

# The DOOR Manual for Plant Nurseries

Reprint – information current in 1996



Let's **DOOR** Our Own Research  
*The DOOR way to practical solutions*

## REPRINT INFORMATION – PLEASE READ!

For updated information please call 13 25 23 or visit the website [www.deedi.qld.gov.au](http://www.deedi.qld.gov.au)

This publication has been reprinted as a digital book without any changes to the content published in 1996. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research:

- Contacts—many of the contact details may have changed and there could be several new contacts available. The industry organisation may be able to assist you to find the information or services you require.
- Organisation names—most government agencies referred to in this publication have had name changes. Contact the Business Information Centre on 13 25 23 or the industry organisation to find out the current name and contact details for these agencies.
- Additional information—many other sources of information are now available. Contact an agronomist, Business Information Centre on 13 25 23 or the industry organisation for other suggested reading.

Even with these limitations we believe this information kit provides important and valuable information for intending and existing growers.

**This publication was last revised in 1996. The information is not current and the accuracy of the information cannot be guaranteed by the State of Queensland.**

This information has been made available to assist users involved in the nursery and garden industry wishing to conduct their own research. This information is not to be used or relied upon by users for any purpose which may expose the user or any other person to loss or damage. Users should conduct their own inquiries and rely on their own independent professional advice.

While every care has been taken in preparing this publication, the State of Queensland accepts no responsibility for decisions or actions taken as a result of any data, information, statement or advice, expressed or implied, contained in this publication.



Queensland Government

# APPENDIX 1

## DOOR-ACCREDITED CONSULTANTS

Cynthia Carson, Garth Hayes, Mal Hunter, Stuart Scott  
Centre for Amenity Horticulture,  
Redlands Research Station,  
Department of Primary Industries Queensland,  
PO Box 327,  
Cleveland Q 4163

Janet Giles (Statistics) Animal Research Institute, Locked Mail Bag 4, Moorooka Q 4105  
Jim Page (Economics) Nambour and Maroochy Office and Laboratory Complex  
Department of Primary Industries, Queensland  
Sunshine Coast Mail Centre,  
PO Box 5083  
Nambour Q 4560

*Add new consultants as they become qualified.*

## APPENDIX 2

### DOOR-ACCREDITED NURSERY OPERATORS

Herbert Hartwig	Azalea Grove Nursery, 36 Park Ridge Road, Park Ridge Q 4125
Jim Goody	Robina Nursery, PO Box 61, Robina Q 4226
Stephen Collins	Colourwise Nursery, PO Box 714, Redland Bay Q 1465
Rob Burfein	Nev Higgs Nursery, PO Box 328, Wynnum Q 4178
Ian Waters	Penny Royal Herb Farm, Penny Lane, Bundaberg Q 4670
Ian Greet	Lockyer Seedling Producers, M/S 149 Rangeview Drive, Gatton Q 4343
Ian Heymink	Costello's Nursery, 333 Tamborine Mountain Road, Tamborine Q 4270
Mattew Plummer	Newton's Container Trees, PO Box 1210, Springwood Q 4127
Martin Hickey	Cedar Glen Advanced Nursery, "Limerick", Church Road, Eatons Hill Q 4037
Lex McMullin	Birdwood Nursery, M/S 2078, Blackall Range Road, Nambour Q 4560
Carmel Hennessey	Bush Garden Nursey, Lot 29, Tinney Road, Upper Caboolture Q 4506

*Add new operators as they become qualified.*

# APPENDIX 3

## PHILOSOPHY OF R&D MANAGEMENT AND LEARNING: DIFFERENT WAYS OF SOLVING PROBLEMS TOGETHER

**PROFESSOR SHANKARIAH CHAMALA**

### INTRODUCTION

The philosophy of Research and Development (R&D) and technology transfer is being transformed in response to the complex problems of industry in the market-driven and highly competitive new world. Similarly, research, extension, and educational agencies are changing their educational methods and their ways of providing research and extension services to industry. An understanding of the philosophical background to the development of the DOOR (Do-Our-Own-Research) project, will aid the appreciation of this different way of solving problems.

The strengths and weaknesses of the traditional research, development and transfer model will be described. The Participative Action Management (PAM) model (Chamala, 1995), which formed the basis of DOOR project, is briefly explained. The PAM model is a major paradigm, or mind set, shift in the way technology is developed and adopted by stakeholders. Adults learn collaboratively in a win-win mode using adult-learning principles and action-learning processes. The role of consultants and other service agencies in collaborative learning is briefly outlined.

### TRADITIONAL MODEL OF TECHNOLOGY DEVELOPMENT AND ITS TRANSFER

The traditional research, development and transfer of technology model is presented in figure 1 below.

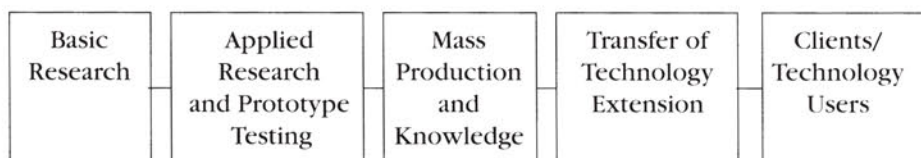


Figure 1 Traditional research, development and transfer of technology model.

In this traditional linear model, the development of scientific research and technology is seen as a top-down, centralised, mostly government run and technocratic approach to solving the agricultural production needs of clients. Technology transfer or extension is simply to tell or sell the technology. Either incentives, penalties (such as legislation) or diplomacy (through education) are used. The client is viewed as very passive and willing to accept anything that is promoted. It is hoped that by working through the most innovative people, the good news will eventually reach everyone. Extension agents used this “trickle down” approach to promote the spread of technology.

This model has its advantages. It helped to bring about the “green revolution” and to increase production. However its limitations, among others, are that government R & D has to concentrate its efforts on the issues of most value to the greatest number of people. Many technologies promoted under this model have not been readily adopted and the reasons for lack of adoption were unclear.

This approach suits research of a general nature, but may be of little use in specific practical situations. For example, a hypothetical new insecticide may have been proven to be very effective in controlling mites in cyclamen. However, this chemical is known to cause serious



chemical burn in fuschias. Where does this leave growers with several indoor foliage lines which are suffering badly from a similar mite? What are the chances that the chemical will control the mites, without burning the valuable stock? Several producers/nurserymen could conduct their own research using the 'trial and error' method. With training, this in house research capacity could be improved to solve industry's specific problems. New models are needed to overcome the limitations of the traditional model to solve complex and specific problems in the horticultural industry.

## **PARTICIPATIVE ACTION MANAGEMENT (PAM) AS THE BASIS FOR DOOR**

Chamala (1990, 1991 and 1995) has developed a new model called Participative Action Management (PAM). This provided the underlying philosophy for the DOOR (Do-Our-Own-Research) project and shaped its management.

What is the PAM model? It is a management model where all relevant agencies, groups and individuals with a common interest in development or R & D come together. They form an appropriate structure, or a platform (e.g. group, partnership, alliance, or corporation) to facilitate joint industry problem solving. The group works for the mutual benefit of the partners. The PAM model is a working-together (or convergence) model where stakeholders' interests are focused on a specific issue, problem or opportunity. This convergence creates energy and the group's plans and guides how this new energy is diverted. The group thus acts as a lens for the collection (convergence) of weak energy and distribution (divergence) of stronger energy. This model is shown in figure 2.

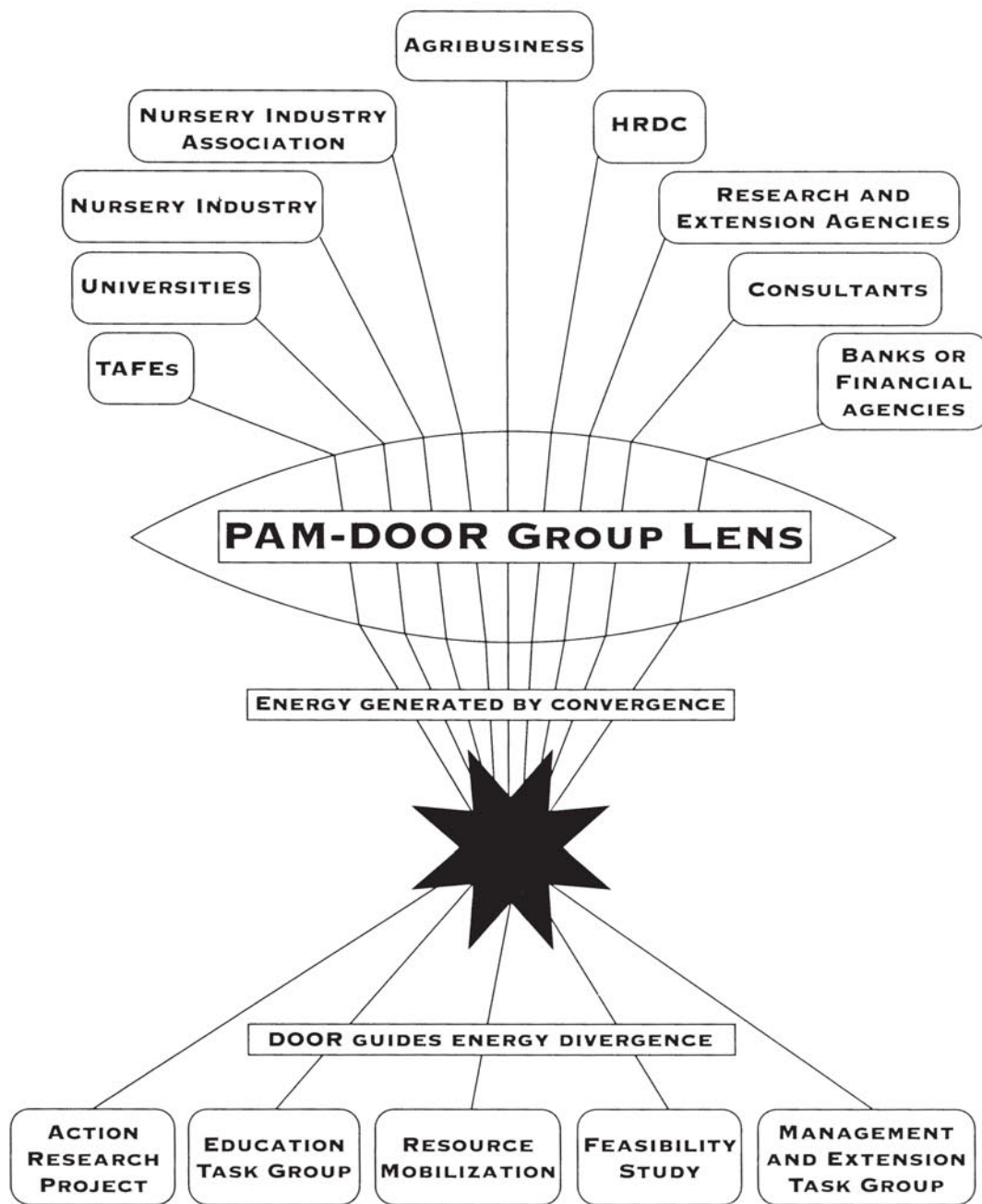


Figure 2 Modified PAM model for DOOR project. PAM DOOR group (lens) focuses energies to yield synergistic, empowering effects.

The overall philosophy of the PAM model comprises 10 principles:

- 1 PAM starts with a systems approach.
- 2 Principle of inclusion — stakeholders' involvement.
- 3 Principle of convergence and directed divergence.
- 4 Empowerment — the cornerstone of the PAM model.
- 5 Individual rights and responsibilities in the DOOR project partnership.
- 6 Building empowering structures.
- 7 Networking with other agencies.
- 8 Encouraging action learning among groups.
- 9 Building group management capacities.
- 10 Sharing the credit/profits in a fair way between the project members.

Further reading on the PAM model, including how to establish a PAM group and planning for PAM groups, may be found in "Overview of Participative Action Approaches in Australian Land and Water Management" by Chamala (in *Participative Approaches for Landcare*, pp 5-42, Ed. S. Chamala and K. Keith, Australian Academic Press, Brisbane, 1995). Participative planning methods are explained by Chamala and Mortiss (1990) and Carmen and Keith (1994).

How does the PAM model operate?

- Shared vision for the industry and its management.
- Participative problem/opportunity identification.
- Participative planning for DOOR and development.
- Participative implementation of DOOR projects and monitoring their progress.
- Developing DOOR teams/groups within the horticulture industry at various levels.
- Developing personal research capacities and problem solving skills.

The DOOR project team adopted the PAM philosophy at its first workshop. This was successful in generating new energies for a pilot project that was well received by industry. Enthusiasm for the concept has spread to a national level. DOOR could open up new opportunities nationally and internationally.

## NEED FOR CULTURE AND MIND SET CHANGES (PARADIGM SHIFTS) FOR DOOR PARTICIPANTS

Capitalist society generally relies on individual gain and competition. In the horticulture industry, with some exceptions, there is a tendency not to share information for fear of losing technical advantage and market share. Similarly, agencies serving the industry, in research and extension, education, consulting or agribusiness have also worked in isolation, sometimes creating confusion in the nursery industry. This approach has promoted duplication and lead to inefficiency in services. It has also promoted dependency between so-called experts and nursery operators.

There is a great need to change from the way industry problem solving has been done in the past and how services have been provided.

The following cultural changes or paradigm shifts among DOOR participants are essential to the success of the DOOR project.

Thus changing or shifting:



- from industry **dependency** on service agencies to **inter-dependency**.
- from **passive** learning to **active** learning.
- from **competition** amongst members to **collective action** and competition for the common good.
- from complete **secrecy** to **sharing information** for mutual benefit.
- from a **one-to-one** mode of action to **collective/collaborative** action.
- from **win-lose** approach to **win-win** approach.
- from **individual** problem solving to **collaborative** problem solving.
- from a **personal efficiency** perspective to industry **bench marking**.
- from **competing** with each other in Australia to **complementing each other** in overseas market development.
- from a **limited** market to an **unlimited international** market **outlook**.
- from **closing the door** on inhouse research to **active participation** in **DOOR projects**.
- from **just taking actions** to **action learning** mode.

## ACTION LEARNING FOR INDIVIDUAL AND COMMON GOALS

Most individuals learn by trial and error, intuition and the school of hard knocks — experience. However, to achieve major mind set changes in problem solving, all the stakeholders (see PAM model) need to collaborate in learning together.

It is important to understand the principles of adult learning, action learning processes and collaborative problem solving. Only then can we alter our paradigms and accelerate the process of change.

People continually seek to acquire the knowledge and skills that will empower (enable) them to understand more, do more, and make more choices in their lives. Understanding the process of adult learning is very important. It has five basic principles.

### **SELF-DIRECTION**

Adults have a deep psychological need to be perceived by others as self-directing. They want to feel, and they want others to know, that they are in charge of their own lives, actions and learning.

### **BUILDING ON EXPERIENCE**

Adults recognise that people learn and change through experience, then see their own experience as part of their identity. If their experience is devalued or ignored, they perceive this as a rejection of themselves as people. Learning must be facilitated and built on their experience.

### **READINESS TO LEARN**

Adults learn things so that they can perform their responsibilities within their occupation, family, or community. They are most ready to learn when they can see that they can immediately use a new skill or new knowledge.

### **PROBLEM-CENTRED LEARNING**

Adults usually learn for immediate application, rather than for some future use.

### **ENJOYMENT AND IMPROVED SELF IMAGE**

Adults choose learning experiences which are enjoyable for them and which enhance their self image as it helps them feel good.



Understanding the basic principles of adult learning helps everyone to know what motivates learning and what blocks or inhibits it. Consultants and others can use this knowledge to facilitate technology and knowledge development for use in practical industry problem solving.

## CHANGING MIND SETS

Changing the usual assumptions, values and attitudes that constitute a mind set that filters outside knowledge is a difficult task. One way to achieve it is through the action learning and collaborative enquiry processes.

Action learning is a process by which individuals or groups of people work on real problems. They reflect on their problem solving process and develop new insights for solving other related problems. It is depicted in a simple four stage process of **plan, act, observe and reflect** (Revans, 1982) (see figure 2).

Good learners go through this process and learn from their experience. Unfortunately, some don't take appropriate action as they cannot see the problem correctly. They lack observation and reflection skills. Solving a problem with other relevant people such as researchers, extension specialists, consultants or other nursery managers, helps to change your mind set. Hence DOOR is a collaborative enquiry process where everyone plays a positive role and contributes appropriate skills to problem solving. The PAM model brings the stakeholders together to collectively solve industry's technological problems. It is an empowering process where everybody plays their part. Smart participants work together for a win-win goal.

## PAM — A SYSTEMS APPROACH

PAM starts with a systems approach. Ecologically, economically and socially we are interconnected. We need to take a systems approach when examining sustainable resource management in the horticulture industry. All water, air, and plant and animal life are inextricably linked. Understanding the interconnectedness of the various sub-systems (segments) of the total system is very important.

The entry point into a DOOR project is different for each individual or group. For example, a nursery operator with a particular potting medium, irrigation regime and fertiliser and pest management program may find that changing his potting media impacts on all his other practices. This, in turn, needs to be analysed to determine the benefits and costs of introducing the change. Consultants can help growers achieve a total system change by helping them see the interconnections within systems. Consultants need to read and gain experience on systems change and how to manage it using collaborative learning methods.

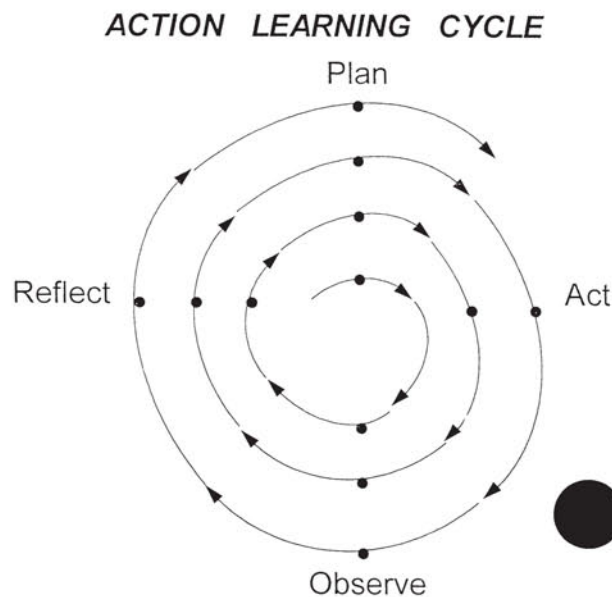


Figure 3 The action learning cycle (modified from Revans, 1982).

# APPENDIX 4

## FACILITATORS NOTES AND RESOURCE MATERIAL

### NOTE 1

Participants may be introduced to the potential ambiguities that can exist in what seems to be a straightforward situation through the young lady/old lady diagram provided below. This image is not copyright and may be copied onto an overhead transparency.



Figure 1 How our perceptions influence our perceptions

### NOTE 2

Pamphlets and further details on the GrowSearch service are available on request. Special bulk purchasing details can be arranged for groups of DOOR participants. At time of going to press, normal annual subscriptions cost \$95, with up to 30 pages of information available for \$30 to casual users. CD-ROM and online searches of international databases are available at commercial rates.

In the pilot workshop for this series, a quick search of world literature through the GrowSearch specialist library revealed the answers to many of the participants' recurring problems.

### NOTE 3

Choose a relatively straightforward example of a scientific paper for workshop participants to work through. The aim should be to build greater confidence in dealing with this material.

## ORNAMENTALS

# Plant hardiness zones for Australia

Iain Dawson

**P**lant hardiness maps allow producers to label their plants as being suitable for particular areas, and, in theory this results in happy customers who can confidently buy plants that will survive in their locality.

Early last year the United States Department of Agriculture (USDA) published an updated version of

*Iain Dawson is employed by CSIRO Division of Plant Industry in Canberra, where he works on the commercial development of Australian native plants. The author thanks Barbara Duus and Trevor Dowling, also with CSIRO, for help in computing the map.*

their map of plant hardiness zones. This divided the US into 11 zones, characterised by their average minimum temperature. Zones 2 to 10 were subdivided into 'A' or 'B', giving a total of 20 zones or sub-zones. These zones only apply to plants growing out of doors with no protection, but have adequate water.

It has been suggested that such a map would be useful for Australia (*Australian Horticulture*, May 1990).

This would be an aid to the plant buyers in Australia, as well as helping exporters to the US describe the hardiness of their plants in a

common language. Similar maps have been drawn before, such as those on the back of many seed packets, but as far as I know none has ever been comparable with the American system.

The statistic used by the USDA is the average annual minimum temperature. This causes immediate confusion. In Australia we use this term to mean the average minimum temperature over the whole year, whereas the USDA means the average, over 10 or more years, of the very lowest temperature observed for each year for each meteorological station. ►

<sup>1</sup> This article originally appeared in *Australian Horticulture*, 1991, volume 89 (8), pages 37-39. It is reproduced here with the kind permission of Iain Dawson, Australian National Botanical Gardens, CSIRO Division of Plant Industry and Australian Horticulture (Rural Press).



## ORNAMENTALS

I prefer to call the USDA term the average annual lowest temperature. This figure tends to make places look very cold! For example, Florida, which we think of as a warm place, is in the US Zone 10 which has minimum temperatures from 30°F to 40°F (-1°C to +4°C). Zone one (eg central Alaska) is below -50°F (-45°C) which is very cold!

### Australian conversion

I have used the same statistic for Australia, but rather than use US zones directly I have modified the limits for each zone. This is because Australia, in winter, is much warmer than most of North America in winter, so the lowest US zones aren't relevant. All of Australia (excluding Macquarie Island) is covered by just over four US zones (7b-11). To make the map more useful to Australians I have created seven zones to fit our climatic range, and used metric units.

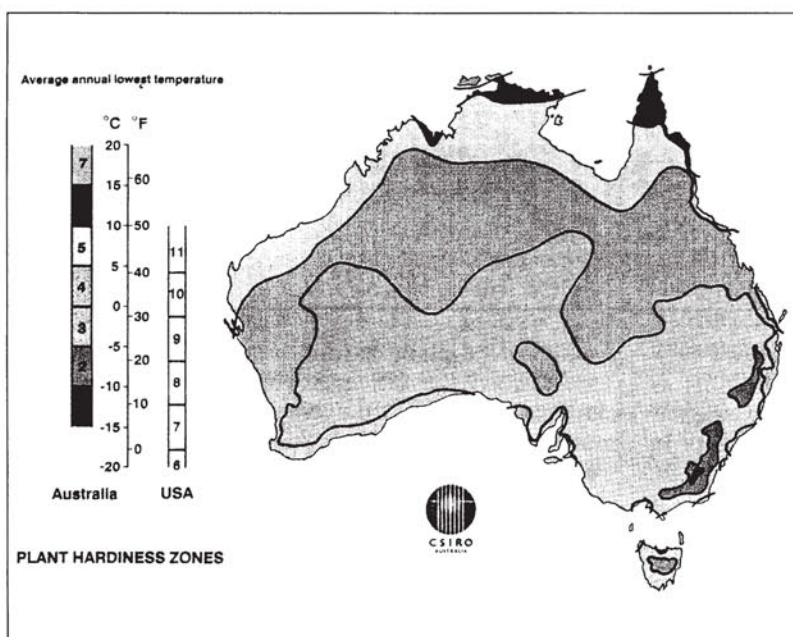
The limits to each zone, and a comparison of US and Australian zones, are shown alongside the map.

The main factors determining average lowest temperature are altitude, latitude and proximity to the coast. Zone 1 covers the alpine areas of south eastern Australia.

Zone 2 the tablelands of south east Queensland, New South Wales and Victoria, and the uplands of central Tasmania.

Much of the southern half of the continent is in Zone 3, except for localities on or near the coast.

Many of our weather stations are on the coast on off-shore islands (some of them are lighthouses) and these are often a zone or two higher than adjacent mainland stations because of the warming effect of the ocean in winter.



Australian plant hardiness zone map prepared by Iain Dawson, CSIRO, Canberra.

As a result of this warming effect Zone 4, which covers a broad area of coastal Queensland in the east across the continent to Shark Bay and Geraldton in the west, also includes Sydney and the north coast of NSW, the Mornington Peninsula, areas adjacent to Spencer Gulf and Adelaide, the south western coastal zone, along with a number of localities dotted all around the southern coast of the continent.

Zone 5 covers some of the Queensland coast, Western Australia north of Shark Bay and across the Top End. Zone 6 includes the Queensland coast north of Cairns, Cape York Peninsula and the coast of the Northern Territory. Zone 7 is mainly restricted to islands off the north coast.

There are many problems with maps of this type. For example, the spread of weather stations is insufficient to give good resolution of the zones and too many places with different climates are lumped together. In Australia we have only 738 stations with a record of more than 10 years. This is one station per 98,491 ha.

Admittedly, the more populated areas have relatively fewer hectares per station but the basic difficulty

remains. Even worse are the problem of local factors such as aspect, altitude, proximity to the sea and so forth. For example, Mt Isa has three climatic stations with more than a 10 year record.

One is a Zone 4a, one a Zone 4b and the other is in Zone 5a.

Sydney residents can choose between Zones 3a to 4b depending which station is used. Most other cities have similar problems. Everyone is aware that different locations in the same city or

suburb are suitable for different plants but it is hard to quantify these differences and even harder to draw a meaningful map.

There may even be a case for publishing a list of weather stations and their zone classification so that people can decide for themselves which is the most appropriate location to use for their local conditions.

### Map variables

Plant hardiness refers to their ability to survive the conditions of a particular location, including tolerance of heat, soil moisture, humidity and so on. Other environmental factors may be important but this map is based only on how well they survive low temperatures in winter.

Even that is a gross oversimplification. For example, are plants affected more by a single extremely low temperature night, or is the number of days of frost (the duration of winter) more important? In fact both are important, but the statistic for the map only relates directly to the former.

Another limitation is plants will often survive in an area for some time, but every now and then there will be a catastrophic cold snap that will kill them.



## ORNAMENTALS

Some risk evaluation — the probability of getting a particularly severe low temperature — often would be more useful for each locality rather than the average conditions. Also, many plants will survive in a locality but won't flower if the day length is inappropriate or if they require vernalisation (a particular duration of low temperature).

The low temperature statistic is only appropriate for woody perennial species, and even then its use is limited. With annuals the time of planting can often be adjusted to allow growth beyond their normal geographical range.

### Interpreting the information

The map is only useful as a broad guide. It needs interpretation that takes into account factors other than low temperature that limit plant growth as well as local knowledge.

An alternative system for describing plant hardiness is to use indicator plants (the USDA also publishes a list of these to go with their map). Common plants with known limits to their range are generally used for this purpose. For example, many people will know whether lemons will grow in their locality. If you then say Geraldton wax will grow more or less where lemons grow you have defined the range Geraldton wax with some accuracy.

Unfortunately no two plant species seem to have exactly the same requirements and even within a species there are differences.

At some time in the future we will probably get around the problems associated with plant/climate maps with much more sophisticated data base systems that combine complex climate statistics and advanced plant growth models.

There are already software packages available to help you select landscaping plants. Two that I have seen are the 'Grow What Where' computer version, published by The Australian Plant Study Group, and 'Plantguide' from **Arbordata**.

However, these have limited climatic inputs. You are asked, for example, to select between fairly

vague zones such as 'warm temperate' or 'eastern tablelands'.

Climatic data bases that allow you to assess the chances of particular climatic events and also take into account some local factors (eg what are the chances of getting more than five nights with temperatures lower than  $-10^{\circ}\text{C}$  on a south facing slope in Canberra?) combined with data bases containing detailed knowledge

of plant responses to their environment (eg how many nights of frost can *Pandorea jasminoides* survive?) will go a long way towards answering the question of what grows where.

In the near future, when a customer asks if a particular plant will grow in their garden, the retailer will probably turn to a computer, not a map, to find the answer. ☼

# APPENDIX 6

## ORIGIN OF RELEVANT JOURNALS

Southern Hemisphere	Northern Hemisphere
<p><b>Australia</b></p> <ul style="list-style-type: none"> <li>• <i>Australian Horticulture</i></li> <li>• <i>Flower Link</i></li> <li>• <i>Ornamentals Update</i></li> <li>• <i>Australian Plants</i></li> <li>• <i>Floriculture Industry Newsletter</i></li> <li>• <i>Australian Protea Grower</i></li> </ul>	<p><b>United Kingdom</b></p> <ul style="list-style-type: none"> <li>• <i>Grower</i></li> </ul> <p><b>United States of America</b></p> <ul style="list-style-type: none"> <li>• <i>American Nurserymen</i></li> <li>• <i>Connecticut Greenhouse Newsletter</i></li> <li>• <i>Foliage digest</i></li> <li>• <i>Florida Foliage</i></li> <li>• <i>Greenhouse Grower</i></li> <li>• <i>Greenhouse Manager</i></li> <li>• <i>Grower Talks</i></li> <li>• <i>Nursery Manager</i></li> <li>• <i>Ornamental Uplook</i></li> </ul>
<b>Articles from both Northern &amp; Southern Hemisphere</b>	
<p><b>World perspective</b></p> <ul style="list-style-type: none"> <li>• <i>Acta Horticulturae</i></li> <li>• <i>Hortscience</i></li> <li>• <i>International Plant Propagator's Society International Combined Proceedings</i></li> <li>• <i>Journal, American Society for Horticultural Science</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Scientia Horticulturae</i></li> <li>• <i>World Flower Trade Magazine</i></li> <li>• <i>FloraCulture</i></li> </ul>

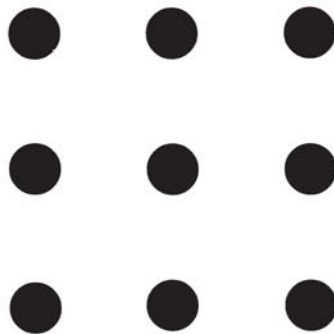
# APPENDIX 7

## VISUAL EXERCISES TO GET BEYOND THE BOUNDARIES

The following nine-dot and cake cutting brainteasers are designed to exercise the right hemisphere of the brain: the creative side. Encourage workshop participants to look for less obvious solutions to the problems. Try breaking some of the clusters of rules (paradigms) that may subconsciously be constraining thought patterns.

Ask the workshop participants for their answers to the brainteasers. They may come up with more than one solution.

### *Nine dot puzzle*



Place a pencil on one of the dots and draw four straight lines through all of the remaining dots, without lifting the pencil from the paper or retracing any of the lines you have drawn.

### *Cake cutting puzzle*

A woman has baked a cake for her party to be attended by eight guests. Her (and your) task is to produce eight pieces of cake with three cuts of the knife.



### *Learning from exercises*

Discuss the following points learnt from these exercises.

### *In problem solving*

- Go outside the boundaries
- Take some risks
- Take new approaches
- Avoid "tunnel vision"
- Avoid setting artificial limits

***In creative thinking***

- Stretch the imagination
- Use the right brain

***In career planning/business***

- Overcome tendencies to set up unrealistic limits, restraints, barriers

***In dealing with prejudices***

- Overcome tendencies to stereotype, limit, or narrowly define others

***In developing assertiveness***

- Look for new options as opposed to staying “frozen” in a given non-productive position.