

17 Environmental Sustainability and Climate Change



This supplementary chapter (loaded to the website in March 2014) identifies whether a policy, plan or proposal:

- contributes to environmental sustainability
- considers climate change mitigation and adaptation
- promotes community resilience.

The chapter needs to be read in the context of the whole NSW Healthy Urban Development Checklist.

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17 Environmental Sustainability and Climate Change

17.1 Introduction

Environmental sustainability

The concept of environmental sustainability has had a major influence on the practice of urban planning over the past 20 years. Environmental sustainability means reducing our impact on the environment and adopting practices that use natural resources sustainably.

Also covered by environmental sustainability is good environmental management. This includes energy use, greenhouse gas emissions, ozone depletion, water use, waste reduction and management, and use of materials. Protecting biodiversity is also important for the environment and human health, often in ways that are not immediately obvious. For instance, significant medical and pharmacological discoveries have been made through greater understanding of the earth's biodiversity.

Environmental sustainability has a strong focus on the needs of future generations. One of the most quoted definitions is: 'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.¹

Nowadays, the term 'sustainable development' is commonly used in planning documents. This refers to balancing environmental and ecological concerns with social and economic aspects of development. This is sometimes referred to as the 'triple bottom line' approach, as it encompasses the three pillars of program sustainability – environmental, social and economic.

Environmental sustainability is a growing issue in the delivery of health services as well as the construction of health facilities. The social determinants of health (discussed in Chapter 2) are a useful tool to examine some of the concept's health and wellbeing dimensions.²

Climate change

The Intergovernmental Panel on Climate Change's Fourth Assessment Report states that the warming of the climate system is now beyond doubt.³ The report presented evidence of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea levels. These

¹ World Commission on Environment and Development. Our Common Future (Gro Harlem Brundtland, Chair). Oxford: Oxford University Press; 1987.

² Wilkinson R, Marmot M (eds). Social Determinants of Health: The Solid Facts. 2nd ed. Copenhagen: World Health Organization; 2003.

³ The report is available at:

<http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml#1>. The Fifth Assessment Report is due in 2013-14.

changes were 'very likely' caused by the release into the atmosphere of a range of gases, notably carbon dioxide and methane, due to human activities.

Countries around the world have been pursuing policies both to mitigate and adapt to climate change. Mitigation refers to policies designed to reduce the emissions of greenhouse gases. These can take many forms, from energy efficiency, switching from fossil fuels to renewable energy, or by developing carbon sinks (such as planting forests). The effectiveness of mitigation policies is critical to how long term climate conditions may change.

Adaptation policies are designed to minimise the adverse effects of climate change and help communities cope with the remaining effects. The adverse effects might be increased risk of extreme weather events (such as flooding, bushfires, and tropical cyclones), heat stress, or certain infectious diseases.

Health impacts of climate change

The literature on the health impacts of climate change focuses on the direct and indirect effects of temperature increases and extreme weather events on people's health.⁴ There are also significant positive health and environmental 'co-benefits' from policies to both mitigate and adapt to climate change.

Health professionals need to be alert to the opportunities for health co-benefits of such policies and to seek to maximise the potential positive health impacts.⁵ For example, improved public transport and encouraging walking and cycling can make people more active and reduce obesity. Decreasing fossil fuel use can lead to less pollution and therefore less respiratory disease. Local programs to assist communities to avoid or manage extreme weather events can promote better mental health.

Health and environmental co-benefits of a sample of mitigation and adaptation strategies are shown in Figure 17.1.⁶

⁴ Costello A, et al. Managing the Health Effects of Climate Change. *The Lancet* 2009; 373(May 16): 1693-1733. Capon AG, Hanna EG. Climate Change: An Emerging Health Issue. *NSW Public Health Bulletin* 2009; 20(1-2).

⁵ Frumkin H, McMichael AJ. Climate Change and Public Health Thinking, Communicating, Acting. *American Journal of Preventive Medicine* 2008; 35(5): 405.

⁶ Based on Kjellstrom T, Weaver HJ. Climate Change and Health: Impacts, Vulnerability, Adaptation and Mitigation. *NSW Public Health Bulletin* 2009; 20(1-2): 7.

Figure 17.1 – Examples of co-benefits of climate change mitigation and adaptation strategies

| Mitigation strategies | Environmental co-benefits | Health co-benefits |
|--|---|---|
| Decreased fossil fuel combustion | Cleaner, pollution-free air | Lower rates of respiratory and cardio-respiratory disease |
| Improved public transport and mass transit systems | Reduced consumption of a range of non-renewable resources, including oil and metals | More people walking and cycling to and from stations promotes health and fitness and reduces overweight and obesity |
| | Reduced pollution from fossil fuel combustion | Lower rates of respiratory and cardio-respiratory disease |
| Increased fruit and vegetable consumption | Reduced ecological footprint | Promotes good health and nutrition and lowers rates of cancer and several chronic diseases |
| Adaptation Strategies | Environmental co-benefits | Health co-benefits |
| Early warning systems for weather extremes and disease outbreaks | Prevention or minimisation of environmental damage | Reduced death and disease following natural disasters and better control of infectious diseases |
| Improved programs to adapt rural economies to a changing climate | Prevention or minimisation of land degradation | Strengthened social capital and beneficial effects on mental health |

In discussions around climate change and health, vulnerability and resilience are important concepts. For example, coastal communities and settlements in flood plains are highly vulnerable to the effects of climate change; farming communities may be vulnerable to drought, which has an impact on both day-to-day living and livelihoods by increasing agricultural production costs and lowering crop yields; people living in remote areas may be more vulnerable due to the greater impact of extreme weather events. Older people are generally more vulnerable to heat stress. As well, disadvantaged groups in the community, such as people on low incomes, may have fewer resources and options in terms of adapting to some of the effects of climate change.

Community resilience is especially relevant in thinking about adaptation to climate change. Resilience is the ability of human communities to withstand, adapt to and recover from stresses or disturbances, such as environmental change or social, economic or political upheaval. It has a number of dimensions such as economic viability, community vitality, social cohesion, people’s skills and capacities, and governance systems.

Generally, communities with a high degree of social capital – more neighbourliness and connections to local political institutions – are better at adapting to change. One focus of the Victorian Government’s response to the 2009 bushfires has been to build community resilience to handle extreme

weather events.⁷ Programs to improve a community's resilience tend to have significant health co-benefits. Community consultation and participation is an important part of establishing resilient and connected communities.

17.1.1 Relevance to NSW

The Protection of the Environment Administration Act 1991 (NSW) contains the foundational definition of ecologically sustainable development (s6(2)) that is cited in other NSW statutes. It states that 'ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes'. This is followed by a number of key principles, such as that 'conservation of biological diversity and ecological integrity should be a fundamental consideration'.

In 'NSW 2021 – A Plan to Make NSW Number One', the NSW Government sets a target to minimise the impacts of climate change in local communities. This involves the NSW Government assisting local government, business and the community to build resilience to future extreme events and hazards. The plan includes a priority action to complete fine scale climate change projections for NSW, which will be available to local councils and the public by 2014. There is also a target to increase renewable energy use to 20 per cent by 2020.

The Department of Planning and Infrastructure has identified a number of initiatives to protect the environment, such as:⁸

- A climate change adaptation strategy for Sydney, developed in collaboration with councils
- Biodiversity certification and strategic assessment processes in Sydney's Growth Centres
- Encouraging sustainable building design, especially in terms of housing, through the Building Sustainability Index (BASIX)
- Establishing a network of protected natural areas in Sydney
- Developing high resolution climate projections for Sydney and NSW to better understand the likely changes to the climate and likely natural hazards
- Implementing plans and strategies to protect the environment, including the Sydney Metropolitan and Hawkesbury-Nepean catchment action plans, Action for Air, NSW Biodiversity Strategy and the Metropolitan Water Plan.

In 2013, the NSW Government released the Draft Metropolitan Strategy for Sydney to 2031.⁹ The strategy highlights the Towards a Resilient Sydney project,

⁷ Victorian Government. Towards a More Disaster Resilient and Safer Victoria – Green Paper: Options and Issues. Melbourne: Victorian Government; 2011.

⁸ Department of Planning and Infrastructure. Sydney Over the Next 20 Years: A Discussion Paper. Sydney: NSW Government; 2012. <http://www.planning.nsw.gov.au/sydney-over-the-next-20-years>

⁹ Department of Planning and Infrastructure. Draft Metropolitan Strategy for Sydney to 2031. Sydney: NSW Government; 2013. <http://strategies.planning.nsw.gov.au/MetropolitanStrategyforSydney.aspx>

which is being undertaken by the Office of Environment and Heritage. This will be the longer-term risk management plan to increase Sydney's resilience to climate change. It will identify Sydney's key vulnerabilities and outline adaptive responses and opportunities that will assist local communities to improve resilience and minimise impacts on local communities. The strategy also supports precinct-scale planning that will encourage and help deliver efficient energy, water and resource use.

The Metropolitan Strategy for Sydney will be a Regional Growth Plan under the NSW Government's proposed new planning system. Other Regional Growth Plans, covering each region of the state, will be progressed over the next few years. These will need to be supported by objective evidence on how sustainable development will be facilitated through the strategic planning process.

17.1.2 Key evidence and leading practice

The environment and climate change

- The Garnaut Review reported that the decade ending in 2010 has been Australia's warmest since record keeping began.¹⁰ It is expected that NSW will become hotter in the future. This will have implications for the health of vulnerable groups in the community, particularly with the increased likelihood of heatwaves.
- The Garnaut Review also warned that the regional variability of climate change may manifest in severe unseasonal weather events. Such events include more frequent and severe heatwaves, heavy rainfall and floods, droughts, tropical cyclones and bushfires.¹¹ These events all have implications for population health.
- This NSW Climate Impact Profile provides a snapshot of how NSW could be affected by climate change in 2050. This is an integrated assessment of the biophysical changes predicted as a result of climate change and it gives information on a region by region basis.¹² There are also Natural Hazards Profiles for each NSW State Plan region.¹³
- Ongoing sea level rise is predicted to reach between 0.5 and 1 metre by 2100.¹⁴ This will increase the risks for coastal areas in NSW from physical

¹⁰ Garnaut R. The Garnaut Review 2011: Australia in the Global Response to Climate Change. Port Melbourne: Cambridge University Press; 2011, p.5.

¹¹ See footnote 10, p.6.

¹² NSW Office of Environment and Heritage. NSW Climate Impact Profile. Sydney: NSW Government; 2010.

<http://www.environment.nsw.gov.au/climatechange/20100171ClmtChngNSW.htm>

¹³ NSW Office of Environment and Heritage. Impacts of Climate Change on Natural Hazards Profiles. Sydney: NSW Government; 2010.

<http://www.environment.nsw.gov.au/climateChange/naturalhazardprofiles.htm>

¹⁴ Climate Commission. The Critical Decade: Update of Climate Science, Risks and Responses. Canberra: Department of Climate Change and Energy Efficiency; 2011.

exposure to sea level rise, erosion, and storm surges, with implications for both coastal infrastructure and homes in vulnerable coastal locations.¹⁵

- One important issue related to climate change is the 'heat island' effect. This is where the centres of heavily built up cities are a number of degrees warmer than surrounding areas. This can be a problem in itself but it also creates a harmful feedback loop with more energy being used for cooling.

Health effects of climate change

- Direct effects of climate change on health include more heart attacks, strokes, accidents, heat exhaustion and death (from heatwaves); more injuries, deaths and post-traumatic stress (from extreme weather events, such as flooding and cyclones); smoke-induced asthma attacks, burns and death (from increased bushfires).¹⁶
- Some groups of people are particularly vulnerable to extreme events. For instance, the elderly, people with infirmities and pre-existing medical conditions¹⁷ and children¹⁸ are particularly vulnerable to heat waves.
- Flow-on or indirect effects of climate change on health include exacerbation of respiratory illnesses, heart and lung diseases (from more exposure to some air pollutants and air-borne allergens), increase in food-borne infections and the spread of mosquito transmitted diseases (from increased rainfall and temperature), and mental health problems (from drought especially in rural areas).¹⁹
- A study of the health impacts of heatwaves in five regions in NSW showed increased hospital emergency admissions due to heat related injuries, dehydration, and other causes. People with underlying mental disorders or pre-existing cardiac or respiratory conditions were particularly susceptible to emergency admission in extreme heat events.²⁰

Actions

- Effective action on the health impacts of climate change requires systems approaches and integrated policy and planning from all levels of government.

¹⁵ Gurrán N, Norman B, Gilbert C, Hamín E. Planning for climate change adaptation in Coastal Australia: State of practice, Report No. 4 for the National Sea Change Taskforce. Sydney: Faculty of Architecture, Design and Planning, University of Sydney; 2011.

¹⁶ Climate Commission. The Critical Decade: Climate Change and Health. Canberra: Department of Climate Change and Energy Efficiency; 2011, p.7.

¹⁷ World Health Organization. Protecting Health from Climate Change: Connecting Science, Policy and People. Geneva: World Health Organization; 2009.

¹⁸ UNICEF. The Benefits of a Child-centred Approach to Climate Change Adaptation. London: UNICEF UK; 2011.

¹⁹ See footnote 16. Also, Department of Health WA. Health Impacts of Climate Change: Adaptation Strategies for Western Australia. Perth: Environmental Health Directorate, Department of Health; 2008.

²⁰ Khalaj B, Lloyd G, Sheppard V, Dear K. The health impacts of heat waves in five regions of New South Wales, Australia: a case-only analysis. International Archives of Occupational and Environmental Health 2010; 83:833-842.

Improved metropolitan and regional planning, which embeds principles for sustainable city governance and health impact assessment, can all contribute.

- Infrastructure choices are very significant determinants of sustainability, for instance the provision of public transport or the choice of waste management technologies. Climate change mitigation must address these social and economic drivers of climate change.²¹
- Environmental sustainability is a worthy goal in its own right. Health professionals should focus on population health outcomes in an integrated approach to sustainability policy and planning.²²

17.1.3 Key questions

A number of the previous chapters in the Healthy Urban Development Checklist relate to environmental sustainability issues. These include Chapter 7 – Healthy food, Chapter 10 – Transport and physical connectivity, Chapter 13 – Public open space, Chapter 15 – Social cohesion and social connectivity and Chapter 16 – Environment and health. Some specific issues to consider are water saving measures, energy efficiency in the home, food production and consumption, green space, and minimising use of chemicals.

The key questions in this section are a guide to better understanding the environmental sustainability and climate change dimensions of a range of policies, plans or development proposals.

How does the policy, plan or proposal:

- SCC.1 Achieve environmental sustainability objectives?
- SCC.2 Consider climate change mitigation?
- SCC.3 Adopt measures to adapt to climate change?
- SCC.4 Promote community resilience?

²¹ United Nations Task Team on Social Dimensions of Climate Change. The Social Dimensions of Climate Change: Discussion Draft. Geneva: World Health Organization and International Labour Organization; 2011. Available at: < http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_169567.pdf >.

²² Capon AG, Synnott ES, Holliday S. Urbanism, climate change and health: systems approaches to governance. NSW Public Health Bulletin 2009; 20(1-2): 24-28.

17.2 Environmental sustainability and climate change checklist questions

SCC1: Achieve environmental sustainability objectives

| Code | Question | Planning Policies and Strategies | Development Proposal |
|--------|---|----------------------------------|----------------------|
| SCC1.1 | Does the relevant council or proponent have an environmental sustainability plan or policy? Has this been applied to the policy, plan or proposal? | | |
| SCC1.2 | Does the policy, plan or proposal include strategies to minimise the consumption of resources (e.g. water, energy, materials)? | | |
| SCC1.3 | Does the policy, plan or proposal integrate economic, social, environmental and institutional objectives? | | |
| SCC1.4 | Does the policy, plan or proposal include strategies to enhance or maintain the natural environment (e.g. biodiversity, landscape, remediation)? | | |
| SCC1.5 | If environmental damage is unavoidable, does the policy, plan or proposal include strategies to minimise the damage or manage or offset remaining damage? | | |
| SCC1.6 | Does the policy, plan or proposal include strategies to reduce the production of waste? | | |
| SCC1.7 | Does the policy, plan or proposal include strategies to divert waste from landfill (for example, by recycling or composting)? | | |
| SCC1.8 | Has the proposal been assessed with a sustainable development rating tool (for instance, BASIX or the Green Building Council of Australia)? | | |

SCC2: Consider climate change mitigation

| Code | Question | Planning Policies and Strategies | Development Proposal |
|--------|--|----------------------------------|----------------------|
| SCC2.1 | Does the policy, plan or proposal include strategies to minimise emissions of greenhouse gases? | | |
| SCC2.2 | Does the policy, plan or proposal explicitly incorporate energy efficient design? | | |
| SCC2.3 | Does the policy, plan or proposal explicitly incorporate renewable energy design features or technologies? | | |
| SCC2.4 | Does the policy, plan or proposal include strategies to incorporate green products or technologies? | | |

SCC3: Adopt measures to adapt to climate change

| Code | Question | Planning Policies and Strategies | Development Proposal |
|--------|--|----------------------------------|----------------------|
| SCC3.1 | Does the policy, plan or proposal ensure that building structures meet standards to withstand hazards, such as floods, bushfires or cyclones? | | |
| SCC3.2 | Does the policy, plan or proposal include strategies for managing the impacts of disasters associated with natural hazards (including flooding, heat waves, bushfires, disease, drought)? | | |
| SCC3.3 | In areas at risk from bushfires, does the policy, plan or proposal consider how the effects of bushfires can best be limited or managed, including adequate emergency access and escape routes? | | |
| SCC3.4 | In coastal areas, does the policy, plan or proposal contain, where necessary, strategies to manage the impacts of sea level rise, storm surges, and coastal erosion? | | |
| SCC3.5 | In flood prone areas, does the policy, plan or proposal consider how the effects of flooding can best be limited? | | |
| SCC3.6 | In built up areas, does the policy, plan or proposal consider the heat island effect and include actions to minimise it (for example, with trees and landscaping, adequate shade, minimising hard surfaces)? | | |

SCC4: Promote community resilience

| Code | Question | Planning Policies and Strategies | Development Proposal |
|--------|---|----------------------------------|----------------------|
| SCC4.1 | Does the policy, plan or proposal provide opportunities to build social networks? | | |
| SCC4.2 | Does the policy, plan or proposal promote local knowledge sharing and information networks? | | |
| SCC4.3 | Does the policy, plan or proposal sufficiently consider the potential impacts of climate change on vulnerable groups, whether as users of the development or as members of the wider community? | | |
| SCC4.4 | Does the policy, plan or proposal build the capacity for people to participate meaningfully in decision-making and planning, particularly about the future of their community? | | |

17.3 Further information

- Australian Green Infrastructure Council – *Quick Check*
<http://www.agic-khub.net.au/resources/>
- Climate Commission – *The Critical Decade: Climate Change and Health*
<http://climatecommission.gov.au/report/the-critical-decade-climate-change-and-health/>
- Climate and Health Alliance and The Climate Institute – *Our Uncashed Dividend: The Health Benefits of Climate Action*
http://caha.org.au/wp-content/uploads/2012/08/OurUncashedDividend_CAHAandTCI_August2012.pdf
- Department of Health, Western Australia – *Health Impacts of Climate Change: Adaptation Strategies for Western Australia*
http://www.public.health.wa.gov.au/2/1396/2/climate_change_and_health.pm
- Green Building Council of Australia – *Green Star Rating Tools*
<http://www.gbca.org.au/green-star/rating-tools/>
- Lancet and University College London Institute for Global Health Commission – *Managing the Health Effects of Climate Change*
[http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(09\)60935-1/fulltext#article_upsell](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(09)60935-1/fulltext#article_upsell)
- NSW Department of Planning and Infrastructure – *Building Sustainability Index (BASIX)*
<https://www.basix.nsw.gov.au/basixcms/>
- NSW Office of Environment and Heritage – *Climate Change Impacts in NSW*
<http://www.environment.nsw.gov.au/climatechange/impacts.htm>
- NSW Public Health Bulletin (2009) – *Climate Change: An Emerging Health Issue – Special Issue*
<http://www.publish.csiro.au/nid/227/issue/5062.htm>
- Town and Country Planning Association, UK – *Climate Change Adaptation by Design: A Guide for Sustainable Communities*
<http://www.tcpa.org.uk/pages/climate-change-adaptation-by-design.html>
- World Health Organization – *Protecting Health from Climate Change: Connecting Science, Policy and People*
<http://www.who.int/globalchange/publications/reports/9789241598880/en/index.html>