

# CURRICULUM VITAE: SM HOWDEN

**Name:** Dr Stuart Mark Howden

**Positions:** Chief Research Scientist, CSIRO Agriculture Flagship  
Director, Climate Change Institute, Australian National University  
Honorary Professor, School of Land and Environment, University of Melbourne

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## Academic credentials:

<i>Degree awarded</i>	<i>Name of institution</i>	<i>Year awarded</i>
PhD	Griffith University	1990
BSc (Honours Class 1)	University of New South Wales	1983

## Selected Awards:

*Distinguished Adaptation Scholar*, University of Arizona (2014)

*Eureka Prize for Sustainable Agriculture* finalist in 2013

*CCRSPI National Award* for excellence in climate research in primary industries (2012)

*Ecological Society of America Sustainability Science Award (2009)* for an outstanding contribution to sustainability science

*Nobel Peace Prize 2007* (for contributing to the Award to the IPCC, shared with Al Gore)

*Teaching Excellence Award*, University of Canberra (1993)

## Intergovernmental Panel on Climate Change roles

- Expert Team on Agriculture and Food Security Scoping Report (2015)
- Lead Author in Core Writing Team of the Synthesis Report for the IPCC Fifth Assessment – Scoping Analysis team and the (2012-2014)
- Lead Author on the *Food Security* chapter of the IPCC Fifth Assessment Report on Impacts and Adaptation
- Contributing Author on the *Australia-New Zealand* chapter of the IPCC Fifth Assessment Report on Impacts and Adaptation
- Expert Team for the Scoping Analysis of the Synthesis Report of the IPCC Fifth Assessment (2012-2013)
- Lead Author on the *Australia/NZ* chapter in the IPCC Fourth Assessment Report on Impacts and Adaptation (2007)
- Lead Author on the *Food, Fibre, Fisheries and Forestry* chapter in the IPCC Fourth Assessment Report on Impacts and Adaptation (2007)
- Contributing Author on the *Agriculture* Chapter in the IPCC Fourth Assessment Report on Mitigation (2007)
- Review Editor of the *Australia and New Zealand* chapter of the IPCC Third Assessment Report (2001)
- Contributing Author to the *Ecosystems and their Goods and Services* chapter of the IPCC Third Assessment Report (2001)
- Lead Author of the '*Additional Activities*' chapter of the IPCC Special Report on Land Use, Land Use Change and Forestry (2001)
- Lead Author of the *Australasia* chapter of the IPCC Special Report on Climate Change Impacts (1997)

- Principal Lead Author of the *Grasslands and Rangelands* chapter of the IPCC Second Assessment Report (1995)
- Lead Author of the *Agriculture* chapter of the IPCC Second Assessment Report (1995)
- Co-Chair IPCC/OECD Working Group I meeting that established the international methodologies and protocols for greenhouse gas inventories (1992)

### **Statement of primary expertise**

I have been working on climate risk management issues and agricultural and environmental innovation for 27 years and have a broad range of skills and experience in a variety of sectors and disciplines, in integrating across these sectors and disciplines and in linking users with relevant science. In the agricultural and food security/nutrition security sphere I have researched and developed innovative solutions in cropping systems, livestock systems, mixed farming systems, viticulture and their value chains and more broadly with natural resource management. This has particularly been in developing adaptation strategies and technologies, developing methods for assessing and building adaptive capacity and in developing adaptive governance systems that can better manage climate risk. This work has often been in Australia but has also included Africa, Asia, the Pacific and South America. I have also worked on the relationships of climate with forestry and biodiversity, water resources and energy demand and more recently with the mining sector. Much of the work has been linking research with partners in industry and policy, focussing on developing adaptation pathways and addressing constraints to adoption. I have also worked for 23 years on greenhouse emission inventories and mitigation options and also on the underlying climate science and its delivery to stakeholders. This provides me with a rare capacity to link across several key elements of the climate change and food/nutrition security issues and to link these into broader sustainable development pathways. I have extensive experience in leading highly innovative, cross-organisational and inter-disciplinary groups and am committed to strong engagement with researcher and stakeholder communities. I am an excellent communicator, able to build awareness and influence with a broad range of audiences. I have been a long-term contributor to the IPCC over a period of 23 years contributing in a number of ways and roles. In addition I have developed strong research profiles outside of climate issues and have also been active in constructing more effective science-policy relationships nationally and internationally (USA, Chile and Europe in particular).

### **Employment history**

- 2015 - Interim Director, Climate Change Institute, Australian National University – develop and lead a cross-University program on climate adaptation and mitigation to generate practical solutions for industry and policy and to raise the profile of ANU in climate change
- 2014 - Chief Research Scientist, CSIRO Agriculture – leading a portfolio of adaptation projects relating to agriculture, food security and mining. Developing frameworks for more ethical and effective engagement of science in operational decision-making and learning. Contributing to the IPCC as Lead Author and Synthesis Report Author, participate in the Agriculture and Food Security Expert Group. Providing international and national leadership on adaptation, innovation and practice and policy change via advisory and other roles.
- 2008 – 2014 Theme Leader, Primary Industries, Enterprises and Communities, CSIRO Climate Adaptation Flagship – developing: adaptation options for managing climate risk and climate changes in the cropping, grazing, fisheries, forestry and mining sectors; climate-change-ready crops; a new generation of statistical seasonal climate forecasts and their application; developing more effective science-policy approaches, assessing adaptive capacity of the rural sector. The Theme budget was \$13M p.a. with \$6M p.a. derived from external sources through competitive grants etc. I was leading 110 staff drawn from across CSIRO with about the same number of external researchers involved in collaborative projects, many from developing countries.
- 2006 – 2008 Theme Leader, Australian Agriculture Transformed, CSIRO Agriculture Sustainability Initiative – developing innovative, sustainable farming systems, integrating adaptation and mitigation into agricultural system assessment, exploring enhanced adaptive governance. The Theme drew on some 40 staff from across CSIRO as well as a similar

number from other organisations including several from developing countries. The budget was \$6M p.a. with \$3M p.a. sourced externally.

- 2000 - 2006 Group Leader, CSIRO Sustainable Ecosystems – managing climate change and climate variability and integrating these issues into other decision-making contexts, sustainable management of cropping and grazing systems including trade-offs between production and environmental risk, developing new approaches for decision-making under uncertainty, developing the theory and practice needed to improve science-policy interactions
- 1996 - 2000 Head, Land and Water Section, Bureau of Resource Sciences – assessing climate change impacts and adaptation, developing greenhouse gas inventories and cost-effective emission-reduction options, environmental risk management, environmental flows and drought policy
- 1990 - 1996 Senior Research Scientist, Bureau of Resource Sciences, Canberra – drought policy, water resource management, climate change issues
- 1987 - 1990 Pasture Agronomist, Queensland DPI, Gayndah and Brisbane
- 1981 - 1982 Research Assistant, NSW Soil Conservation Service, Sydney

### **Other Appointments and Responsibilities (selected)**

- Director, Australian National University Climate Change Institute (2015)
- Honorary Professor, School of Land and Environment, University of Melbourne (2008- present)
- Editorial Board of the journal *Climate Risk Management* (2015)
- APEC Climate Centre Science Advisory Committee (2015 – present)
- Organising Committee, Transformations 2015 Conference, Stockholm October 2015
- Strategic Advisory Council, Center for Integrated Modeling of Sustainable Agriculture and Nutrition Security (2013-present)
- US Federal Development and Advisory Committee for the 3<sup>rd</sup> National Climate Assessment (2010-2014)
- Scientific Committee, Third Global Climate Smart Agriculture Conference, March 2015 (2014-present)
- Convenor Transformational Adaptation session of 2014 International Climate Adaptation Conference, Fortaleza, Brazil (2013-2014)
- International Science Advisory Committee of the Chilean Centre for Climate Science and Resilience (2010 - present)
- Member of DAFF Expert Review Panel (2012)
- Member of INRA Science Advisory Board for the Adapting Agriculture and Forestry to Climate Change Meta-Program (ACCAF) (2011-2015)
- Member of AnimalChange Scientific Advisory Board (2011-2015)
- Invited reviewer for draft report by National Institute of Water and Atmospheric Research (2011)
- Member of NCCARF Science Review Panel (2011-2012)
- Co-convenor of 'Food Regimes and Food Security': 2011 Symposium of the Academy of the Social Sciences in Australia
- International Scientific Steering Committee for the Resilience 2011 conference (2011)
- Member Steering Committee for AgMIP: the Agricultural Model Intercomparison Project (2010-2015)
- Invited by the US EPA to review their climate change and pests program (2010)
- Co-convenor, Primary Industries Adaptation Research Network for (2009-2014)
- National Adaptation Research Plan for Primary Industries writing team (2009-2010)
- Convenor of the Global Change theme in the 2009 World Congress on Modelling and Simulation (2008 – 2009)
- Meat and Livestock Australia Environmental Science Advisory Panel (2007-2011 )
- Science Advisory Committee for the Netherlands Climate Change Spatial Planning program (2007 – 2011)
- Climate Change Research Strategy for Primary Industries Reference Group (2007-2009)

- Working group for the Prime Minister's Science, Engineering and Innovation Council, Australia, Reports on 'Climate change in Australia: regional impacts and adaptation' (2007) and 'Food Security' (2010).
- Science Committee, Greenhouse Gas in Animal Agriculture Conference, NZ, 2007.
- Convenor for '*Agromanagement for future studies*' session in Farming Systems Design 2007
- Member, Editorial Board, *Agricultural Systems* (2002-present)
- Member, Science and Technical Advisory Panel Roster of Experts, Global Environment Fund (2003 - 2007)
- Member, South-East Asian Committee of the START program (2001-2007)
- Convenor for Symposia on climate change (1997), carbon cycling (2001), and climate variability and change (2003) for the International Congress on Modelling and Simulation.
- Joint coordinator, CSIRO Impacts and Adaptation Working Group (2001-2003) and CSIRO Climate and Atmosphere Sector, Impacts Component (2000-2002)
- Member, Working Group, Commonwealth Greenhouse Science in Agriculture (2000-2003)
- Acting Manager, Climate Variability in Agriculture Program for Land & Water Australia (2003)
- Convenor for Symposia on '*Future shocks to rangelands*' and '*Climate change*' for the Vith and VIIth International Rangeland Congresses, respectively (1998-2003)
- Chair, Livestock Working Group, National Greenhouse Gas Inventory (1994-2002)

***Invited Keynote Speaker at International and National Conferences (selected since 2008 only)***

- *International Conferences*: Food Security and Environmental Change: Linking science, development and policy (Oxford, April 2008); Australian and NZ Horticultural Science Conference (Gold Coast, July 2008); Climate Change and Animal Production Conference (Campinas, Brazil, May 2008), Crop Science Conference (Essen, Germany, October 2008), Managing plant genetic resources in the agro-ecosystem; global change, crop associated biodiversity and ecosystem services (Aleppo, Syria, November 2008), International Fertiliser Association Conference (Melbourne, December 2008), Australia-Sino Research Forum (Guangzhou, China, July 2009), World Modelling and Simulation Congress (Cairns, July 2009), University of Nottingham Feed Conference (Nottingham, September 2009), CGIAR Science Forum (Wageningen, June 2009), UN WMO Commission for Agricultural Meteorology Symposium (Toowoomba, May, 2009), Atmospheric and Climate Reconstructions over the Earth (Lamington, April, 2009), Biodiversity and Food security in a warming world, Chennai (February 2010), International Pulse and Legume Conference, Brisbane (May 2010), International Plant Biotechnology Conference, St Louis (June 2010), International Climate Change Adaptation Conference, Gold Coast (June 2010), Sino-Australia Regional Dialogue, Brisbane (July 2010), Prairies Regional Forum on Climate Change, Calgary (November 2010), UK Environment Agency Annual Conference, London (November 2010), CEPAL Regional Development Conference on Agriculture and climate change: innovation, policy and institutions, Santiago (November 2010), US Regional and Sectoral Climate Change Assessment Symposium (Washington DC, November 2010), FAO Effects of Climate Change on Animal production and health (November 2010), American Meteorological Association Conference (Seattle, January 2011), Greenhouse 2011 Conference (Cairns, March 2011), Pacific Climate Solutions Conference (Vancouver, June 2011), FAO Climate Change Symposium (Lima, June 2011), Research for the Future, (Paris, September 2011), 1<sup>st</sup> Annual World Congress of Agricultural Biotechnology (Beijing, October 2011), Climate Change and Agriculture and Fishery (Montevideo, March 2012), Animal Change Conference (Edinburgh, March 2012), Adaptation Futures Conference (Tucson, May 2012), Planet Under Pressure (London, March 2012), New technologies for mitigation and adaptation for agriculture in a changing climate (Santiago, September 2012), Asia Pacific Climate Symposium (St Petersburg, October 2012), Future agricultural sustainability in Chile (Santiago, October 2012), High level meeting on National Drought Policy (Geneva March 2013), Animal Change Conference (March 2013), Dublin Roundtable on Food Security (Dublin, April 2013), Food security and climate change symposium (Washington DC, June 2013), Transformation in a Changing Climate Conference (Oslo, June 2013), Australian Oceania Geosciences Congress (Brisbane, June 2013), International Grasslands Congress (Sydney, September 2013), Australia and Japan science dialogue (Brisbane, November 2013), US National Academy of Sciences BECS

Symposium (LA, November 2013), Adaptation Futures: Third International Climate Change Adaptation Conference (Fortaleza, May 2014), Livestock, Climate Change and Food Security Conference (Madrid, May 2014), International Landcare Conference (Melbourne, September 2014), Food security, biodiversity and climate extremes (Washington DC, October 2014), Sustainability Science Congress (Copenhagen, October 2014), Agriculture, Climate and Growth Symposium (Copenhagen, November 2014), ClimateSmart Agriculture Conference (Montpellier, March 2015), Klepper Lectureship: Joint ASA-CSSA-SSSA Conference (Minneapolis, September 2015); International Fertiliser Association (Kuala Lumpur, October 2015)

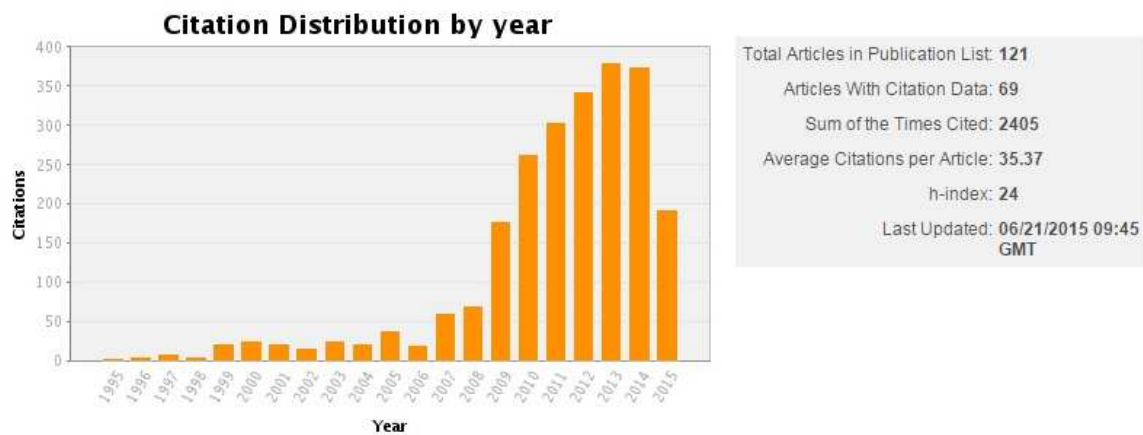
- *Australian Conferences:* Australian Agronomy Conference (Adelaide, September 2008), National NRM Knowledge Conference: Changing Landscapes (Melbourne, April, 2008); National Educators Conference (Geelong, January 2008); Australian Veterinarians Association Conference (Perth, May 2008); National Vegetation Management Conference (Toowoomba, October 2008); Australian Society of Animal Production conference (Brisbane, June 2008); Crawford Fund Annual International Development Conference (Canberra, September 2008), Greenhouse 2009 (Perth, March 2009), Climate 21 (Perth, March 2009), National Climate Change Adaptation Research Facility Conference (Brisbane, July 2009), Northern Agricultural Regional Conference, (Geraldton, October 2009), Chestnuts Australia Conference (Bright, October 2010), Securing Food Futures in the Asia-Pacific Conference (Canberra, October 2010), New Rural Industries Australia Conference, (Gold Coast, November 2010), Commonwealth Parliamentary Association Conference (Canberra, November 2010), Earth Systems Science Conference (Canberra, December 2010), Victorian DPI Climate Change Symposium (Melbourne, November 2010), SA Climate Change Symposium (Adelaide, November 2010), New Rural Industries Conference (Gold Coast, November 2010), Earth Systems Science Conference (Canberra, December 2010), CCRSPI Conference (Melbourne, February 2011), Citibank Ecologically Sustainable Symposium (Sydney, March 2011), DCEE Adaptation Policy Forum (Canberra, March 2011), Four Degrees Climate Change (Melbourne, July 2011), Global Change Institute Food Summit (Brisbane, September 2010); Adelaide Festival of Ideas (Adelaide, October 2011), Food Regimes and Food Security (Canberra, November 2011), PIARN Masterclass (Canberra, February 2012, Nuriootpa, November 2012); Regional Climate Change Workshop for Pacific Parliaments (Canberra, August 2011); South Australia NRM Planning Forum (Adelaide, June 2012); NCCARF Climate Adaptation in Action conference (Melbourne, June 2012); CCRSPI Conference (November 2012), Primary Industries and Climate Change Symposium (Melbourne, June 2013), Australian Grains Industry Conference (Melbourne, August 2013), CANA Climate Change Symposium (Sydney, April 2014), Food Security and the Murray Darling Basin (Albury, November 2014), Australian Meteorological and Oceanographic Society (Canberra, August 2015)

### **Outreach activities**

I undertake many outreach and broader communication activities in addition to the more formal pathways such as through conferences, policy forums and scientific publications. These outreach activities are with farmers, farmer groups, natural resource management groups, catchment management authorities, agri-business, non-government organisations, public interest groups, universities and schools amongst others. I regularly give lectures to students at various universities including ANU, Canberra, Melbourne and Queensland. I estimate that over the past six years I have engaged with some 10,000 people directly. In addition, I have had appearances on high profile Australian and international TV (e.g. Four Corners, Catalyst) and radio (AM, PM, Bush Telegraph) shows and popular media (e.g. The Conversation, newspapers) to communicate to broader audiences. I actively seek opportunities to interact with broader audiences as I consider highly interactive delivery of science information as a critical first step in addressing complex issues such as climate change, sustainable agricultural systems and food and nutrition security.

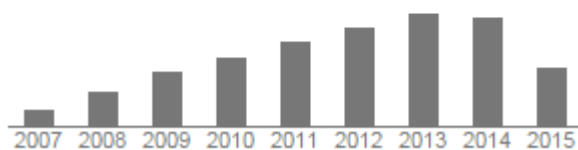
## Citation performance

Thomson-Reuters ResearchID performance



Google Scholar performance (which includes IPCC report chapters whereas ResearchID does not)

Citation indices	All	Since 2010
Citations	9774	6975
h-index	43	34
i10-index	107	76



## Publication List

### Journal papers

1. Rivera-Ferre, M et al. (2015) Re-Framing climate change mitigation and adaptation options in the livestock sector. (in prep)
2. Ingram, J., Schneeman, B., Fanzo, J., Acharya, T., Allen, L., Boote, K., Drewnowski, A., Ewert, F., Gustafson, D., Hall, S., Hendley, P., **Howden, M.**, Janssen, S., Jones, J., Latulippe, M., Lotze-Campen, H., McDermott, J., van Meijl, H., Nelson, G., Newsome, R., Roulin, A., Scholes, R., Tanumihardjo, S., Tavill, G., van der Mensbrugge, D., and Wiebe K., (2015) Assessing Sustainable Nutrition Security: The Role of Food Systems. *Global Food Security* (submitted)
3. Amarasingha, R.P.R.K., Suriyagoda, L.D.B., Marambe, B., Gaydon, D.S., Galagedara, L.W., Punyawardena, R., Silva, G.L.L.P., Nidumolu, U., **Howden, M.** (2015) Variable-date of planting increases crop and water productivity of rice (*Oryza sativa* L) in Sri Lanka. *Agricultural Water Management* (submitted)

4. Ludemann, C., **Howden, S.M.**, Eckard, R (2015) What is the best use of oil from cotton (*Gossypium* spp.) and canola (*Brassica* spp.) for reducing net greenhouse gas emissions-biodiesel, or as a feed for cattle? *Animal Production Science* (submitted)
5. Jakku, E., Thorburn, P.J., Mendham, E., Marshall, N.A., Moon, K., **Howden, S.M.** (2015) Learning the hard way: A case study of an agricultural company undertaking transformational adaptation to climate change. *Climatic Change* (submitted)
6. Cvitanovic C., Crimp S., Fleming A., Bell J., **Howden M.**, Hobday H., Taylor M., and Cunningham R. (2015) Building food secure and climate adapted Pacific Island communities: from knowledge to action. *Climate Risk Management* (submitted)
7. **Howden, S.M.**, Jacobs, K., (2015) Innovations in Assessment Processes: Assessment and Adaptation. *Climatic Change* (accepted)
8. Aldunce, P., Beilin, R., Handmer, J., **Howden, M.** (2015) The Disaster Resilience Spiral: a model for continuous improvement in Disaster Risk Management. *Environmental Hazards* (accepted)
9. Lacey, J., **Howden, S.M.**, Cvitanovic, C., Dowd, A.M. (2015) Informed agricultural adaptation: Ethical considerations for adaptation researchers and decision-makers. *Global Environmental Change*, 32: 200-210
10. Ghahramani A, Kokic PN, Moore AD, Zheng B, Chapman SC, **Howden SM**, Crimp SJ (2015) The value of adapting to climate change in Australian wheat farm systems: farm to cross-regional scale. *Agriculture, Ecosystems and Environment* 211: 112–125
11. Dunn, M., Lindsay, J. & **Howden, M.** (2015) Spatial and temporal scales of future climate information for climate change adaptation in viticulture: a case study of user needs in the Australian wine-grape sector. *Australian Journal of Grape and Wine Research*, 221:226-239.
12. Aldunce, P., Beilin, R., Howden, M., and Handmer, J. (2015) Resilience for disaster risk management in a changing climate: Practitioners' frames and practices. *Global Environmental Change* 30, 1-11
13. Fleming, A., Dowd, A., Gaillard, E., Park, S., **Howden, M.** (2015) Climate change is the least of my worries': stress limitations on adaptive capacity. *Rural Society*, 1-18  
<http://dx.doi.org/10.1080/10371656.2014.1001481>
14. Amarasingha, R.P.R.K., Galagedara, L.W., Marambe, B., Silva, G.L.L.P., Punyawardena, R., Nidumolu, U., **Howden, M.** and Suriyagoda, L.D.B. (2014) Modelling the impact of changes in rainfall distribution on the irrigation water requirement and yield of short and medium duration rice varieties using APSIM during *Maha* season in the Dry zone of Sri Lanka. *Tropical Agricultural Research*, 26: 274-284.
15. Porter, J.R., Xie, L., Challinor, A.J., Cochrane, K., Howden, S.M., Iqbal, M.M., Lobell, D.B. Travasso, M.I. (2014) Food security and food production systems. *Climate change*, 485-533
16. Amarasingha, R.P.R.K., Galagedara, L.W., Marambe, B., Silva, G.L.L.P., Punyawardena, R., Nidumolu, U., **Howden, M.** and Suriyagoda, L.D.B. (2014) Aligning sowing dates with onset of rains improve rice yields and water productivity: Modeling *Oryza sativa* L. in *Maha* season in the dry zone of Sri Lanka. *Tropical Agricultural Research*, 25: 277 – 286
17. Kokic, P., Crimp, S. and **Howden, M.** (2014) A probabilistic analysis of human influence on recent record global mean temperature changes. *Climate Risk Management*, 3: 1-12. DOI: 10.1016/j.crm.2014.03.002

18. Crimp, S., Bakar, K.S., Kocic, P., Jin, W., Nicholls, N. & **Howden, M.** (2014) Bayesian space-time model to analyse frost risk for agriculture in South-East Australia: explaining the frost paradox. *International Journal of Climatology*, DOI: 10.1002/joc.4109
19. Dowd, A.M., Marshall, N., Fleming, A., Jakku, E., Gaillard, E. & Howden, M. (2014) The role of networks in transforming Australian agriculture. *Nature Climate Change*, 4: 558–563
20. Howden, M., Schroeter, S., Crimp, S. & Hanigan, I. (2014) The changing roles of science in managing Australian droughts: an agricultural perspective. *Weather and Climate Extremes* 3: 80-89.
21. Aldunce, P., **Howden, M.**, Beilin, R., Handmer, J. (2014) Framing disaster resilience and the implications of the diverse conceptualisations of ‘bouncing back’. *Disaster Prevention and Management*, 23(3): 252-270.
22. Curtis, D.J., **Howden, S.M.**, Curtis, F., McColm, I., Scrine, J., Blomfield, T., Reeve, I. & Ryan, T. (2014) Case studies in Australia and Canada that use drama in environmental education to change environmental attitudes and behaviours. *Australian Journal of Environmental Education* 29(2), 182–201.
23. Challinor, A J, Watson, J., Lobell, D, **Howden, M.**, Smith D., Chhetri, N. (2014) A meta-analysis of crop yield under climate change and adaptation. *Nature Climate Change*, 4:287–291, DOI: 10.1038/NCLIMATE2153
24. Marshall, N.A., Dowd, AM., Fleming, A., Gambley, C., **Howden, M.**, Jakku, E., Larsen, C., Marshall, P.A., Moon, K., Park, S. and Thorburn, P.J. (2013) Transformational capacity in Australian peanut farmers for better climate adaptation. *Agronomy for Sustainable Development*, 3:583-591, DOI: 10.1007/s13593-013-0186-1
25. Nidumolu U, Crimp S, Gobbett D, Laing A, **Howden SM** & Little S. 2013. Spatio-temporal modelling of heat stress and climate change implications for the Murray dairy region, Australia. *International Journal of Biometeorology*, 58:1095–1108, DOI: 10.1007/s00484-013-0703-6
26. Nelson, R., **Howden, S.M.**, et al. (2013) Placing the power of real options analysis into the hands of natural resource managers – taking the next step. *Journal of Environmental Management*, 124: 128-136.
27. Marshall, NA, Park, S, **Howden, SM**, Dowd, AM, Jakku, ES (2013) Climate change awareness is associated with enhanced adaptive capacity. *Agricultural Systems*, 117: 30-34.
28. Uday Nidumolu, Peter Hayman, **Mark Howden** and Bronya Alexander. 2012. Re-evaluating the margin of the South Australian grain belt in a changing climate. *Climate Research*, 51: 249-260.
29. Marshall, N.A., Park, S.E., Adger, W.N., Brown, K., and **Howden, S.M.** (2012) Transformational capacity and the influence of place and identity. *Environmental Research Letters* 7(3): 1-9.
30. Ziska, LH, Bunce, JA, Shimono, H, Gealy, DR, Baker, JT, Newton, PCD, Reynolds, MP, Jagadish, KSV, Zhu, C, **Howden, SM** (2012) Food Security and Climate Change: On the potential to adapt global crop production by selection for rising atmospheric carbon dioxide concentration. *Proceedings of the Royal Society*, 279: 4097-4105.
31. Park, S.E., Marshall, N.A., Jakku, E., Dowd, A.M., **Howden, S.M.**, Mendham, E., Fleming, A. (2012) Informing adaptation responses to climate change through theories of transformation. *Global Environmental Change* 22(1): 115-126.



32. Chapman, SC, Chakraborty, S, Dreccer, MF, **Howden, SM** (2012) Plant adaptation to climate change – opportunities and priorities in breeding. *Crop and Pasture Science* 63, 251-268.
33. Nidumolu, Uday Bhaskar, Hayman, Peter, **Howden, Mark**, Alexander, Bronya. (2012) Re-evaluating the margin of the South Australian grain belt in a changing climate. *Climate Research* 51:249-260.
34. Rickards, L., **Howden, S.M.** (2012) Transformational adaptation: agriculture and climate change. *Crop and Pasture Science* 63(3): 240-250.
35. Park, S., **Howden, M.** and Crimp, S. (2011) Informing regional level policy development and actions for increased adaptive capacity in rural livelihoods. *Environmental Science and Policy*, 15: 23-37.
36. **Howden, M.** (2010) The Role of Science in Adapting to Climate Change: The Australian Experience so far. *Vitro Cellular & Developmental Biology-Animal* 46(35-35)
37. Crimp, S.J., Stokes, C.J., **Howden, S.M.**, Moore, A.M., Jacobs, B., Brown, P.R., Ash, A.J., Kocic, P. and Leith, P. (2010) Managing MDB livestock production systems in a variable and changing climate: challenges and opportunities. *Rangelands Journal*, 32: 293-304.
38. Park, S.E., **Howden, S.M.**, Crimp, S.J., Gaydon, D.S., Attwood, S.J. and Kocic, P.N. (2010) More than eco-efficiency is required to improve food security. *Crop Science*. doi: 10.2135/cropsci2009.10.0566; Published online 27 January, 2010.
39. Kocic, P., Crimp, S.J., **Howden SM.** (2010) Forecasting climate variables using a mixed-effect state-space model. *Envirometrics* DOI: 10.1002/env.1074
40. Nelson, R., Kocic, P., Crimp, S., Martin, P., Meinke, H., and **Howden, M.** (2010) The vulnerability of Australian rural communities to climate variability & change: Part I – Conceptualising and measuring vulnerability. *Environmental Science & Policy*, 13: 8-17.
41. Nelson, R., Kocic, P., Crimp, S., Martin, P., Meinke, H., **Howden, M.**, Devoil, P., McKeon, G. and Nidumolu, U. (2010) The vulnerability of Australian agriculture to climate variability & change: Part II – Vulnerability assessments that support adaptation. *Environmental Science & Policy*, 13: 18-27.
42. Meinke, H., **Howden, S.M.**, Struik, P.C., Nelson, R., Rodriguez, D., Chapman, S.C. (2009) Adaptation Science for Agriculture and Natural Resource Management - Urgency and Theoretical Basis. *Current Opinion in Environmental Sustainability*, 1: 69-76.
43. McKeon, M.M., Stone, G.S., Syktus, J.I., Carter, J.O., Flood, N., Ahrens, D.G., Bruget, D., Chilcott, C.R., Cobon, D., Cowley, R., Crimp, S.J., Fraser, G.W., **Howden, S.M.**, Johnston, P.W., Ryan, J.G., Stokes, C.J. and Day, K.A. (2009) Climate change impacts on northern Australian rangeland livestock carrying capacity: a review of issues. *Rangelands Journal*, 21: 1-29.
44. Sterk, B.P. Carberry, P., Leeuwis, C, van Ittersum, **M. Howden**, S.M. Meinke, H. van Keulen, H. Rossing W.A.H. (2009) The interface between land use systems research and policy: multiple arrangements and leverages. *Land Use Policy*, 26: 434-442

45. Nelson, R., **Howden, S.M.** and Stafford Smith M., 2008. Using adaptive governance to rethink the way science supports Australian drought policy. *Environmental Science & Policy*, 11: 588-601.
46. Smith, P., Martino, D., Cai, Z., Gwary, D., Janzen, H.H., Kumar, P., McCarl, B., Ogle, S. O'Mara, F., Rice, C., Scholes, R., Sirotenko, O., **Howden, M.**, McAllister, T., Pan, G., Romanenkov, V., Schneider, U., Towprayoon, S., Wattenbach, M., Smith, J. (2008) Greenhouse gas mitigation in agriculture. *Philosophical Transactions of the Royal Society London Biological Sciences*, 363: 789-813.
47. **Howden, S.M.**, Crimp, S.J. and Stokes, C.J. (2008) Climate change and its effect on Australian livestock systems. *Aust. J. Experimental Agriculture*, 40:780-788.
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