

Australians' views of climate change

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EXECUTIVE SUMMARY

CSIRO was contracted by the Garnaut Climate Change Review team to review recent studies examining Australians' views of climate change, their beliefs about the role of human activities in producing climate change, and their support for various policy responses to climate change. The review also considered whether, and to what extent, public views had changed since the previous Garnaut review in 2008.

A total of 22 studies were identified and analysed. Working to the priorities outlined by the Garnaut review team, relevant information from each study was extracted, reviewed, and considered in relation to information from other studies.

From the existing research, we conclude that:

- Most Australians believe the climate is changing, but fewer believe that the change is attributable to human activity.
- Belief in climate change and its anthropogenic drivers has waned in recent years, reflecting trends in other Western countries.
- Responses to questions about climate change vary systematically with question wording and response formatting, but these differences do not negate the overall conclusions above.
- Beliefs about climate change are strongly related to political preferences, voting behaviours and gender, but no clear relationships between these beliefs and location, age or income have emerged.
- Most Australians believe that Australia should take action on climate change without waiting for global consensus.
- There is no clear consensus on what policy actions Australians prefer, such as setting a carbon price or establishing an emissions trading scheme.

There is a clear need for further directed research into Australians' understanding of climate change policy options, their support for those options, and their willingness to pay within each policy option.

The best ways to communicate information about climate change, its anthropogenic drivers, and potential policy responses to climate change all require close consideration and further inquiry.

Australians' views of climate change

STUDY AIMS

The Garnaut Climate Change Review is assessing the state of current knowledge about the Australian public's views on climate change and any changes since the first Garnaut Climate Change Review in 2008. The following issues are of particular interest:

- the extent of community views in Australia that climate change is happening, and whether it is attributable to human activity or is a natural variation
- whether community views of climate change have altered in recent years
- differences between sectors of the community (e.g. rural vs urban) in views about climate change
- comparability of views in Australia with views in the UK and the USA
- community support for mitigation actions and community willingness to pay for actions, policies, and other responses
- community support for specific policy options (e.g. an emissions trading scheme, a carbon price, etc).

Currently available surveys (reports, journal articles, newspaper polls, etc) were reviewed to identify the available evidence relating to these questions, and the appropriate level of confidence in that evidence. The review focused on the years 2008-2011, to cover the period since the publication of the first Garnaut Climate Change Review.

METHODS

Relevant studies were identified by the Garnaut Climate Change Review team and by the CSIRO team in February 2011. This initial set of studies was examined for citations of further relevant studies, which were then included where they fitted our criteria. Published studies, government reports, and other reports were also sought on databases such as Google Scholar, reports in the news media, and through climate change researcher newsletters. The criteria we used for a study's inclusion were:

- time frame (January 2008 to March 2011)
- location (Australia, New Zealand, UK, or USA)

- methodology (a quantitative survey that attempted to sample the whole population or at least a broad segment of the population; sufficient information to enable analysis of the methodology was available to the review team)
- relevance of questions asked (survey questions at least probed perceptions of climate change and, where possible, perceptions of climate-change related policies).

In total 23 studies were identified and 22 were included in this review. The study that was omitted, *Farmers decisions that relate to climate change* (Hogan, Perry, Ng & Bode; 2011) gave insufficient information to be included in this review. Other relevant studies are likely to exist but were unavailable or are unpublished to date. Details of the studies are listed in Table 1 and full reference details are listed in Appendix 1. For clarity of presentation the surveys will be referred to by their abbreviated titles presented in Table 1.

Full reports of each study were obtained where possible (i.e. they were publicly available or were obtainable directly from the researcher). Each report was read by one of three researchers who extracted the relevant information (see Appendix 1 for a list of items of information extracted from each report). To check inter-coder reliability, five surveys were coded by two researchers. Agreement was found to be 80%.

Table 1: List of the surveys, dates and methods

Category of Study	Year(s)	Number of respondents; Data collection method; Sampling method
Australian studies from academic and research institutions		
ABS 2007-08 Environmental views and Behaviour Survey	2007-2008	13,527; Telephone survey; Multi-stage random
ANUpoll 2008, 2010	2008 & 2010	1,000; Telephone; Random in 2008 /1,200; Telephone; Random in 2010
Australian Survey of Social Attitudes	2009-2010	1,718; Self-complete; Random stratified
CSIRO Baseline survey	2010	5,036; Online; Stratified Research panel
CSIRO National Consumption and Lifestyle	2009	2,171; Online; Random
CSIRO Science into Society	2010	1,602; Online; Research panel
DIISR Survey	2010	1,000; Online; Unknown
Griffith /Cardiff Universities Australian sample	2010	3,096 (AUS); Online; Stratified Research Panel
UQ Political Leaders and Climate Change	2009	809; Online; Research panel
Australian national polls and contract research by government agencies and one Not-for-profit organisation		
ARCCANSI Survey	2009	3,000; Phone/Online; Research panel
Australian Gallup Polls 2008 & 2010	2008-2010	1,000+; Telephone; Random
DAFF: Australia's Farming Future Market Research 2009	2009	1,000; Telephone; Random stratified
Essential Media survey	2009-2010	~1,000; Online; Convenience
Ipsos survey	2007-2010	1,050; Online; Random
Lowy Institute Poll	2004-2010	1,001; Telephone; Random
Newspoll	2010	1,200; Telephone; Random
Thermometer surveys	2008 & 2009	1,606; Online; Research panel(1,297) & Random (309) in 2009; 1,510; Online; Research panel & Random in 2008
Studies from research and academic institution based outside of Australia		
Griffith/Cardiff universities' UK sample	2010	1,822 (UK); Face-to-face; Stratified random
Yale Global Warming surveys	2010	2,030; Online; Stratified Research panel
Polls and contracted research based outside of Australia		
New Zealand GPC survey	2009-2010	503; Telephone; Unknown
Pew Global Attitudes survey	2010	24,790; face-to-face/telephone; Multi-stage cluster/random
USA Gallup Polls	1998-2010	1,014; Telephone; Random

FINDINGS

We summarise the results of available studies as they relate to the questions identified in the Aims section (information about some questions has been combined with some others, for ease of presentation). Generally, the pattern of results across the studies is consistent. Where appropriate, we provide an estimate of the percentage of the population that displays a particular set of beliefs. This percentage should be interpreted as a single best estimate, which is surrounded by a confidence interval that is not, as yet, available. Where studies do not match the general pattern of results, we indicate so.

1. The extent of community belief in Australia that climate change is happening, and whether it is attributable to human activity.

A majority of Australians accept that climate change is happening.

The size of this majority depends on how the question is put to respondents. When respondents are asked to respond with a dichotomous YES/NO to a question about whether they believe climate change is happening, about 75% indicate they believe it is. (Appendix 2 lists the wording of the questions in each survey).

When respondents are given the option of saying whether climate change will happen in the future (e.g. CSIRO Science into Society study asked about the next 30 years), acceptance that climate change is happening now is about 63%, while a further 15% indicate they believe that climate change will happen in the next 30 years (Table 2).

When respondents are asked specifically whether they think climate change is *not* really happening, very few respondents agree (ranging from 2% in the Thermometer survey to 9% in ARCCANSI).

When question-wording asks whether respondents believe that the climate is changing, and, for those assenting, also asks whether climate change is natural or human-induced, about 50% of respondents say they think that human activity is driving climate change. If the question put to respondents includes the option that climate change is at least *partially* human-induced, or uses a Likert response scale to allow degrees of agreement (e.g. responding to questions from 1 = strongly disagree to 7 = strongly agree), about 90% of participants indicate that think human activity is at least partially responsible for climate change. (Table 3)

The variation in survey responses indicates that question framing influences the reported acceptance figures. Acceptance levels are strongly affected by: distinguishing between natural variations and anthropogenic climate change; distinguishing between current climate change and possible future climate change; asking whether climate change *is not* happening rather than asking whether it is; and allowing respondents to indicate that climate change is partly caused by human activities.

Table 2: Percentage of people who believe climate change is happening

Study	2010	2009	2008
CSIRO Baseline survey	83%	-	-
CSIRO Science into Society Survey	63%	-	-
Griffith /Cardiff Universities Australian sample	74%	-	-
ARCCANSI survey	78%	-	-
Newspoll	73%	-	84%
Griffith /Cardiff Universities UK sample	78%		
USA Gallup Poll	53%	58%	65%

Table 3 demonstrates clearly the effect of question wording on responses (Appendix 2). The studies by Newspoll and Griffith University asked respondents to indicate whether climate change may be partly due to human activity; the other studies asked respondents to indicate whether climate change is caused by human activity or by natural temperature variations.

Some surveys (CSIRO Baseline, ABS, ANUpoll, Griffith/Cardiff, ARCCANSI, Australian Gallup, Yale Global Warming, New Zealand GPC) also asked respondents about the seriousness of the threat of climate change, or about how worried they were about climate change. Across the studies, 56% to 69% of Australian respondents perceived the threat of climate change to be *serious*, or *very serious*. Also, 52% to 66% of respondents were *worried* or *very worried* about climate change. Results were similar for the UK, USA and NZ surveys (71%, 55%, & 63% respectively). ABS found that 73% were *concerned* or *very concerned*.

Table 3: Percentage of people who believe climate change is human induced

Study	2010	2009	2008
CSIRO Baseline survey	50%	-	-
Griffith/Cardiff Universities Australian sample	77%	-	-
UQ Political Leaders and Climate Change	-	55%	-
ARCCANSI survey	58%	-	-
Australian Gallup Poll	44%	-	52%
Essential Media survey	45%	53%	-
Ipsos survey	77%	-	-
Newspoll	94%	-	96%
Thermometer surveys	-	73%	73%
DAFF	-	58% (urban) 27% (rural)	-
INTERNATIONAL SURVEYS			
Yale Global Warming surveys	56%	-	-
USA Gallup Poll	50%	-	58%
New Zealand GPC Survey	46%	44%	-
Griffith/Cardiff Universities UK sample	77%		

Several surveys (Essential Media, ANUpoll, CSIRO National Consumption and Lifestyle, Ipsos, Lowy, CSIRO Science into Society) suggest that Australians consider managing the economy to be a more important issue than the environment. Health is rated at a similar level or higher than the environment. Only the CSIRO National Consumption and Lifestyle survey ranked environmental issues as most serious. In contrast the Ipsos survey and Lowy Institute Poll found a range of issues such as family and living costs, jobs, immigration and quality education to be more significant national issues than climate change. Again, these results

appear to be sensitive to question wording, including the response options provided, and whether respondents are asked to rate or rank the options.

International data presented in Tables 2 & 3 compares Australia to the UK, USA and New Zealand. The only directly comparable results are from the Griffith/Cardiff Universities survey, which show comparable belief patterns between the UK and Australia, with a slightly higher proportion of people in the UK believing in climate change, but with the same proportion of people in Australia and the UK indicating belief in human-induced climate change. The USA appears to have a lower level of belief in climate change but the USA, New Zealand and Australia show similar levels of belief that it is human induced.

2. Have community beliefs changed in recent years? Do changes reflect international trends?

On balance, the evidence suggests that the percentage of Australians who believe climate change is happening and that it is caused by human activity has declined over the past three years.

The sources of information on changes over time in Australia were Newspoll, Australian Gallup Poll, Essential Media and Thermometer surveys (see Tables 2 and 3). There were two limitations on comparison across these studies: the wording of the Newspoll question on human causes appears to have led to much higher agreement, and the Thermometer surveys, although undertaken in different calendar years, were administered only six months apart, which is judged to be too close to show a trend.

Newspoll shows an 11% drop in belief in climate change from 2008 to 2010 (Table 2). In terms of the human causes of climate change, the Australian Gallup Poll indicates that the percentage of respondents who believe climate change was due to human activities decreased from 52% in 2008 to 44% in 2010. Further, the number of respondents who believed climate change was a result of natural causes rose from 21% in 2008 to 31% in 2010. Australian Gallup Polls typically have population estimate ranges of $\pm 2\%$, suggesting that the differences between 2008 and 2010 are more than random variability. This conclusion is supported by the Essential Media survey, which shows an 8% drop in belief in human-induced climate change from 2009 to 2010.

The pattern of decreased belief in climate change in Australia is matched by a similar trend observed in other Western countries. Survey data from the USA Gallup Poll and New Zealand

GPC survey demonstrate appreciable declines in climate change acceptance since 2008. Belief in climate change is marginally higher in Australia than the USA, but whether this difference is statistically significant cannot be assessed. The Pew Global Attitudes survey shows reduced concern and priority across many countries; however, the decline is most marked in wealthy nations and the opposite trend was observed in developing countries. The Pew data suggests that some developing countries (e.g. China, India, South Korea) are countering the overall trend, with increased levels of concern and willingness to pay for climate mitigation.

Reports have suggested several reasons for the decline in acceptance of climate change. Three primary suggestions are the global financial crisis, from October 2008, the failure to reach global agreements at Copenhagen, and “Climategate” in December 2009 (Australian Gallup Poll: Pugliese & Lyons, 2010). An additional reason for the decline is suggested by the relationship between political beliefs and climate change beliefs (noted in Section 3) as Australia, UK and USA have moved to a more conservative position in the last three years. To date, no study has tested any of these possible explanations.

3. Differences in beliefs between sectors of the community

Beliefs about climate change in Australia divide more clearly along political lines and gender than by other demographic categories. There were consistent political differences across Australian and international studies, showing that support for left-wing political beliefs is associated with greater belief in human-induced climate change. Women consistently were more likely to believe in human causes of climate change and more likely to be concerned by it.

In summary:

- Beliefs about climate change divide along political lines in Australia (CSIRO Baseline survey, Essential Media survey, Newspoll), as well as in the USA and Western European nations (Pew Global Attitudes survey, Yale Global Warming surveys). Support for left-wing political beliefs is associated with greater belief in human-induced climate change and with higher levels of concern about the effects of climate change. For example, the CSIRO Baseline survey reported that those most likely to think climate change is happening due largely to human activity were Greens voters (82%) and Labor voters (63%). In contrast, those most likely to think it is a normal fluctuation in the Earth’s

climate were Liberal/National voters (59%). This political division emerged regardless of whether respondents were asked about political preferences or intended voting behaviour. (For example, Pew asked USA respondents: “Do you consider yourself conservative, moderate or liberal” and European respondents: “Place yourself on the left-right spectrum”; Newspoll identified “Labor supporters and Liberal supporters”).

- **Gender** has a significant effect, with women more likely to think that climate change is caused by human activity (Essential Media: women 49%, men 40%; CSIRO Baseline survey: women 56.3%, men 44.9%). ABS also reported that men were less concerned than women about climate change, with 25% not concerned compared with 19% of women not concerned. Women (77%) were also more likely than men (66%) to support early action on climate change according to the Lowy Institute Poll.
- **Location** also appears to have a consistent but small effect, with people from capital cities more likely to believe in climate change (CSIRO Science into Society). The CSIRO Baseline survey also found statistically significant differences, with slightly lower levels of belief in climate change in rural areas. The DAFF study showed marked differences in the climate change beliefs of Australian urban dwellers and primary producers; 58% of urban dwellers, and 27% of primary producers, agreed that human activity was the primary cause of climate change. These results comparing primary producers (rather than rural people generally) with urban dwellers may be attributable to differences in political persuasion, noted above, but the available evidence does not allow competing explanations to be tested.
- The effect of **age** on climate change beliefs is inconsistent across studies. The CSIRO Science into Society survey found that both younger and older age groups are less likely to believe or be engaged in climate change issues or behaviour than other groups. Respondents aged 55 and over were more likely to think climate change was the result of natural causes and that nobody could do anything (ARCCANSI). The ABS research indicated that respondents aged 65 years and older (60%) were less likely to report any concerns about climate change (60%) than were adults in other age groups, however the Lowy Institute Poll found that older people were more likely to be willing to pay more for electricity.
- **Income** had no noticeable effect on belief (CSIRO Baseline survey) but according to the Lowy Institute Poll, those earning over \$65K per year were less inclined to take action.

- **Education** was examined by the ABS survey: those with a bachelor's degree were more likely to be concerned about climate change (83%) than those with diplomas (78%) and those with no post-secondary qualifications (69%). However we cannot determine how this concern relates to beliefs about the causes of climate change.

Whereas the Yale Global Warming surveys in the USA found clear population types, the demographic trends for Australia, apart from political beliefs and gender, are either not available or not consistent across surveys. Sometimes the data may have been available but were not presented in the reports. Again, differences in wording between surveys make comparisons more difficult.

4. Community support for mitigation actions and community willingness to pay for actions, policies, and other responses.

Most Australians believe that Australia should act to reduce its carbon emissions, and should not wait for a global agreement. Support for immediate action has declined, and support for gradual and for wait-and-see approaches has increased. There is insufficient research to allow conclusions about willingness to pay for particular actions or about support for particular policies.

The Lowy Institute Poll and Thermometer surveys both found a substantial majority of respondents agreed that Australia should take action to reduce its carbon emissions without waiting for a global agreement (Lowy; 72%; Thermometer; 83%). The Lowy Institute Polls revealed 46% support immediate action on climate change, even if it means significant cost. A further 40% prefer gradual, low-cost steps, and 13% prefer a wait-and-see approach. Support for immediate action reduced significantly between the 2008 and 2009 surveys, but there was relatively little change between 2009 and 2010. A gradual, or wait-and-see, approach has seen corresponding increases.

The surveys that addressed personal behaviour (ABS, ANUpoll, CSIRO Baseline, Ipsos, CSIRO National Consumption and Lifestyle, ARCCANSI, Survey of Social Attitudes, New Zealand GPC) found that respondents reported making efforts at home to reduce their personal contribution to climate change. Recycling was the most common activity, but using less water and electricity, and using environmentally friendly products also were commonly reported. The CSIRO Baseline survey also assessed whether the behaviour was done for environmental reasons or other reasons, which revealed that using less power and buying

local foods were undertaken by many for environmental reasons, but were just as likely to be chosen for other reasons. Similarly the ABS survey found 92% of those concerned about climate change were limiting their electricity use but 78% of those who were not concerned were also limiting their use. Transport is one area in which people seem to have greater resistance to change (e.g. CSIRO National Consumption and Lifestyle survey, ANUpoll year, New Zealand GPC). Even when alternatives to the car were used it was more likely to be for non-environmental reasons (CSIRO Baseline survey). It seems that people are less able or willing to reduce driving their car for environmental reasons.

Several studies investigated willingness to pay (ANUpoll, ARCCANSI, Survey of Social Attitudes, Lowy Institute Poll). The ANUpoll and the Survey of Social Attitudes found a third to a half of respondents were willing to pay more for electricity, fuel, and taxes or to decrease their standard of living; 65% reported that they were willing to pay higher prices to protect the environment, but only a third were willing to pay more tax. The ARCCANSI survey asked people what percentage increases would be acceptable to them to ensure the continuity of services such as water, sewage and electricity. They found that respondents' willingness to pay for all daily essential services (e.g. water, electricity, sewage, public transport, and so on) decreased substantially when the prices increased by more than 10%. The Lowy Institute Poll reported that willingness to pay for climate change through increased electricity prices declined from 71% in 2008 to 59% in 2010.

The issue of a carbon tax or emissions trading scheme was addressed in the ANUpoll, ARCCANSI, CSIRO Science into Society and Newspoll surveys. This was another issue where responses were influenced by the precision of the question wording. In the ARCCANSI study respondents were asked to choose from four options, with two of the options directly related to emission reductions policies. About one-fifth of respondents preferred to put a tax on carbon or other greenhouse gas emissions. Another one-fifth chose a carbon trading scheme where businesses can buy and sell credits to match their carbon outputs. A policy to compensate firms most affected by carbon tax was viewed least favourably by respondents. Importantly, over half the respondents (54%) indicated that they did not choose either option as they did not know enough to make a preference. The Ipsos 2010 survey reported a small decline in support for action on carbon trading from 21% in 2009 to 17% in 2010. Other surveys did not distinguish so clearly between the policy options so the percentages were harder to interpret. For example, Newspoll data suggest about half the Australian community is willing to put a price on carbon.

The CSIRO Science into Society study grouped together the options of an emissions trading scheme and carbon tax and compared them to other policy options. The combined option of 'emissions trading scheme and carbon tax' scored a mean of 3.1 on a 1 to 5 scale of support, whereas developing new energy sources, reducing environmental problems like pollution and ensuring the water supply scored a mean greater than 4.1. Taxes on electricity or petrol scored 2.1 and 2.3 respectively. The option that the Australian government should do nothing about climate change was also rated unfavourably at 2.0.

CONCLUSIONS AND IMPLICATIONS

From the existing research, we conclude that:

- Most Australians believe the climate is changing, but fewer believe that it is attributable to human activity.
- Belief in climate change and its anthropogenic drivers has waned in recent years, matching trends in other Western countries.
- Responses to questions about climate change vary systematically with question wording and response format, but these differences do not negate the overall conclusions above.
- Beliefs about climate change are strongly related to political beliefs / voting behaviours and gender, but relationships to location, age or income have not clearly emerged.
- Most Australians believe that Australia should take action on climate change without waiting for global consensus.
- There is no clear consensus of what policy actions Australians prefer such as setting a carbon price, an emissions trading scheme, or a carbon pollution reduction scheme.

The influence of question wording on reported levels of attitudes and beliefs about climate change makes measuring and tracking Australians' views complex. The gathering of scientifically rigorous longitudinal data from multiple sources, and with multiple methods, should be encouraged and enhanced in order to reflect with accuracy the existing and changing community sentiment. The effects of question wording and framing, as well as the impact of external context (e.g. 'Climategate', local and global economic events, political events) warrant systematic inquiry.

There is a clear need for further directed research into understandings of climate change policy options, support for those options, and into willingness to pay responses within each

policy option. For government there is the challenge of clearly presenting the policies to the public. Complex policy initiatives such as an emissions trading scheme or a carbon tax with compensation arrangements are difficult to assess through standardised surveys. The challenge is to explain the options clearly without being too lengthy. The importance of framing is supported by studies of simulations of policy options. Hatfield-Dodds and Morrison (2010) found that different responses are elicited depending on whether the policy option is framed as negative compared to a 'lost opportunity'. When impacts are framed in terms of 'costs', 73% of respondents support government action (22% do not support, 3% can't say); however, when impacts are framed in terms of 'foregone gains', support for action increases to 86% (11% do not support, 4% can't say). Such differences that arise through this sort of perceptual bias could be large enough to constrain policy formulation and action (Hatfield-Dodds & Jollands 2006). It seems essential to allow respondents to report that they do not understand the issues.

How information about climate change, anthropogenic drivers, and responses to climate change is communicated requires close consideration and further inquiry.

REFERENCES

- Ashworth, P. (2010). Results of Climate Change Survey 2010 [Powerpoint Slides]. CSIRO.
- Australian Bureau of Statistics (2009). Environmental views and behaviour, 2007-2008, cat. no. 4626.0.55.001, ABS, Canberra.
- Cormick, C. (2010). What drives climate change 'drifters'. The 11th International Conference on Public Communication of Science & Technology Dec 2010.
- Donnelly, D., Mercer, R., Dickson, J., & Wu, E. (2009). Australia's Farming Future Final Market Research: Understanding Behaviours, Attitudes, and Preferences Relating to Climate Change. Instinct & Reasons: Melbourne.
- Essential Media (2010). Position on climate change, available at: <http://www.essentialmedia.com.au/position-on-climate-change/>, accessed 20th February, 2011.
- Evans, A. The Australian Survey of Social Attitudes, 2009. [Computer file]. Canberra: Australian Social Science Data Archive, The Australian National University, 2010.
- Gallup (2011). Americans' Global Warming Concerns Continue to Drop, available at: <http://www.gallup.com/poll/126560/americans-global-warming-concerns-continue-drop.aspx>, accessed 28th February 2011.
- Gallup (2011). Australians' Views Shift on Climate Change, available at: <http://www.gallup.com/poll/141782/australians-views-shift-climate-change.aspx>, accessed 28th February 2011.
- Graham, S., Schandl, H., & Williams, L. (2009) A Snapshot of the Lifestyles and consumption Patterns of a small of Australian protocol. CSIRO Sustainable Ecosystems: Canberra.
- Hanson, F. (2010). Australia and the world: public opinion and foreign policy. Lowy Institute, Sydney, online at: www.lowyinstitute.org/Publication.asp?pid=1148.
- Hatfield Dodds, S., & Jollands, N., (2006) Issues in Communicating the Impacts of Climate Change Policy Options, Report prepared for the New Zealand Ministry of the Environment, New Zealand Centre for Ecological Economics, Palmerston North NZ

Hatfield Dodds, S., & Morrison, M. (2010) Confusing opportunity costs, losses and foregone gains: Assessing the effects of communication bias on support for climate change policy in the United States and Australia. CCEP Working Paper 9.10. December 2010.

Hogan, A., Perry, H.L., Ng S.P. & Bode, A. (2011). Decisions made by Farmers that relate to Climate Change. Barton, ACT: Rural Industries Research and Development Corporation.

Ipsos-Eureka (2010). Climate change report 2010, available at:
http://www.ipsos.com.au/IESRI/lib/IpsosEureka_ClimateChangeReport2010.pdf, accessed 15 February 2011.

ISSR. (Unpublished). Political leaders and climate change. Institute for Social Science Research and the Global Change Institute. University of Queensland: Australia.

Lamberts, R., Grant, W. J., & Martin, A. (2010). ANUpoll: Public Opinion about sciences, The Australian National University: Canberra.

Leiserowitz, A., & Smith, N. (2010). Knowledge of climate change among global warming's six Americas. Yale University. New Haven, CT: Yale Project on Climate Change Communication.

Leviston, Z., & Walker, I. A. (2011). Baseline Survey of Australian Attitudes to Climate Change: Preliminary Report. National Research Flagships Climate Adaptation. CSIRO Ecosystem Sciences, Perth.

McAllister, I. (2008). ANUpoll: Public Opinion towards the Environment, The Australian National University: Canberra.

Newspoll (2010). 100204 Climate change + CPRS. Available at
http://www.newspoll.com.au/image_uploads/100204%20Climate%20Change%20+%20CPRS.pdf, accessed 25th February, 2011.

Ong, A., Zafiris, M., & Gowan, C. (2010). Community Attitudes to Climate Change [Powerpoint Slides]. Sweeney Research: Sydney.

Pew Research Center (2010), 'Obama More Popular Abroad than at Home, Global Image of US Continues to Benefit', available at: <http://pewglobal.org/2010/06/17/obama-more-popular-abroad-than-at-home/>, accessed 20 February 2011.

Pugliese, A. & Lyons, L. (2010). Australians' Views Shift on Climate Change, available at <http://www.gallup.com/poll/141782/australians-views-shift-climate-change.aspx>, accessed 28th February 2011.

Reser, J.P., Pidgeon, N., Spence, A., Bradley, G., Glendon, I.A., & Eliul, M. (Draft only, not for circulation). Public risk perceptions, understandings, and responses to climate change in Australia and Great Britain: Interim report. Griffith University, Climate Change Response Program: Queensland, Australia. Understanding Risk Centre: Cardiff University: Wales.

Think Taverner. (2008). Thermometer Survey Report: Our Community's Response to Climate Change. Surry Hills, New South Wales.

Venables, D (2010). Survey shows climate change ranks lowest among issues and concerns about its costs have risen. Media release for the Greenhouse Policy Coalition, available at: http://gpcnz.co.nz/Site/News_Releases/GPC_survey_2010.aspx, accessed 28th February, 2011.

APPENDIX 1: REFERENCES BY SURVEY

CSIRO Science into Society survey	Ashworth, P. (2010). Results of Climate Change Survey 2010 [Powerpoint Slides]. CSIRO.
CSIRO Baseline survey	Leviston, Z., & Walker, I. A. (2011). Baseline Survey of Australian Attitudes to Climate Change: Preliminary Report. National Research Flagships Climate Adaptation. CSIRO Ecosystem Sciences, Perth.
Griffith/Cardiff survey	Reser, J.P., Pidgeon, N., Spence, A., Bradley, G., Glendon, I.A., & Eliul, M. (Draft only, not for circulation). Public risk perceptions, understandings, and responses to climate change in Australia and Great Britain: Interim report. Griffith University, Climate Change Response Program: Queensland, Australia. Understanding Risk Centre: Cardiff University: Wales.
New Zealand GPC survey	Venables, D (2010). Survey shows climate change ranks lowest among issues and concerns about its costs have risen. Media release for the Greenhouse Policy Coalition, available at: http://gpcnz.co.nz/Site/News_Releases/GPC_survey_2010.aspx, accessed 28th February, 2011.
Lowy Institute Poll	Hanson, F. (2010). Australia and the world: public opinion and foreign policy. Lowy Institute, Sydney, online at: <www.lowyinstitute.org/Publication.asp?pid=1148.
DIISR survey	Cormick, C. (2010). What drives climate change 'drifters'. The 11th International Conference on Public Communication of Science & Technology Dec 2010.
Essential Media	Essential Media (2010). Position on climate change, available at: http://www.essentialmedia.com.au/position-on-climate-change/, accessed 20th February, 2011.
Ipsos	Ipsos-Eureka (2010). Climate change report 2010, available at: http://www.ipsos.com.au/IESRI/lib/IpsosEureka_ClimateChangeReport2010.pdf , accessed 15 February 2011.
Thermometer surveys	Think Taverner. (2008). Thermometer Survey Report: Our Community's Response to Climate Change. Surry Hills, New South Wales.
ABS 2007-08	Australian Bureau of Statistics (2009). Environmental views and behaviour, 2007-2008, cat. no. 4626.0.55.001, ABS, Canberra.
ANUpoll 2010	Lamberts, R., Grant, W. J., & Martin, A. (2010). ANUpoll: Public Opinion about sciences, The Australian National University: Canberra
ANUpoll 2008	Evans, A. The Australian Survey of Social Attitudes, 2009. [Computer file]. Canberra: Australian Social Science Data Archive, The Australian National University, 2010.
ARCCANSI survey	Ong, A., Zafiris, M., & Gowan, C. (2010). Community Attitudes to Climate Change [Powerpoint Slides]. Sweeney Research: Sydney
Australian Gallup Polls 2008 & 2010	Pugliese, A. & Lyons, L. (2010). Australians' Views Shift on Climate Change, available at http://www.gallup.com/poll/141782/australians-views-shift-climate-change.aspx , accessed 28th February 2011.
DAFF	Donnelly, D., Mercer, R., Dickson, J., & Wu, E. (2009). Australia's Farming Future Final Market Research: Understanding Behaviours, Attitudes, and Preferences Relating to Climate Change. Instinct & Reasons: Melbourne.

Australian Survey of Social Attitudes	Evans, A. The Australian Survey of Social Attitudes, 2009. [Computer file]. Canberra: Australian Social Science Data Archive, The Australian National University, 2010.
CSIRO National Consumption and Lifestyle survey	Graham, S., Schandl, H., & Williams, L. (2009) A Snapshot of the Lifestyles and consumption Patterns of a small of Australian protocol. CSIRO Sustainable Ecosystems, Canberra.
Newspoll	Newspoll (2010). 100204 Climate change + CPRS. Available at http://www.newspoll.com.au/image_uploads/100204%20Climate%20Change%20+%20CPRS.pdf , accessed 25th February, 2011.
Pew Global Attitudes survey	Pew Research Center (2010), 'Obama More Popular Abroad than at Home, Global Image of US Continues to Benefit', available at: http://pewglobal.org/2010/06/17/obama-more-popular-abroad-than-at-home/ , accessed 20 February 2011.
UQ Political Leaders and Climate Change	ISSR. (Unpublished). Political leaders and climate change. Institute for Social Science Research and the Global Change Institute. University of Queensland: Australia.
USA Gallup Polls	Gallup (2011). Americans' Global Warming Concerns Continue to Drop, available at http://www.gallup.com/poll/126560/americans-global-warming-concerns-continue-drop.aspx , accessed 28th February 2011.
Yale Global Warming surveys	Leiserowitz, A., & Smith, N. (2010). Knowledge of climate change among global warming's six Americas. Yale University. New Haven, CT: Yale Project on Climate Change Communication.

APPENDIX 2: CODING FRAME FOR THE ANALYSIS OF THE STUDIES

General
• Reference details
• Who conducted the research
• Who funded the study
• Stated aims of the study
• Date of study
Method
• Design
• Level of study – individual, organisational, community
• Area of study – regional , state, national
• Sampling method – convenience, random, stratified
• Generisability of findings to a community or nation
• Sample size
• Method of data collection
• Framing events/ context: political, natural disasters co-occurring external events
• Question wording – leading or biased
• Question wording – unclear, double barrelled
• Quality of study – independence, peer review
Topics :- Question Wording and Results
• Study focus: climate change; environment; economy; other
• Belief in climate change and human causes
• Concern /Importance of climate change
• Priority of climate change relative to other issues
• Trust in climate science/scientists
• Personal behaviour
• Willingness to pay
• Demographic influences on beliefs
• Other influences on beliefs, e.g. world views, voting patterns
• Policy relevance: including support for specific policies e.g. CPRS, carbon price, direct action,
• Do respondents support action, if so, what?

APPENDIX 3: QUESTION WORDING: CLIMATE CHANGE IS HAPPENING

Categories of studies Year Question wording & response (#)*

Australian studies from Academic & research institutions

CSIRO Baseline survey	2010	Do you think that climate change is happening? #Yes - 82.8% #No - 17.2%
CSIRO Science in Society survey (Ashworth, 2010)	2010	Do you believe the climate is changing now or will change in the next 30 years? #Yes, it is already happening - 63% #It will happen within the next 30 year - 15% #No, it is not happening and wont - 7%
Griffith/Cardiff University Australian sample	2010	As far as you know do you think the world's climate is changing? #Yes - 73.9% ; #No - 18.2%; #Don't know - 7.8%.

Australian national poll and market research contracted by government agencies

Newspoll	2010	Thinking now about climate change. Do you personally believe or not believe that climate change is currently occurring? #Yes (2010 - 73% ; 2008 - 84%) #No (2010 - 22%; 2008 - 12%) #Uncommitted (2010 - 5%; 2008 - 4%).
ARCCANSI Survey	2009	When do you think you will start experiencing the effects of climate change? #It's happening now - 78% #within the next 10 years - 5% #within the next 20 years - 4% #within the next 50 years - 3% #over 50 years - 2% #never - 3% #don't know - 5%

Studies from research and academic institution based outside of Australia

Griffith/Cardiff University UK sample	2010	As far as you know, do you personally think the world's climate is changing, or not? #Yes - 78.3% #No - 15.3% #Don't know - 6.4%
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Polls and contracted research based outside of Australia

USA Gallup Poll		Which of the following statements reflects your view of when the effects of global warming will begin to happen? #They have already begun to happen (2010 - 53% ; 2009 - 58% ; 2008 - 65% ; 2007 - 64% /62%; 2006 - 63% ; 2005 - 59%; 2004 - 56%;2003 - 57% ; 2002 - 58%; 2001 - 58%; 1998 - 51%) #They will start happening within a few years #They will start happening within your lifetime Within your lifetime (2010 - 35%; 2009 - 31%; 2008 - 24%; 2007 - 27%/26%; 2006 - 23% ; 2005 - 28%; 2004 - 29%; 2003 - 27%; 2002 - 26%; 2001 - 25%; 1998 - 28%) #They will not happen within your lifetime but they will affect future generations, (or) they will never happen(2010 - 10%; 2009 - 10%; 2008 - 10%; 2007 - 8%/7%; 2006 - 10% ; 2005 - 10%; 2004 - 12%; 2003 - 12%; 2002 - 13%; 2001 - 13%; 1998 - 14%)
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*bolded and italicised percentages are those reported in Table 2.

APPENDIX 4: QUESTION WORDING: CLIMATE CHANGE IS HUMAN INDUCED

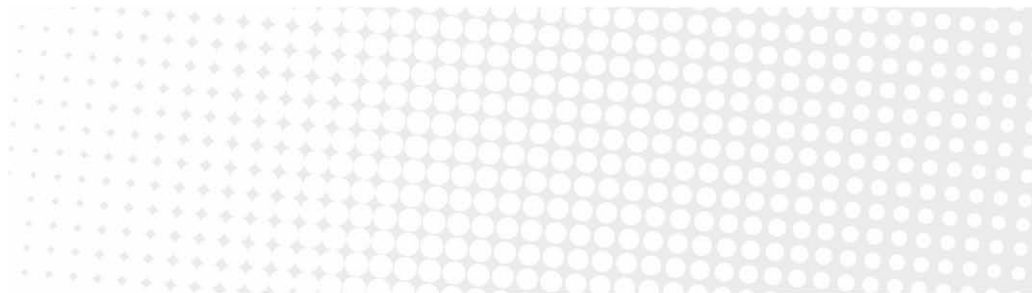
Categories of studies	Year	Question wording & response (#)*
Australian studies from Academic & research institution		
CSIRO Baseline survey	2010	Given what you know, which of the following statements best describes your thoughts about climate change? # I don't think that climate change is happening - 5.6% # I have no idea whether climate change is happening or not - 3.8% # I think that climate change is happening, but it's just a natural fluctuation in Earth's temperatures - 40.2% # I think that climate change is happening, and I think that humans are largely causing it - 50.4%
Griffith University	2010	Thinking about the causes of climate change, which of the following best describes your opinion? ** #Climate change is entirely caused by natural processes (4.9% AUS; 5.6% UK), #Climate change is mainly caused by natural processes - 12.6% #Climate change is partly caused by natural processes and partly caused by human activity - 45.8% #Climate change is mainly caused by human activity - 27.6% #Climate change is entirely caused by human activity - 4.2% #I think there is no such thing as climate change (2.7% AUS; 2.2% UK), #Don't know (1.9% AUS; 2.5% UK), #No Opinion (0.4% AUS; 0.4% UK).
UQ Political Leaders and Climate Change	2009	The planet is warming because of human activity producing greenhouse gases (mean=3.48) #1. strongly disagree - 8.5%; #2. disagree - 11.7%; #3. uncertain - 25%; #4. agree - 33.1%; #5. strongly agree - 21.6%;
Australian national poll and market research contracted by government agencies		
Australian Gallup Poll	2010	Temperature rise is a part of global warming or climate change. Do you think rising temperatures are a result of human activities, or a result of natural causes? (this question was asked to Australian adults who are aware of climate change) #human activities (2008: 52% and 2010: 44%) #a result of natural causes (2008: 21% and 2010: 31%) #both (volunteered response) (2008: 20% and (2010: 21%) #don't know/refused (2008: 4% and 2010: 2%) #have not heard of climate change (2008: 3% and 2010: 2%)
Thermometer surveys	2008-2009	Which of the following best represents your view about climate change? #Climate change is not happening (Sep'08 – 2%; Feb'09 – 3%) #The climate is changing, but this has nothing to do with human activity (Sep'08 - 14%; Feb'09 – 16%)

		<p>#The climate is changing due to human activity (Sep'08 - 73%; Feb'09 – 73%)</p> <p>#Unsure/other (Sep'08- 11%; Feb'09 – 9%)</p>
Newspoll	2010	<p>Do you personally believe that climate change is...?</p> <p>#entirely caused by human activity (2010 - 24%; 2008 - 32%),</p> <p>#partly caused by human activity (2010 - 70%, 2008 - 64%),</p> <p>or do you believe climate change is not caused by human activity at all (2010 - 5%; 2008 - 3%)</p> <p>#uncommitted (2010 - 1%; 2008 - 1%)</p>
Essential Media Survey	2009-2010	<p>Do you agree that there is fairly conclusive evidence that climate change is happening and caused by human activity or do you believe that the evidence is still not in and we may just be witnessing a normal fluctuation in the Earth's climate which happens from time to time?</p> <p>#Dec 2010 45% believe that climate change is happening and is caused by human activity (down 8% since last surveyed in Nov 2009), 36% think we are just witnessing a normal fluctuation in the Earth's climate (up 2%) and 19% don't know (up 6%).</p> <p>#Nov 2009 53% believe that climate change is happening and is caused by human activity, 34% think we are just witnessing a normal fluctuation in the Earth's climate and 13% don't know.</p>
Ipsos Eureka Survey	2007-2010	<p>Which best described your opinion about the causes of climate change?</p> <p>#Climate change is partly caused by natural processes and partly by human activity - 41%,</p> <p>#Climate change is mainly by human activity - 26%</p> <p>#Climate change is entirely caused by human activity - 10%,</p> <p>#Climate change is entirely caused by natural processes - 5%,</p> <p>#There is no such thing as climate change - 3%,</p> <p>#Don't know - 5%</p>
ARCCANSI Survey	2009	<p>On a 1 to 7point scale, to what extent do you agree or disagree with the following statements about cc?</p> <p>#Climate change is a natural process that humans have contributed to (5 to 7 agreement ratings - 58%; 1 to 3 disagreement ratings - 21%)</p> <p>#I would like to reduce my impact on the environment, only if it doesn't cost me (5 to 7 agreement ratings - 41%, 1 to 3 disagreement ratings - 30%)</p> <p>#No matter what I do, climate change is an unstoppable process (5 to 7 agreement ratings - 38%, 1 to 3 disagreement ratings - 37%)</p> <p>#scientists will find a technological solution to cc (5 to 7 agreement ratings - 22%, 1-3 disagreement ratings - 40%)</p> <p>#climate change is not really happening (5 to 7 agreement ratings - 9%, 1 to 3 disagreement ratings - 77%)</p>
Australia's Farming Future Market Research - DAFF Survey	2009	<p>Tell me whether you agree or disagree or neither with the following statement? Human activity is the primary cause of climate change:</p> <p>#urban sample (agree 58%, neither 13%, disagree 28%);</p>

		#primary decision maker sample (agree 27% , neither 15%, disagree 58%); #secondary decision maker sample (agree 30%, neither 12%, disagree 58%);
Studies from research and academic institution based outside of Australia		
Cardiff University	2010	Thinking about the causes of climate change, which of the following best describes your opinion? ** #Climate change is entirely caused by natural processes - 5.6%, #Climate change is mainly caused by natural processes - 12.2% <i>#Climate change is partly caused by natural processes and partly caused by human activity - 46.3%</i> <i>#Climate change is mainly caused by human activity - 24.3%</i> #Climate change is entirely caused by human activity - 6.5% #I think there is no such thing as climate change - 2.2% #Don't know - 2.5%, #No Opinion - 0.4%
Yale Global Warming surveys	2010	Assuming global warming is happening, do you think it is... #Caused mostly by human activity - 50%; #Caused by both human activities and natural changes (volunteered) - 6%; #Caused mostly by natural changes in the environment - 35%; #None of the above because global warming isn't happening - 7%; #Other - 2%; #Don't know (volunteered) - 1%
Polls and contracted research based outside of Australia		
USA Gallup Poll	1998-2010	And from what you have heard and read, do you believe increases in the Earth's temperature over the last century are due more to the effects of pollution from human activities, or natural changes in the environment that are not due to human activities? #Human Activities (2010 – 50% , 2008 - 58% , 2007 - 61% , 2006 - 58% , 2003 - 61%) #Natural Causes (2010 - 46%, 2008 - 38%, 2007 - 35%, 2006 - 36%, 2003 - 33%)
New Zealand GPC Survey	2009-2010	Which statement do you most agree with? #The world climate is having the same ups and downs that it always has. There's no evidence that we have a particular problem (17%); #There's evidence to show the world is experiencing climate change - and it is certainly a problem. However there seems to be no clear proof that this is caused by human activity (36%). #There's evidence to show the world is experiencing climate change - and it is certainly a problem. There seems to be clear proof that this is caused by human activity (45.8% in 2010; 44.2% in 2009). Unsure (3%).

* Italicised responses were aggregated to form the percentage of respondents believing in human-induced climate change, as reported in Table 3

* italicised and bolded percentages are those reported in Table 3.



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