INTERNATIONAL PUBLIC OPINION, PERCEPTION, AND UNDERSTANDING OF GLOBAL CLIMATE CHANGE

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I. INTRODUCTION

> *The release of carbon dioxide to the atmosphere by the burning of fossil fuels is, conceivably, the most important environmental issue in the world today."*
> *(Nature, 1979)*

Natural scientists have described global warming[1] as perhaps the preeminent environmental risk confronting the world in the 21st century. Meanwhile, social scientists have found that public risk perceptions strongly influence the way people respond to hazards. What the public perceives as a risk, why they perceive it that way, and how they will subsequently behave are thus vital questions for policy makers attempting to address global climate change, in which the effects are delayed, have inequitable distributions of costs and benefits, and are beyond the control of any one group. Public support or opposition to proposed climate policies will also be greatly influenced by their risk perceptions. Further, "scientists need to know how the public is likely to respond to climate impacts or initiatives, because those responses can attenuate or amplify the impacts" (Bord, Fisher, & O'Connor, 1998, p. 75).

This thematic paper summarizes international public opinion, perception, and understanding of global climate change and reports results from an in-depth study of public climate change risk perceptions, policy preferences and individual behaviors in the United States.

II. GLOBAL CLIMATE CHANGE

Background

Scientific identification of anthropogenic climate change and assessments of the potential consequences date back nearly 200 years. The warming effect of an enhanced greenhouse effect was first recognized in 1827 by French scientist Jean-Baptiste Fourier. In 1896, Svante Arrhenius, a Swedish chemist, first calculated the effect of increasing concentrations of carbon dioxide in the atmosphere and predicted that a doubling of CO_2 would lead to an increase in average global temperatures of 5 to 6˚ C (9 to 11˚ F), a result remarkably similar to current projections (Houghton 1994:12). He estimated, however, that it would take another 3,000 years of fossil fuel burning to reach a doubling of CO_2. He further argued that this would unequivocally be a good thing, especially from the perspective of a northern European:

[1] The terms "global climate change" and "global warming" are used interchangeably throughout this report. Global climate change is the term most often used by the scientific community, while global warming is the term most often used by the media and the lay public. These two terms can have different connotations among the public (see Leiserowitz, 2003).

> *By the influence of the increasing percentage of carbonic acid in the atmosphere, we may hope to enjoy ages with more equable and better climates, especially as regards the colder regions of the Earth, ages when the Earth will bring forth much more abundant crops than at present for the benefit of rapidly propagating mankind (quoted in Christianson 1999:115).*

By 1957, however, scientific assessment of the potential consequences of anthropogenic climate change began to shift with the publication of a paper by Roger Revelle and Hans Suess of the Scripps Institute of Oceanography. They argued:

> *Human beings are now carrying out a large-scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future. Within a few centuries we are returning to the atmospheres and oceans the concentrated organic carbon stored in sedimentary rocks over hundreds of millions of years (quoted in Christianson 1999:155-156).*

In this same year, Charles Keeling began measurements of atmospheric carbon dioxide from an observatory on the Mauna Loa volcano in Hawaii. He soon identified what became known as the "Keeling Curve" – a graph that showed atmospheric concentrations of carbon dioxide increasing year by year. This was a dramatic finding, as until this point most scientists believed that the oceans absorbed all the carbon emitted to the atmosphere by the human burning of fossil fuels. Instead, the Keeling Curve proved that carbon dioxide was accumulating in the atmosphere faster than the oceans or other carbon sinks (e.g., vegetation) could absorb it (Johansen 2002:40). Thus, human emissions of carbon dioxide were substantially enhancing the greenhouse effect.

By 1979, many scientists were growing increasingly concerned and began reaching out to the policy community. A group of leading researchers advised U.S. President Carter's Council on Environmental Quality that:

> *Man is setting in motion a series of events that seem certain to cause a significant warming of world climates unless mitigating steps are taken immediately (Pomerance 1989:260).*

Also in that year, a leading science journal editorialized that "The release of carbon dioxide to the atmosphere by the burning of fossil fuels is, conceivably, the most important environmental issue in the world today" (Nature 1979).

Throughout the early decades of research, many scientists remained cautious about whether anthropogenic climate change was in fact occurring. By the late 1980s and early 1990s, however, as evidence from a variety of sources accumulated, including direct temperature measurements, historical records, paleoclimatic reconstructions, receding glaciers, computer model simulations, etc., a majority of scientists became convinced that global warming was occurring. By the mid 1990's only a handful of "climate skeptics" remained opposed to the growing scientific consensus. And by 2007, the Intergovernmental Panel on Climate Change had concluded that global warming is "very likely" caused by human activities, with more than 90 percent certainty (IPCC, 2007).

Public Awareness and Risk Perceptions of Global Warming

Despite the scientific warnings of earlier decades, global warming did not become a significant public issue until 1988 - at that time the hottest year since the middle of the nineteenth century and the year in which Dr. James Hansen, director of the NASA Goddard Institute of Space Studies and a leading climate modeler, testified before the U.S. Congress that "the greenhouse effect has been detected and it is changing our climate now" (Christianson 1999:196). Hansen's testimony became front-page news around the world.

Since 1988, numerous public opinion polls have found that Americans, Europeans, and Japanese are increasingly aware of and concerned about global climate change and supportive of a wide range of mitigation and adaptation policies. To date, however, there have been only a few in-depth studies of public climate change risk perceptions (e.g., Bostrom et al., 1994; Kempton, 1997; Bord et al., 1998; Poortinga et al., 2006; Leiserowitz, 2006). Unfortunately, we also still know very little about international public opinion or behavior regarding climate change, in large part because only a few multi-national surveys have included even a single question on the issue (Leiserowitz, Kates, & Parris, 2005; Brechin, 2003). Public opinion is critical because it is a key component of the socio-political context within which policy makers operate. Public opinion can fundamentally compel or constrain political, economic and social action to address particular risks. For example, public support or opposition to climate policies (e.g., treaties, regulations, taxes, subsidies, etc.) will be greatly influenced by public perceptions of the risks and dangers of climate change. Further, successfully mitigating or adapting to global warming will require changes in the behavior of billions of human beings, who each day make individual choices that collectively have enormous impacts on the Earth's climate. This thematic paper summarizes our currently limited understanding of global public opinion and behavior regarding global warming.

Awareness of Global Warming

In 2006, the Pew Global Attitudes Survey found that large majorities of respondents from developed countries had heard of global warming, while awareness remained quite low in several developing countries (Figure 1). In particular, large majorities of respondents had never heard of global warming in Pakistan, Indonesia, Nigeria, and Egypt. These results suggest that many, especially in the Muslim world, have never heard of global warming. If borne out by further research, this lack of basic awareness of the problem has many important implications, ranging from the lack of political pressure on local and national governments to act, to potentially greater long-term vulnerability as individuals and communities make decisions regarding urban and coastal development, agricultural and subsistence practices, water management, etc. At the same time, however, people in some developing countries may have observed, attempted to explain, and adapt to changes in their local climate, albeit without the conceptual framework and findings of climate change science.

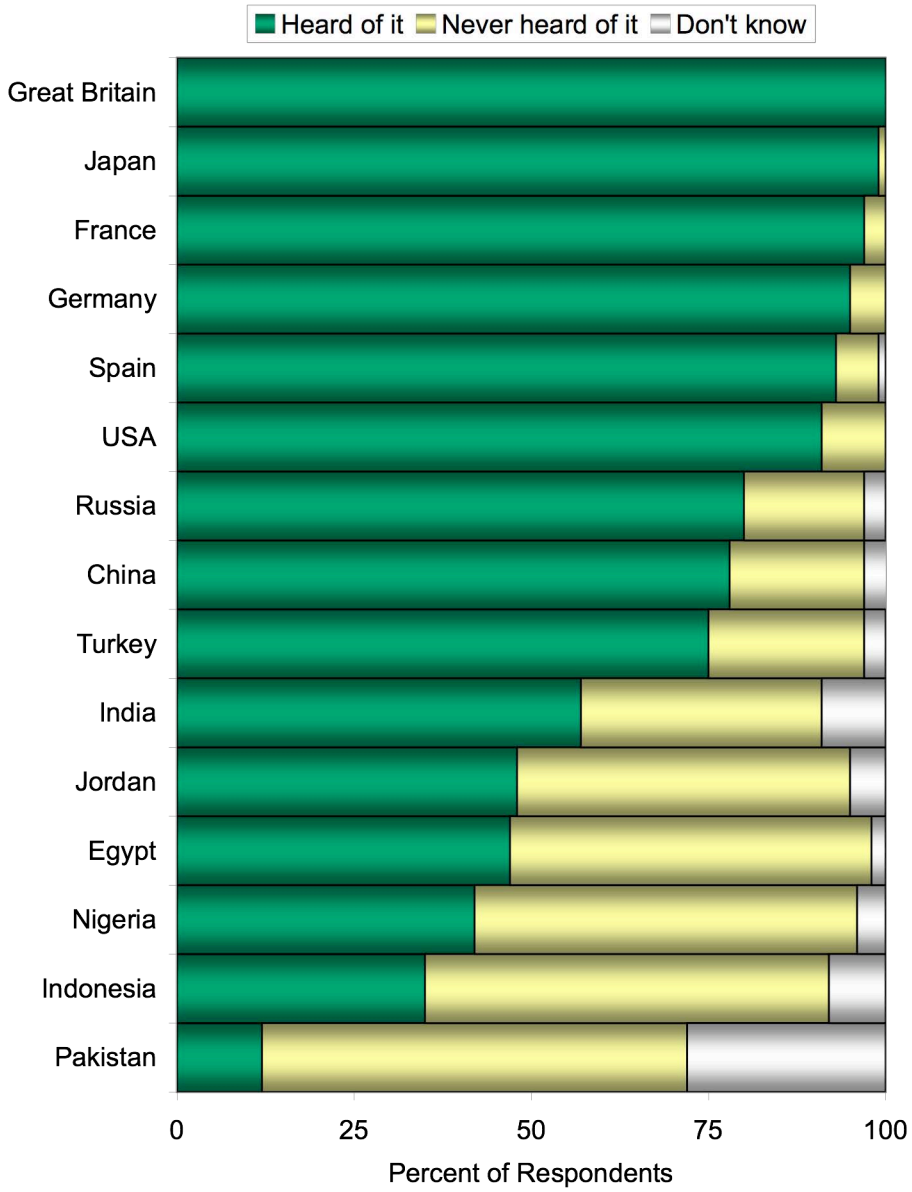


Figure 1. "Have you ever heard of the environmental problem of global warming?" (Pew 2006)

Seriousness of Global Warming

Awareness of the problem is a necessary, but insufficient condition to motivate an individual or collective response. Meanwhile, social science research has demonstrated that risk perceptions are critical components of public and social responses to hazards. In-depth studies often assess public perceptions of the likelihood and severity of potential consequences. Unfortunately, no in-depth study on international risk perceptions of global warming has yet been conducted, so we still know very little about how the global or diverse national publics perceive this issue. There are, however, limited data on the perceived seriousness of global warming. In a 2000 survey of

34 countries, GlobeScan asked respondents, "How serious a problem do you consider climate change or global warming, due to the greenhouse effect?" They found that majorities in each country said that climate change was a somewhat to very serious problem (Figure 2). It is interesting to note that many developing countries viewed this global risk as more serious than most developed countries.

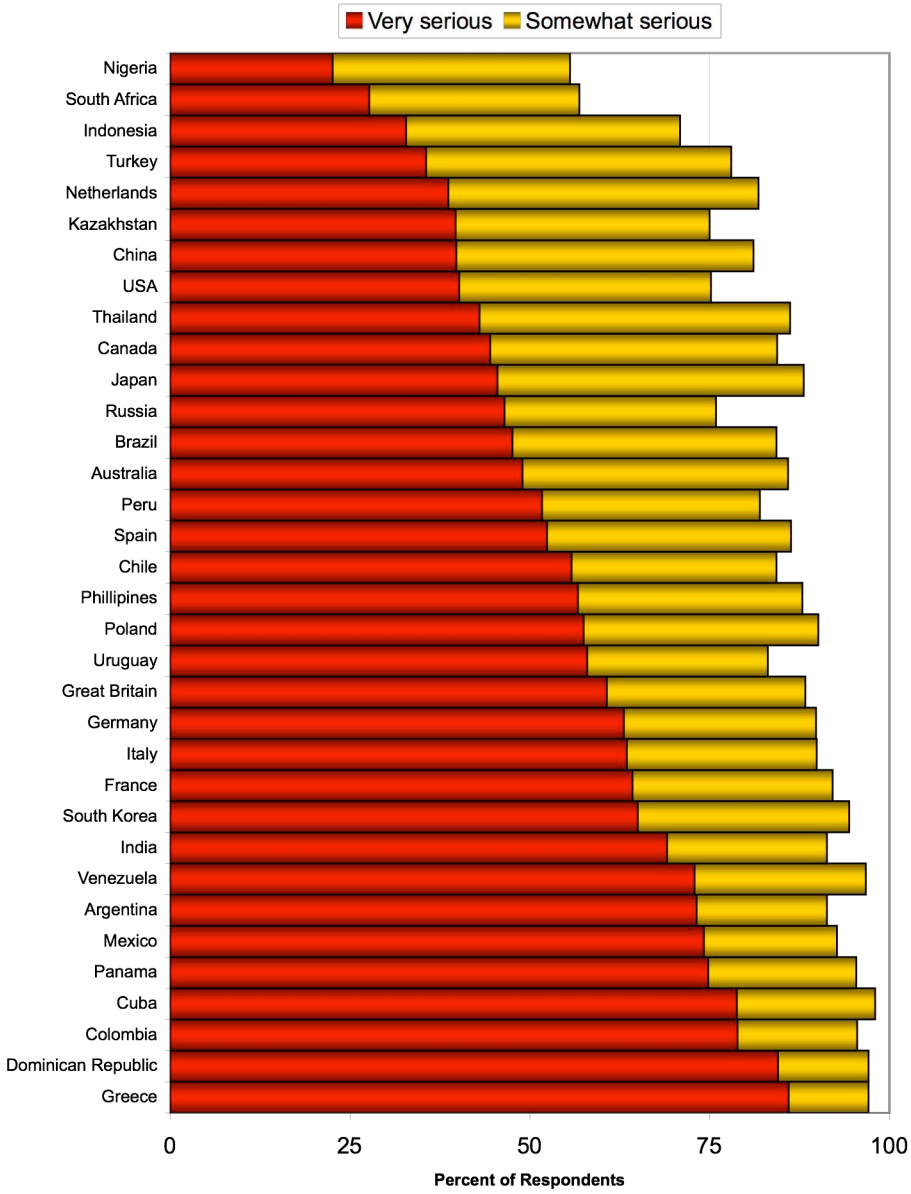


Figure 2. Perceived Seriousness of Global Warming (GlobeScan, 2000)

Global concerns about climate change, however, may be increasing. In 2006, GlobeScan resurveyed many of these same countries and found that the percent of respondents saying climate change was a "very serious problem" had increased significantly in many countries (Figure 3). This may be for a variety of reasons, ranging from increased scientific certainty,

media and policymaker attention, observed impacts around the world, or the diffusion of basic awareness of the problem worldwide.

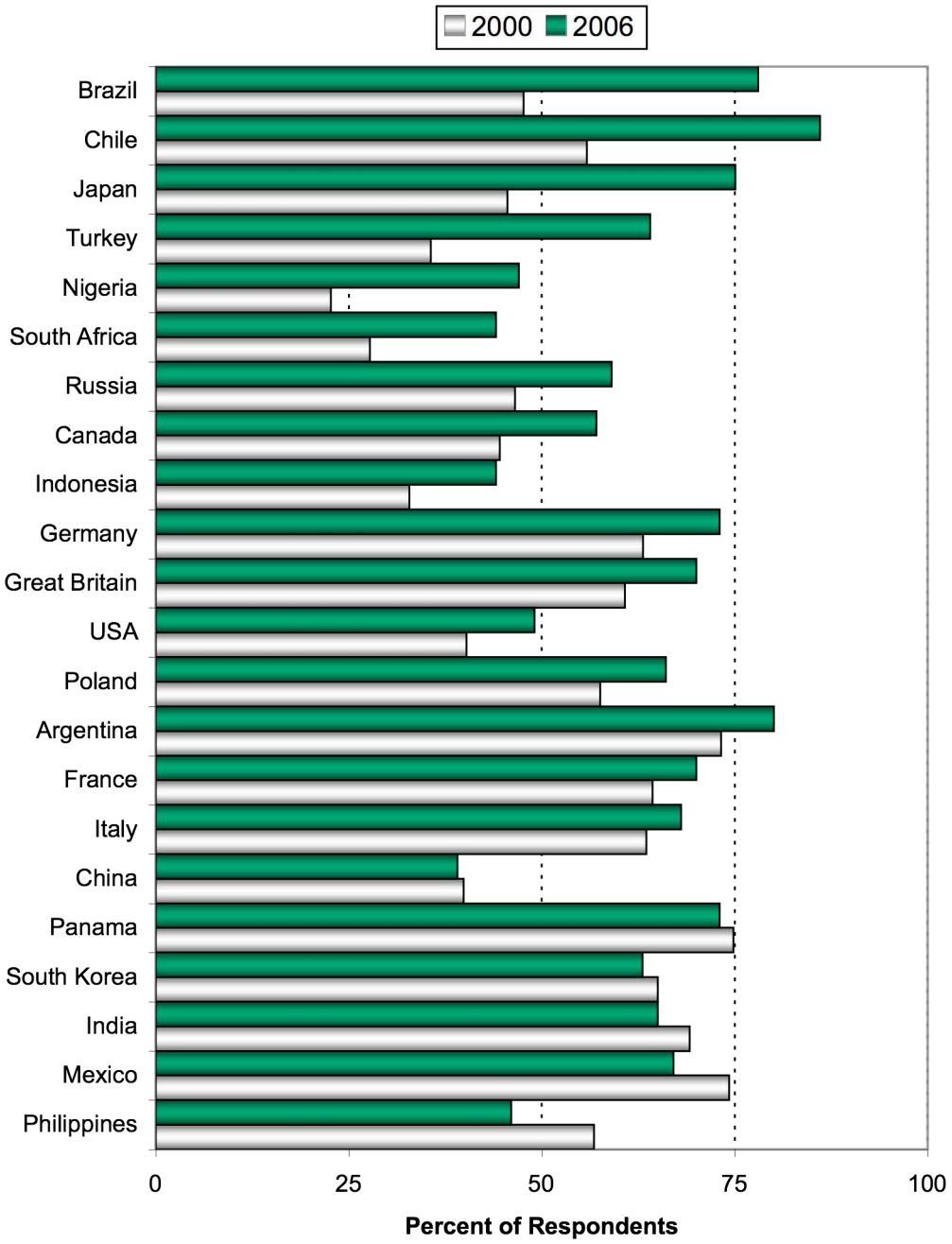


Figure 3. Climate Change is a "Very Serious Problem" (GlobeScan 2000; 2006)

However, stating that a problem is "very serious" is not the same as stating that it is an urgent or high priority, as discussed below. Based on the limited data currently available, it appears that climate change remains a relatively low priority globally, compared to other, more pressing issues (war, poverty, unemployment, etc.).

In 2006, the Chicago Council on Global Affairs and WorldPublicOpinion.org conducted a survey of ten countries, including several not covered by the prior GlobeScan studies. As part of a set of questions on global problems, they asked, "Below is a list of possible threats to the vital interests of [survey country] in the next 10 years. For each one, please select whether you see this as a critical threat, an important, but not critical threat, or not an important threat at all…global warming." They found that large proportions of the public in most countries said that global warming represents a critical threat in the next 10 years, while relatively few said it was not important at all (Figure 4). Notably, however, a relatively large proportion of Americans said that climate change is "important, but not critical." In summary, drawing on these different surveys, it appears that the global public already views global warming as a serious threat.

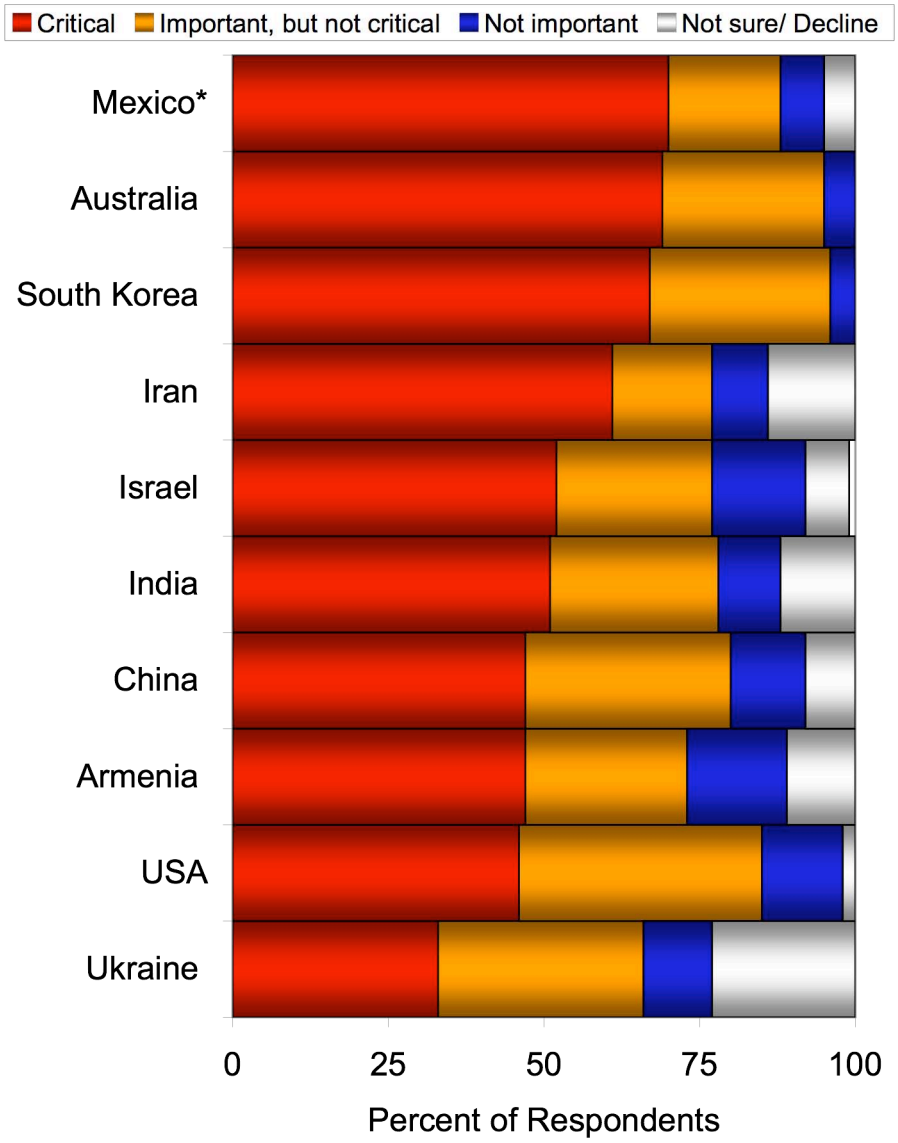


Figure 4. Climate Change as a National Threat in Next 10 Years (CCGA/WPO, 2007)

In 2001, GlobeScan asked respondents how believable they found the following statement: "Climate change will pose a direct threat to me and my family over the next decade." Respondents from developing countries tended to be much more convinced that climate change would be a direct threat than respondents from developed countries (Figure 5). Over the long term this perception may be accurate, as many developing countries are likely to suffer greater impacts of climate change, in part because they often lack the adaptive capacity of developed countries. At the same time, the perception of many developed country respondents that they are not personally vulnerable in turn contributes to the perception that global warming is a geographically distant threat that will primarily impact people and places far away. Thus climate change may remain a relatively low priority for many in developed countries until they understand or begin to witness climate change impacts closer to home.

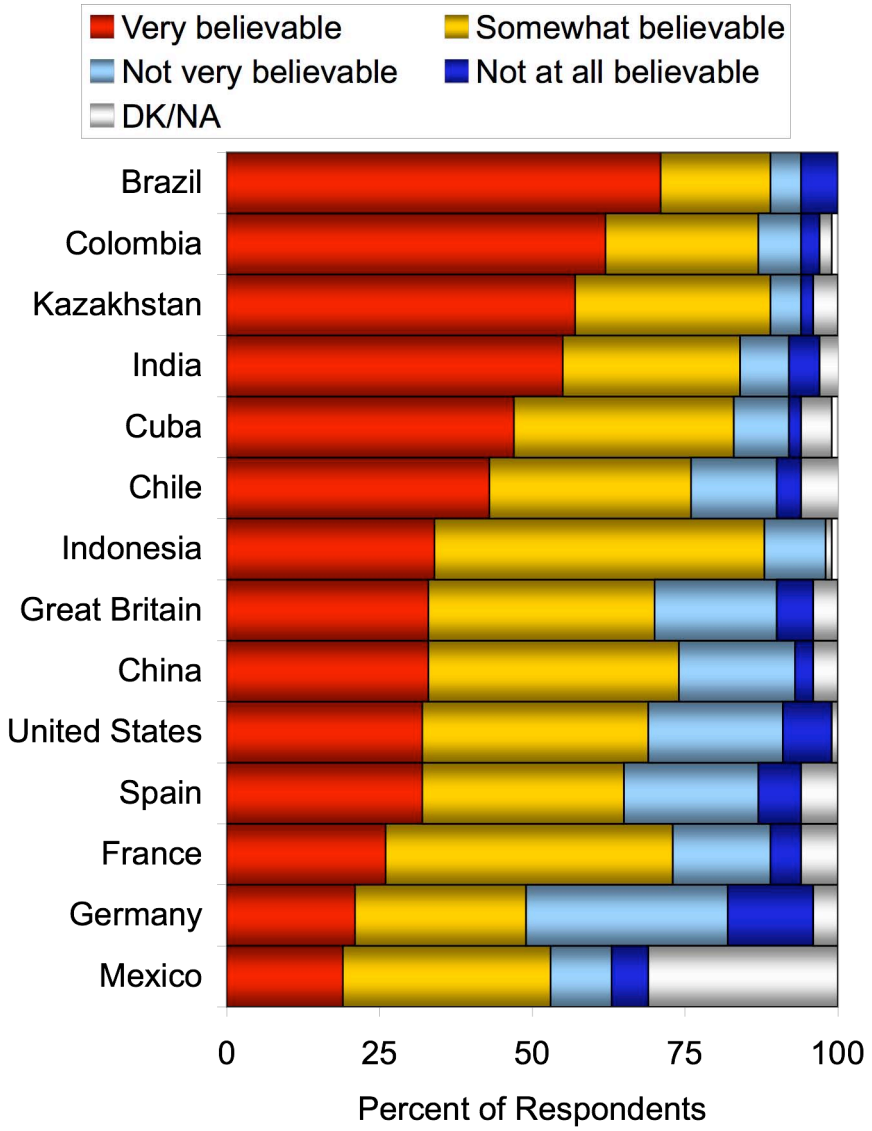


Figure 5. Direct Threat to You or Your Family in Next 10 Years (GlobeScan, 2001)

Another key measure of perceived risk is the degree of personal worry respondents have regarding a hazard. While the terms "concern" and "worry" are often used synonymously, they can produce different survey results. One may have a general concern for an issue without actively worrying about it. Worry is a more active emotional state and as such is arguably a stronger predictor of action and behavior than either "concern" or "seriousness." The 2006 Pew Global Attitudes Survey asked respondents "How much do you personally worry about global warming?" and found levels of worry generally lower than perceived seriousness and greatly varying across countries (Figure 6). The greatest levels of worry were found in Japan, India, and Spain, while the United States, China, Egypt reported the lowest levels of worry. The United States in particular also had the largest proportion of respondents who said they don't worry at all about global warming (21%). These results may help explain, among many other reasons, why many political leaders in the United States have not felt compelled to address the issue.

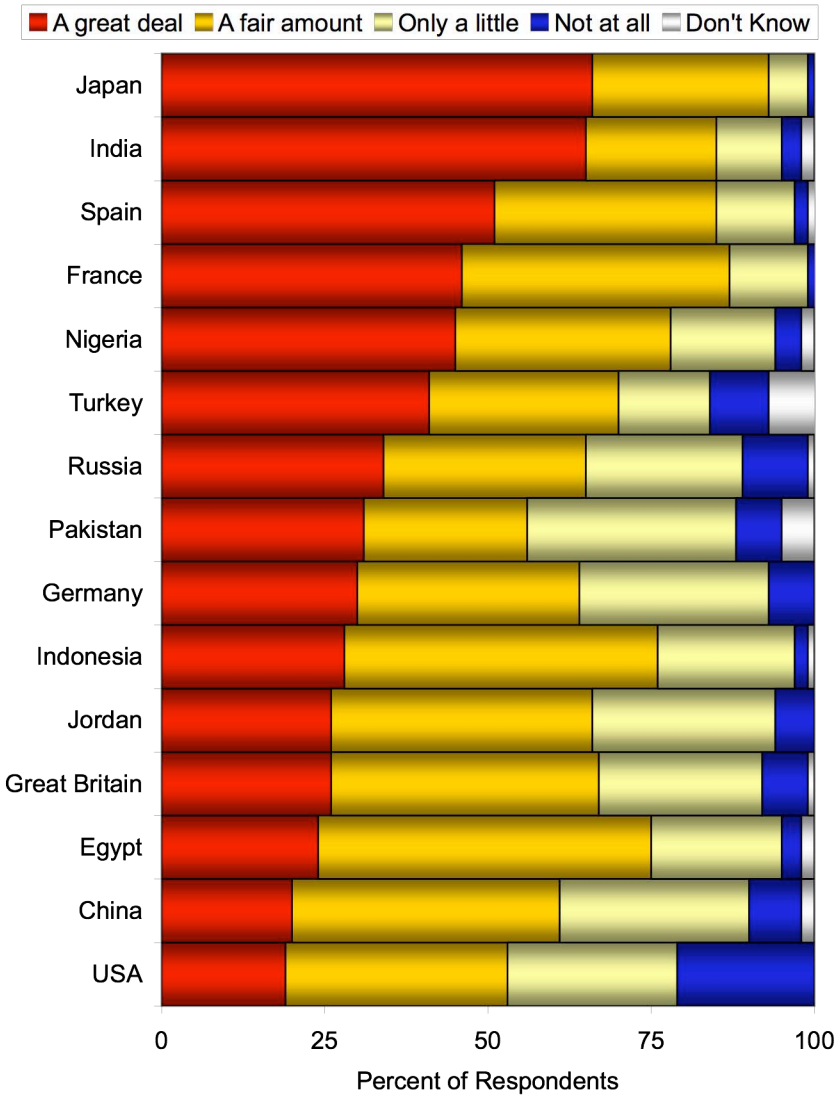


Figure 6. Worry about Global Warming (Pew, 2006)

In the United States, the Gallup Organization has been tracking American levels of worry about global warming and other environmental issues for nineteen years, using the following question: "I'm going to read you a list of environmental problems. As I read each one, please tell me if you personally worry about this problem a great deal, a fair amount, only a little, or not at all…The greenhouse effect or global warming." They found that the percentage of Americans saying they were worried "a great deal" has fluctuated over the years, reaching a high of 40% in the year 2000, followed by a decline to 26% in 2004 (Figure 7)[2]. Since then, the percentage has risen, reaching a new high of 41% in March of 2007. This new high, however, is only slightly above the historical range. It remains to be seen whether the recent increase in public worry about global warming represents the first signs of a social tipping point, leading to greater levels of public engagement and political pressure, a new equilibrium, or the heights before another downward slide as other national and global issues take the spotlight.

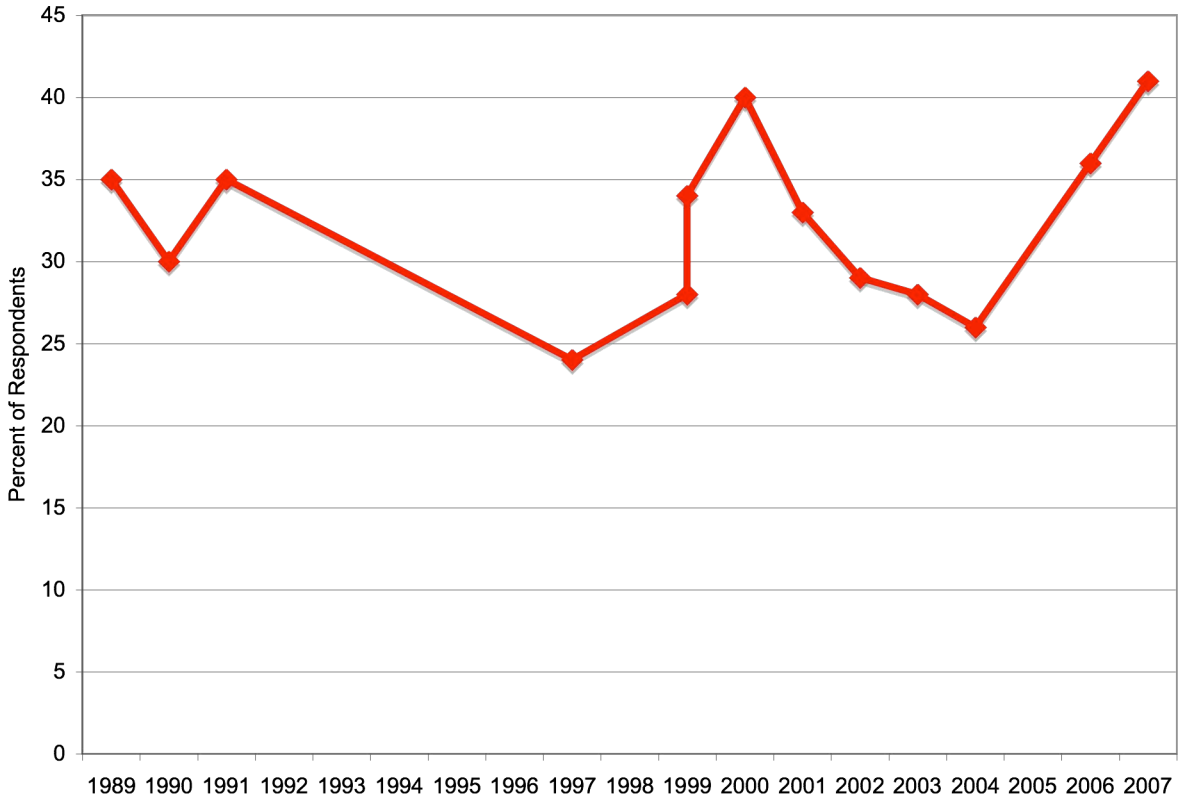


Figure 7. Worried "A Great Deal": US Trend 1989-2007 (Gallup, 2007)

Beyond these general measures of perceived seriousness and worry, in 2001, GlobeScan asked respondents in 30 countries the following question: "Now I would like to ask you some questions

[2] Gallup reported that 36% of Americans said they were worried "a great deal" in 2006, while Pew reported only 19%, despite the fact that the surveys were conducted only two months apart (March and May respectively). However, Gallup's question was part of a set of questions including other environmental issues (air and water pollution, deforestation, toxic waste, etc.), while Pew's was part of a set of questions including other global issues (e.g., bird flu, the Iran nuclear dispute, Abu Ghraib and Guantanamo abuses, etc.). These different contexts of the question may have influenced the results.

about climate change, which is sometimes referred to as global warming or the greenhouse effect. Which ONE of the following possible impacts most concerns you personally, if any?" Worldwide, the potential impacts of climate change on human health were the single most cited, followed by drought and water shortages, species loss, and extreme weather events (Figure 8).

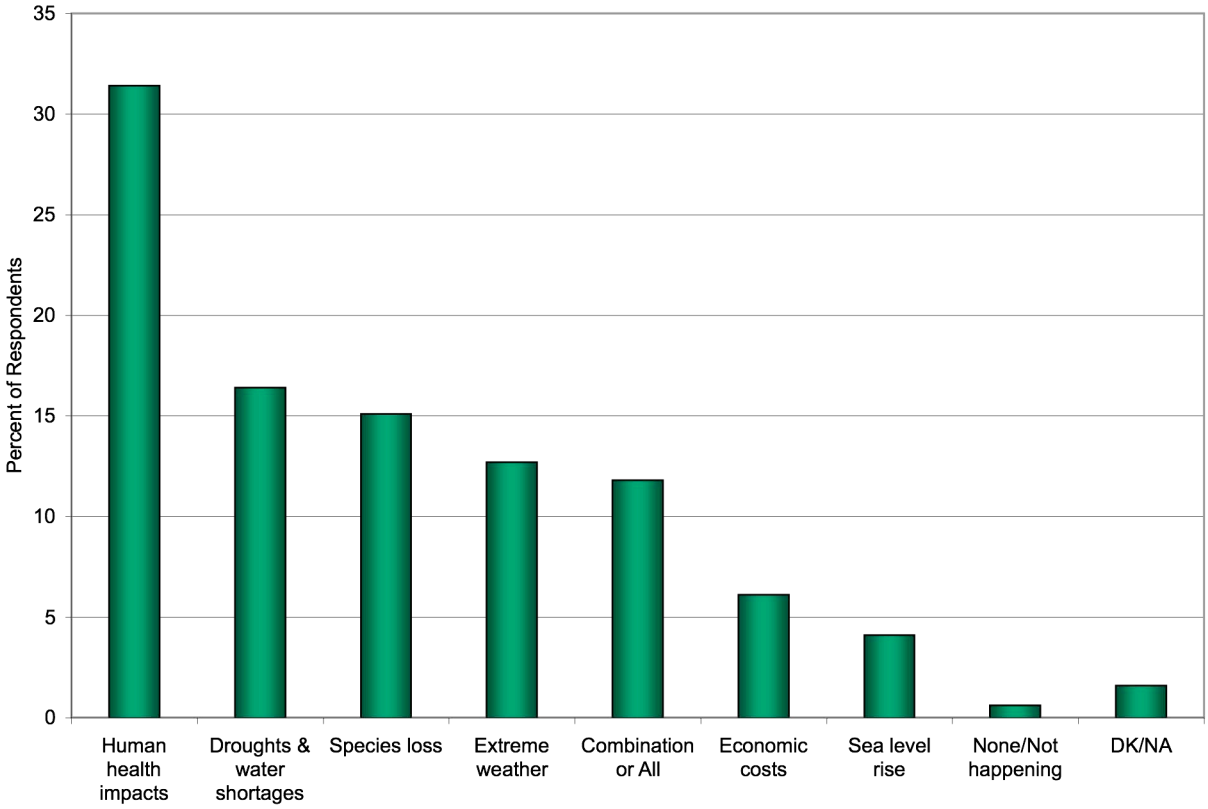


Figure 8. Climate Impacts of Greatest Concern (GlobeScan, 2001)

Developed countries, however, were generally less concerned about the human health impacts than developing countries (Figure 9). Meanwhile, substantial numbers of respondents from Brazil (45%), China (29%), and South Korea (26%) were concerned primarily about drought and water shortages, while many from India (28%), Argentina (26%), Chile (22%), and Canada (22%) were primarily concerned about species loss. By contrast, many Japanese (31%) and Thai respondents (23%) were most concerned about extreme weather events, while many Nigerian respondents (26%) were concerned about the potential economic impacts. Interestingly, however, sea level rise, which receives a great amount of media attention, was rarely selected, with the slight exceptions of Great Britain (15%) and Germany (12%). As the impacts of climate change will be geographically heterogeneous, these results at least suggest that different national publics are beginning to think about how global warming may specifically impact them.

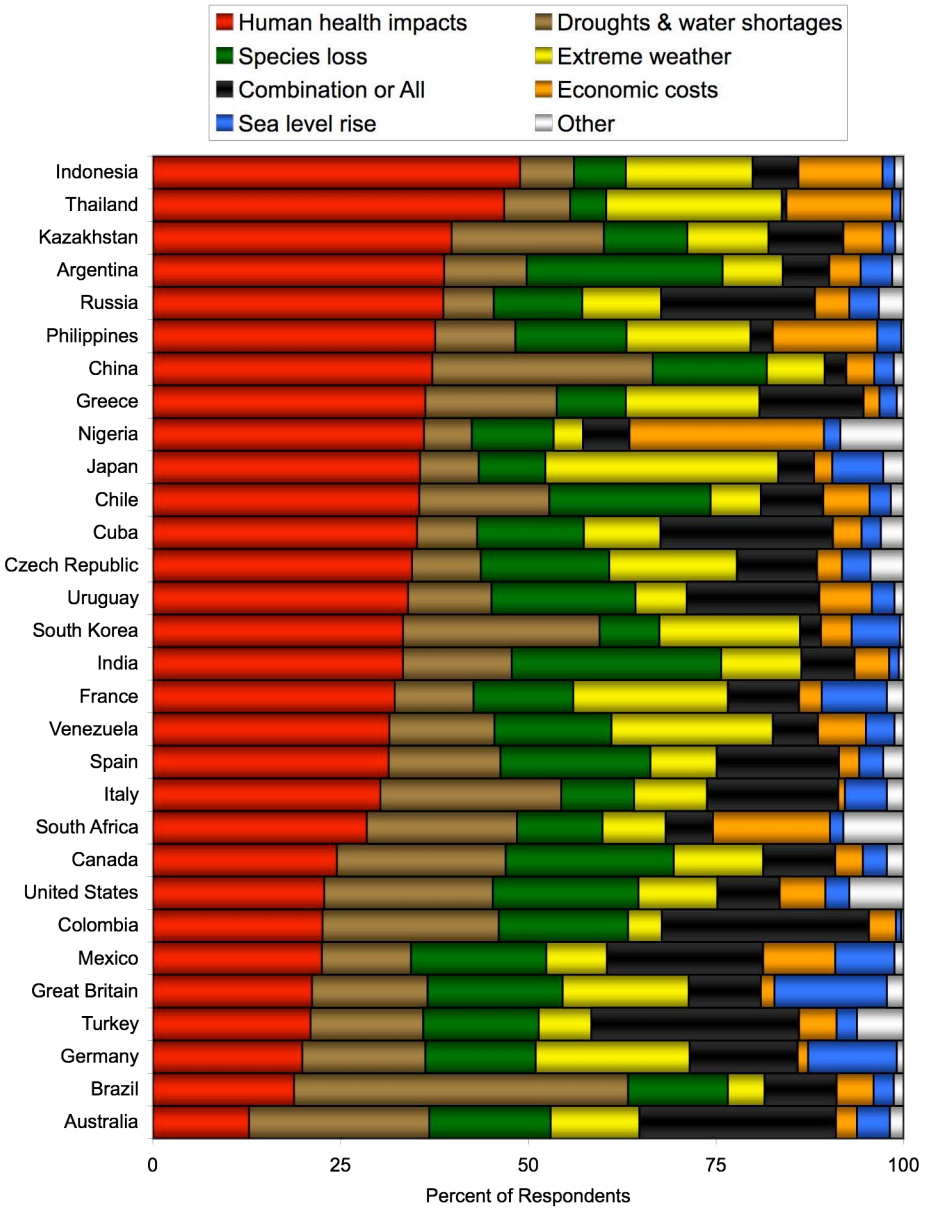


Figure 9. Climate Impacts of Greatest Concern by Country (GlobeScan, 2001)

American (US) Risk Perceptions of Global Warming

To better understand American climate change risk perceptions, policy preferences and behaviors, an in-depth national survey study (n = 673) was conducted in 2003.[3] This study found that Americans as a whole perceived climate change as a moderate risk (Figure 10). On average, Americans were somewhat concerned about global warming, believed that impacts on worldwide standards of living, water shortages and rates of serious disease are somewhat likely and that the impacts will be more pronounced on non-human nature. Importantly, however, they were less

[3] For study details, see Leiserowitz (2005, 2006, 2007).

concerned about local impacts, rating these as somewhat unlikely. The moderate level of public concern thus appeared to be greatly influenced by the perception that climate change is a danger to geographically and temporally distant people, places and non-human nature.

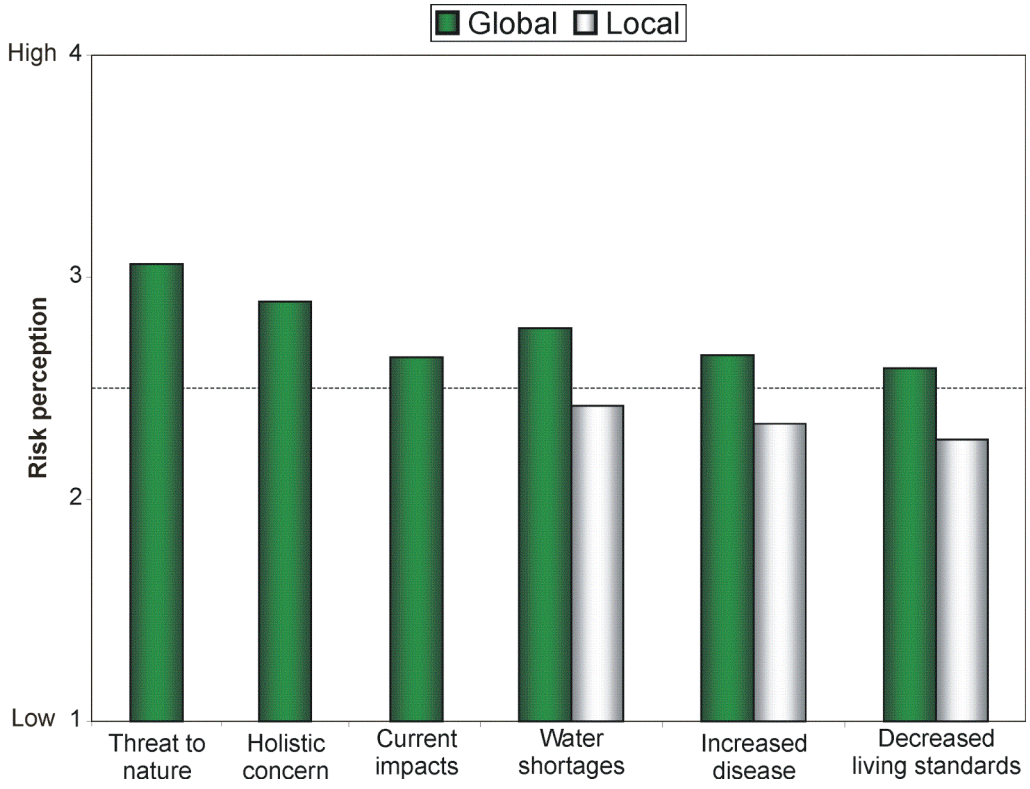


Figure 10. American Risk Perceptions of Global Warming. Scales range from 1 (low) to 4 (high). Response categories include seriousness of threat to nature and current impacts around the world (not at all to very serious); level of concern about global warming (not at all to very concerned); and the likelihood of specific impacts locally and worldwide (very unlikely to very likely). *n* = 590.

This conclusion was supported by the results of a separate question that asked respondents to indicate which scale of climate change impacts was of greatest concern to them (Figure 11). The question asked, "Which of the following are you most concerned about? The impacts of global warming on …(1) you and your family; (2) your local community; (3) the U.S. as a whole; (4) people all over the world; (5) non-human nature; or (6) not at all concerned."

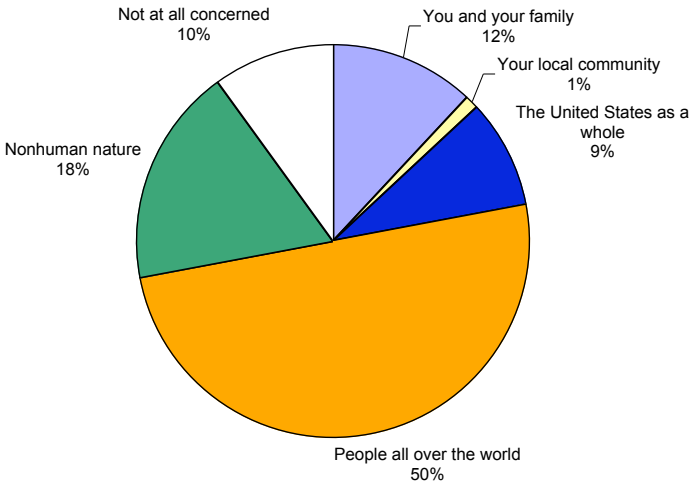


Figure 11. Scale of Concern (Leiserowitz, 2003)

A clear majority of respondents (68%) were most concerned about the impacts on people around the world and non-human nature. Only 13% were most concerned about the impacts on themselves, their family or their local community. This may help explain why global climate change remains a relatively low priority in issue ranking surveys (e.g., Dunlap & Saad, 2001). Higher ranking national issues (e.g., the economy, education, health care, etc.) and environmental issues (clean air, clean water, urban sprawl) are all issues that are more easily understood as having direct local relevance. "Global" climate change, however, is not yet perceived as a significant local concern among the American public. Former Speaker of the U.S. House of Representatives Tip O'Neill once famously stated "all politics is local." To the extent that this is true, climate change is unlikely to become a high-priority national issue until Americans consider themselves personally at risk.

Beliefs and Knowledge About Climate Change

In 1999, GlobeScan asked respondents, "How convinced are you that human activities are a significant cause of changes to the earth's climate and long term weather patterns?" They found that a large majority of respondents around the world were somewhat to totally convinced (Figure 12). However, the United States, the dominant emitter of greenhouse gases, was relatively less convinced with 21% of respondents saying they were either not very (14%) or not at all (7%) convinced. By comparison, a number of developing countries, including Argentina, Egypt, Kazakhstan, India, and China were all much more likely to say they were totally convinced.

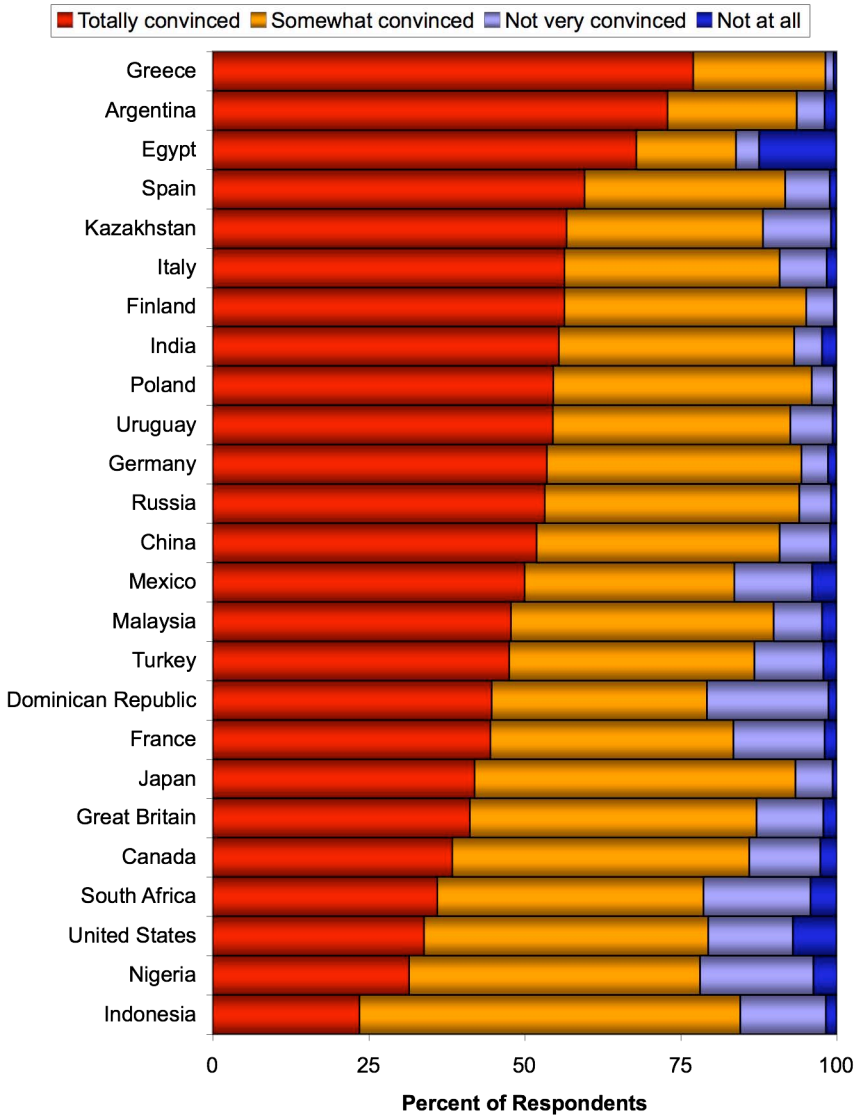


Figure 12. How convinced are you that human activities are a significant cause of changes to the Earth's climate and long-term weather patterns? (GlobeScan, 1999)

These overall large majorities, however, may be sensitive to the question wording. For example, in 2006, The Pew Research Center for People and the Press (2007) conducted a national survey in the United States, which asked Americans whether they believed that the earth is getting warmer "mostly because of human activity such as burning fossil fuels, OR mostly because of natural patterns in the earth's environment." In the 1999 GlobeScan data reported above, 77% of Americans were somewhat to totally convinced that human activities "contribute" to recent changes. By contrast, the Pew survey found that only 47% said that these changes were "mostly due" to human activities. Thus Americans appear broadly willing to accept the idea that human activities contribute to global warming, but many are not yet convinced that human activities are the primary cause. This is important because acceptance of this fact is likely a critical determinant of support for mitigation policies and willingness to engage in individual emissions reduction.

In 1999 GlobeScan asked respondents "Which of the following is the main cause of the greenhouse effect?" Relatively few could correctly identify "the use of fossil fuels, such as oil, gas and coal" (Figure 13). Further, the single most identified "cause" was "depletion of the Earth's ozone layer" again demonstrating that many people around the world continue to confuse or conflate these two different issues. The third most identified cause was "air pollution from factories and cars." While technically incorrect, this response category may have confused some respondents, as factories and cars are in fact major contributors to global climate change as emitters of carbon dioxide. Further, many people may consider carbon dioxide an air pollutant. The "loss of forests" was identified as the main cause by particularly large numbers of respondents in India (42%), Argentina (37%), Turkey (37%), the Dominican Republic (34%), Uruguay (32%), and Malaysia (30%). Finally, large percentages of respondents said they didn't know in Egypt (43%), Russia (26%), South Africa (26%), and the United States (23%).

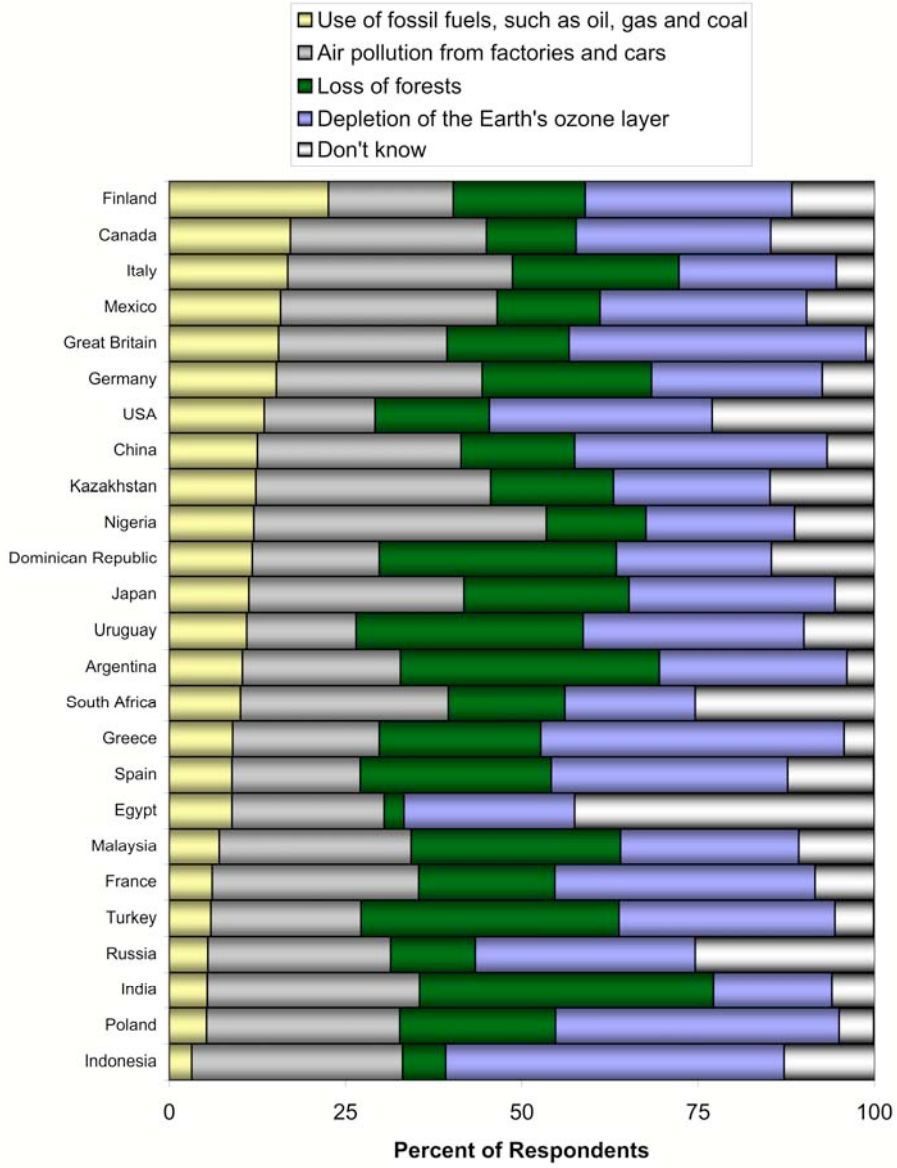


Figure 13. Main Cause of the Greenhouse Effect (GlobeScan, 1999)

Knowledge of Global Warming Causes and Solutions in the United States

A 2002 national survey (Leiserowitz, 2003) asked Americans to identify the primary cause of global warming. A large plurality (47%) said that damage to the ozone layer is the primary cause, confirming that many Americans (and others around the world) continue to confuse and conflate these two different environmental issues (Figure 14). By contrast, only 23% of Americans correctly identified the burning of fossil fuels as the primary cause of global warming. Fortunately, relatively few identified nuclear power plants, toxic waste, or aerosol spray cans as the (incorrect) *primary* cause, yet a separate question in this same study found that many Americans incorrectly believe that these also contribute to global warming (50%, 66%, and 70% respectively). Thus accurate understanding of the causes of global warming remains quite limited in the United States.

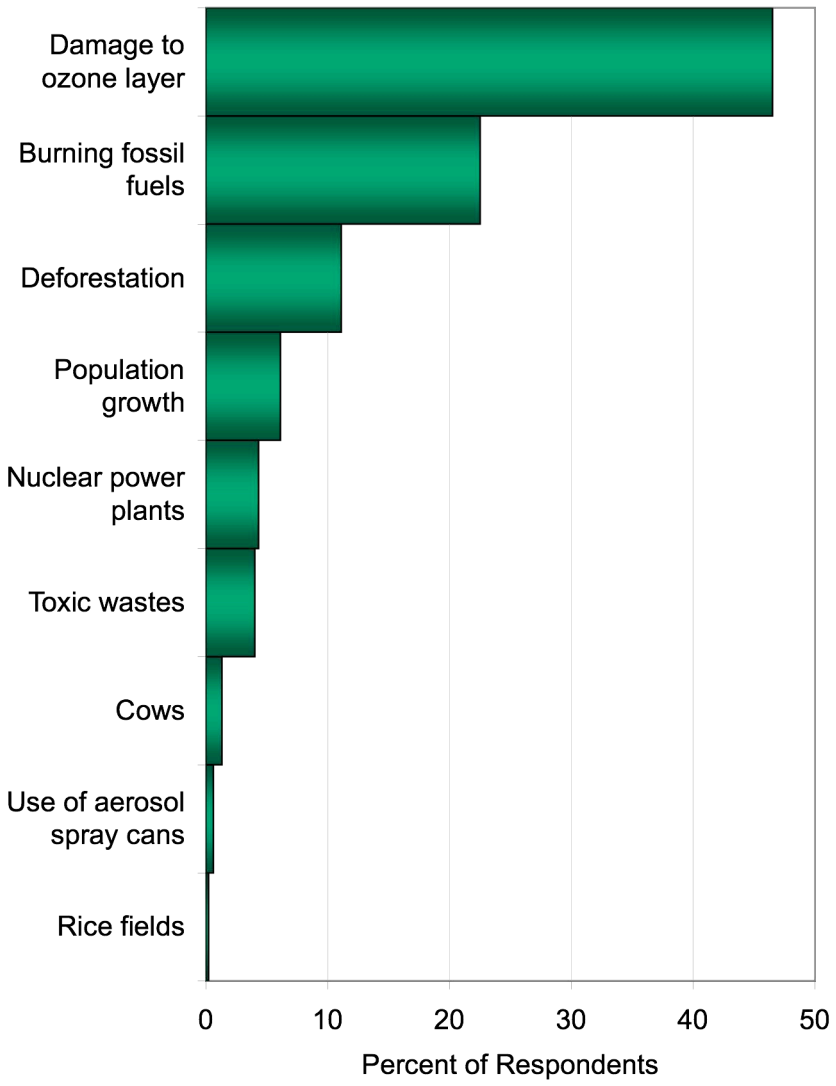


Figure 14. Primary Cause of Global Warming (Leiserowitz, 2003)

This survey also asked Americans to identify the most effective solution to global warming. Renewable energy and increasing energy efficiency were the most identified solutions (33% and 17% respectively), suggesting that despite broad misunderstanding regarding the causes of global warming, many Americans correctly believe that alternative energy (solar, wind, biomass, etc.) and improved efficiency are important solutions (Figure 15). Relatively few, however, identified driving less as the primary solution despite the fact that the transportation sector, including automobile use, accounts for 1/3 of all U.S. emissions from fossil fuel combustion (US EPA, 2007: ES-8). These results may also help explain why Americans strongly support national policies to develop renewable energy sources and improve energy efficiency, yet strongly oppose carbon taxes or other policies intended to reduce personal fossil fuel use, as reported below.

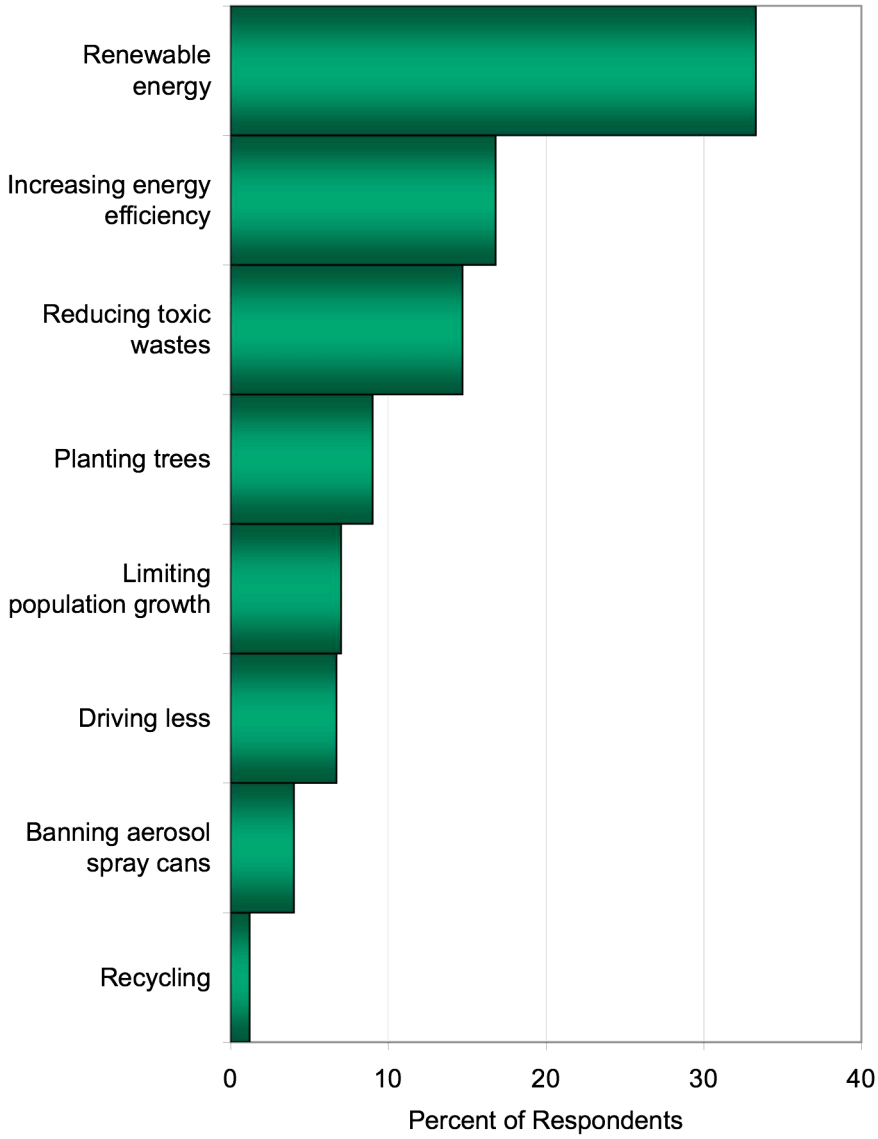


Figure 15. Most effective solution to global warming (Leiserowitz, 2003)

Policy Preferences

Despite decades of high-level, multinational negotiations, which have led thus far to the UN Framework Convention on Climate Change and the Kyoto Protocol, very little data has been collected on global public support or opposition to local, national, or international policies to mitigate or adapt to climate change. Yet these and likely subsequent global agreements will have profound implications for both human societies and natural ecosystems. These agreements and the policy instruments they endorse will impact not only the overall level of greenhouse gases in the atmosphere, degree of global warming, and subsequent climate impacts, but will also have significant economic, political, and cultural impacts on particular people, places, and economic sectors.

In 1999, GlobeScan investigated whether the global public preferred a precautionary approach towards this uncertain risk. Respondents were asked, "As you may know, scientists are uncertain how much impact human activities have on the world's climate. Some people say we should not take major action to reduce human impacts on climate until we know more, because of the great economic costs involved. Other people say we should assume the worst and take major action now to reduce human impacts on climate, even if there are major costs. Which of these points of view best reflects your own?"

They found a strong multinational preference for a precautionary approach in most countries (Figure 16). In several countries, however, including the United States (46%), South Africa (45%), and the Dominican Republic (42%), and Nigeria (40%), substantial percentages of respondents preferred instead to wait for more research before acting.

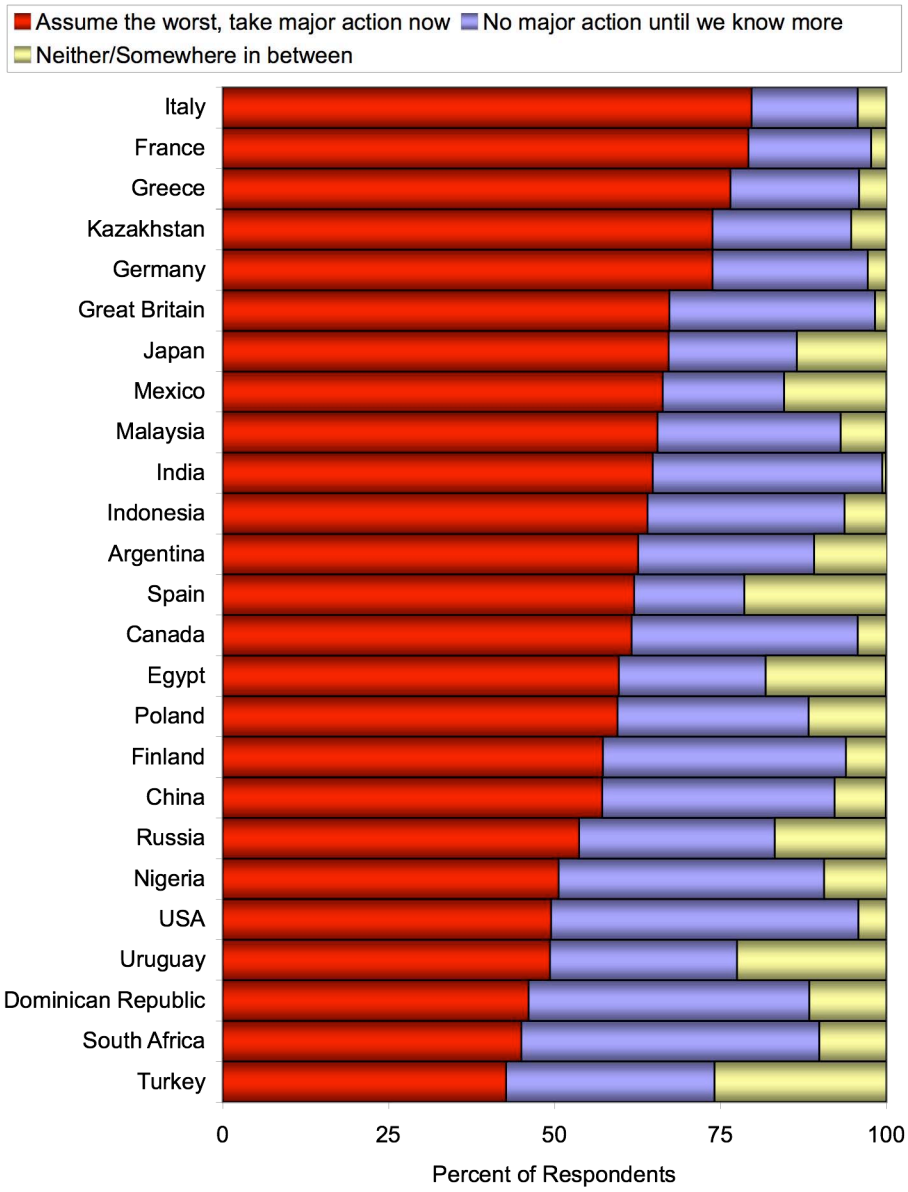


Figure 16. Act Now or More Research? (GlobeScan, 1999)

By 2006, however, the Chicago Council for Global Affairs and WorldPublicOpinion.org found that relatively few respondents in any of the 13 countries they surveyed agreed that "until we are sure that global warming is really a problem, we should not take any steps that would have economic costs" (Figure 17). By contrast, in Peru, Australia, Argentina and Israel large majorities agreed that, "global warming is a serious and pressing problem. We should begin taking steps now even if this involves significant costs." Notably, however, key emitters of greenhouse gases like the United States, China, and Russia were more divided about the urgency of action, with many respondents preferring a gradual approach.

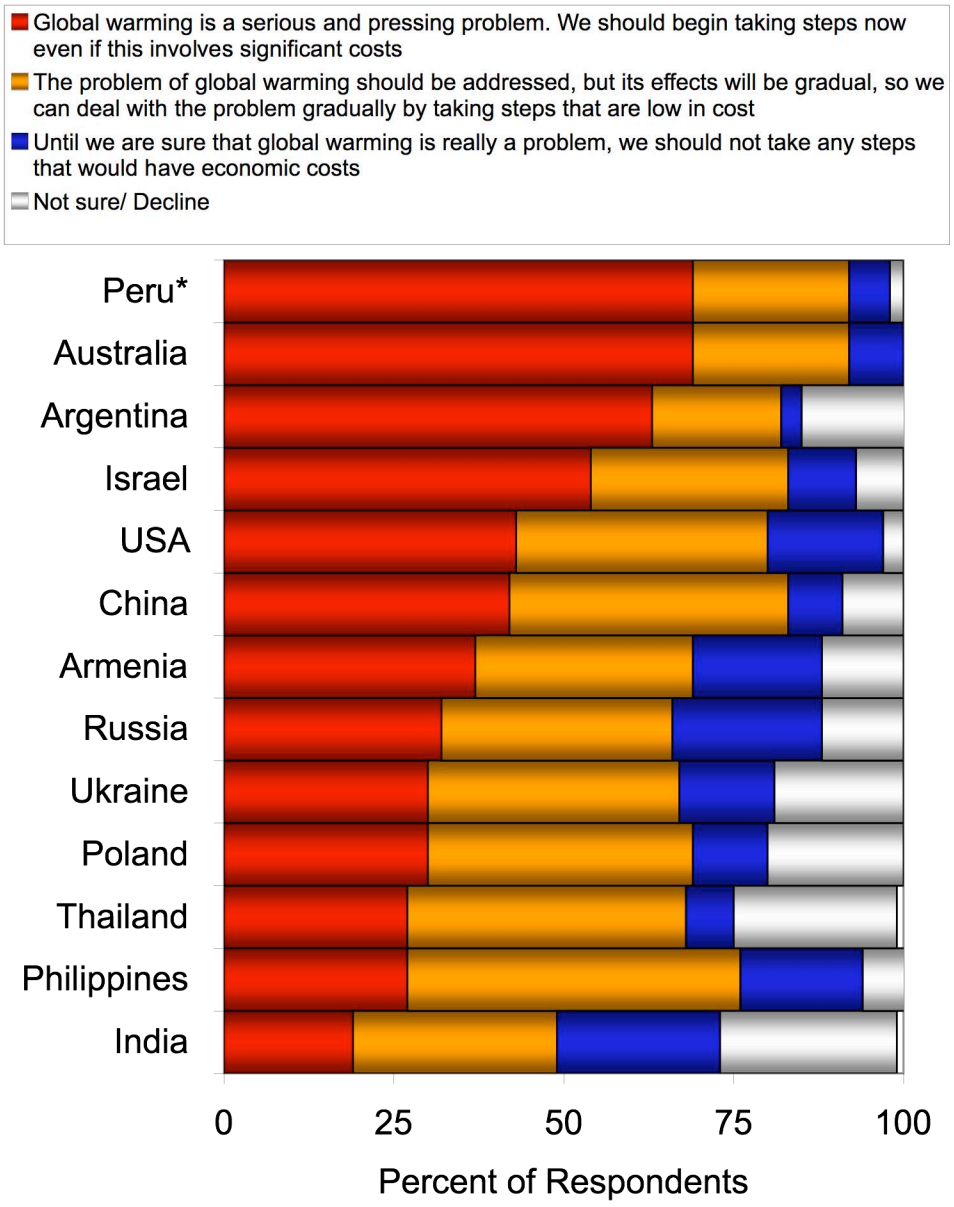


Figure 17. Act Now, Gradually, or Not at All? (CCGA/WPO, 2007)*

In 1998 GlobeScan also investigated attitudes regarding the contentious issue of developing country participation in emissions reduction. The UN Framework Convention on Climate Change includes the principle of "common but differential responsibilities and respective capabilities" which stipulates that although all countries of the world share responsibility for reducing emissions, the industrialized nations bear a special responsibility because they are the world's largest emitters of greenhouse gases, both historically and currently (United Nations, 1992). The industrialized nations are also expected to lead because they have much greater technical, scientific, and financial resources to reduce emissions. When the Kyoto Protocol was

*In Peru, this question was asked only of those respondents who said they were "informed" or "very informed" about global warming.

being negotiated in 1997, however, the U.S. Congress passed a non-binding resolution (95 to 0) urging the Clinton administration not to accept any treaty that did not include the "meaningful" participation of all developing as well as industrialized countries, arguing that to do so would put the U.S. at a competitive disadvantage. This pitted the United States and several allies against much of the developing world in subsequent negotiations.

In 1998, GlobeScan asked respondents the following question: "Air emissions from richer countries have had the most impact on the Earth's climate, however, emissions are growing more quickly in poorer countries with large populations. As a result, there is a debate about when these poorer countries should join richer countries in taking significant action to reduce human impacts on climate. Do you think these poorer countries should…?"

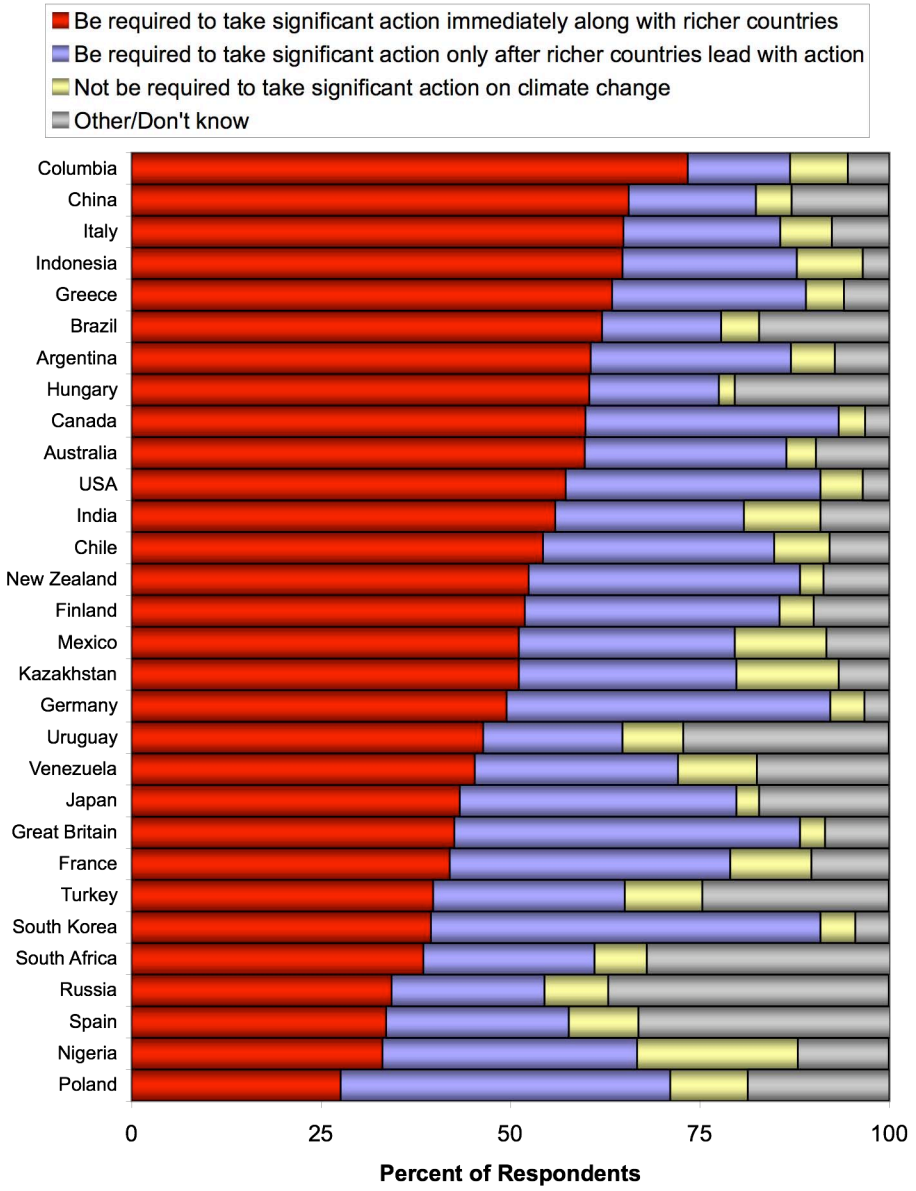
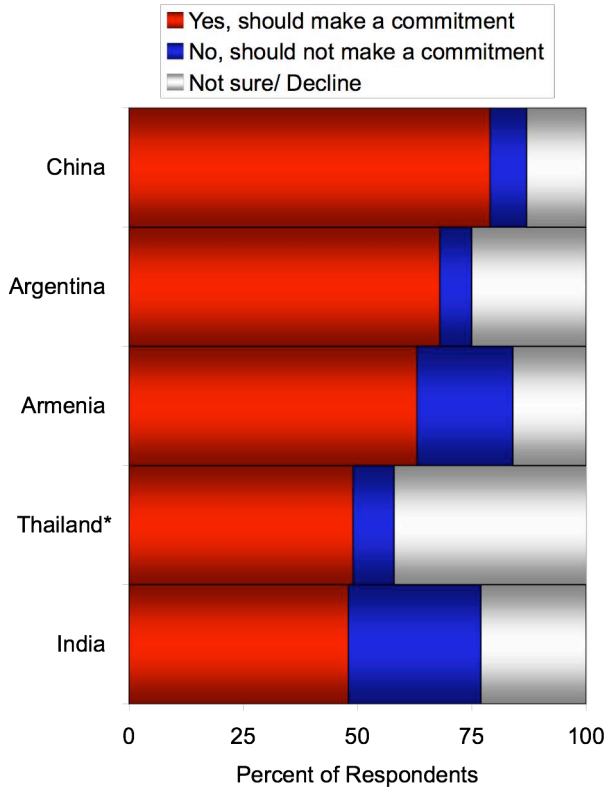


Figure 18. When Should Poor Countries Act? (GlobeScan, 1998)

Perhaps surprisingly, large majorities of respondents in many developing countries said that "poorer countries should be required to take significant action immediately along with richer countries" (Figure 18). Further, relatively few in any country said that poorer countries should not be required to take significant action at all. These results suggest that when thinking about how to solve global warming, most respondents around the world want everyone to reduce emissions. However, these results are from only one question and it is quite possible that a different framing of the question would lead to different results. For example, this question highlights the fact that emissions are rising more rapidly in developing countries. This is largely due, however, to the fact that they are developing countries and have started from a much lower per-capita rate of emissions than industrialized countries. A question frame that emphasized per-capita differences in emissions might very well lead to different results, thus while provocative, this data perhaps opens more questions than it answers.

In a more recent set of surveys (2006) the Chicago Council on Global Affairs and WorldPublicOpinion.org asked respondents in five developing countries. "If the developed countries are willing to provide substantial aid, do you think the less-developed countries should make a commitment to limit their greenhouse gas emissions?" They found very strong support for this idea in China, Argentina, and Armenia. In India, however, over a quarter of respondents said their country should not make such a commitment, while 43% of Thai respondents appeared to be uncertain (Figure 19).[4]



[4] The Thai survey, however, uniquely included an additional response option "Depends" which was added to the Not sure / Decline category.

Figure 19. Reduce Emissions if Developed Countries Provide Aid? (CCGA/WPO, 2007)

This same survey also asked respondents in the United States, Ukraine, and Poland, "If the less-developed countries make a commitment to limit their greenhouse gas emissions, do you think the developed countries should provide substantial aid to help them?" There was very strong support for this in Poland and Ukraine, while a majority supported this idea in the United States (Figure 20). Nonetheless, 32% of American respondents said that the US should not provide aid, even if developing countries agree to limit their emissions. This may partly be due to the fact that a substantial minority in the United States still opposes all action on climate change. It may also be due to the fact that many Americans greatly overestimate the amount of foreign assistance provided by the United States, thus may be reluctant to provide more, while others are opposed to aid in principle (Leiserowitz et al., 2005).

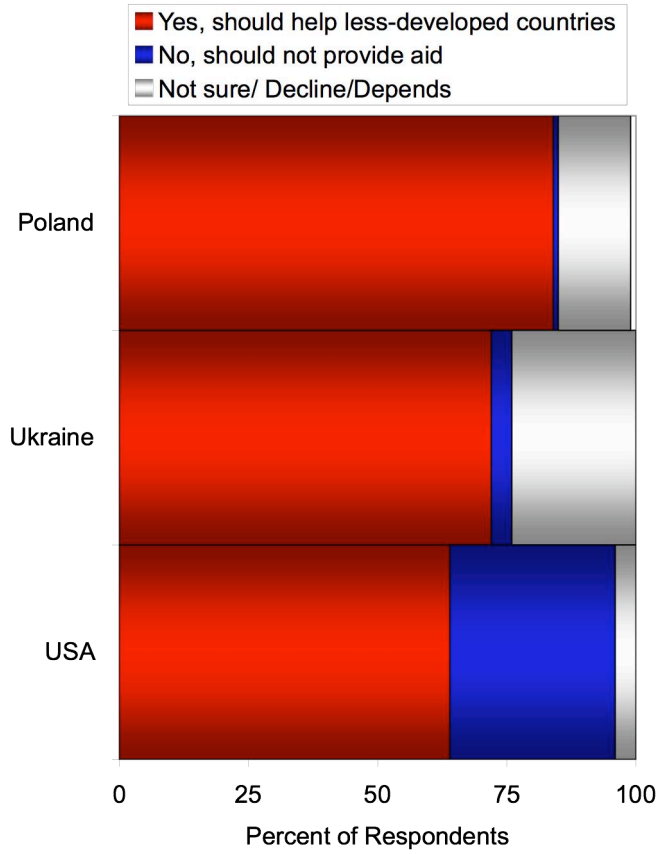


Figure 20. Provide Aid if Developing Countries Reduce Emissions? (CCGA/WPO, 2007)

In 2001, prior to international ratification of the Kyoto Protocol (2004), GlobeScan asked, “After 10 years of international negotiations, national governments have set action targets, but have been unable to reach a legally-binding agreement to reduce human impacts on the Earth’s climate. Which one of the following statements best reflects your view of this?” Respondents were then given several response options to choose from:

- “There are good reasons for the negotiations taking this long”
- "This isn't good enough; national governments should take the problem and the negotiations more seriously and quickly reach a binding agreement"
- "The situation is not acceptable; the United Nations should be given the power to impose legally-binding actions on national governments to protect the Earth's climate"
- "None of above / No agreement necessary"

Among all respondents worldwide, 42% said that national governments should act more quickly (Figure 21). Surprisingly, however, 34% of respondents went further and said that the United Nations should be given the power to impose legally-binding actions on national governments, including clear majorities of the public in Great Britain, Australia, Canada, Colombia, and Germany. These highly provocative results, however, are based on only one question, in which respondents were given no contextual information about the implications of giving the UN this kind of unprecedented power. If this approach had actually been debated publicly, the results undoubtedly would have been different. Nonetheless, these data do suggest that in 2001, there existed a significant degree of frustration in many countries, especially in the developed world, at the slow rate of progress toward an international agreement, while the developing world was generally much more supportive of the existing process. It is unknown whether these same levels of frustration continue to this day. For example, on the one hand the Kyoto Protocol has since gone into effect; on the other, as described above, there appears to be rising concern about climate change in many countries.

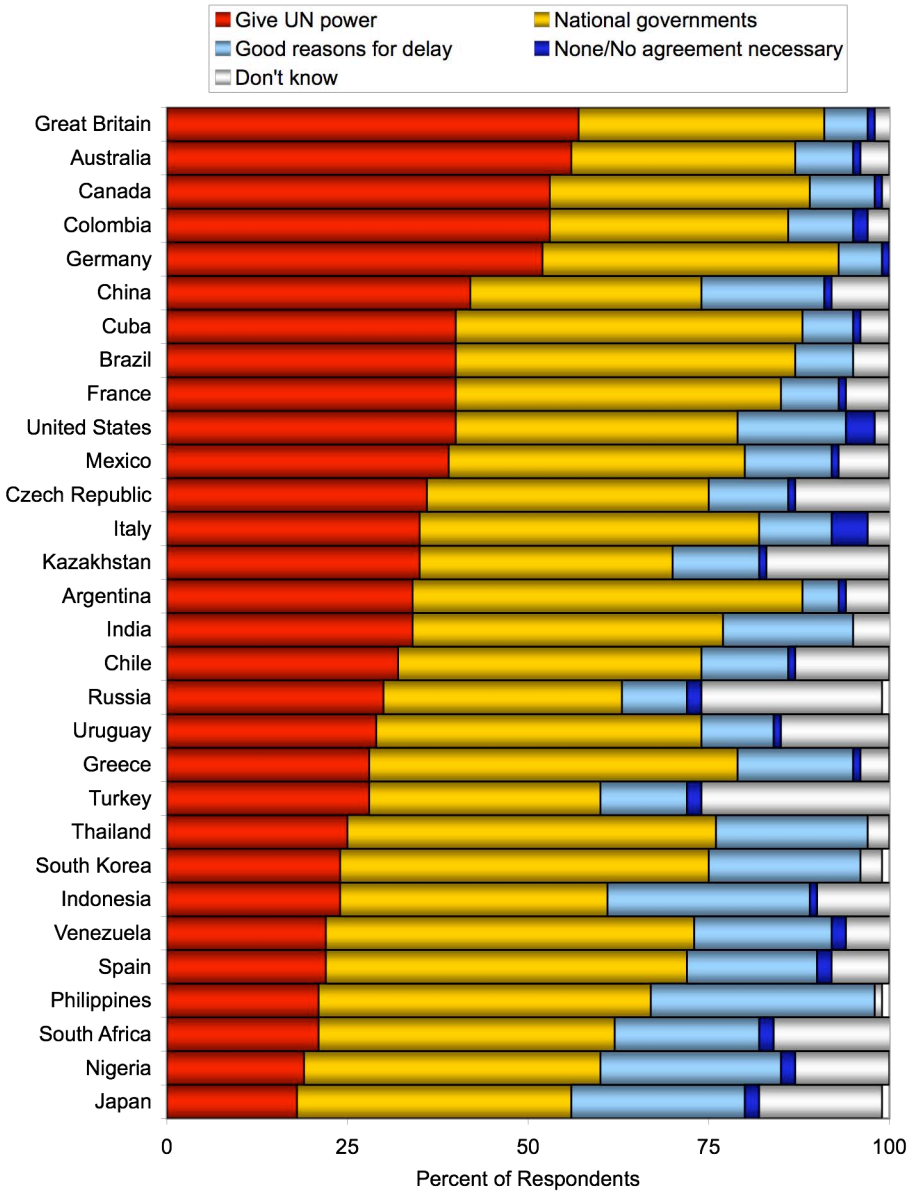


Figure 21. International Action (GlobeScan, 2001)

Climate Policy Support in the United States

An in-depth study in the United States measured American public support for a variety of specific policy proposals to mitigate global warming at the national and international levels (Figure 22). It found that of those Americans who had heard of global warming (92%):

- 90% thought the United States should reduce its greenhouse gas emissions.
- 88% supported the Kyoto Protocol and 76% wanted the United States to reduce greenhouse gas emissions regardless of what other developed or less-developed countries do.

- 79% supported an increase in vehicle fuel economy standards (CAFE).

- 77% supported government regulation of carbon dioxide as a pollutant and a shift in subsidies from the fossil fuel industry to the renewable energy industry (71%).

- While a majority favored a tax on "gas guzzlers" (54%), large majorities opposed a 60-cent gasoline tax (78%) or a 3% business energy tax (60%) to reduce greenhouse gas emissions.

- Americans divided evenly (40%) regarding a market-based emissions trading system, while 18% were uncertain.

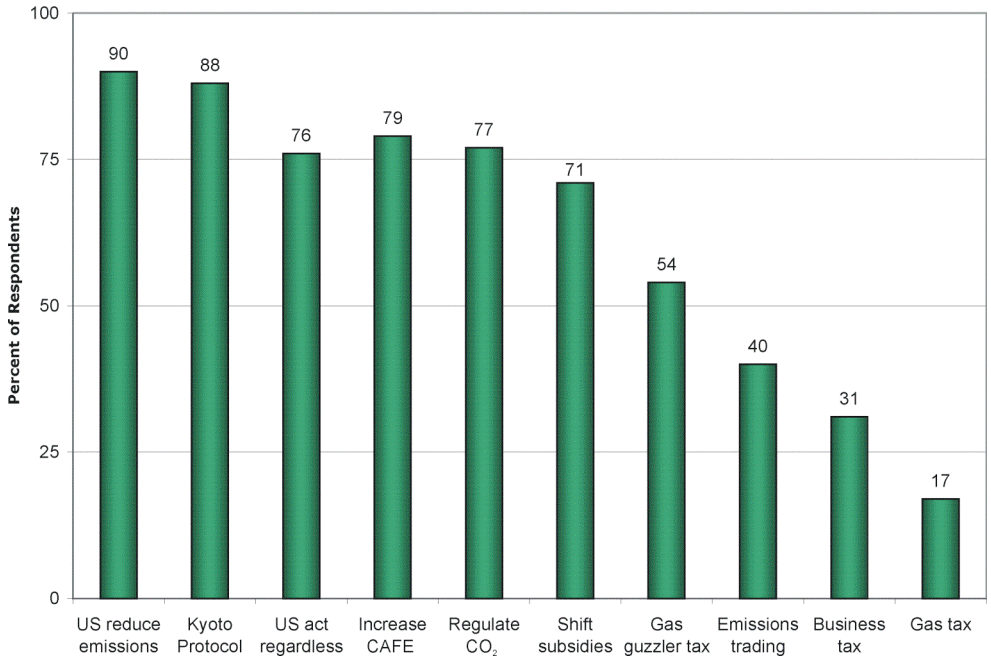


Figure 22. American Policy Preferences (Leiserowitz, 2003)

This research thus identified a contradiction in American climate change risk perceptions and policy preferences. On the one hand, Americans expressed moderate levels of concern about the issue, strongly believed that the U.S. should reduce its greenhouse gas emissions, strongly supported national regulation of carbon dioxide as a pollutant, and strongly supported international treaties to reduce emissions, like the Kyoto Protocol. On the other hand, the public strongly opposed an increase in business energy and gasoline taxes – both direct pocketbook issues. A majority of Americans did support a tax on "gas guzzler" vehicles, but they were evenly split regarding an international market in emissions trading. Thus, the public largely supported policy action at the national and international levels, but opposed two tax policies that would directly affect them.

Priority of Global Warming

Overall, the world public appears largely aware of and concerned about global warming. While many view it as a critical threat, how does it compare to the many other pressing issues vying for world attention and action? Unfortunately, we have very limited data about how climate change ranks compared to other issues. In a 2005 survey of 22 countries, however, GlobeScan asked respondents to volunteer answers to the question, "What do you think is the most important problem facing the world today?" After grouping similar answers, they found that war and conflict led the list, followed by poverty, economic issues, terrorism, unemployment and then general concerns about the environment (Figure 23). On average, only 1% of respondents specifically mentioned climate change, global warming or the greenhouse effect as the world's most important problem. While this question did not allow people to directly rank climate change relative to other issues, it does demonstrate that climate change is not an issue that comes readily or immediately to mind and strongly suggests that it remains a relatively low global priority compared to many other world issues.

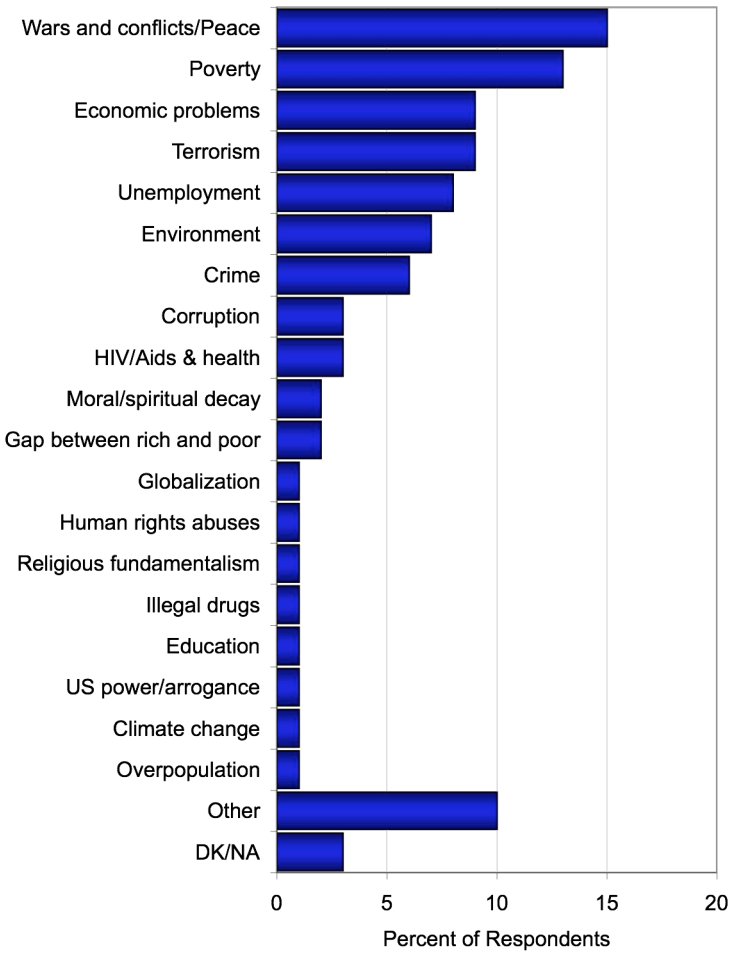


Figure 23. Priority of World Issues (GlobeScan, 2005)

But how does global warming rank compared to other environmental issues? Again, no one has ever asked multinational respondents to directly rank environmental issues by priority. In a 2000 survey of 34 countries, however, GlobeScan asked respondents to rate the seriousness of several environmental problems (Figure 24). Large majorities worldwide selected the strongest response possible ("very serious") for seven of the eight problems measured. Overall, these results demonstrate very high levels of public concern about a wide range of environmental issues, from local problems like water and air pollution to global problems like ozone depletion and climate change. Climate change, however, ranked seventh out of eight environmental issues. These results suggest that the global public, in both developed and developing countries, does consider climate change to be a significant problem, albeit a lower priority than most other environmental problems.

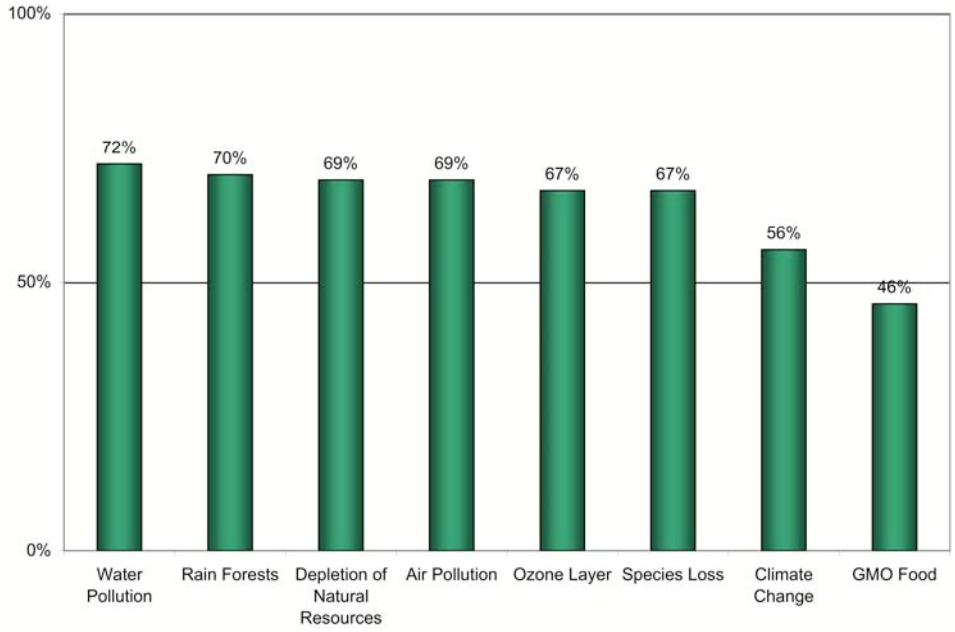


Figure 24. Global Priority of Environmental Issues (Leiserowitz, 2005)

Priority of Global Warming in the United States

An in-depth survey on global warming attitudes in the United States asked respondents, "Here are some issues now being discussed in Washington. Among these, which do you think should be the top priority for Congress and the President?" Global warming was ranked tenth out of ten national issues (Figure 25) and fifth out of nine environmental issues (Figure 26). These results are similar to many other national surveys in the United States, which find that environmental issues are consistently viewed as relatively low priorities compared to other national issues and that global warming remains a relatively low priority among other environmental issues. Climate change may be moving slowly up the priority ladder in the United States, but clearly has a long way to go before it overtakes more "bread and butter" and seemingly more locally relevant issues like economic growth, health care, education, etc.

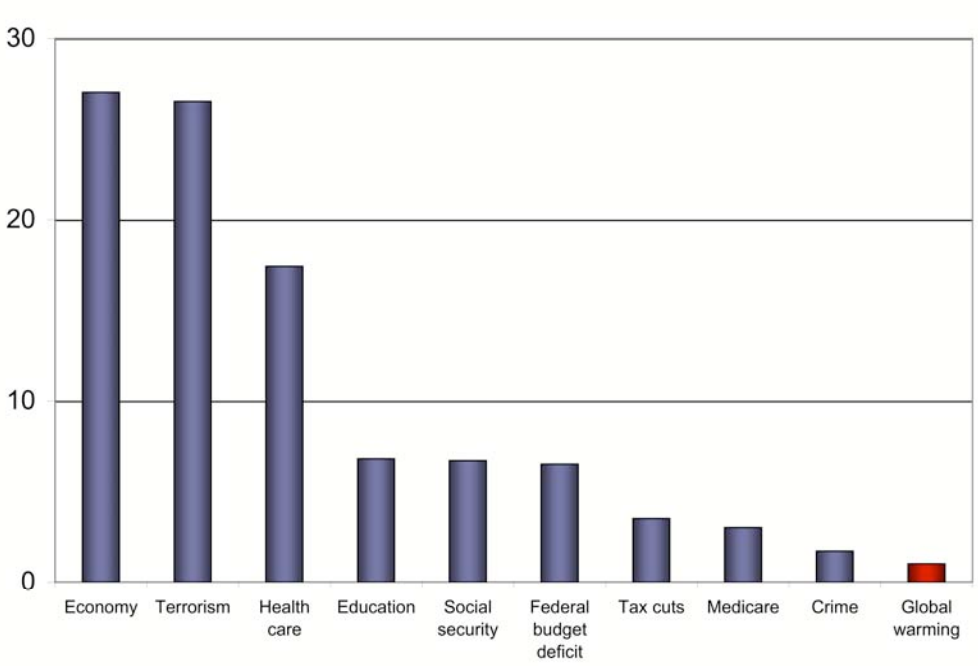


Figure 25. Priority of National Issues in the USA (Leiserowitz, 2004)

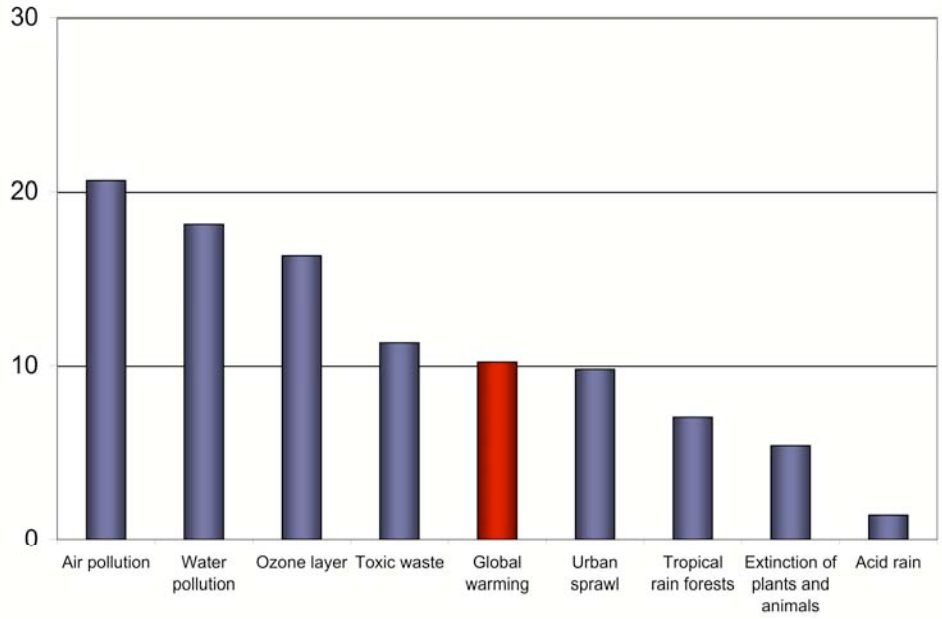


Figure 26. Priority of Environmental Issues in the USA (Leiserowitz, 2004)

Behavior

Finally, stabilization of the Earth's climate will require more than large-scale government policies, programs, and international treaties. Greenhouse gas emissions are partly the byproduct of the countless decisions made by billions of individual human beings every day. Almost everything done in modern global society involves the burning of fossil fuels, whether directly by driving cars,

heating or cooling homes, turning on lights, or indirectly through the products bought and used, while in other parts of the world, every day decisions about land use or deforestation also impact global greenhouse gas concentrations. Thus, individual behavior change will be a critical component of any successful strategy to reduce global greenhouse gas emissions.

In 2001, GlobeScan asked respondents in 28 countries whether they would be willing to pay 10% more for gasoline or petrol, if the money was used to reduce air pollution. Worldwide, 60% of respondents either strongly agreed (28%) or somewhat agreed (32%) that they would do so (Figure 27). Again, this is only one question, asking about an abstract, hypothetical increase in fuel prices, with no explicit tradeoffs stated. Nonetheless, these results suggest that under the right circumstances, many publics would at least be willing to consider higher prices on fuel, if the money raised was explicitly used to reduce air pollution.

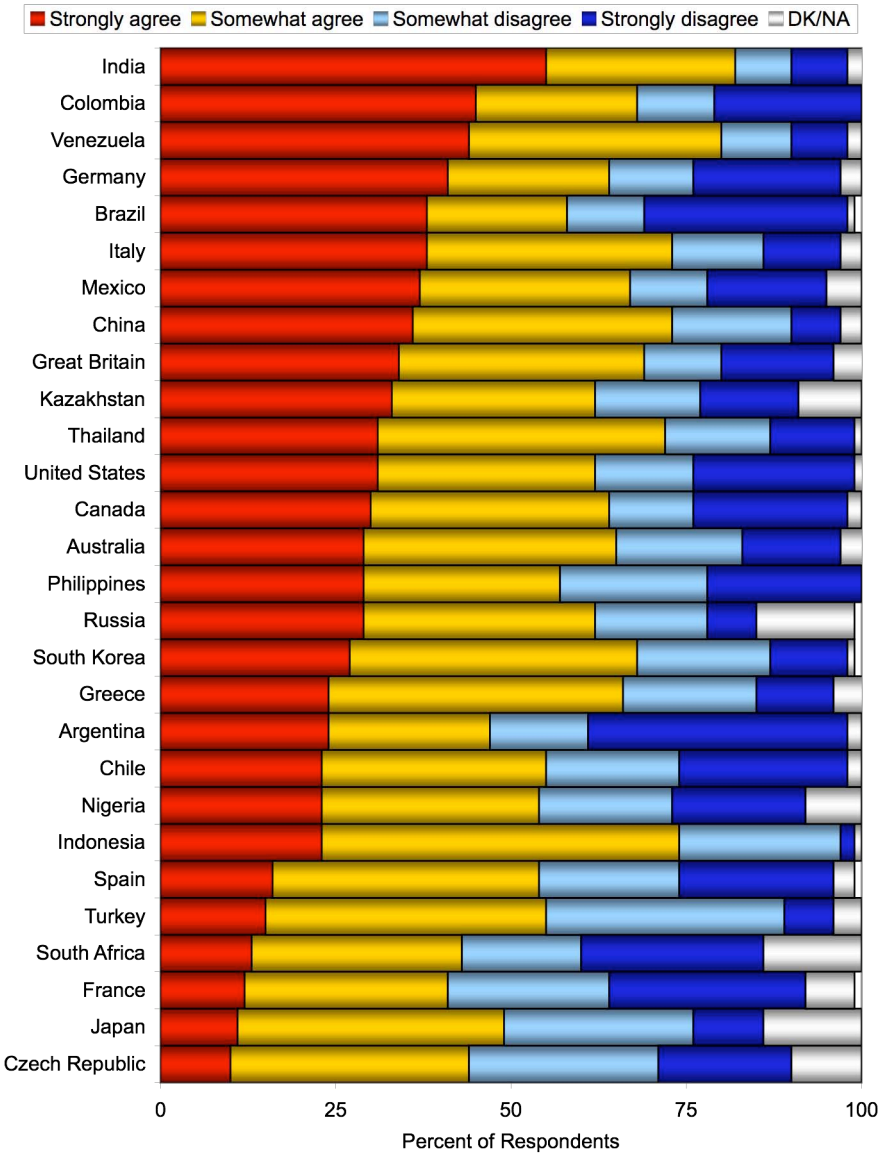


Figure 27. Willingness to Pay 10% More for Fuel (GlobeScan, 2001)

Likewise, GlobeScan also asked these respondents whether they would be willing to pay 10% more for "household electricity to have it supplied by solar energy, wind power, or some other renewable source." Worldwide, 68% of respondents either strongly agreed (34%) or somewhat agreed (34%) that they would pay more for renewable energy (Figure 28), suggesting the emergence of a significant global market for "green" energy production.

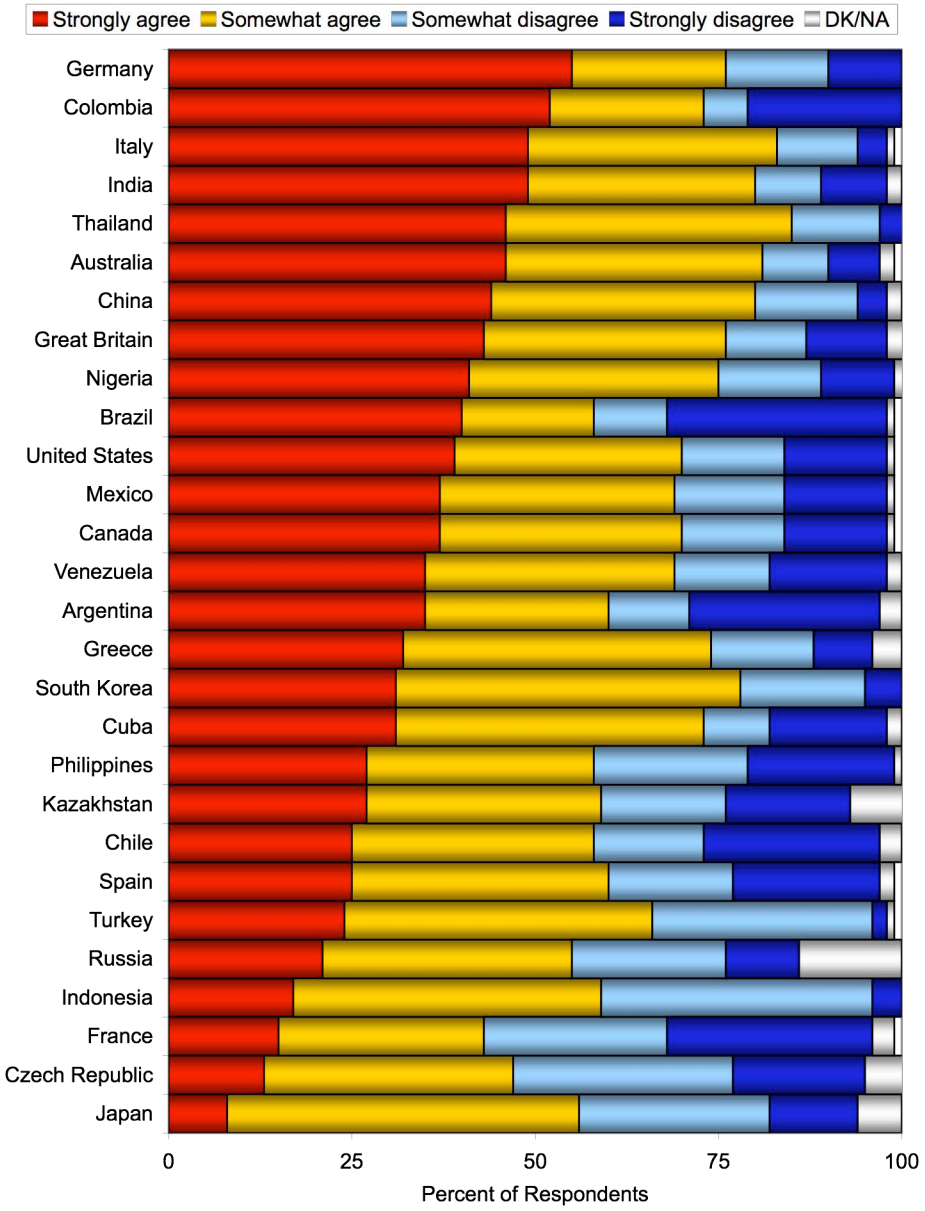


Figure 28. Willingness to Pay 10% More for Renewable Electricity (GlobeScan, 2001)

Individual Behaviors in the United States

A recent in-depth survey on climate change in the United States (Leiserowitz, 2003) asked respondents whether they had already acted to reduce greenhouse gas emissions across a diverse set of individual behaviors (Table 1). Also included was a bogus behavior "chosen not to buy an aerosol spray can" as a further test of public confusion with the issue of ozone depletion. Respondents were asked, "Have you done any of the following things because you are concerned about global warming? (If you have done any of these things for another reason, check the "No" box.)"

TABLE 1. American Global Warming Behaviors

	% Americans
Used energy-efficiency as a selection criterion when buying a light bulb, a household appliance, or a motor vehicle.	51
Installed insulation or weatherized your home or apartment.	45
Purchased energy from an alternative source, such as wind or solar power.	4
Used alternative forms of transportation instead of driving.	26
Chosen not to buy an aerosol spray can.	46
Planted a tree.	49
Joined, donated money to, or volunteered with an organization working on issues related to global warming.	15
Made your views on global warming clear to politicians.	9
Talked to family, friends, or colleagues about how to reduce or prevent global warming.	27

n = 595

Overall, this survey found that approximately half of Americans said they had used energy-efficiency in past consumer choices (51%) or installed insulation or weatherized their home (45%). In addition, 46% said they had chosen not to buy an aerosol spray can, which provides further evidence that many Americans continue to confuse or conflate global warming with stratospheric ozone depletion. The second highest response was planting a tree (49%), an action that has become perhaps the quintessential, symbolic "environmental act."

Only a quarter (26%) of the American public had used alternative forms of transportation, such as rail, car-pools, walking, bicycling, etc. instead of driving. Only 4% of Americans reported purchasing alternative energy, which in part reflects limited access to renewable energy sources. Further, very few Americans reported political behaviors on global warming. Only 15% said they had joined, donated money to, or volunteered with an organization working on global warming issues and only 9% said they had contacted politicians to communicate their concerns about global warming. Finally, only a quarter (27%) of Americans reported talking to family members, friends or colleagues about how to reduce or prevent global warming. A separate question asked, "How often do you discuss global warming with your family and friends?" On a 6-point scale ranging from 1 (rarely discuss) to 6 (often discuss), over 43% of Americans chose the extreme value "rarely discuss." An additional 25% chose the second-most extreme value (2), thus nearly 70% of Americans said they rarely discussed global warming within their immediate

social networks. These two results are critical indicators of the depth of American risk perceptions and concerns about this issue. Until global warming becomes a "household word" or a topic commonly discussed as part of everyday discourse, it will likely remain a low-priority issue for most Americans. These results also demonstrate that although sizeable proportions of the American public reported a few energy efficient behaviors (45 to 51%), the great majority has not engaged the issue either socially or politically.

Research Limits and Needs

This thematic paper summarizes what is currently known about climate change perceptions, opinions, and behaviors worldwide and in the United States, by drawing upon the few multinational and quasi- global-scale surveys that have been conducted. None of these surveys, however, with the exception of the in-depth study in the United States, were primarily focused on global attitudes and behaviors towards global warming – each only had a few questions at most on climate change. Likewise, most studies were not theory driven and therefore aimed merely to describe, not explain, global trends in global warming attitudes and behaviors. Some of this data is proprietary, and each survey sampled a geographically limited and different set of countries, making it extremely difficult to do either truly global or comparative analysis (Appendices A and B). Further, in some countries, sampling was conducted primarily in urban centers, thereby not adequately representing the views of rural residents. Few efforts, with the exception of the GlobeScan and Gallup surveys, have measured trends over time.

Further, this review found, in most cases, only limited data available and in many other cases no data at all. For example, no one has yet conducted an in-depth examination of global public perceptions of the likelihood or severity of climate change impacts or the risks of climate change to national or economic security around the world. Likewise, we know almost nothing about global support or opposition to climate change mitigation policies, ranging from international treaties like the Kyoto Protocol to specific policies, like emissions trading, carbon taxes, higher energy efficiency standards, or the controversial use of nuclear power as a "green" energy source. We also know nothing about global support or opposition to various climate change adaptation options, such as the defense or even relocation of urban centers vulnerable to sea level rise or the potential use of genetically modified, drought-resistant crops. In addition, we know almost nothing about the behavioral changes that individuals around the world have already undertaken or might be willing to make as part of a global, collective effort to reduce greenhouse gas emissions. And finally, much work remains to be done to identify and understand the underlying psychological, cultural, economic, geographic, and political factors that drive global warming risk perceptions, attitudes, and behaviors, as well as to further apply that knowledge in the effort to accelerate collective action on climate change.

Summary and Conclusion

Based on the limited data available, it appears that although large majorities of the global public are aware of global warming, some, particularly those in Islamic countries, in rural parts of the developing world, and notably in India, remain unaware of this issue, at least as conceptualized by modern science. It also appears that large majorities worldwide already believe that climate change is a very serious problem and are growing more concerned. In general, there appears to be significantly greater concern about climate change in the European Union and even some major developing countries (e.g., Brazil, India) than in China or the United States.

Many respondents also consider global warming a threat to their own country's vital interests, however, individuals in developing countries appear to be more convinced that climate change is a direct threat to them and their families than do individuals in developed countries. Worldwide, respondents are most concerned about the potential impacts on human health, followed by water shortages, species loss, or extreme weather events. Many individuals, however, do not personally worry that much about the issue, especially in key emitting countries like the United States, although levels of worry about global warming in the US have recently increased. Nonetheless, many within the US perceive climate change as only a moderate and distant risk that will primarily impact people and places far away in space and time.

Large majorities worldwide believe that human activities are a significant cause of climate change, yet many continue to confuse and conflate global warming with depletion of the ozone layer, which in turn leads many to support ineffectual solutions, such as the banning of aerosol spray cans. However, respondents from Europe, India, China and many developing countries are significantly more convinced that human activities are causing climate change than respondents from the United States. In turn, large majorities worldwide appear to prefer a precautionary approach, agreeing that action is needed now, even if there are major economic costs involved. Perhaps surprisingly, large majorities of respondents in many developing countries said that "poorer countries should be required to take significant action immediately along with richer countries." Further, relatively few in any country said that poorer countries should not be required to take significant action at all. Finally, there is some evidence that many members of the global public want their national governments to act more quickly and forge strong international agreements, while over a third of those surveyed actually preferred that the UN be given the power to impose reductions on national governments, which at least suggests significant frustration with the slow rate of international action on climate change. Nonetheless, climate change appears to remain a relatively low priority compared to other pressing world, national, or even other environmental issues. This relatively low priority may help explain why much national and international action has thus far been relatively slow and weak.

Finally, despite the critical need for widespread changes in climate change-related consumer and political behavior around the world, we still know very little about what individuals are willing or able to do, what barriers to action they confront, or what factors motivate these behavioral changes. The very limited data we do have at least suggests a willingness by many worldwide to pay higher prices for fuel if the money raised was devoted to reducing air pollution and higher prices for electricity produced by renewable energy sources. Thus, a market for green energy and products is emerging worldwide, opening up potentially enormous new business opportunities as the world increasingly demands less carbon-intensive goods and services.

Thus overall, awareness, concern, and support for significant action to deal with global warming appears to be gaining momentum among the worldwide public, although there are many obstacles remaining, including our limited understanding of the current status of global public opinion and the unknown potential for rapid social change to dramatically reduce global greenhouse gas emissions at a rate fast enough to forestall large-scale climate disruptions.

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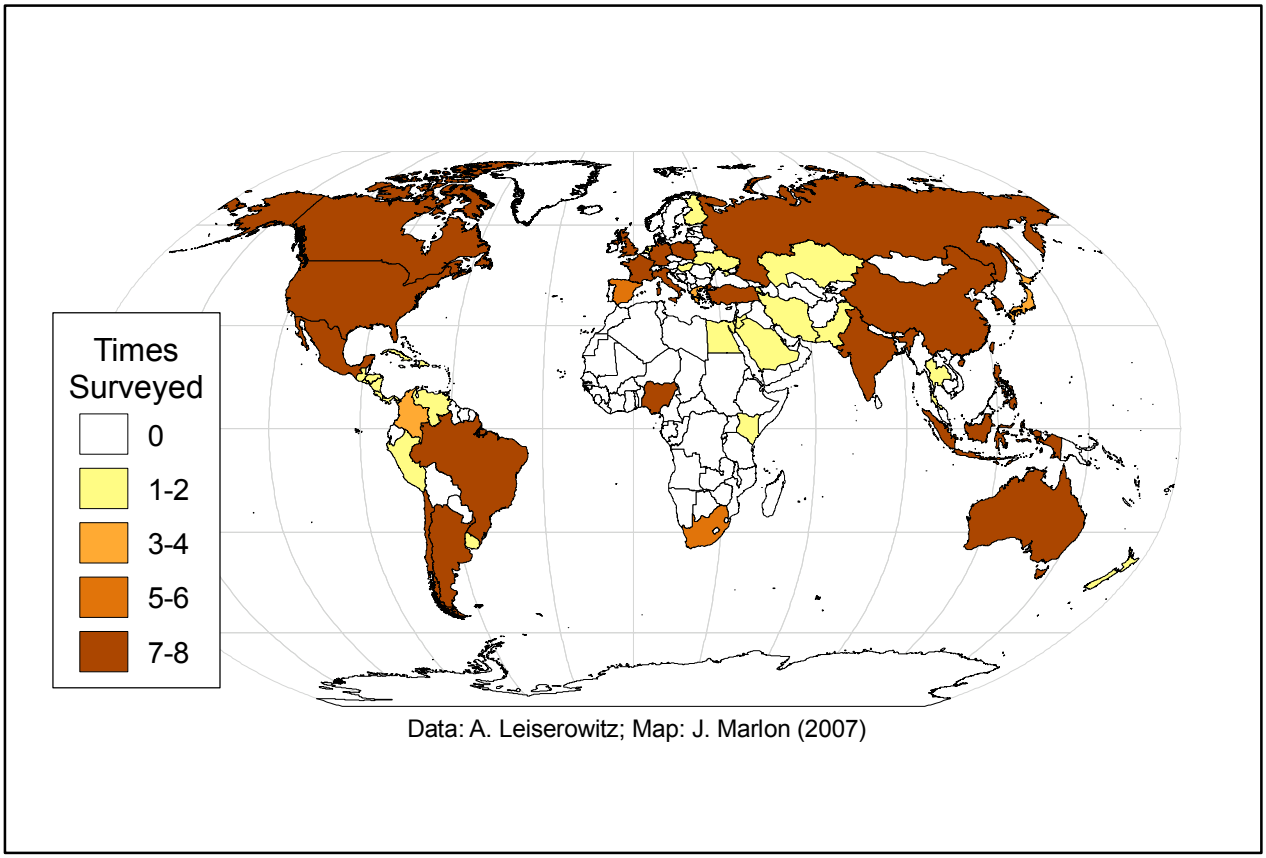
Appendix A: Multinational surveys with at least one question on climate change.

COUNTRY	GS IEM 1998	GS IEM 1999	GS IEM 2000	GS IEM 2001	GS GIM 2005	GS CSRM 2006	PEW 2006	CCGA / WPO 2007
Argentina	X	X	X	X	X	X	X	X
Armenia								X
Australia	X	X	X	X	X		X	X
Brazil	X	X	X	X	X	X	X	X
Canada	X	X	X	X	X	X	X	X
Chile	X	X	X	X	X	X	X	X
China	X	X	X	X	X	X	X	X
Colombia	X	X		X				
Costa Rica						X		
Cuba				X				
Dominican Republic				X				
Egypt							X	
El Salvador						X		
Finland	X					X		
France	X	X	X	X	X	X	X	X
Germany	X	X	X	X	X	X	X	X
Great Britain	X	X	X	X	X	X	X	X
Greece	X	X	X	X				
Guatemala						X		
Honduras						X		
Hungary	X	X						
India	X	X	X	X	X	X	X	X
Indonesia	X	X	X	X	X	X	X	X
Iran								X
Israel								X
Italy	X	X	X	X	X	X	X	X
Japan	X			X		X	X	
Jordan							X	
Kazakhstan	X			X				
Kenya						X		
Mexico	X	X	X	X	X	X	X	X
Netherlands				X				
New Zealand	X							
Nicaragua						X		
Nigeria	X	X	X	X	X	X	X	X
Pakistan							X	
Panama				X		X		
Peru				X				X
Phillipines		X	X	X	X	X	X	X
Poland	X	X	X	X	X	X		X
Russia	X	X	X	X	X	X	X	X
Saudi Arabia						X		
South Africa	X	X	X	X	X	X		
South Korea	X	X	X	X	X	X		X
Spain	X	X	X	X	X		X	
Thailand				X				X
Turkey	X	X	X	X	X	X	X	
Ukraine								X
United States	X	X	X	X	X	X	X	X
Uruguay	X			X				
Venezuela	X			X				

GlobeScan (Environics) International Environmental Monitor 1998
GlobeScan (Environics) International Environmental Monitor 1999
GlobeScan (Environics) International Environmental Monitor 2000
GlobeScan (Environics) International Environmental Monitor 2001
GlobeScan Global Issues Monitor (2005)
GlobeScan Corporate Social Responsibility Monitor (2006)
Pew Global Attitudes Survey 2006
Chicago Council on Global Affairs / WorldPublicOpinion.org (2007)



Appendix B: Number of times each country has been surveyed with at least one question about climate change.