The 2050 Garden: Exploring plants and practices in a changing climate

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The Climatic Research Unit and the Tyndall Centre for Climate Change Research at the University of East Anglia were delighted to receive from the RHS a Silver Lindley Medal for their exhibition *The 2050 Garden*. The 2050 Garden was developed in response to an invitation from the RHS to participate in the Continuous Learning theme of climate change alongside several other UK research and teaching establishments. The 2050 Garden was the work of young researchers Saffron O'Neill and Johanna Forster with local plantsman Ian Stanton, landscaper Graham Wilson, and graphics by Rocket Design. It was a small exhibition garden with dimensions of 5m x 5m.

The silver-medal award winning Chelsea 2050 Garden

Exploring 'The 2050 Garden'

The exhibit reflected upon the traditional British country garden, before looking to gardens of the future under a changed climate. The visitor was taken on a journey through time from the RHS Chelsea Flower Show of 1950 to the Flower Show of 2050.

Primary and secondary information boards in the Heritage Garden

The Heritage Garden

The Heritage garden represented a classic border from the 1950s period, containing quintessentially British cottage garden plants which would have featured at Chelsea in the 1950s, such as Delphinium, foxglove (Digitalis), Aquilegia, Azalea and Rhododendron. Such typical cottage garden planting may be threatened by climate change because of increasing emissions leading to higher temperatures and changing rainfall.

The 'Low' emissions garden

100 years on from the Heritage garden, this part of the exhibit represented a low emissions future. To achieve the 'low' emissions level reflected in this future garden, a far higher standard of worldwide environmental care is needed than is currently the case. Nevertheless, the low emissions future still has higher global emissions than today. Both the lowest winter and highest summer average temperatures have increased by over one degree Celsius from today. The growing season has lengthened with fewer cold spring and autumn nights. Mulch and ground cover plants are used to help conserve the soil moisture.

The garden showed a range of plants which are already grown in some UK gardens, but often need a sheltered position and some protection through the colder months. These plants would thrive without winter protection under the 'low' emissions future. Strong sculptural plants featured here are *Cupressus sempervirens*, *Acacia dealbata*, Loquat (*Eriobotrya japonica*) and the European fan palm (*Chamaerops humilis*).

The 'High' emissions garden

This part of the exhibit represents a future 2050s garden, with higher global emissions than experienced by the 'low emissions' and Heritage garden. The world described in the 'high emissions' garden arises from the continued intensive burning of fossil-fuels and rapid global economic development. The lowest winter and highest average summer temperatures have increased by over 2°C from the current average, and the

growing season is a little longer in spring and significantly longer in autumn. Extreme weather is likely to become significant for gardeners, and planting will take into account the likelihood of increasing storm damage. Gardens will need to cope with bouts of intense rainfall, but also droughts will become more common.

The high emissions garden featured plants that are now more commonly grown in a cool conservatory for at least part of the year. These half-hardy species may now be grown outside year round. This garden featured *Plumbago capensis*, and the parrot claw plant (*Clianthus puriceus*), hardier cacti and succulents providing strong sculptural features, such as *Aeonium arboreum* 'Schwartskoft'

Within each of the three gardens there were information boards explaining the climate scenario, the likely environmental conditions, and the associated garden plants that were on display. Secondary information boards explained changes of particular interest to the gardener, such as longer growing seasons, extremes in rainfall, increases in pests and fewer frosts.

Visitors to the garden were encouraged to post their own observations of how the climate is changing their gardening. These were written on plant labels and placed in the 'ideas box-hedge' at the front of the exhibit.

Challenges of communicating climate change

The UK Climate Change Bill aims to cut carbon dioxide emissions by 80% by 2050. To accomplish this, widespread attitudinal and behavioural change across society is needed, and there is a need to encourage public motivation to change. Plants, gardens and gardeners are intrinsically linked to weather and climate and provide a wonderful platform for exploring with the public the science of climate change and ideas for living with climate change. The 2050 Garden was designed to explore the impacts of potential climate futures on British gardens, and encourage attitudinal change to climate change.

This exhibit specifically aimed to address the following challenges often associated with engaging non-experts with the subject of climate change:

Abandoning the deficit model

Relying on the 'information deficit model' of science communication is insufficient to meaningfully engage individuals with climate change, with socio-psychological research indicating that there are three facets to engaging non-experts with climate change: cognition, affect and behaviour. The exhibit attempted to address each of these components to meaningful engagement.

Spatial and temporal scales

A key part of engaging non-experts with climate change stems from making a macro-environmental problem more salient to individuals. Research by O'Neill (2008) indicates that individuals are generally more engaged with climate change when experienced through their own locality. Plants and gardeners are intrinsically linked to weather and climate, and provide a fitting platform to explore climatic changes, mitigation and adaptation. Furthermore, whilst scientists may use Global Climate Models to project emissions to 2100, individuals find it difficult to imagine timescales

of more than 50 years into the future (Drotz-Sjöberg, 2006). We hypothesised that individuals may find it easier to consider a timescale in the distant future if they have first imagined (or remembered) a time period in the more easily conceptualised past. Thus the instillation was based around the concept of a journey through time, starting from 1950 and entering into 2050.

Positive visioning

'Fear won't do it' when it comes to communicating climate change (O'Neill and Nicholson-Cole, 2009). Thus, the 2050 Garden was designed to be colourful and accessible, and to immediately appeal to keen horticulturalists through the use of rare and interesting plant species, and unusual planting combinations. Visitors were encouraged to walk around the garden and talk to the climate scientists on hand throughout each day about the garden. Both the positive and negative aspects of gardening in a changing climate were displayed. Adaptive solutions and mitigative options were both presented and sought from the visitors through the 'ideas box-hedge'.

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Author biographies

Dr. Saffron O'Neill is a Tutor in Climate Change at the University of East Anglia, and a Research Fellow with the Tyndall Centre. Her PhD thesis research was titled 'An iconic approach to representing climate change', and was also undertaken at the University of East Anglia. Saffron's research interests are centred on an interdisciplinary approach linking the physical climate sciences with sociology and psychology.

Johanna Forster's primary research interests focus on human-wildlife interactions and biodiversity conservation, in particular with regards to the conservation of marine ecosystems. She is currently researching coral reef resource users associated with the tourism industry in the Caribbean in order to examine the resilience of tourism-related reef activities and threats to livelihood security and sustainable resource use under future climate change.