. 1986).

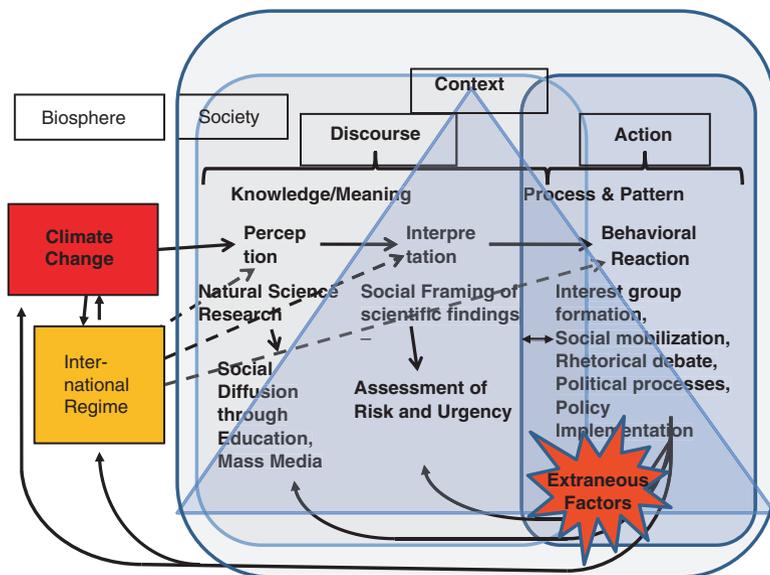


Fig. 13.2 Climate change reaction process

discourses to produce new forms of power and in the current concern, change societal practices and political policies affecting climate change mitigation. Figure 13.2 presents a hypothetical model of that process within the national arena and between national and international levels.

In the Fig. 13.2 schematic, the geochemical phenomenon of climate change is first understood by scientific research, and then diffused into fields of discourse (among leadership and public) through various media. Social actors initially accept or reject this scientific “claim” and frame it with varying levels of risk and urgency. Eventually, the issue stimulates social action; concerned groups mobilize for or against the new ideas. Discourse and action occurs with a context that supports some types and sanctions others. Extraneous factors such as economic recessions or unexpected climate disasters also influence reactions and outcomes. Early-reacting nations (such as Sweden) affect the initial formation of the international regime on the problem, which then feeds back into nations/areas to further affect their reactions. This cycle produces effects on the original geophysical phenomenon of climate change.

As the United States exemplifies, even the existence of climate change, not to speak of what to do about it, can be much contested (McCright and Dunlap 2003). In some nations, coalitions of climate change deniers attain great political power. The link between power and knowledge has long been stressed by social theorists (Foucault 1972). For change to occur, influential sectors of the population, especially its leading organizations, must learn new ways of knowing and framing an issue.

For instance, important authorities must change from denying the existence of climate change to accepting it as demonstrable fact. Moreover, they must decide that climate change poses great risks to the public good and national and global welfare, and treat it as a top priority. The physical qualities of a phenomenon (such as higher levels of atmospheric GHG or more hurricanes) do not directly determine its social interpretation. Rather, actors define a thing by attaching meanings and importance to it, building on their cultural predispositions, education, habits, news coverage, propaganda, social pressure, expectations and other factors. Sociologists call this process the social construction of an issue (Perrow 1984; Hannigan 1995; Eder 1996). At any given time, the field of discourse in a society around an issue – its current social construction – reveals the understandings and interpretations that help steer the social response. Change in the dominant discourses occurs through the mobilization of change-oriented actors, as enabled by the possibilities inherent in their contexts. Existing cultural and social conditions constrain the emergence of new discourses and the possibilities of their application to create change. The Compton project hypotheses express these defining conditions that cause variation in national climate change responses.

Since it occurs as a long-term geophysical transformation, climate change can only be known about through advanced, highly specialized scientific research on atmospheric chemistry and climatological processes. This knowledge is not accessible to the ordinary senses. Therefore, as different from many social problems, for non-specialists to perceive and understand this phenomenon requires them to place a great deal of trust and faith in climate science and scientists. That such faith is contestable is obvious from the presence and popularity of climate change deniers, who question the dominant scientific claims on many bases from the scientific to the religious. Even if the majority or most powerful actors of a society have accepted climate change and the risks it poses as fact, making the issue a top priority and acting on it to produce real social change and reduction of national GHG share is still very difficult to achieve. Since climate change is a global issue of unprecedented proportions, its vastness can induce individual actors, whether nations, organizations or persons, to dismiss their own responsibilities and efforts as insignificant or futile. For international climate change treaties to elicit the needed global cooperation, along with regulation and sanction, actors at all levels will have to think of their own contributions as significant, important and fair. This acceptance will spring directly from the risks posed by climate change threat itself or from global agreements, but will have to be cultivated and built through appropriate domestic social and cultural arrangements tailored to each country.

To successfully mitigate climate change, at some point domestic actors must move beyond discourse and engage in action that changes the existing patterns of energy sourcing and usage that cause the problem. Thorough change will proceed through a combination of persuasion and, once new regulations are in place, sanction. Individuals by themselves, no matter how powerful, cannot bring about such vast changes. Such change requires the mobilization of collective action, either by a few powerful actors or by many less-powerful actors. Would-be change agents have to form groups, mobilize movements and join coalitions to persuade and pressure.

However, collective action faces a fundamental social obstacle. Controlling and reducing climate change is a huge public good— it will benefit all of humanity and most other species as well. However, the early actors that push to solve the problem are often not highly valued or rewarded for their services. Rather, the stream of personal benefits flows to actors who stay within comfortable or known routines and continue business-as-usual. Due to this imbalance, all sorts of public goods – from pot holes to public health to climate change – tend to get neglected. This neglect is a basic flaw in the economic theory of the market. Instead of an “invisible hand” that benefits all, in terms of its effect upon the environment, the market produces an “invisible foot” (or in economics terms, an externality) that kicks us all (though some more than others) (Daly and Cobb 1989).

This social mechanism is known by many names: the common resources problem, the Prisoners’ Dilemma and the Tragedy of the Commons (Dietz et al. 2002). Applied to the difficulty of mobilizing actors to protect their common welfare, it is called the *dilemma of collective action*. Since the benefits of protecting a public good will go to everyone anyhow, why should any individual rational actor bother to help in the protection effort (Olson 1975)? These inertial mechanisms operate at all levels of social organization, from inter-personal to inter-national.

Politics is essentially about solving public goods problems, and though messy, it sometimes ends up protecting the public good. But it depends upon vociferous campaigning, either within a limited circle of elites or more widely throughout society. Such mobilization depends upon many cultural and social conditions. Mobilization can be stimulated by moral and social as well as material incentives, from norms about defending the public good to peer pressure to provision of financial resources. It also depends upon the costs imposed by opponents and political regimes (McAdam et al. 2001; Goodwin and Jasper 2004). Once mobilized, groups often form coalitions to strengthen their common influence. Movements and coalitions appeal to mass publics asking for voluntary change, but also pressure government to pass regulations that enforce changes on everyone (for instance, by placing a tax on fossil fuels to discourage their use). In so doing, they often give rise to counter-movements and opposing coalitions that try to stop such changes. In this way, the field of action can display dynamic swirls of interaction. Depending on the social context and the issue, the dynamics of change can involve mainly tense negotiations among high-level government officials and politicians, or can rise up from ordinary citizens who protest on the streets, or many other combinations of actors.

A descriptive comparison of the reaction of Sweden and the United States to climate change will put some flesh on these theoretical bones. The two cases’ GHG outcomes differ greatly. Sweden ratified the Kyoto Protocol while the United States refused to do so. Figure 13.1 shows that Sweden is among the top achievers in attaining its Kyoto Protocol emissions reduction goals, while the United States has greatly increased its GHG emissions. Starting in the 1990s, Sweden passed policies to reduce its GHG emissions levels. But the US did nothing until the Energy Bill finally passed under President Obama in 2009, and the effectiveness of that bill is still in question. Evidently, Sweden found a way to overcome the dilemma of collective

action and serve the long-term global public good, while the United States did not. Investigating their climate change response processes, we find that the two cases differ in their qualities of discourse, action and context. The current comparison is tentative based on the authors' initial field interviews in Sweden plus general information on the U.S. and is intended for heuristic purposes to demonstrate the model and generate hypotheses.

In the *discourse field*, on the whole, the Swedish media seem more favorable to the validity of science than the US media. Culturally, the Swedish public also has a more accepting orientation toward the validity of science than the bifurcated US public, which is more heavily influenced by the rejection of scientific logic. Also, in Sweden climate change scientists play a stronger role in the formation of policy through their participation in multi-stakeholder discussion forums. Through their rational discourse, such forums seem to amplify the spread of agreement on the conclusions supported by the most evidence, which would tend toward acceptance of scientific assessments of the risks posed by climate change. In the US, conversely, stakeholder participation in policy formation tends to take place in secret by lobbying groups or else in adversarial public hearings that are not oriented to discussion and mutual learning. Scientists play very different roles in the two societies. The intellectual independence of the domestic climate change science community is high in both countries. However, the legitimacy of the domestic climate change science community is relatively unquestioned in Sweden, whereas in the US it is highly contested. In Sweden climate change scientists seem to play much more central and determining roles in policy formation. In the 1980s, as the climate change issue arose, compared to the US, Sweden probably had a more highly developed set of existing discourse networks and cooperative patterns built up among many stakeholders that could be mobilized to confront the climate change threat. Therefore, the potential for social learning was much higher in Sweden than in the US.

In the *action field*, the political strength of advocacy coalitions for taking action against climate change seems very strong in Sweden and relatively weak in the US. As noted above, in Sweden these coalitions have more chances to participate in and influence the policy-making process than in the US. At the same time, the array of economic interest groups that are highly invested in fossil fuel production, sales and consumption, while important to the industrial systems of both societies, seem to be much stronger and exercise much more political power in the US. US political institutions, wedded to the pluralist contention of interest groups lobbying Congress with the wealthier ones able to buy more influence, tend to give dominance to powerful business groups. In contrast, Swedish political institutions, as forms of social corporatism formed in the aftermath of World War Two, give much more equal representation to all sectors of interest groups: business, labor and farmers. The long dominance of the Social Democratic Party in Sweden has tempered all these groups to think about the larger and longer term social good as well as their own immediate benefits. But in the US, the political system virtually forces all economic groups to pursue their immediate short run benefits or be left out. While both societies display strong and active citizens' groups devoted to

various causes of the social good, in Sweden the environmental NGOs seem to have attained stronger incorporation into the corporatistic policy formation process, while in the US, such groups are more left outside that process, especially during eras of Republican political dominance. It would seem that the interaction of these differing factors, probably plus others to be discovered, affected the discourse and action phases of the two societies so as to produce very different reactions to climate change and GHG outcomes. As the Compon research project matures, it will be able to greatly refine and specify the effect of these and other factors through empirical multi-national comparison in the evolving global regime and climate change context.

National reactions interact with and help or hinder the formation of global regimes. In the late 1980s, Sweden reacted first among nations to global climate change – its climate scientist Bert Bolin set up a scientific council to assess the data on the phenomenon (Bolin 2007). In a few years, Bolin's Swedish council became the model for the global IPCC, with Bolin as its first leader. This early-riser behavior indicates that in Sweden the underlying conditions were very favorable to climate change action. The diffusion of scientific knowledge from the IPCC was crucial in setting up the international climate change regime – the UNFCCC, established at the Rio UNCED in 1992. Almost all nations in the world signed the UNFCCC framework, which stipulated a common moral commitment to work to solve the climate change problem. Thus, in addition to scientific knowledge, the UNFCCC added a moral or normative stimulus to the climate change issue around the world. Exactly how these two stimuli affected national behavior is unclear, but they did encourage governments to convene the Kyoto Conference. In turn this created the Kyoto Protocol, the first agreement to set clear reduction targets for the prosperous or industrialized countries (in the UNFCCC, Annex 1 countries) and to speak about sanctions for non-compliance (though not enact them).

This two case descriptive comparison illustrates how cross-national differences in discourse, action and context can help explain the cross-national patterns and principles of reaction to climate change. To develop formal hypotheses about the factors explaining these differences, though, we cannot draw from descriptive case studies alone, but must also bring to bear ideas from existing social scientific research and theory.

### **13.3 Causal Hypotheses**

The COMPON project develops and tests hypotheses about how discourse, action and context interact to produce different degrees of climate change mitigation. The reaction processes occur not only at national but also international as well as at sub-national and regional [EU] levels and these will be included in the analysis. In each national unit, though, unique fields of discourse and action interact with national and other contexts to produce very specific processes and outcomes of

**Table 13.1** Conditions of discourse and action

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- International
    - International regime (information, norms, rules)
    - World political-economic system position
  - National
    - Geophysical factors (resources, vulnerability)
    - Demographics: population size, development and prosperity levels, carbon intensity of economy...
    - Cultural orientations toward science, public good...
    - Networks that can facilitate learning and mobilization
    - Mobilization of movements/advocacy coalitions
    - Effects of institutions on discourse and action
    - Relative power of fossil-fuel dependent interest groups
    - Participation in formation of international regimes
- 

mitigation. Finding social principles that explain more than one national case has long been the goal of cross-national comparative social science (Tilly 1984). While each national unit has its unique aspects, there may be more general principles that govern how more than one of them, perhaps a category of them (developed/developing, democratic/authoritarian, etc.) wrestles with the thorny task of mitigating climate change (Table 13.1).

In explaining a national reaction process, its level of development and type of economy will of course be very important. Less-developed countries use their lower levels of prosperity to justify exemption from GHG emissions reductions, arguing that the more prosperous nations bear the major responsibility. In contrast, national dependence upon external sources of fossil fuels may prompt support for the development of alternative types of energy, sometime nuclear rather than sustainable ones. Fears of losing international trade competitiveness is causing many trading nations to hesitate to go first in imposing costly emissions reductions measures on their own industries. Frames representing such concerns will show up in national discourse fields and be carried by advocates into political contention.

As outlined in Fig. 13.2, for individual actors as for whole societies, the path to action about climate change depends first of all upon acceptance of the dominant scientific consensus as valid and factual. The next step is to frame that knowledge as urgent, so that the risks of inaction outweigh the costs of action. This depends on raising the financial or moral costs of inaction (by taxes or conscience) or by lowering the cost of action (by subsidies or building confidence in burden-sharing). The spread of new knowledge and new ways of framing it is strongly facilitated by existing networks: “stakeholder beliefs and behavior are embedded within informal networks” (Sabatier and Weible 2007, p. 196). Accordingly the creation of networks through stakeholder participation may be crucial to spreading belief and action. Existing network patterns and cultural orientations exert independent effects upon variation in national reaction to the international climate change regime (Tompkins and Amundsen 2008).

In order to change behavior at a social level, the initial bearers of claims and norms must expand networks, persuading an increasing circle of adherents until their number and activity reaches a critical mass. In this process, social learning must turn into social mobilization. Gaining new voluntary adherents can proceed as far as possible through persuasion. However, given the high degree of social inertia and disinterest, personal voluntary action will never suffice to change social behavior enough to effectively reduce atmospheric GHG concentrations. To attain that goal, advocacy coalitions will have to attain sufficient political power to enable them to pass and enforce regulations and laws that demand and enforce certain general standards of behavior, such as a cap and trade law or a carbon tax. When a mobilized *advocacy coalition* wins enough support to form a majority government, it becomes able to control the central levers of the state, the law and policy-making process. From that vantage point, the new regime can establish the legal and policy conditions to bring about society-wide change in behavioral norms (by education, persuasion, inducement, regulation, new institutions and other means).

An international research project on national compliance to international environmental agreements, the Social Learning Project (SLP) led by William Clark of the Kennedy School of Harvard University, concluded with an hypothesis about the decisive type of social action needed to bring about national compliance. The SLP concluded that the key factor bringing about effective national response to global environmental problems was the *strength of the advocacy coalition*:

*. . . . the motivating force for most of the changes we observed were coalitions of actors more or less loosely joined for the express purpose of affecting issue development. Many of the most influential coalitions were international in character (Social Learning Group 2001, 187).*

This concept of advocacy coalition conjures up an image of political contention, with opposed sides struggling to attain their favored goals. This may be the case, as the theory of the Treadmill of Production argues (Schnaiberg et al. 2003). If so, research would validate a *contention hypothesis*:

*Attempts to create a climate of discourse favorable to strong measures against climate change will arouse such intense opposition that the only way to make change will be through powerful social mobilization, victory in elections and the implementation of government regulation.*

However, advocacy coalitions could also only be vehicles for persuasion and education transforming the society to a new point of view. This is the assumption of the theory of Ecological Modernization (Janicke 2002; Mol and Sonnenfeld 2000) and produces a *diffusion hypothesis*:

*Social learning will come about through a gradual diffusion of new ideas and goals into a society in a non-politicized learning process where the eventual consensus will become so strong as to directly prompt large-scale voluntary changes in behavior and policies.*

The Social Learning Group (SLG) stressed the inadequacy of social science methods for explaining their advocacy coalition conclusion and expressed that

they had arrived at this conclusion almost by accident after their long research project. They stressed that the Social Learning Group project was “not designed as an exercise in developing or testing propositions about the growth and impacts of such actor coalitions or interest networks” (187). Picking up this baton, the Compon project not only explicitly develops and tests such propositions but furthermore examines the conditions for their effectiveness through cross-societal comparison.

Action about climate change occurs within the set of organizations and persons directly agitated and concerned about the issue. Social scientists call this set of actors a *policy domain*—all the organizations in a society that direct their concerns and activities toward a specific issue (Burstein 1991). In these terms, the Compon project studies and compares the climate change policy domains of different countries. The organizations in a policy domain can come from many different social sectors: government agencies, political party committees, business associations, labor unions, scientific research centers, local governments, non-governmental organizations, mass media, religious organizations and social movements. They can also include individuals who serve as crucial leaders, mediators or knowledge brokers. Given the global breadth of climate change, national climate change domains include international actors from the same range of sectors. The different national climate change policy domains have in common a reference to the same global regime exemplified by the UNFCCC, the IPCC the Kyoto Protocol and post-Kyoto agreements. Each national Compon team constructs a list of relevant organizational actors for their country and interviews representatives of these organizations.

In the international debates around the Kyoto Protocol and the formation of the post-Kyoto regime, there are three major points of disagreement: targets and timetables (who bears what burdens of GHG reductions and by when?), technology transfer (should developed countries charge less developed countries for GHG reduction technology?) and financing mechanisms (how much should developed countries pay less developed ones to help reduce GHG levels?). Currently a fourth major point has emerged: how to attain reductions in deforestation and forest degradation (REDD). In general, developing and more immediately vulnerable countries argue that the developed countries are most responsible for problem, and thus should bear the major burden of fixing it. But net of development and vulnerability, nations exhibit considerable variation in their mitigation of climate change (Table 13.1).

Specific hypotheses about the causal factors conducive to effective societal mitigation of climate change, derived from previous theory and research and focusing on features of societal discourse, action and context guide our research. The hypotheses use the general term “take effective action to mitigate climate change (CC)” to refer to the specific actions most appropriate and possible for a given nation. Such actions range from the societal culture and the behavior of specific types of actors to the qualities of existing institutions. Response methods will vary by society with the bottom line being its trend in contribution to the reduction of global atmospheric GHG concentrations. The hypotheses are stated in terms

directly testable by empirical discourse and policy network data. Space allows only a brief statement:

H1: *The more receptive the national culture to findings produced by the scientific method, the more the nation will assign high risk to climate change and find appropriate ways to mitigate CC.*

H2: *The more legitimate and politically engaged the domestic climate change science community of a nation, the more the nation will accept the dominant scientific consensus about CC.*

H3: *The more the national media promulgate the dominant scientific information and global norms about climate change, the more the society and government will mitigate CC.*

H4: *The more that norms in favor of the public good are embedded within social networks among organizations, the more the nation will mitigate CC.*

H5: *The more receptive the national culture to collaboration to enhance the public good, the more the nation will mitigate CC.*

H6: *The more powerful are interest groups that defend activities dependent upon fossil fuel use, the less will the nation mitigate CCs.*

H7: *The more that the national political institutions equalize the power and representation of different sectors of interest groups in the political process, the more the nation will mitigate CC.*

H8: *The more that the political system provides venues for broadly representative and egalitarian stakeholder participation in the formation of policies, the more the nation will mitigate CC.*

H9: *The greater the autonomous capacity of the civil society (NGOs and NPOs supported through fees and donations from membership), the stronger will be the advocacy coalitions in support of mitigating CC.*

H10: *The more that pro-mitigation domestic organizations can utilize existing social networks to mobilize support, the more the nation will mitigate CC.*

H11: *The more that domestic organizations participate in the international regime formation, the more the nation will trust and comply with the regime and mitigate CC.*

These hypothesized factors will present themselves in different mixtures depending on the case. The technique of Qualitative Comparative Analysis (QCA) allows the researcher to discern their additive and interactive effects upon the outcomes of interest: national contribution to the reduction of atmospheric GHG concentrations (by reduction of emissions or protection of sinks such as forests) (Ragin 1987). An illustrative QCA table follows just before the concluding section.

## 13.4 Research Methods

As the Social Learning Group noted, previous social science methods had proven inadequate to test their concluding advocacy coalition hypothesis. Previous social science methods use interviews, published materials and news media, historical records, census statistics, and representative random or more targeted surveys of individuals. These methods are not well suited to measuring *networks of actors* and discourses as they engage in attempts to change the behavior and politics of their society. In order to collect such data, the Compon project uses discourse and policy network methods. Network analysis focuses on the relationships among actors; the common possession or transfer of a certain belief from actor to actor is one type of relationship. When traced in its flow among many actors, it produces the image of a network. The policy network method applies this approach to the study of political processes. The policy network method grows out of quantitative network analysis, used in sociology since the mid-1970s (Freeman 2004; Wasserman and Faust 1994). Pioneering work comparing US and German community politics using quantitative network methods (Laumann and Pappi 1976) led to the quantitative policy network method (Laumann 1979; Laumann and Marsden 1979). Applied first in studies of the United States national political system (Laumann and Knoke 1987; Heinz et al. 1993), the method quickly spread to a wide range of studies (Knoke 1990; Anheier 1987). A comparison of the US, Germany, and Japan (Knoke et al. 1996), including the current author, accomplished the first cross-national comparison of the mature policy network method and provides the basis for the current study. The method has since blossomed in many qualitative and quantitative studies (Kenis and Schneider 1991; Marsh 1998; Raab and Kenis 2007; Schneider et al. 2007).

The Compon project radically expands the comparative scope of policy network research. It currently includes investigator teams from different disciplines representing 16 cases. The project includes the crucial BRIC bloc of developing and transitional countries, Brazil, Russia, India and China. Without their compliance, the world cannot mitigate climate change. The cases also include a variety of industrialized countries: East Asian examples (Taiwan, South Korea, Japan); European-style ones (New Zealand, England, Germany, Sweden, Austria, Greece) and North American cases (United States, Canada) and the transitional case of Lithuania, plus the global level networks among organizations influencing the formation of the post-Kyoto international regime as a distinct case. Developing countries, including Mexico, are currently in preparation. The cases vary on factors that influence capacities and propensities to mitigate GHG emission levels or protect sinks (forests), such as natural resource availability and geophysical vulnerability as well as many features of discourse and action fields and context. The Compon project is modular, so researchers can add new country cases at any time (contact the PI: broad001@umn.edu). The Compon survey will be repeated at 5–7 year intervals and produce a publically-available data set for the comparative study of changing national reactions to global climate change over time.

Each Compon country team will conduct a survey-based case study on its national (or international) case. As a first step, each team will use media content analysis and expert interviews to determine the list of organizations in its own national climate change domain, the major points of and protagonists in debates about climate change, and the main recent national and international policy-decisions. The total organizational list will consist of between 50 and 120 engaged or influential national organizations of all types per country, plus about 30 common key international organizations (including the IPCC). Compon data will come from three sources: media content and discourse network analysis of three leading newspapers of different political persuasions, in-depth interviews with experts and organizational representatives, and a quantitative network survey of the identified organizational actors.

To facilitate the data collection, following the model in Fig. 13.2, the Compon project collects data on national response processes occurring in and between the discourse and action fields as well as from news and other media, in-depth interviews and secondary sources (Fig. 13.3). The discourse field consists of a distribution of frames (expressions of belief and evaluation) relating to climate change. The action field, in contrast, consists of the activities of actors (organizations and important individuals) as they seek to persuade or dominate others and affect policy-outcomes. When actors advocate similar frames without necessarily knowing each other, they produce actor-discourse networks. When the actors hold the same frames and cooperate in mobilization and advocacy coalitions, they generate action networks. The distinction between two types of networks hinges on the presence or absence of direct social relationships among the actors.

For data on the discourse field, the Compon project will draw information from all three sources. Content analysis of newspaper articles in three major newspapers and important records such as legislative debates will reveal many of the debates and frames active in field of public discourse as well as the actors that espouse them. This task will utilize the relational software Discourse Network Analysis

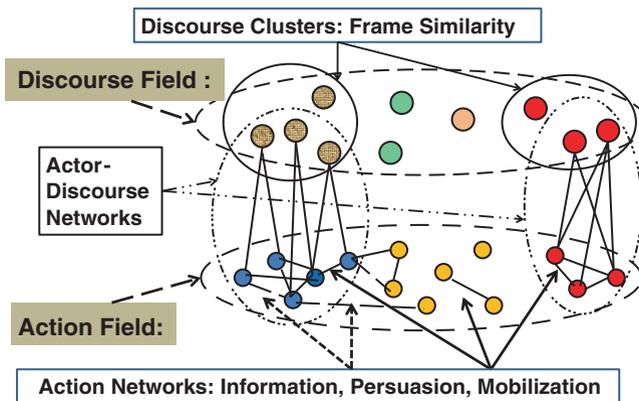


Fig. 13.3 Two fields of analysis: discourse and action (see Color Plates, Fig. 13.3)

(written by Philip Leifeld). The in-depth interviews and organizational survey will also procure data on the frames held by different actors.

As scientific information about climate change diffuses through the discourse field, evaluative norms come into play. Norms carry habitual criteria for evaluating climate change, from irrelevance to denial to worry about personal material loss to concern with its impact on humanity or the global ecosystem. Actors using different normative standards will necessarily disagree about what to do. Only some actors will accept sufficient responsibility to seriously think about, evaluate and act upon the issue.

For data on the field of action, the project will use in-depth interviews and the quantitative survey, as well as actor-discourse networks from the media analysis. The quantitative survey will gather information on the networks among organizations, including the transfer of vital scientific information, vital political information, and mutual engagement in negotiation or coalition. The network survey will also ask respondents to assess relative organizational influence in politics. In this way, the project will gather the empirical data needed to study the mutual shaping of discourse and action in the process of social mobilization around climate change.

Evaluative norms spread through discussion networks among organizations and individuals, as well as through mass and specialized media. Organizations learn through their networks and peer pressure about what evaluations (frames) to adopt. Some organizations can dominate the spread of frames, imposing frames upon obedient subordinates, or the diffusion can be interactive, through rational discussion among peers. The learning style will affect the quality of national response to climate change. Specially designed survey questions will trace these networks. For example, the Compton network survey will ask: "from which other organizations does your organization receive valuable scientific information about climate change?" And "with which other organizations does your organization mutually discuss the issue of climate change." To the degree that the two networks trace the same pattern, the findings will indicate a discursive style of learning.

Tracing the flow of information and norms through networks will help indicate the function of institutions. Agenda 21 and other sources argue that egalitarian forums for stakeholder participation are crucial for resolving environmental problems (Ruckleshaus 2005). With optimal function, such forums may help the diffusion of scientific evidence and risk evaluation. In the network data analysis, if a diversity of organizations have information networks to such a forum, and also hold scientific and action-oriented norms, it will indicate that the forums do indeed have the predicted function.

Other network questions will concern sources of political support (defined as a public display of solidarity with the respondent organization's policy stance on an issue). Partners in political negotiations and in advocacy coalitions are also important networks. Such networks often build upon longer existing relationships, such as the long-term exchange of mutual aid (reciprocity). These networks suffuse societies in different densities and patterns, helping give rise to different policy-making processes. For instance, the reciprocity network penetrates the full Japanese field of labor politics very thoroughly, but in the US is only present among labor unions (Broadbent 2001, 2008). In the Japanese case, the presence of reciprocity networks

increased the likelihood that the so-connected actors would transfer information and political support. Other network questions will concern perceived influence, leadership roles, informal socialization partners, and organizations with determining influence over one's own organization's policy stances. In this way, network questions provide indicators of the relative power of organizations in the system (as indicated in Fig. 13.4).

In addition to network questions, the Compon survey will ask for other types of information in the following categories: levels of organizational effort in issue areas (i.e., energy technology, policy formation, scientific research, education, etc.); types of organizational activity (advocacy, legislation, providing discussion forum, etc.); organizational participation in policy formation processes (i.e., government discussion of cap and trade policy, political pressure tactics, level of satisfaction with outcome); and finally, the resources of an organization (i.e., membership, professional staff).

### **13.5 Illustrative Analysis of Information Network: Japan Case**

Some initial findings from the Compon project Japan case as well as from an earlier analysis of Japan's global environmental policy network will give the reader a better grasp of the approach and how it can be applied to hypotheses about processes of social and political change. The illustrations here present some network images derived from the survey, but do not go into the more detailed statistical analyses that a full analysis will entail. The results from the Compon Japan case address initial findings the field of climate change discourse as it is indicated by the attention paid to the issue by three national newspapers over time.

These findings show the rise and fall of media attention to climate change over the years from 1997 to 2008 (Fig. 13.4). From a high point in 1997 at the time of the Kyoto Conference, media attention suffered a precipitous drop during the "lost decade" of severe economic recession, but a renewed surge with the issuance of the IPCC Fourth Assessment Report in 2007. The FAR stated with virtual certainty the anthropogenic causes and disastrous consequences of climate change. Figure 13.4 represents on the most superficial level of analysis of the discourse field, preceding more detailed media coding and survey data.

Turning to the field of action, data from the GEAPON survey are useful. A team conducted a policy network survey of Japan's global environmental politics domain in 1997, just before the hosting of the Kyoto Conference (COP3) in Kyoto, Japan. Entitled Gepon (Global Environmental Policy Networks), the survey itself was modeled on the team members' previous policy network survey in Japan that concerned labor politics (Knoke et al. 1996). Along with global climate change, the Gepon project also considered acid rain, ozone layer depletion and other global environmental issues. While initially proposed by the author of this article, the survey was funded, designed and mostly carried out by Professor Yutaka Tsujinaka of Tsukuba University. About a year later, the author of this chapter conducted five

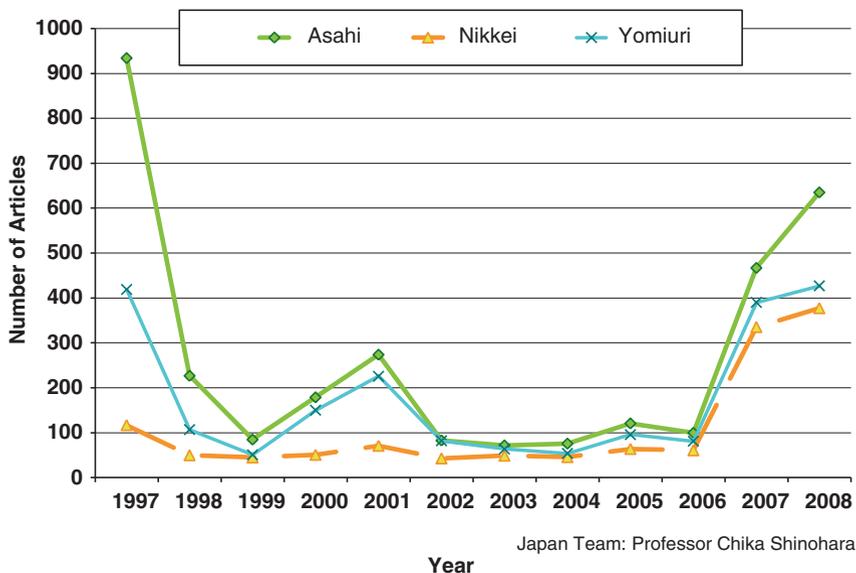


Fig. 13.4 Climate change newspaper articles annual number 1997–2008

additional interviews using the same survey form to supplement important organizational responses missing in the original survey.

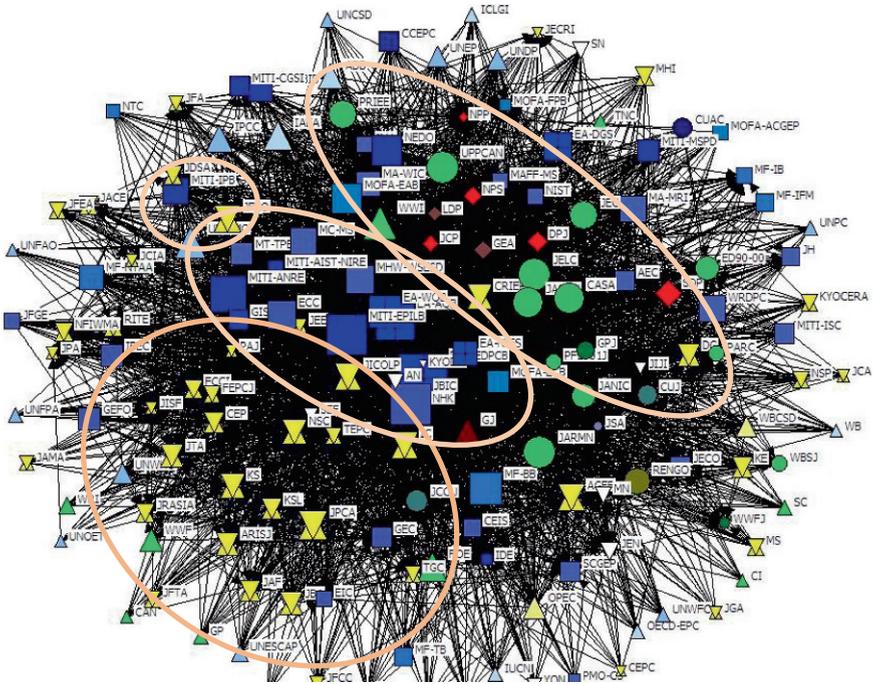
The Gepon project identified the organizations active and influential in Japan’s global environmental policy domain at that time. In this case, the organizational list included 122 domestic organizations all of which were surveyed. The list also included 30 international organizations that were not directly surveyed, but which domestic organizations could check as sources of information or other network relationships. The survey asked several network relations, one concerning the exchange of important information. The exact wording of the question was as follows:

*Concerning the political process on global environmental issues, it is important to exchange scientific and political information. Over the past one to two years, with which of the following list of organizations has your organization exchanged that kind of information? Please check all organizations that apply.*

The responses to this question (and other network questions) from the 122 organizations were converted into a matrix of 122 rows by [122+30=] 152 columns (the 30 extra organizations represent international organizations such as the World Bank, the Climate Action Network, and others). Each cell in the matrix (122×152) represents a potential exchange of information between two organizations. The number of exchanges engaged in by an organization is indicated by its degree score. Since information exchange indicates a reciprocal transfer of information, ideally the in-degrees and out-degrees of a domestic organization should be equal. But

sometimes two organizations do not both acknowledge the relationship (check each other). The data in the network image is based only on mutually-acknowledged exchanges of information, thereby helping its reliability (this does not include international organizations which were not surveyed directly). Since information can be exchanged or transferred without loss, information networks tend to be denser than networks of mutual aid in more material ways. Figure 13.5 well illustrates that density.

This network image is not hand-drawn; it was generated from the empirical network data by a computer algorithm in a network software program (Borgatti et al. 2002). Despite its initial impression of impenetrable complexity, a closer examination of Fig. 13.5 reveals some principles of its macro-formation or structure. These principles help explain Japan's information exchange system about global environmental issues in 1997. The colored geometrical objects (icons) within the network represent the 122 responding organization plus, on the outer periphery, the 30 international organizations. Each organization has its acronym label close by. The double triangles (yellow) represent business organizations, the squares (blue ) government agencies, and the circles (green ) environmental NGOs, all domestic to Japan. Among the governmental ministries and agencies (blue squares), those with internal lines cutting them into four sections represent departments within Japan's



Size of Icon: Amount of information exchange with other organizations

Fig. 13.5 Japan global environmental information network, 1997 (see Color Plates, Fig. 13.5)

Environmental Agency (*Kankyochō*). Single diamonds (brown or red) represent political parties, with the brown ones being the ruling Liberal Democratic Party and one of its agencies, and the red ones the parties out of power (Japan Socialist, Democratic Socialist, and Japan Communist Parties). Inverted triangles (white) represent news organizations. International organizations, which were not surveyed directly but have scores from being checked by domestic organizations, appear as upright triangles (their colors in the same typology as domestic ones, light blue for government, light green for environmental NGOs, etc.). Because the international organizations were not surveyed directly, they are mostly in the periphery of the formation. In this image, the size of the icon indicates its degree score – the number of times it was checked by other organizations as being a partner in information exchange. The bigger the icon, the more it exchanges information with other organizations. The relative centrality of a domestic-organizational icon in the network indicates its relative importance as a hub for conveying information among other organizations that do not directly exchange information themselves.<sup>3</sup>

What does this network diagram tell us about Japan's global environmental information flow pattern in 1997 just before the country hosted the Kyoto Conference? At this point, the entire political society was highly activated about hosting the Kyoto Conference, the third Conference of Parties to the UNFCCC. First of all, it shows that government agencies (the blue squares) were the biggest conveyors of information and occupied the central location in the entire information network. This is to be expected since the Kyoto Conference was a government sponsored event hosting delegations from many foreign governments. However, this may also reveal more persistent patterns in Japan's information flow system. Among the government agencies, the three largest ones, closest to the center, were the Global Environment Department, Planning and Coordination Bureau (GEDPCB) of the Environmental Agency (its title and icon partly obscured behind another icon), the Environmental Protection and Industrial Location Bureau of the Ministry of International Trade and Industry (EPILB-MITI), and the Japan Bank for International Cooperation (JBIC), which handles the financial aspects of Japan's international environmental development aid programs. Other government agencies cluster nearby forming a central blue axis to the entire figure. The two tiny white triangles (Asahi Newspaper-AN and Kyodo News Agency-Kyodo) embedded within the government sector illustrate the well-known dependency of the Japanese news media on the government bureaucracy to obtain information. However, the tiny size of the mass media icons indicates that they did not exchange information much with other organizations on the one to one basis. Rather, their major function in the information flow system was to inform the total society indirectly through their publications and broadcasts (Kabashima and Broadbent 1986).

In a society like Japan in which the formal government bureaucracy plays such a central role in the political process, with the major role in developing most national policies, their centrality in the information flow system should come as no surprise.

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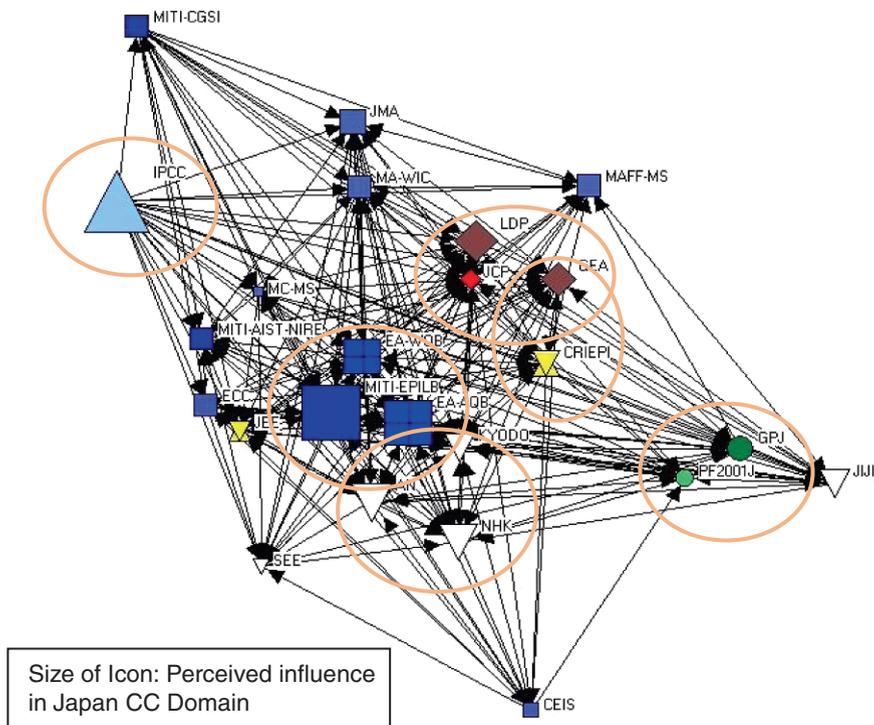
<sup>3</sup>For an explanation of network analysis concepts see (Wasserman and Faust 1994).

But to see an empirical map of these central actors ensconced within the entire information flow system and their relation to other actors and clusters helps define the operating principles of the system throughout the whole society. For instance, the figure reveals that business (yellow double triangles) and environmental NGOs (green circles) cluster on opposite sides of the central government actors and exchange a great deal of information within their respective clusters. Only one business organization takes a more central role in the whole pattern, the Japan Federation of Economic Organizations (JFEO or Keidanren) positioned at the top of the pattern near the government agencies. This network formation indicates that at this time, government agencies largely performed the role of intermediaries or bridge-keepers for the flow of information between business and NGOs and to the entire society.

The centrality of bureaucracy is in stark contrast to the relative marginality of the political parties as information hubs. The political parties, both the dominant one (Liberal Democratic) and those not in power (Socialist, Communist), are clustered together for information exchange. In Japan, the paucity of staff for Diet members reduces them to getting their information from the bureaucracy and other organizations, including business and NGOs, rather than researching and creating their own sources of information and analysis (as plentiful staff allow United States Congressional representatives to do). This figure of course places organizations according to their information exchange centrality, not to their policy decision-making capacity, which is quite a different concept. In that regard, the survey includes a measure of the perceived political influence of organizations in Japan's climate change policy domain which we will examine next.

The next figure extracts a specific network of interest to this chapter (Fig. 13.6). In this case, the network displays the set of organizations in Japan that directly received information from the IPCC. This is of course an extremely important set of organizations, because they function as the bridge-keepers between international and domestic information pools. They transmit information from the international scientific community into the domestic Japanese society and politics. Figure 13.6 uses the score for perceived influence for the size of the nodes. This score is simply the number of respondents that checked off the organization as being either very influential or somewhat influential (appropriately weighted).

The network image of Fig. 13.6 shows a large and diverse set of organizations that directly received information from the IPCC in 1997. They are in their same placement as in the full network. These organizations include a large number of government agencies (blue squares), and large number of business organizations (yellow double triangles), some political parties (the brown and red diamonds), two environmental NGOs (green circles) and many media companies (white triangles). The remaining brown triangle is Globe Japan, an international association of national politicians concerned about global environmental issues. The size of the icons reflects their perceived level of influence in Japan's domestic politics of global environmental issues (as determined by the number of respondents checking that organization as being "especially influential"). The centrality and size of government agencies and their closeness to the media helps explain the precipitous drop in media attention to climate change after 1997 revealed in Fig. 13.4.



**Fig. 13.6** Domestic organizations receiving information directly from IPCC (see Color Plates, Fig. 13.6)

Evidently, media attention is closely tied to government engagement in the issue, which also declined after 1997.

As compared to the information centrality held by government agencies in Fig. 13.5, the network image in Fig. 13.6 reveals a somewhat wider dispersion of political influence (indicated by the size of the icons). The network image indicates the very surprising conclusion that in the 1997 Japanese global environmental policy domain, the IPCC was among the big three influential organizations! The other two are the JFEO or in Japanese, *Keidanren* and the EPILB-MITI (noted in Fig. 13.6 as MITI-EPILB). Among the government ministries and agencies, the Air Quality Bureau of the Environmental Agency (AQ-EA) is second to the MITI bureau. The network image also reveals strong levels of perceived influence for the three news media clustered close to the government agencies. The Liberal Democratic Party is also assessed as highly influential, while the Japan Communist Party is diminutive. Business associations have almost entirely dropped out of the picture because they do not receive climate change information directly from the IPCC. Rather, businesses hand over this information gathering task to a specialized business research institute, the Research Institute of the Electric Power Industry

(CRIEPI), from which they probably get most of their information (a proposition for testing with this data). In another surprise, almost all of the domestic environmental NGOs do not receive information directly from the IPCC. Instead, the Japan branch of Greenpeace International serves as the primary information bridge-keeper to the domestic NGO community. This network figure indicates that in Japanese society the information bridge-keepers between outside and inside are relatively few, and those that perform this role have relatively high levels of political influence. This finding is in line with the network theory that being a bridge-keeper over a structural hole (a gap between clusters of organizations) gives power to the bridging actor (Burt 1992).

This brief review of one network in one country and one subset network within it only takes the first, most superficial step into the analytical capacities of the policy network method and indicates findings relevant to our hypotheses. We would want to examine the other networks, of course, such as political support, and their relationship to each other. For instance, do political support networks overlap with (predict) information flow networks or not? We would also want to examine the relative policy success of the different organizations, and the coalitions they forged to produce those outcomes. There are many techniques of network analysis that can be brought to bear in such an analysis. Matrix correlation, for instance, will enable us to examine the degree to which one network overlays another, indicating a confluence of two types of relationships. Using the other sorts of data in the survey we can probe the effect of organizational resources and networks upon the relative political effectiveness of different coalitions. Previous policy network surveys have not included the attitudes, beliefs and frames that the Compton survey will tap. With this data, we will be able to cluster actors by their beliefs and frames, and investigate how these affect the formation of advocacy coalitions. In short, the preceding illustration of policy network analysis was just to indicate the orientation of the method to the inter-organizational relationships and patterns that are the life blood of larger political structures and institutions.

Compared to the heuristic analysis of the Swedish and US cases analyzed above, the empirical data just presented provides a more empirical basis for estimating the validity of the hypotheses for the case of Japan. Like Sweden, at a crucial phase, Japan played a central role in the formation of the global regime by hosting the Kyoto Conference, even later opposing US behavior by ratifying the Protocol. However, Japan has not been able to meet its own GHG reduction target under the Kyoto Protocol (Fig. 13.1). During the current commitment period of 2008–2012, Japan shows an increase of 14% in GHG emissions over 1990, while its goal was a reduction of 6%. The industrial sector succeeded by voluntary measures in keeping its GHG emissions stable over the period since 1990, but the consumer sector, buying bigger cars and more air conditioning, has greatly increased its GHG emissions. Concerning the knowledge phase of reaction to climate change, Japanese culture is very receptive to the logic of scientific evidence – indeed the culture is enamored of technology and very successful in its innovation – and relatively free of powerful belief systems that would militate against accepting such logic. Compared to US media, Japanese news media are

closely dependent upon government ministries for information (see Fig. 13.4) and have rarely presented views questioning the validity of the IPCC findings and assertions (this claim will be tested by Compton data). Japan’s climate change science establishment is closely tied to and funded by the government. It seems that Japanese climate scientists rarely act as autonomous knowledge brokers among different sectors or in the policy-making process, nor do they directly address the public contrary to current government policy (unlike, for instance, top climate scientist James Hansen in the US) . In the nation’s action phase, advocacy coalitions have played a weak role in influencing national climate change policy. Frames concerning national prosperity and energy sufficiency formulated by the Ministry of Economy, Trade and Industry have dominated debates about climate change, rather than fears about the future disasters that climate change will bring such as presented by the Environment Ministry. The close alliance between the ruling Liberal Democratic Party and the corporatistic business sector led by the JFEO (Keidanren) have further buttressed a weak political posture toward climate change insisting on voluntary action by business and no carbon tax on consumption rather than the imposition of regulations by government.

Using the method of Qualitative Comparative Analysis (Ragin 1987) described above, the very tentative findings on the three nations described in the body of this paper indicate values on the eleven hypothesis as shown in Table 13.2. Presented in a table, if the hypothesized factor works to reduce a society’s contribution to global atmospheric GHG concentrations, it receives a +, if the factor works to increase that society’s contributions to GHG levels, it receives, a –, and if the factor is irrelevant, a 0. The combination of positively and negatively bearing hypothesized conditions indicates the causal mixture bringing about a society’s effect on global atmospheric GHG concentrations. The specific policies a society uses to achieve its effect may vary widely by society and constitute a subsidiary research focus within the Compton project.

This QCA table allows the researcher to look for patterns of causation. In this example, the table reveals the hypothesized factors that distinguish the one positive case (that lowered its GHG emissions over the 1990–2004 period), Sweden, from the two negative cases that did not lower their emissions. The most relevant pattern consists of Hypotheses 6, 7 and 8, as their differences parallel the differences in case outcomes. These hypotheses concern: powerful interest groups defending the use of fossil fuels, national institutions that equalize power and representation between different interest groups, and the presence of venues for broadly representative egalitarian stakeholder participation. One could expound upon the implications of this finding. However, due to the lack of data and analysis,

**Table 13.2** QCA comparison of three cases

Case	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	Outcome (Δ GHG)
Sweden	+	+	+	+	+	-	+	+	+	?	+	+
Japan	+	-	+	+	+	+	-	-	-	?	+	-
United States	-	+	+	-	-	+	-	-	+	+	-	-

at this point, this kind of comparison can only serve heuristic purposes to illustrate the method. As the national and international teams complete their work, this kind of comparative analysis based on much more solid empirical data will give more reliable results.

## 13.6 Conclusion

This chapter has reviewed the construction and logic of the Compon research project as an attempt to clarify the social and cultural factors affecting the formation of national fields of discourse and action around climate change, within and as they connect to the international climate change regime. Starting with the advocacy coalition hypothesis, the chapter has presented a number of hypotheses and offered an illustrative comparative test of them by examining three cases: Sweden, the United States and Japan. The analysis of the Japan case begins to use some empirical data for these tests. The chapter illustrates the great potential of the network and other data being collected by the Compon project. The chapter represents an introduction not only to the Compon project but also to the wider field of comparative social science and its use for understanding variation in national behavior. Hopefully, as a project enjoying the participation of many social scientists around the world, and open to new participants as well, the Compon project can sharpen humanity's understanding of the social and cultural factors that facilitate or hinder the capacity and propensity of national societies to mitigate climate change, and in that way, also contribute to the stabilization and reduction of this threat to our collective possibilities, hopes and well-being.

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