CONSENT TO PARTICIPATE IN RESEARCH

Popular Support for Climate Change Policy

You are asked to participate in a research study conducted by Professor Trudy Ann Cameron, Ph.D., of the Department of Economics and the Department of Policy Studies at the University of California, Los Angeles. Your household has been drawn as part of a sample designed to reflect the general population in your geographic region. I hope your household will be able to help us preserve the statistical properties of this sample by allocating about 20-30 minutes to this survey. **The adult in your household with the most recent birthday should complete the survey.**

- **PURPOSE OF THE STUDY**

Climate change policy remains a controversial issue, and the National Science Foundation, through UCLA, has funded a two-year study of the determinants of ordinary people's willingness to pay higher prices for goods and services in order to prevent or slow climate change.

- **PROCEDURES**

If you volunteer to participate in this study, we ask you to answer a number of questions to the best of your ability. The survey is designed to first check your current understanding of climate change issues. Then we ask you to consider two possible climate change policies and select the one that you most prefer. In addition to your opinions about climate change, you will be asked to express your attitude towards risk and how you tend to view trade-offs that must be made over time. There are no "right" or "wrong" answers to these types of questions. We will then collect some basic information about you so that we may group your answers with those of other people who are like you.

- **POTENTIAL RISKS AND DISCOMFORTS**

None anticipated.

- **POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY**

During the survey, you may find you learn more about climate change. Climate change policy is controversial. Your answers on this survey, when combined with those of other participants, will help decision-makers formulate better climate change policies.

- **PAYMENT FOR PARTICIPATION**

In recognition of your assistance in completing and returning the survey form in a timely fashion, we provide $1 as a token of our thanks for your time and effort.

If you have any questions or concerns about this survey, please feel free to contact the researcher in charge (Professor Trudy Ann Cameron) at tcameron@econ.ucla.edu or (310) 825-3925. By signing this form, you are giving your consent to participate in this research study. You are not waiving any legal claims, rights or remedies because of this consent. If you have questions regarding your rights as a research subject, contact the Office for Protection of Research Subjects, 2107 Ueberroth Building, UCLA, Box 951694, Los Angeles, CA 90095-1694 (310) 825-8714.

I understand the procedures described above. I agree to be a participant in this study. I will retain the second copy of this form for my records.

_____ _____

Signature Date

Trudy Ann Cameron, Ph.D.; UCLA IRB #G99-07-028-02

Welcome to the Global Policy Survey!

Q1. "Global" Problems and Problems around the Globe Societies cannot afford to fix all global policy problems, so we have to decide upon priorities. What are your personal priorities? (Check one box per row.)

	Higher Priority	Moderate Priority	Lower Priority	Not Sure
a. Preventing wars	☐ 1	☐ 2	☐ 3	☐ 4
b. Reducing poverty and hunger	☐ 1	☐ 2	☐ 3	☐ 4
c. Protecting endangered species	☐ 1	☐ 2	☐ 3	☐ 4
d. Reducing violent crime	☐ 1	☐ 2	☐ 3	☐ 4
e. Improving health	☐ 1	☐ 2	☐ 3	☐ 4
f. Cleaning up the environment	☐ 1	☐ 2	☐ 3	☐ 4
g. Preventing climate change	☐ 1	☐ 2	☐ 3	☐ 4
h. Improving education	☐ 1	☐ 2	☐ 3	☐ 4

Q2. Your topic will be climate policy People differ widely in what they already know about climate change. Try this quiz. If you are not an expert, you will have an opportunity to learn more during this survey. Some questions require more detailed knowledge than others.

a. Climate is the same thing as weather.

☐ 1 true ☐ 2 false ☐ 3 don't know/not sure

b. Destruction of the world's forests contributes to climate change.

☐ 1 true ☐ 2 false ☐ 3 don't know/not sure

c. Nuclear power plants are a major contributor to climate change.

☐ 1 true ☐ 2 false ☐ 3 don't know/not sure

d. Climate change and holes in the ozone layer are more or less the same thing.

☐ 1 true ☐ 2 false ☐ 3 don't know/not sure

e. If climate changes, temperatures will go up or down by about the same amount everywhere.

☐ 1 true ☐ 2 false ☐ 3 don't know/not sure

f. Use of aerosol spray cans is a major cause of climate change.

☐ 1 true ☐ 2 false ☐ 3 don't know/not sure

g. Toxic chemicals (such as pesticides) are major contributors to climate change.

☐ 1 true ☐ 2 false ☐ 3 don't know/not sure

Q3. a. In the last 24 hours, about what was the highest local temperature? _____°F

b. About what was the lowest local temperature? _____°F

Q4. How different will average temperature be in your area in 30 years if nothing is done to prevent climate change?

a. As a best guess, I think temperature will most likely { **increase** ☐ 1 / **decrease** ☐ 2 / **stay same** ☐ 3 } by about _____°F

b. The largest { **increase** ☐ 1 / **decrease** ☐ 2 } I would expect is by about _____°F

c. The smallest { **increase** ☐ 1 / **decrease** ☐ 2 } I would expect is by about _____°F

d. How confident are you in your guesses about temperature change?

☐ 0 **Not very confident**

☐ 1 **Somewhat confident**

☐ 2 **Completely confident**

Q5. Where climate change effects may be felt

Given your own concerns about your well-being and that of your family, how worried are you about the vulnerability to climate change of each of the following?

	Not Worried	Somewhat Worried	Very Worried	Don't know
a. Agriculture, Water- food and fiber, fresh water resources	☐ 1	☐ 2	☐ 3	☐ 4
b. Ecosystems-forests, deserts, rangeland, wetlands, wildlife	☐ 1	☐ 2	☐ 3	☐ 4
c. Human health-health and well-being, including diseases	☐ 1	☐ 2	☐ 3	☐ 4
d. Oceans, Weather-sea levels; frequency and severity of storms	☐ 1	☐ 2	☐ 3	☐ 4
e. Equity, Fairness-distribution of ill effects across the population	☐ 1	☐ 2	☐ 3	☐ 4

Q6. We are going to ask what you believe will happen *if nothing is done to prevent climate change*. We call this a "**Business-as-usual**" policy. This shows **examples** of ways you can answer.

IF YOU ARE UNCERTAIN about what will happen, you can show a range of outcomes by checking two boxes, like this (on the next question):

Impacts	**Example Only**		
Oceans, Weather	☐ ☐ ☑ ☐ ☑ ☐ ☐ ☐ ☐		
sea levels; frequency severity of storms	extreme undesirable change	no change	extreme desirable change

IF YOU ARE FAIRLY SURE, choose the one level that best describes what you think will occur (on the next question).

Impacts	**Example Only**		
Oceans, Weather	☐ ☐ ☐ ☐ ☐ ☐ ☑ ☐ ☐		
sea levels; frequency severity of storms	extreme undesirable change	no change	extreme desirable change

Worldwide, how do you think climate change will affect each of the following, by 30 years from now, if a policy of **Business-as-usual** is followed?
(Check one or two boxes per row like the examples above.)

a. Agriculture, Water-food and fiber, fresh water resources

b. Ecosystems-forests, deserts, rangeland, wetlands, wildlife

c. Human health-health and well-being, including diseases

d. Oceans, Weather-sea levels; frequency and severity of storms

e. Equity, Fairness-distribution of ill effects across the population

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9

extremely harmed — unaffected — extremely improved

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9

extremely harmed — unaffected — extremely improved

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9

extremely harmed — unaffected — extremely improved

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9

extreme undesir. chge. — no change — extreme desir. change

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9

more than 80% borne by poor — roughly 50% (equal share) — less than 20% borne by poor

Q7. Where do you expect to make your permanent home?
(Please pick only one area in one section.)

a. Canada Northern ☐1 or Southern ☐2 portion of:

b.

☐ 1 Alberta
☐ 2 British Columbia
☐ 3 Manitoba
☐ 4 New Brunswick
☐ 5 Newfoundland
☐ 6 Northwest Territories
☐ 7 Nova Scotia
☐ 8 Nunavut
☐ 9 Ontario
☐ 10 Prince Edward Island
☐ 11 Quebec
☐ 12 Saskatchewan
☐ 13 Yukon

c. United States

☐ 1 AK	☐ 9 DE	☐ 17 KS	☐ 25 MO	☐ 33 NM	☐ 41 SC	☐ 49 WI
☐ 2 AL	☐ 10 FL	☐ 18 KY	☐ 26 MS	☐ 34 NV	☐ 42 SD	☐ 50 WV
☐ 3 AR	☐ 11 GA	☐ 19 LA	☐ 27 MT	☐ 35 NY	☐ 43 TN	☐ 51 WY
☐ 4 AZ	☐ 12 HI	☐ 20 MA	☐ 28 NC	☐ 36 OH	☐ 44 TX	
☐ 5 CA	☐ 13 IA	☐ 21 MD	☐ 29 ND	☐ 37 OK	☐ 45 UT	
☐ 6 CO	☐ 14 ID	☐ 22 ME	☐ 30 NE	☐ 38 OR	☐ 46 VA	
☐ 7 CT	☐ 15 IL	☐ 23 MI	☐ 31 NH	☐ 39 PA	☐ 47 VT	
☐ 8 DC	☐ 16 IN	☐ 24 MN	☐ 32 NJ	☐ 40 RI	☐ 48 WA	

d. Other North American countries

Country_____State/Prov._____

e. Countries outside North America

Country_____State/Prov._____

Q8. How should the costs of climate change prevention be paid? (Check one box per row.)

A. Don't believe we need to prevent climate change. ☐ 1

B. In your own country, responsibility for prevention costs should belong to:	**Disagree**	**Neutral**	**Agree**
a. energy producers and users	☐ 1	☐ 2	☐ 3
b. industry (investors)	☐ 1	☐ 2	☐ 3
c. government and taxpayers	☐ 1	☐ 2	☐ 3
d. consumers	☐ 1	☐ 2	☐ 3

C. Internationally, responsibility for prevention costs should belong to:	**Disagree**	**Neutral**	**Agree**
a. densely populated developing countries like India and China	☐ 1	☐ 2	☐ 3
b. other developing countries	☐ 1	☐ 2	☐ 3
c. the US and its major trading partners	☐ 1	☐ 2	☐ 3
d. other industrialized countries	☐ 1	☐ 2	☐ 3
e. countries in proportion to their contribution to the problem	☐ 1	☐ 2	☐ 3

Q9. How believable is climate change information from Government Agencies?
(Intergovernmental Panel on Climate change, US EPA, Environment Canada, etc)

☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6
definitely believable	probably believable	possibly believable	probably not believable	definitely not believable	don't know

Stapled into this blank space in the survey (which was the centerfold of the 11" x 17" format) was the "sealed" set of Expert Opinion information. This component of the survey consists of eight pages in booklet form, printed on 8.5" x 11" sheets and stapled into the survey so that they staple would have to be removed to read the contents.
This "Expert Opinion" booklet is appended to the back of this example, which is just of one of the randomly generated survey instruments used in the study.

Q11. Would you like to revise your climate expectations for 30 years from now? If no, go to Q12?

a. As a best guess, I think temperature will most likely { ☐ 1 **increase** / ☐ 2 **decrease** / ☐ 3 **stay same** } by about _____F

b. The largest { ☐ 1 **increase** / ☐ 2 **decrease** } I would expect is by about _____F

c. The smallest { ☐ 1 **increase** / ☐ 2 **decrease** } I would expect is by about _____F

d. How confident are you in your guesses about temperature change?

☐ 0 **Not very confident**

☐ 1 **Somewhat confident**

☐ 2 **Completely confident**

Q12. Would you like to revise your opinions about impacts? If no, go to Q13.

a. Agriculture, Water-food and fiber, fresh water resources

b. Ecosystems-forests, deserts, rangeland, wetlands, wildlife

c. Human health-health and well-being, including diseases

d. Oceans, Weather-sea levels; frequency and severity of storms

e. Equity, Fairness-distribution of ill effects across the population

	1	2	3	4	5	6	7	8	9
a.	extremely harmed				unaffected				extremely improved
b.	extremely harmed				unaffected				extremely improved
c.	extremely harmed				unaffected				extremely improved
d.	extreme undesir. chge.				no change				extreme desir. change
e.	more than 80% borne by poor				roughly 50% (equal share)				less than 20% borne by poor

Q13. We are now going to ask you to make a choice between two potential policy options. It is sometimes difficult to get people to think about their choice in a survey like they would think in a real voting situation. However, when you think about your upcoming choice of policy options, we ask you to choose just exactly as you would vote if you were really going to face the consequences of your vote: which is to pay money if a particular policy vote passes.

If the two policy options presented next were the ONLY policy alternatives, which would you prefer (or, find least objectionable)?

Consider the expected climate change impacts that you have just identified.

- **"Business-as-Usual"** allows your expected impacts to occur and costs nothing(beyond the effects of climate change).
- **"Maximum Prevention"** involves extensive actions to keep climate conditions roughly as they are at present. It involves the individual costs and sharing of costs as shown below.

Household cost/month:	**about $400/month ($300 to $500)**
How these higher household costs will be experienced:	**65%** via *INCREASE* in energy taxes **10%** via *INCREASE* in income taxes **10%** via *DECREASE* in invest. returns **15%** via *INCREASE* in consumer prices
How global costs will be shared across countries	**70%** by India and China **10%** by other developing countries **10%** by US and Japan **10%** by other industrialized countries

How would you vote?

- ☐ 1 Business-as-Usual
- ☐ 2 Maximum Prevention
- ☐ 3 I would not vote

Q14. If you voted for Business-as-Usual, is this because

- ☐ 1 You place some positive value on prevention, just not much?
- ☐ 2 You place zero value on prevention?
- ☐ 3 From your point of view, climate change would actually be a good thing?

Q15. Trade-offs involving money over time Imagine that you have won a lottery. The lottery commission gives you two ways of taking your winnings:

1. **$3,600 each year** for **40 years** (for a total of **$144,000**), with the first payment today, OR
2. A smaller **lump sum** payment today (which you could put into a savings account or invest, or just use it to pay for something you really want or need right now).

For *each* row in the table below, please check just one box.

If your lump sum payment would be	**Would you prefer this lump payment, rather than the annual installments?**		
	Yes	**Not sure**	**No**
a. $27,000	☐ 1	☐ 2	☐ 3
b. $46,000	☐ 1	☐ 2	☐ 3
c. $74,000	☐ 1	☐ 2	☐ 3
d. $119,000	☐ 1	☐ 2	☐ 3

Q16. Other trade-offs over time Some trade-offs involve future benefits to society, rather than future money coming just to you as an individual. Suppose that you are being asked to choose between two policy options:

1. **One-time tax credit, this year only, for each US household,** OR
2. Having the total amount of the proposed tax credit for all households spent on R&D (research and development) for more energy-efficient air conditioners. If successful, this technology will save an average of **$50 per household per year** for the period **between 5 and 25 years** from now.

Note the following:

- There is a **50% chance** that the government Research & Development program will be successful.
- There is a **50% chance** that without the program, private companies would provide this technology.

For each row in the table below, please check one box.

If your one-time tax credit would be	**Would you prefer this tax credit, rather than the R&D program?**		
	Yes	**Not sure**	**No**
a. $45	☐ 1	☐ 2	☐ 3
b. $98	☐ 1	☐ 2	☐ 3
c. $212	☐ 1	☐ 2	☐ 3
d. $334	☐ 1	☐ 2	☐ 3
e. $488	☐ 1	☐ 2	☐ 3

Q17. Do you expect to be still alive in:

	Definitely yes	Probably yes	Not Sure	Probably no	Definitely no
a. **70 years?**	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
b. **50 years?**	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
c. **30 years?**	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
d. **10 years?**	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Q18. Investments with an element of risk

Assume you have just inherited a small amount of money. You can use it to make

- a risky investment,
- a "no-risk" investment, or
- neither of these investments.

For the "Investment Scenario" below, pick your most-preferred option of the three.

Amount Invested this year	Time to payoff	Pay-off amount in constant $ (today's purchasing power)	Most preferred?
$2,400	**10 yrs**	**$3,900** with certainty	☐ 1
$2,400	**10 yrs**	50% chance of **$3,400** and 50% chance of **$5,200**	☐ 2
$0		Do not make either of these investments	☐ 3

Q19. Expected income ($US) Consider the **time period** in each column below. Assuming no inflation, which category best describes your expected annual gross income (from all sources) at each point in the future? (Check one box *per column*. If you are uncertain, you may check a range.)

Income Bracket	a. 10 years from now	b. 20 years from now	c. 30 years from now
less than US $9,999	☐ 1	☐ 1	☐ 1
US $ 10,000 to US $ 19,999	☐ 2	☐ 2	☐ 2
US $ 20,000 to US $ 29,999	☐ 3	☐ 3	☐ 3
US $ 30,000 to US $ 49,999	☐ 4	☐ 4	☐ 4
US $ 50,000 to US $ 74,999	☐ 5	☐ 5	☐ 5
US $ 75,000 to US $ 99,999	☐ 6	☐ 6	☐ 6
US $ 100,000 to US $ 124,999	☐ 7	☐ 7	☐ 7
US $ 125,000 to US $ 149,999	☐ 8	☐ 8	☐ 8
US $ 150,000 to US $ 199,999	☐ 9	☐ 9	☐ 9
more than US $200,000	☐ 10	☐ 10	☐ 10
probably not applicable	☐ 11	☐ 11	☐ 11

Q20. How can you be described? (Check one or more boxes.)

a. What was your age at your last birthday? _____years

b. What is your gender?

☐ 1 male ☐ 2 female

c. Highest education level completed?

☐ 1 highschool or less ☐ 2 some college ☐ 3 college graduate ☐ 4 master's degree ☐ 5 doctoral degree ☐ 6 trade school ☐ 7 professional degree

d. If you have attended any college, what is (was) your major field of study? (Check as many as apply.)

☐ 1 physical sciences ☐ 2 life sciences ☐ 3 social sciences ☐ 4 arts and humanities ☐ 5 engineering ☐ 6 business ☐ 7 other/ undecided

e. Which category describes your current status? (Check as many as apply.)

☐ 1 work full time ☐ 2 work part-time ☐ 3 student ☐ 4 non-paid work ☐ 5 retired ☐ 6 childcare/ eldercare provider ☐ 7 other

f. "I consider myself well-informed about environmental issues."

☐ 1 agree ☐ 2 neutral ☐ 3 disagree

g. "I consider myself to be..."

☐ 1 liberal ☐ 2 moderately liberal ☐ 3 moderate ☐ 4 moderately conservative ☐ 5 conservative

h. "Based on the way that the issues are presented in this survey, I suspect that the research team conducting this study believes that preventing climate change is..."

☐ 1 very unimportant ☐ 2 somewhat unimportant ☐ 3 neutral ☐ 4 somewhat important ☐ 5 very important

i. "The annual income bracket for my family is..."

☐ 1 less than $20,000 ☐ 2 $20,000 to $30,000 ☐ 3 $30,000 to $50,000 ☐ 4 $50,000 to $75,000 ☐ 5 $75,000 to $100,000 ☐ 6 $100,000 to $150,000 ☐ 7 more than $150,000

j. "The largest amount of money that I believe I could currently qualify to borrow on a credit card, or from a bank, credit union, trust company or family member (without collateral) is:"

☐ 1 $0 ☐ 2 $100 ☐ 3 $1,000 ☐ 4 $10,000 ☐ 5 $50,000 ☐ 6 $100,000 ☐ 7 more than $100,000

k. About how many lottery tickets per year do you buy?

☐ 1 not legal to play | ☐ 2 no such lottery | ☐ 3 0 tickets | ☐ 4 1-6 tickets | ☐ 5 7-12 tickets | ☐ 6 13-26 tickets | ☐ 7 27-52 tickets

l. To how many environmental groups or organizations do you belong?

☐ 1 0 groups | ☐ 2 1 group | ☐ 3 2 groups | ☐ 4 3 groups | ☐ 5 4 groups | ☐ 6 5 groups | ☐ 7 6 or more

m. About how much total time did you spend studying the "expert" information about climate change, not including interruptions?

☐ 1 less than 1 minute | ☐ 2 1-2 minutes | ☐ 3 2-5 minutes | ☐ 4 5-10 minutes | ☐ 5 10-20 minutes | ☐ 6 20-30 minutes | ☐ 7 more than 30 minutes

n. Did you have to rush to complete this survey?

☐ 1 no | ☐ 2 yes a little | ☐ 3 yes a lot

o. Do you have any children (or grandchildren)?

☐ 1 yes | ☐ 2 no, but will have later | ☐ 3 no, but may have later | ☐ 4 no, I do not plan any

p. "Compared to normal weather for your region at this time of year, recent condition could be described as: (Check as many as apply.)",

☐ 1 about normal | ☐ 2 unusually cold | ☐ 3 unusually warm | ☐ 4 unusually dry | ☐ 5 unusually wet (rain/snow) | ☐ 6 unusually humid | ☐ 7 unusually stormy

Please write today's date. _____/_____/2002
MONTH/DAY

REMEMBER TO RETURN THE "EXPERT OPINION" INSERT, AND THE SURVEY IN THE ENCLOSED POSTAGE-PAID ENVELOPE. THANK YOU!!

Thanks!

We are very grateful that you have been willing to use some of your valuable time to complete this survey. The types of policy measures that are being considered to deal with climate change are potentially very costly and the benefits are highly uncertain. There is a lot at stake, and it is important to understand how different people view the problem and how these views affect their willingness to support climate change prevention measures.

By participating in this survey, you have taken advantage of an opportunity for your voice to be heard. If you are interested in receiving a summary of the results of this study when they become available, please send a stamped, self-addressed envelope to the address below.

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This page was the front cover of the "booklet" insert containing the Expert Opinion information that survey respondents could choose to look at, or could ignore. Booklet was printed on 8.5" x 11" paper.

Q10. Expert opinions

In this section, you will have an opportunity to see what government agencies have to say about some of the possible impacts of climate change. You may choose to look **at some, none, or all** of the information that is provided.

These sheets contain selected quotes from a number of government agencies about the anticipated effects of climate change on:

1. Temperatures
2. Agriculture and Water
3. Ecosystems
4. Equity, Fairness
5. Human Health
6. Oceans, Weather

IF YOU DO HAVE TIME TO READ THIS MATERIAL,

- Detach these sheets, study the information
- Continue with questions Q11 and Q12 on the next page.
- Don't forget to include these pages with your survey when you return it in the envelope provided.

IF YOU DO NOT HAVE TIME TO READ THIS MATERIAL,

- Leave these sheets attached to the survey as they are now.

Background Information about Climate Change from Government Agencies (concerning climate change at the global level)

Please be sure to return these pages with your survey in the return envelope provided.

1. Temperatures

- "...climate models project that the mean annual global surface temperature will increase by 1-3.5°C by 2100..."
- "The average rate of warming probably would be greater than any seen in the past 10,000 years, although the actual annual to decadal rate would include considerable natural variability, and regional changes could differ substantially from the global mean value."

Source: Intergovernmental Panel on Climate Change--(IPCC); http://www.ipcc.ch/ © 1998

- "Human activities are releasing greenhouse gases into the atmosphere."
- "Rising levels of greenhouse gases are expected to cause climate change."
- "In a typical 'non-intervention' scenario, carbon dioxide emissions rise from 7 billion tonnes of carbon per year in 1990 to 20 billion in 2100...This scenario leads to the equivalent of a doubling of pre-industrial CO_2 concentrations by 2030, and a trebling by 2100."
- "External factors, such as a series of volcanic eruptions or a change in the power output of the sun, could also have a major impact, but the consensus is that climate change over the 21st century as a whole is likely to be dominated by the effects of greenhouse gas emissions."
- "Measurement records indicate a warming of 0.3-0.6°C in global average temperature since 1860."
- "Climate models predict that the global temperature will rise by about 1-3.5°C by the year 2100."
- "If nothing is done to reduce emissions, current climate models predict a global warming of about 2° C between 1990 and 2100."
- "The observed global warming trend is larger than the trends that models indicate could be due to natural variability." "Uncertainty about the ability of models to simulate natural climate variability remains a significant problem."
- "There are many uncertainties about the scale and impacts of climate change... Because of the delaying effect of the oceans, surface temperatures do not respond immediately to greenhouse gas emissions, so climate change will continue for many decades after atmospheric concentrations have stabilized. Meanwhile, the balance of the evidence suggests that the climate may have already started responding to past emissions."

- "Rapid and unexpected climate transitions cannot be ruled out."

Source: United Nations Framework Convention on Climate Change (UNFCCC)--Climate Change Information Kit; http://www.unfccc.de/ Date viewed: 09/01/2000

- "Human activities are increasing greenhouse gas concentrations and trapping more heat. The Earth's climate is predicted to change due to the buildup of greenhouse gases."
- "Climate has changed over the past century. Global mean temperature has increased 0.5-1 °F."
- "Climate is expected to continue to change in the future. Projected temperature increase of 3.6°C by 2100 (1.8-6.3 °F)."

Source: EPA--Global Warming Site; http://www.epa.gov/globalwarming/impacts/ Date viewed: 09/01/2000

- "Human activities are increasing the atmospheric concentrations of greenhouse gases and these changes are projected to lead to regional and global changes in climate and climate-related parameters such as temperature..."
- "...confidence is higher in the hemispheric-to-continental projections of climate change than in the regional projections, where confidence remains low."
- "...the majority of the identified changes in climate and, therefore, the identified impacts, are projected to occur over the next century, and that the average rate of warming would probably be greater than any seen in the last 10,000 years. Furthermore, although future, unexpected, large and rapid climate system changes (as have occurred in the past) are difficult to predict, future changes may also involve 'surprises'."

Source: Canada Country Study (CCS) Volume VII; http://www.ec.gc.ca/climate/ccs/sectoral_summ.htm Date viewed: 09/01/2000

- "The best estimates today are that these gases should have already increased the average temperature of the earth by about 2.3°F m , (1°C). Since it appears that the average temperature of the earth has only increased by between 1 and 2°F (.6 to 1°C), it is likely that some other things have also changed."

Source: The U.S. Global Change Research Information Office; http://www.gcrio.org/gwcc/toc.html Date viewed: 09/01/2000

- **Q1. Did this information add to your knowledge about the effect of climate change on temperatures? Yes$_1$ / No$_2$ / Not Sure$_3$ (Circle One)**

2. Agriculture and Water

- "Changes in climate will interact with stresses that result from actions to increase agricultural production, affecting crop yields and productivity in different ways, depending on the types of agricultural practices and systems in place. The main direct effects will be through changes in factors such as temperature, precipitation, length of growing season, and timing of extreme or critical threshold events relative to crop development, as well as through changes in atmospheric CO2 concentration (which may have a beneficial effect on the growth of many crop types). Indirect effects will include potentially detrimental changes in diseases, pests and weeds, the effects of which have not yet been quantified in most available studies."
- "Generally, middle to high latitudes may experience increases in productivity, depending on crop type, growing season, changes in temperature regimes and the seasonality of precipitation.
- "Inland aquatic ecosystems will be influenced by climate change through altered water temperatures, flow regimes, water levels and thawing of permafrost at high latitudes."
- "Some coastal eco-systems (saltwater marshes, mangrove ecosystems, coastal wetlands, coral reefs, coral atolls and river deltas) are particularly at risk from climate change and other stresses. Changes in these ecosystems would have major negative effects on freshwater supplies, fisheries, biodiversity and tourism."
- "Changes in climate could exacerbate periodic and chronic shortfalls of water, particularly in arid and semi-arid areas of the world. Developing countries are highly vulnerable to climate change because many are located in arid and semi-arid regions, and most derive their water resources from single-point systems such as bore holes or isolated reservoirs. These systems, by their nature, are vulnerable because there is no redundancy in the system to provide resources, should the primary supply fail. Also, given the limited technical, financial and management resources possessed by developing countries, adjusting to shortages and/or implementing adaptation measures will impose a heavy burden on their national economies."
- "There is evidence that flooding is likely to become a larger problem in many temperate and humid regions, requiring adaptations not only to droughts and chronic water shortages but also to floods and associated damages, raising concerns about dam and levee failures."

- "In lakes and streams, warming would have the greatest biological effects at high latitudes where biological productivity would increase and lead to expansion of cool-water species' ranges and at the low-latitude boundaries of cold- and cool-water species ranges, where extinctions would be greatest. Increases in flow variability, particularly the frequency and duration of large floods and droughts, would tend to reduce water quality, biological productivity and habitat in streams."

Q2. Did this information add to your knowledge about the effect of climate change on agriculture and water? Yes$_1$ / No$_2$ / Not Sure$_3$ (Circle One)

3. Ecosystems

- "In tropical rangelands, major alterations in productivity and species composition would occur due to altered rainfall amount and seasonality and increased evapotranspiration, although a mean temperature increase alone would not lead to such changes."
- "The geographical distribution of wetlands is likely to shift with changes in temperature and precipitation, with uncertain implications for net greenhouse gas emissions from non-tidal wetlands."
- "Climate change is projected to occur at a rapid rate relative to the speed at which forest species grow, reproduce and reestablish themselves (past tree species' migration rates are believed to be on the order of 4-200 km per century). For mid-latitude regions, an average warming of 1-3.5°C over the next 100 years would be equivalent to a poleward shift of the present geographic bands of similar temperatures (or 'isotherms') approximately 150-550 km, or an altitude shift of about 150-550 m. Therefore, the species composition of forests is likely to change; in some regions, entire forest types may disappear, while new assemblages of species and hence new ecosystems may be established."
- "As a consequence of possible changes in temperature and water availability under doubled equivalent-CO2 equilibrium conditions, a substantial fraction (a global average of one-third, varying by region from one-seventh to two-thirds) of the existing forested area of the world likely would undergo major changes in broad vegetation types with the greatest changes occurring in high latitudes and the least in the tropics."

Source: Intergovernmental Panel on Climate Change (IPCC); http://www.ipcc.ch/ © 1998

Q3. Did this information add to your knowledge about the effect of climate change on ecosystems? Yes$_1$ / No$_2$ / Not Sure$_3$ (Circle One)

4. Equity, Fairness

- ".. the regional findings...lend support to concerns over the 'potential serious consequences' of increased risk of hunger in some regions, particularly the tropics and subtropics...."
- "The livelihoods of subsistence farmers and pastoral peoples, who make up a large portion of rural populations in some regions, also could be negatively affected."

Source: Intergovernmental Panel on Climate Change (IPCC); http://www.ipcc.ch/ © 1998

- "Climate change policies should not aggravate existing disparities between one region and another nor attempt to redress all equity issues. "
- "Climate change is likely to impose costs on future generations and on regions where damages occur, including regions with low greenhouse gas emissions. Climate change impacts will be distributed unevenly."
- "...the implications of climate change for developing countries are different from those for developed countries. The former often have different urgent priorities, weaker institutions, and are generally more vulnerable to climate change."
- "Climate policy, like many other policy issues, raises particular questions of equity among generations, because future generations are not able to influence directly the policies being chosen today that could affect their wellbeing and because it might not be possible to compensate future generations for consequent reductions in their wellbeing."

Source: IPCC Working Group III (Intergovernmental Panel on Climate Change)
http://www.ipcc.ch/pub/sarsum3.htm#four
Date viewed: 11/06/2000

- "Additionally, there is a danger that entire unique cultures may be obliterated. This is not something that can be considered in monetary terms, but becomes a question of loss of human diversity, for which we have no indicators to measure economic value."

Source: IPCC Working Group III (Intergovernmental Panel on Climate Change)
http://www.ipcc.ch/pub/sarsum3.htm#seven
Date viewed: 11/06/2000

- "...for economic and equity reasons, Canada, along with other countries, should go beyond that "worth doing anyway" potential to the extent that there are climate policy measures that would cost less than the costs associated with climate

- Change damage. While such damages are likely to be higher developing countries than in industrialized regions, Canada too would have reduced climate change damages from concerted international action."

Source: Canadian Global Change Program
http://www.globalcentres.org/cgcp/english/html_documents/publications/ministers/eng96.htm
Date viewed: 11/06/2000

Q4. Did this information add to your knowledge about the effect of climate change on equity and fairness? Yes$_1$ / No$_2$ / Not Sure$_3$ (Circle One)

5. Human Health

- "Climate change could affect human health through increases in heat stress mortality, tropical vector-borne diseases, urban air pollution problems, and decreases in cold-related illnesses. Compared with the total burden of ill health, these problems are not likely to be large. In the aggregate, however, the direct and indirect impacts of climate change on human health do constitute a hazard to human population health, especially in developing countries in the tropics and subtropics; these impacts have considerable potential to cause significant loss of life, affect communities, and increase health-care costs and lost work days."
- "...the geographical zone of potential malaria transmission would expand in response to global mean temperature increases at the upper part of the IPCC-projected range (3-5°C by 2100), increasing the affected proportion of the world's population from approximately 45 per cent to approximately 60 per cent by the latter half of the next century. Areas where malaria is currently endemic could experience intensified transmission (on the order of 50-80 million additional annual cases, relative to an estimated global background total of 500 million cases). Some increases in non-vector-borne infectious diseases, such as salmonellosis, cholera and giardiasis, also could occur as a result of elevated temperatures and increased flooding."
- "Human health is vulnerable to changes in climate particularly in urban areas, where access to space conditioning may be limited."

Source: Intergovernmental Panel on Climate Change (IPCC); http://www.ipcc.ch/ © 1998

Q5. Did this information add to your knowledge about the effect of climate change on human health? Yes$_1$ / No$_2$ / Not Sure$_3$ (Circle One)

6. Oceans, Weather

- "Changes in climate will affect coastal systems through sea-level rise and an increase in storm-surge hazards and possible changes in the frequency and/or intensity of extreme events."
- "An estimated 46 million people per year currently are at risk of flooding from storm surges. Climate change will exacerbate these problems, leading to potential impacts on ecosystems and human coastal infrastructure. Large numbers of people also are potentially affected by sea-level rise, for example, tens of millions of people in Bangladesh would be displaced by a 1-m increase (the top of the range of IPCC Working Group I estimates for 2100) in the absence of adaptation measures."
- "For some island nations, the high cost of providing storm-surge protection would make it essentially infeasible, especially given the limited availability of capital for investment."
- "Fisheries and fish production are sensitive to changes in climate and currently are at risk from overfishing, diminishing nursery areas, and extensive inshore and coastal pollution. Globally, marine fisheries production is expected to remain about the same in response to changes in climate; high-latitude freshwater and aquaculture production is likely to increase, assuming that natural climate variability and the structure and strength of ocean currents remain about the same." "The principal impacts will be felt at the national and local levels, as centers of production shift. The positive effects of climate change, such as longer growing seasons, lower natural winter mortality and faster growth rates in higher latitudes, may be offset by negative factors such as changes in established reproductive patterns, migration routes and ecosystem relationships."

  Source: Intergovernmental Panel on Climate Change (IPCC); http://www.ipcc.ch/ © 1998

- "Other sectors most at risk (from projected rising sea levels) are tourism..."

  Source: United Nations Framework Convention on Climate Change (UNFCCC) (Climate Change Information Kit); http://www.unfccc.de/ © 1998

Q6. Did this information add to your knowledge about the effect of climate change on oceans and weather? Yes[1] / No[2] / Not Sure[3] (Circle One)