The future of gardening: Unpacking the issues

"There is no clearer illustration of the extent of human dominance of the Earth than the fact that maintaining the diversity of 'wild' species and the functioning of 'wild' ecosystems will require increasing human involvement.", commented an influential group of scientists in Science Magazine, 1997, an irony lost on many I expect.

It is encouraging to see advice on water-wise gardening trending in every form of media, and hopefully, we are all adding many more water-wise species, arranging them in water-use zones, capturing rainwater, and recycling greywater. These are all measures of merit and must be practised irrespective of rainfall volumes, but, with historical weather patterns changing designing resilient landscapes is becoming increasingly more complex one that is not easily solved by plant choice and water recycling alone. To make an effective and long-lasting impact will take a significant shift in how both the professional and the home gardener design and manage urban landscapes. Over the course of the next year we will unpack the issues; what changes can we expect; how will this affect the way we currently garden; how will plants respond to unavoidable disruption? We need to understand a little more about how things work so we can be a part of the solution, rather than being forced to react to whatever events unfold. We too, need to adapt.

For example; we now all know that excessive CO2 levels in the atmosphere will increase temperatures. And so we diligently plant Spekboom as our way of helping to reduce these levels, all the while disrupting natural carbon sinks as we dig and turn the soil, chop down trees, and clear grasslands releasing volumes of CO2 in the process. Lesser known is the fact that these high levels affect plant growth too; specialists call it 'atmospheric fertilisation,' with high pollution levels also creating unusual growing conditions.

Likely ways a changing climate will affect us:

- It is hot and humid today, 36 degrees Celsius; yesterday was 19 degrees Celsius, cool and wet. The historical seasonal, even day-to-day, weather patterns that we rely on for planting, pruning, flower, seeding and fruiting, are increasingly difficult to predict, with wild swings from day to day. Weather events are predicted to be stronger and more prolonged.
- There are already signals from nature that changes are in place; spring is earlier, something most gardeners have already noticed. This poses problems for flower and food growers as warming days are interspersed with sudden cold snaps that can kill off the first buds of the growing season, and leave plants and animals vulnerable. Think too of the fruits you eat, the gorgeous bulbs you plant out for spring colour; many fruiting and flowering plants need a winter rest period and others, a winter chill for hormone production, new leaf growth, and spring bud formation. Warmer winters are already suppressing these functions. So, planting times will shift.
- As the factors that govern plant distribution change – relative humidity, air temperature, soil moisture and structure, seasonal precipitation, sunlight, even wind exposure - we can expect plant boundaries to shift – at the local level, regional, and biome level. Plants then have three choices in responding to climate change: Migration, adaptation, extinction.
- New plant communities will develop. This has already happened of course, as the plant nursery trade increased massively over the last 100 years. Our gardens are all made up of novel plant communities, groupings not found naturally. In very disturbed areas, under tough conditions, plants able to survive drought, tolerate a variety of soil conditions, and recover rapidly after a major

disturbance, will become increasingly important in making up urban plant communities, suggest ecologists. And they are needed to clean the air, absorb CO2, control erosion, and build soils. And provide wildlife habitats.

- Ecologists express concern about the disruption to plant and animal connections; will a specific plant's pollinator respond in the same way, ensuring these ancient synchronistic connections remain in place? How does this affect the pest and predator balance? Gardeners could see an upsurge in pest populations and a decrease in pollinators and predators should there be nothing on which to feed. And once these relationships are out of kilter, the functioning of habitats and full ecosystems are put under pressure. The ability of ecosystems to adapt to disruptions depends on whether there are sufficient redundancies built in; that is, adequate species that fill similar enough roles so that, should one be lost, another can take its place with minimal disruption.
- In the animal world the generalist species – those feeding on a variety of plants – may have less of a challenge to survive. We could, though, lose the niche specialists and they are critical, for what will take their place?

Water management:

The first thing we think about with climate change is access to water; when will it rain? How much will it rain? I don't care about a dirty car; just let me know when I can water the garden! Prolonged drought, higher temperatures, heavier than normal rainfalls will be the norm. In fact, research indicates that, around the world, a higher portion of water is being dumped in just a few heavy rainstorms rather than being more evenly spread through the wet season. This causes other problems; delayed planting, soil compaction, root damage, leaching of soil nutrients, flooding from excessive hard surface run-off. All regions will face water challenges, and resource pressure means increasingly less water for landscape use. If we continue to rely on reticulated water, there will be seasonal and daily pressures on urban water storage systems, and reservoirs and dams will run dry. While arid areas battle to keep landscapes functioning on minimal water levels, gardeners elsewhere are challenged to find plants able to cope with drought, heavy rainfall, and high humidity levels.

A difficult economic climate requires that urban landscapes must be tough and resilient so they can adapt and survive through the years. For, as ecologists, Gunderson and Holling explain, 'resilience requires both persistence and change.'

How do we build these landscapes?

- Build your garden with 'good bones,' suggests US landscape architect, Joan Woodward. (We'll expand on all of these points in future issues).
- Allow flexibility in the design. So, allow plant communities to find their own place; if a plant moves to take up another position, let it. Allow others to colonise newly opened gaps. Plants will die, either as a result of pressure from more aggressive species or when growing conditions change forcing a plant out of its preferred habitat. Do you replace it with the same species, allow another to move in naturally, or experiment with another?
- Don't pamper your plants with irrigation and fertiliser – even be prepared to forgo a helping of compost once in a while. Challenging your plants now, before conditions get worse, will help them to adapt, fight off pests and diseases, and find a way to cope with growing conditions. This approach

will help you sort the weak from the resilient giving you an idea of which species are likely to survive your garden's conditions.

- Relax control and don't force your garden into the static state so typical of conventional landscapes where nothing changes, and each plant must fill it allotted place just so. Allow their spontaneous migration and the re-ordering of communities. Survival must not be a result of your constant input, for the most sustainable gardens are ones that thrive on reduced human input, and natural ecosystem functions.
- We have in the past, chosen plants based not on their suitability to the site but for looks and emotional attachments, and many plants already grow at the furthest reaches of their suitability scale. So as the varying aspects of local climate conditions shift, gardeners may find the favourite standbys begin to falter. But conditions will suit a different spread of plants – some local, others from out of area. What we should not do is increase our input to ensure their survival; this is not sustainable as we head into uncertain conditions.

Humans expect the natural world to adapt to our wants and likes, to the results of our mismanagement from decisions taken with scant regard for the environment. If we want to protect food resources and ensure the planet continues to welcome us, we must make changes too, and gardeners can take the lead in this by giving the local flora and fauna a helping hand. I don't believe moving to Mars is an option; the journey seems a long and tedious one, and there are no trees or insects. I cannot imagine not being able to hug a tree and listen to the buzzing of the bees.