

Climate change and garden related industries

Climate change will have significant impacts for garden-related industries such as nurseries and garden centres in relation to two aspects: operational effects and market opportunities.

8.1 Impacts on operations

Insofar as these enterprises are growers of plants, they will meet the much the same type of opportunities and risks as those facing gardens.

Higher mean temperatures will allow a wider range of plants to be grown (see Table 9, page 110), but extreme weather events may cause more damage. This damage will be exacerbated where plants are grown in plastic tunnels or glasshouses, which are themselves vulnerable to hail storms and strong winds, and in containers. Container grown plants with their root systems confined, often in a black container, are more susceptible to root damage from exceptionally high or low temperatures, than are established plants in gardens. Notcutt (*pers. comm.*) has pointed out that there has not been an exceptionally severe winter since 1962/3, at which time container plant production was in its infancy. A severe winter now that container plant production is the norm, could have devastating consequences for nurseries and garden centres.

Reduced availability of water in the summer will have major implications for nursery stock production. Even if not rationed, the cost of mains water is likely to increase as will the cost of boreholes, reservoirs and water treatment plants which may be necessitated by tighter regulation of water supplies. Container grown plants are much more susceptible to moisture stress in hot, especially windy, conditions than are plants in the open ground, so a reliable water supply is essential regardless of cost. Water conservation, recycling and adoption of more efficient irrigation systems will help to offset the increasing cost and decreasing availability of water. Novel work by Horticulture Research International,

East Malling, uses restricted water supply to improve the quality of container grown plants (Cameron, *pers. comm.*). Reduction of wind speed on the nursery, using natural (hedges and trees) or synthetic windbreaks, will also reduce water loss.

Although not strictly a result of climate change, the increasing legislative and societal pressures arising out of general concern for the environment, and therefore stimulated by debate about climate change, will also pose challenges in terms of pesticide and other chemical use, restrictions on peat use, taxation of fuel, recycling of waste materials and tighter safety regulations, all of which will be reflected in higher production costs. Working conditions will deteriorate on very hot days, especially in polythene tunnels and glasshouses, possibly necessitating a midday rest for staff and improved clothing for spray operators or structures with increased ventilation.

More unsettled conditions arising from climate change will also have impacts on plant production. Container grown trees and shrubs, in particular, are inherently unstable and will fall over in high winds or heavy rain. Although a nursery will not usually face the type of wind-blow risk which faces the owner of a garden with mature trees, young trees will be damaged if containers are blown over. The cost of setting trees upright after a gale, or of staking to prevent blowing over, or of writing off damaged stock is considerable. More attention to shelter will reduce wind damage. Howard's Nursery in Norfolk uses living windbreaks of *Miscanthus sacchariflorus*, which also has some potential as biomass for fuel. Increasing the weight of compost, although introducing other problems, would make plants more stable, and probably better able to adjust from the nursery to more normal, mineral soils. Container design could also be developed to improve stability.

Nursery infrastructure will also be affected by climate change. A hailstorm at Notcutts nursery in August 1987 caused damage to polythene tunnels

and glasshouses, as well as to plants, with costs exceeding that of all frost damage in the past 50 years. Notcutts garden centre in Peterborough was flooded at Easter 1998 causing widespread loss to property and stock, and a flood during the same period at the National Trust's Bodiam Castle (Kent) destroyed the gift shop's entire stock.

Indirect losses as a result of adverse weather conditions can be even more devastating. The flooding at Notcutts Peterborough centre resulted in loss of trade at a crucial time of year for sales. At present, 50% of garden centre sales are concentrated into a few weeks of spring and early summer. Hilliers Nurseries sell two-thirds of their stock in March, April and May (Woodhead, *pers. comm.*) Drought also reduces interest in gardening and has a major impact on the purchase of plants, lawn mowers and other equipment.

Perhaps the most significant implications of climate change for garden industries will arise from extreme weather events, such as droughts and floods. These events may affect garden industries more severely than they affect gardens. The loss of trees in a storm will be a devastating but temporary setback in the lifespan of a garden, incurring extra costs and reducing visitor numbers during closure, but the garden has considerable cultural momentum. Suitably informed, visitors might be encouraged to visit in larger numbers to see the devastation from a safe vantage point and to support repair efforts. The loss of stock or of structures on a commercial nursery engenders no such sympathy and, without adequate reserves or costly insurance, there is a serious risk of bankruptcy.

The key to survival will be adaptability and management of risk. Irrigation equipment may be necessary as temperatures rise and summer rainfall declines but it may be less acceptable as water shortages become more severe. A company which continues to produce only hosepipes might run into trouble. One which diversifies into water butts, grey water treatment and mulch mats would probably flourish.

To survive, businesses will need to understand that the only constant is change. For instance, plants were grown in non-peat composts for centuries before peat became widespread less than half a century ago.

Among the benefits of historic garden conservation has been the rediscovery of more sustainable methods of production and the realisation that it is possible to make a profitable enterprise out of demonstrating these methods. The use of sun frames rather than sophisticated mist units in plant propagation, traditional techniques of composting and organic production, and biological control of pests, have all led to more sustainable plant production systems and often reduced costs of production. In addition to the direct advantages which these developments produce, the success of demonstrating such techniques at the 'Lost' Garden of Heligan (Cornwall), for example, shows the commercial advantages of adopting them.

Growers will be affected in the same way as gardens will be by very high temperatures, water deficits and other climatic changes, but because the nursery stock and garden centre industry relies on rapid throughput of plants, it will be particularly vulnerable to extreme weather events. Awareness of the risk climate change poses is important. Coping with risks will require business decisions, balancing reserves against increased profits or increased investment, as much as any physical response. The costs, savings and benefits of climate change adaptations should be calculated in relation to the costs of increased productivity or decreased damage.

8.2 Impacts on marketing opportunities

The warmer temperatures that should result from climate change may stimulate the enthusiasm for gardening and the use of gardens. The sale of garden products, such as garden furniture, tools and equipment for an outdoor lifestyle, may therefore increase.

Climate change also offers the opportunity for introducing new exotic species onto British patios and possibly even the open ground, benefiting both suppliers and customers. However, successful establishment of exotics depends crucially on adequate hardening off. For example Citrus 'Meyer's Lemon' has been cultivated outdoors in the UK for several years. The plant is grown by UK raisers under glasshouse conditions, but needs careful hardening off if it has a reasonable chance of sur-

viving outdoors. Many retailers are importing exotic new species from warmer countries. Without suitable hardening off, it is likely that such imported plants may not survive the transition from growing in a warm climate to a cool one.

Similarly for many potential new garden species, there exist in the UK selected clones which have demonstrated their hardiness. If the same species are obtained from abroad it is likely that less hardy clones will be selected with the resulting poor establishment. Clonal selection of exotic species for growing in the UK is therefore important.

As gardeners become more adventurous, the loss of garden plants from drought, floods or late frosts should potentially be beneficial for the garden industries if they can themselves manage to escape the worst effects of extreme weather events.

Some idea of what may be possible in terms of planting in warmer conditions can be seen in gardens such as Tresco on the Isles of Scilly, or in many Cornish gardens, which enjoy exceptionally mild climates. Nurseries such as Hilliers are expanding their range of Mediterranean plants and palms (Woodhead, *pers. comm.*) and others are exploring the boundaries of what is possible in relation to the introduction of exotic new species into British gardens (Emmett, *pers. comm.*).

A sophisticated international network of breeders and growers is feeding new plants into UK garden centres, especially half-hardy bedding container, and hanging basket plants from Australia, California, Germany and elsewhere. Decrease in size of new gardens, an increasing emphasis on outdoor leisure and disinclination to struggle to maintain small lawns is leading to an explosion of demand for decking and containers.

Encouragement to change the contents of containers several times each year could stimulate an increase in year-round sales of plants and perhaps reduce the risks currently incurred in heavy dependence on spring sales. Indeed, autumn planting in general may become more popular. Before the advent of container plant production the majority of planting in UK gardens was carried out with bare

root plants in October, November and December. The availability of container plants has shifted the main planting season to the spring when more pleasant planting conditions usually prevail. A trend to warmer, drier autumns and increasingly mild winters could regenerate interest in autumn planting, a move which would also reduce the risk of losses of newly (spring) planted material in summer droughts. A particular opportunity for nurserymen will arise, as summer temperatures increase and summer rainfall decreases, of focussing customer attention on autumn gardening as a sign that the heat of summer is over in much the same way that spring sales reflect delight in the end of winter. This will require research and development of new crops and crop schedules and a considerable marketing effort, but potential rewards are substantial.

Table 9, overleaf, indicates species that have potential as new garden plants in the future conditions of climate change.

Quite often it is not the ability to survive winter cold that limits the introduction of new species into UK gardens, but their ability to tolerate wet conditions. For example many cactus species can tolerate temperatures well below freezing, but will not tolerate wet conditions. Retailers may introduce new species which are cold tolerant, but may be quite intolerant to the wet conditions which inevitably occur during UK winters. As well as the possibility of introducing new exotic species into gardens many 'less exotic' species are likely to do better under conditions of climate change. For example, cyclamen will thrive in milder winters and drier summers.

Climate change is likely to alter and expand the range of plants which can be grown in the UK. There is potential to encourage gardeners to use their gardens more and to invest in them more, whether on new outdoor furniture, new exotic plants or water conservation equipment.

As with impacts of climate change on garden visitors, so with impacts on garden expenditure, there will be some direct and obvious effect of climate change but marketing will be the main factor in shaping the garden industry market.

Table 9: Plants likely to perform better in a warmer climate. (Source: Emmett [pers. comm.])

The following genera (listed by family) are currently of interest to enthusiasts of exotic gardening because they contain species that are currently on the borderline of cold/wet tolerance in milder regions of the UK.

Agavaceae	<i>Agave</i>
	<i>Cordyline</i> (Torbay palm)
	<i>Yucca</i>
Aizoaceae	<i>Carpobrotus</i> (Hottentot fig)
	<i>Delosperma</i>
	<i>Drosanthemum</i>
Aloaceae	<i>Aloe</i>
Araceae	<i>Alocasia</i>
Arecaceae	<i>Chamaerops</i>)
	<i>Trachycarpus</i>) Palms
	<i>Phoenix</i>)
Bromeliaceae	<i>Fascicularia</i>
	<i>Puya</i>
Cannaceae	<i>Canna</i> (Indian shot)
Crassulaceae	<i>Aeonium</i>
	<i>Crassula</i>
	<i>Echeveria</i>
	<i>Sedum</i>
Musaceae	<i>Ensete</i>
	<i>Musa</i> (Banana)
Myrtaceae	<i>Callistemon</i> (Bottle brush)
	<i>Metrosideros</i>
Oleaceae	<i>Olea</i> (Olive)
Proteaceae	<i>Banksia</i>
	<i>Leucadendron</i>
	<i>Grevillea</i>
	<i>Protea</i>
Restionaceae	<i>Elegia</i>
	<i>Restio</i>
Zingiberaceae	<i>Hedychium</i> (Ginger)