

# A Changing & Variable Climate

## The Australian Nursery & Garden Industry's Policy Position on Climate Change and Variability

The Australian nursery and garden industry has a lead role to play in managing the effects of climate change and variability upon our urban and natural environments. The industry, through the provision of plant material, has strong linkages with key primary industries throughout Australia which are responsible for providing food and fibre to feed and clothe the world.

The production sector also services other key end users including forestry, revegetation providers, landscapers and local government, as well as many involved in developing the Australian urban forest (a term used to describe trees and shrubs on public and private land in and around urban areas).

The Australian nursery and garden industry contributes both directly and indirectly to carbon sequestration and provides significant economic, cultural and social benefits to the wider Australia community. To respond to the challenges currently facing the industry, six strategies have been formulated:

- 1 Leadership in policy development in the area of climate change and variability** – recognition of the impacts of policy decisions on businesses and their customers.
- 2 Investment in on-farm support to address climate change and variability** – a commitment by governments to support on-farm practices, innovation and incentives to adapt, manage and respond to climate risk.
- 3 Recognition of established industry best management practice** – recognition and support of the Nursery Production Farm Management System as a key adaptation strategy for the industry and investment in research, development and extension activities.
- 4 Recognition of Australia's urban forest in managing climate change and variability** – government and relevant authority support for the protection of this community asset.
- 5 Consideration by government and relevant authorities in their approach to urban town planning.**
- 6 Incentives to the Australian community to support greener communities** – investment in community green infrastructure grants.



# The issues facing the Australian nursery and garden industry

Climate change and variability are global issues of high importance shaping the future of the Australian nursery and garden industry (NGI). These issues have an impact across the entire nursery supply chain and present a myriad of challenges for the industry.

Unlike agriculture, the finished product arising from nursery production is live plant material and therefore, consideration of the ongoing maintenance of this living commodity is required. Access to secure and clean water at both the production and end user level, as well as selecting the right plant material for the right climate, will be key issues for the Australian NGI to consider under a changing and variable climate.

To respond to these issues, the Australian NGI must act on several fronts including;

- **influencing and responding to rapid policy developments;**
- **managing and accounting for on-farm emissions;**
- **contributing to direct and indirect carbon sequestration by promoting the many benefits of the Australian urban and rural forests; and**
- **participating in the development of greenlife that can survive in a changed environment and meet the expectations of the food and fibre industries.**

The Australian NGI is well positioned to meet these challenges and through the production of living products, it has the capacity to make a significant contribution to reducing greenhouse gas emissions. It will also play an integral role in mitigating the effects of climate change and variability.

Before considering this policy position any further, it is important to note climate change and variability are separate, yet interconnected issues. For the purpose of this policy position, climate change is defined as the build up of atmospheric greenhouse gases leading to an increase in the earth's average temperature. This warming effect is referred to as global warming. Greenhouse gases, including carbon dioxide (CO<sub>2</sub>), nitrous oxide (NO<sub>2</sub>) and methane (CH<sub>4</sub>), are thought to be driving this phenomenon from possible anthropogenic emissions coupled with natural climatic variations.

Climate variability refers to year-on-year weather variations or medium term cycles that include rainfall patterns and temperature fluctuations. Managing climatic variability is part of the daily decision-making process for all businesses involved in the Australian NGI.





Distinguishing these issues further is the projection that climate change will occur slowly over the coming century and beyond, with the predicted degree in climate change small relative to climate variability, especially in the short-term.

Furthermore, the projected impacts of climate change are spatially heterogeneous and will vary across regions and seasons. They may include reduced rainfall through increased intensity of rainfall events, temperature rises leading to changes in cropping patterns, changes in pest and disease distribution and an increase in extreme weather events such as floods and droughts.

It should be noted that a degree of uncertainty is associated with both climate change and variability linked with the uncertain nature of climate at a local scale.

Climate change and variability are multifaceted issues and may impact on the triple bottom line of business in both positive and negative ways. For instance, increases in rainfall events arising from climate variability can minimise the need for irrigation. However, excess rainfall can flood and destroy a business.

Elevated CO<sub>2</sub> arising from climate change may enhance photosynthesis

and consequently drive crop growth, however, projected temperature increases may counteract this gain. Climate change may also result in changes in pest and disease activity including distribution, occurrence and frequency of existing and exotic plant pests.

These changes may present the Australian NGI with significant biosecurity challenges, including on-farm pest management and domestic and international market access.

Historically, the Australian NGI has been resilient and adaptive in response to a variety of climatic pressures. Despite this, the industry has identified support components that will be required so it can continue to adapt and manage climate variability and predicted climate change impacts.

It has the capacity to make a significant contribution to reducing greenhouse gas emissions and will also play an integral role in the mitigation of climate change. In doing so, the industry will respond proactively and responsibly to ensure a sustainable future for the Australian NGI.





# Six strategic responses

## 1. Leadership in policy development in the area of climate change and variability – recognising the impacts of policy on businesses and their customers.

Policy development by local, state and federal governments will have significant implications for the Australian NGI. Rapid policy development that is poorly designed and orchestrated may lead to greater impacts on the industry than those associated with climate change and variability.

Policies designed on a market mechanism in order to meet carbon reduction targets may inadvertently increase prices of key production inputs and could potentially lead to a reduction in the competitiveness of the Australian nursery industry in developing export markets.

Of key consideration when devising policies to address climate change and variability, is for governments to commit to a holistic, triple bottom line approach due to the interconnected nature of these issues.

Moreover, both climate change and variability have wider impacts across a range of other key environmental issues, including natural resource

management, water management and security, biosecurity and quarantine. These issues need to be considered collectively in driving policy development in response to changes in on-farm practices and the options for addressing on-farm adaptation.

### ***Evaluating the framework of a Carbon Pollution Reduction Scheme (CPRS)***

There is continued uncertainty surrounding the implementation of a Carbon Pollution Reduction Scheme (CPRS) to reduce Australian greenhouse gas emissions. Australian horticultural industries (which include nursery production) fall under the umbrella of agriculture and are currently excluded from a CPRS. Indeed, the proposed Australian CPRS will not proceed until the current commitment period of the Kyoto Protocol expires. In addition,

greater certainty and clarity on the action of other major economies including the US, China and India is yet to emerge.

The Australian NGI welcomes this position, however, requests that consultation is provided on any future CPRS model to ensure the industry has a real opportunity to participate in future climate policy decisions.





Despite the current delay of the CPRS, consideration must be given to the costs that will be placed on key nursery industry inputs such as energy, water, fuel, fertiliser etc. along the supply chain. These will place considerable financial pressure on the industry and its customer base, whilst at the same time, providing little recognition for the wider community benefits associated with plants. An economic impact assessment of any market mechanism to manage and reduce greenhouse gas emissions is warranted to ensure a fair and equitable process for affected parties.

It is important to note plants provide a suite of ecosystem services that considerably enhance the environment in which we live (e.g. through the process of photosynthesis, plants can directly absorb carbon dioxide (CO<sub>2</sub>) and generate oxygen (O<sub>2</sub>)).

Excess carbon generated by this process is stored (sequestered) in above and below ground biomass. Nursery & Garden Industry Australia (NGIA) commissioned research into the carbon sequestered in street trees in urban communities has indicated between 11 and 31 tonnes of carbon per hectare can be sequestered.

Recognition of the carbon sequestered by plants, including trees within the urban forest, should be a fundamental component in future CPRS negotiations.

Consideration should also be given to carbon sequestered on production sites through conservation of remnant vegetation and through the production of plant life.

NGIA supports plants being regarded as carbon credits in future CPRS models and supports investment in research to ensure this can be delivered to the Australian NGI and the wider community.

Additional aspects to consider when considering future proposed CPRS models include:

- economic rationale for introducing a market based mechanism;
- constraints on market development and access arising from market based mechanisms;
- clarity in the framework and policy details of a market based approach to avoid confusion among the nursery industry supply chain;
- alternative policy options including financial incentives and regulations; and
- the need for a scheme that accommodates variations within the horticultural sector, including the diversity of commodities.





## 2. Investment in on-farm support to address climate change and variability – a commitment by governments to support on-farm practices, innovation and incentives to adapt, manage and respond to climate risk.

The Australian NGI is supportive of government policy encouraging on-farm practices, innovations and incentives to adapt and manage climate risk. For example, the Managing Climate Variability Program is an Australian Government program designed to help local farmers manage climate risk on the ground. This is done through the provision of practical tools to incorporate weather and climate information into farm business decisions. This program should be expanded to assist the Australian NGI and horticultural sector at large.

The Managing Climate Variability Research and Development Strategy 2008–2014, is designed to assist farmers and natural resource managers manage risks and exploit opportunities, given Australia's variable and changing climate. This strategy will be achieved by investments to increase forecasting accuracy, build the predictive capability of key attributes (e.g. soil moisture), and develop tools which translate climate forecasts and resource attributes into decision support tools.

These tools must provide growers with a better understanding of their cropping systems in order to predict future changes in climate. They must also focus on changes in the growth rate of key crops and changes in pest and disease population dynamics as a result of changes in greenhouse gases and temperature. It is imperative the Australian NGI is consulted at all stages during the implementation of this strategy.

The Australian NGI supports government policy regarding on-farm practices, innovations and incentives to adapt and respond to climate change. Australia's Farming Future is the Australian Government's climate change initiative designed to provide assistance to local primary producers, including the Australian NGI.

This scheme, which is scheduled to cease in July 2012, provides assistance via several

elements including The Climate Change Research Program, Farm Ready Scheme, The Climate Change Adjustment Program, Transitional Support and Community Networks and Capacity Building. The NGA welcomes this assistance and calls for these schemes to continue post July 2012, particularly given the uncertainty surrounding the introduction of an Australian CPRS.

To assist the industry, NGA has developed NurseryFootprint, a carbon footprint tool designed specifically for the Australian NGI to estimate emissions from production nurseries. This tool provides growers with the ability to calculate their greenhouse gas emission profile and also provides businesses with a cost/benefit analysis to measure the environmental impacts of specific nursery lines from cradle to grave.

Further investment in this tool is required to benchmark the carbon footprint of production nurseries across Australia. This will ensure the industry has quantifiable data reflecting the whole of industry emission profile. Emission benchmarking, based on nursery best practice emissions, will be reviewed and updated as technology improves.

NGIA recognises that greater adoption of renewable energy technologies is a sound approach in reducing the demand on non-renewable energy, hence reducing greenhouse gas emissions. The industry has developed calculators and resources to assist production nurseries determine renewable energy resources that can be integrated into their operations to save energy costs and reduce greenhouse gas emissions.

NGIA encourages governments to invest in appropriately designed programs that facilitate greater adoption of renewable energy through installation rebates and feed-in tariffs.



### 3. Building on industry best management practice – recognising and supporting the Nursery Production Farm Management System as a key adaptation strategy for the Australian nursery industry and investment in research, development and extension activities.

The Australian NGI seeks recognition and support of the Nursery Production Farm Management System (FMS) by all levels of government as the key adaption strategy for the local industry. This industry driven best management practice scheme provides production nurseries and growing media suppliers with a framework for sound on-farm risk management in relation to climate change and variability. It is imperative businesses possess the relevant knowledge and skills to make informed management decisions and at the same time, prepare for a carbon economy.

The Nursery Production FMS incorporates the Nursery Industry Accreditation Scheme Australia – Best Management Practices (NIASA-BMP), EcoHort® (which promotes best management practices in environmental and natural resource management) and BioSecure HACCP (which promotes best practice in pest and disease management and biosecurity risk assessment and management). The Nursery Production FMS could provide an opportune and complementary transitional measure to encourage businesses to take early action to mitigate emissions and enhance effective business management decision making.

It is imperative these programs utilise the best available science and are regularly updated as research evolves and new findings on innovative practices to reduce greenhouse emissions become available. Investment in research and development into these best practice programs is vital to ensure these programs are relevant and in line with innovation and

technological advancements in climate change and variability issues. Research into issues such as pests that pose high risks of spread given new climate conditions will further assist in building capacity for the Australian NGI.

Ongoing investment is also required to ensure the resources are available to deliver this valuable program to whole of industry through a skilled industry

development officer (IDO) extension network. Extension activities will ensure businesses can apply the outcomes of the Nursery Production FMS, as well as provide businesses with the outcomes of other government and industry research and development programs to directly address climate change and variability





#### 4. Recognising the role of Australian's urban forest in managing climate change and variability – driving government and relevant authority support for the greater community protecting this asset.

The urban forest is a vital resource in managing climate variability and change. Recognition of the urban forest in policy as a community asset in the health and wellbeing of the Australian population, mitigating climate change and variability and increasing the economic prosperity of the Australian economy, is urgently required across all levels of government.

##### ***a. Realising the indirect benefits of the Australian urban forest in managing climate change and variability.***

In addition to direct removal of carbon through photosynthesis and carbon sequestration, urban forests have a multitude of indirect public benefits including mitigating the Urban Heat Island Effect (UHIE), where urban areas become warmer than the surrounding rural countryside, often by several degrees. This is attributed to large expanses of paved and dark surfaces in urban environments such as roads, car parks and roofs.

This phenomenon is potentially deadly for city dwellers, as heat stress associated with elevated temperatures is linked to higher rates of human mortality and illness, particularly amongst vulnerable demographics such as the elderly, lowers socio-economic groups and residents in high density, older housing stock with limited surrounding vegetation.

Urban forests can achieve this by providing shade in summer, reducing the absorption of heat by hard surfaces. Vegetation in urban forests can also cool the air by a process

known as transpiration where water within a plant is lost as water vapour from the leaf surface. This in turn cools the surrounding air and acts as a natural air-conditioner. Vegetation can also reduce wind speeds and further decrease both cooling and heating demand.

Lowered air temperatures and wind speeds from Australia's urban forest can also reduce cooling costs and peak energy demand, resulting in reduced greenhouse gas emissions from power plants.

Research commissioned by NGIA into the energy savings provided by street trees in four suburbs of Melbourne indicates 11,253 GJ of energy savings, valued at \$468,373, can be provided. These savings result from reduced emissions associated with air-conditioned dwellings, as well as reduced gas use for heating in winter. Urban forests improve thermal comfort in outdoor areas, reduce heat stress related events and in general enhance the liveability of Australia urban environments.

##### ***b. Investing in research to quantify the benefits associated with the Australian urban forest to better demonstrate its value.***

Urgent investment to quantify the benefits of the urban forest is required to efficiently and effectively manage this valuable resource and provide a sound platform for strategic planning and decision-making at local, state and national levels.





To aid this process, modelling based off the i-Tree peer reviewed software suite developed by the Centre for Urban Forest Research unit of the US Department of Agriculture (USDA) is required. This model provides a dollar value for the environmental benefits created by urban forests and can also quantify the value of urban forests in reducing energy related carbon emissions and sequestering carbon.

In addition, this tool calculates the costs involved in maintaining urban green-life, including establishment costs and pruning, which can be weighed against the benefits. Although this tool has been successfully applied across the US and other countries in the northern hemisphere, its application in Australia requires further research owing to differences in climatic conditions, as well as plant species considerations.

### ***c. Increasing the canopy cover of the Australian urban forest***

To maximise the environmental benefits associated with urban forest, it is important the canopy cover of the Australian urban forest is increased by targeting suitable public spaces in urban and regional corridors. This process will require open dialogue with the Australian NGI and relevant authorities and community groups, in accordance with principles of public safety, including fire and road safety provisions. This includes street verges, car parking lots and any other areas deficit in vegetation, or areas with an exposure of hard surfaces.

Vegetation should be provided with an optimal growing environment where possible, including plenty of room to grow both above and below ground. In meeting canopy cover targets, it is important at all times to involve the community where possible to ensure they become a direct partner, participant and 'owner' of this community asset.

The following considerations are required by governments at all levels:

- Create a diverse urban forest habitat, with trees of different ages and species, to promote a continuous canopy cover over time and allow for natural succession.
- Consider species with similar landscape maintenance requirements to minimise inputs such as irrigation, pruning/canopy maintenance, fertilisation and weed, pest and disease control.
- Immediately replace dead or dying trees to compensate for CO<sub>2</sub> lost through tree and stump removal.
- Quantify cultural practices such as mulching in terms of the carbon uptake provided by the urban forest.
- Evaluate the most carbon friendly way to manage the urban forest in relation to fertiliser and irrigation management.
- Improve soil carbon in urban forests and support management techniques that sequester soil carbon.
- Encourage more trees to shade west and east facing windows and walls of dwellings and avoid planting trees to the south of buildings.
- Shade air-conditioners to increase their operating efficiency while not obstructing their air flow.
- In suitable public spaces that are longer than the building, create multi-row, evergreen windbreaks to lower wind speeds and decrease cooling and heating demand.





## 5. Considerations for government and relevant authorities in their approach to urban town planning – greater recognition of the Australian urban forest.

Threatening this access to urban green space is the design of new urban developments in cities across Australia. Many new housing estates have dwellings that extend near to the boundary of the plot, minimising the size of the backyard and leaving very little private amenity space to the rear of the dwelling and in extreme cases, none at all.

Future planning decisions need to realise the contribution of the urban forest in ameliorating the UHIE. NGIA would like to see all Australians living in towns and cities with access to natural green space of at least two hectares in size, located no more than 300 metres (or five minutes walking distance) from their place of residence and work.

In Australia, urban sprawl will continue to accelerate air pollution which is attributed to growing vehicle numbers. The State of Australian Cities 2010 report indicated transport emissions are one of the strongest sources of emissions growth in Australia. This is expected to continue, with direct CO<sub>2</sub> equivalent emissions projected to increase 22.6 per cent between 2007 and 2020 – or

around 1.58 per cent per year.

The report also noted respiratory problems are the most commonly reported health condition among children and young adults. It is estimated that respiratory conditions and exposure to air pollution accounts for 2.3 per cent of all deaths in Australia at present.

Trees and vegetation are pertinent in urban centres to ameliorate air pollution. The value of vegetation has been explored globally and it has been well documented that vegetation can remove air pollutants including particulate matter less than 10µm (PM<sub>10</sub>), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>) and volatile organic compounds (VOCs). These pollutants are either removed through direct absorption via uptake through leaf stomata, or interception into the tree or onto the tree surface. In addition to direct removal, the transpiration and canopy size of trees can reduce ambient temperatures,

which in turn can directly reduce the frequency and intensity of ground-level O<sub>3</sub>, the key component of smog.

NGIA is currently researching the capacity for trees to remove pollutants from urban communities, in addition to the energy saving benefits discussed earlier. To date, data collected suggests street trees in four suburbs can directly remove 2890kg of air pollutants per annum. The value of this contribution in town planning is warranted in future planning decisions.





## 6. Providing incentives to the Australian community to support greener communities - investing in community green infrastructure grants.

Greener communities will increase the biodiversity in urban and regional corridors and help maintain the stability of natural systems that supply ecosystem services.

Conserving existing vegetation and providing incentives to increase the green space using suitable public spaces in urban and regional corridors is urgently required.

Allocation of trees through competitive grants could serve as an opportunity to increase the aggregate extent of the urban forest (i.e. increase tree plantings) to increase canopy cover targets whilst encouraging the community to be a direct partner, participant and 'owner' of these assets.

These grants would also protect and maintain existing areas of conservation interest, enhancing biodiversity. Grants, fiscal incentives and policy decisions that support the implementation of greening projects and programs are required at local, state and federal levels. These initiatives would:

- **Increase productivity** – by generating a new green industry and green jobs (e.g. green roof installations, consultants, contractors and researchers).

- **Enhance liveability** – by providing the Australian community with access to multiple physical and mental health benefits (e.g. community gardens, sensory gardens etc.).

- **Promote sustainability** – by reducing energy use, remediate atmospheric pollutants and mitigate climate change and variability.

- **Enhance biodiversity** – by providing food, shelter and places to breed for invertebrate and bird species.

- **Increase property asset values** – by increasing the appeal of properties and consequently their sale price.

- **Increase retail spending** – by attracting customers to green precincts and increasing their retail spend and time spent in these precincts.

Collectively, this will result in Australia becoming an emerging 'Green Metropolis' attracting global investment and tourism opportunities.





# Maintaining an informed community



Communicating climate change and variability impacts and opportunities to industry and the wider public is an important component of these strategies. To ensure issues contained in this policy position are understood by all sectors of the Australian NGI, effective communication to relevant parties is important to facilitate appropriate business management and decision-making.

NGIA will ensure growers are equipped with the tools and resources to help minimise their environmental footprint and better adapt to climate change and variability. It is important growers have the necessary information about government policies which could affect their operations to build industry resilience and develop capacity to assess the opportunities as well as the impacts.

The Australian NGI also has the capacity through the retail sector to make a significant impact on educating the wider community about climate change and variability. These pseudo 'climate change and variability shop-fronts' are ideally positioned to deliver key messages regarding the role of urban forestry in addressing the challenges of climate change and variability.



The Australian NGI will work on educational campaigns to promote how individuals and communities can utilise plants as a solution to climate change and variability. In 2011, NGIA is launching a consumer campaign; "Improve Your Plant/Life Balance". This campaign aims to educate, engage and inspire consumers on the value of green life in their lives and its role in the health and wellbeing of individuals and the community.

## Further information

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**February 2011**

*All photography by Dr Anthony Kachenko except Parliament House, Canberra, p4 by John O'Neill*



*This policy position has been funded by Horticulture Australia Limited using the Nursery Industry Levy and matched funds from the Australian Government.*

