

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

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 We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research: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.

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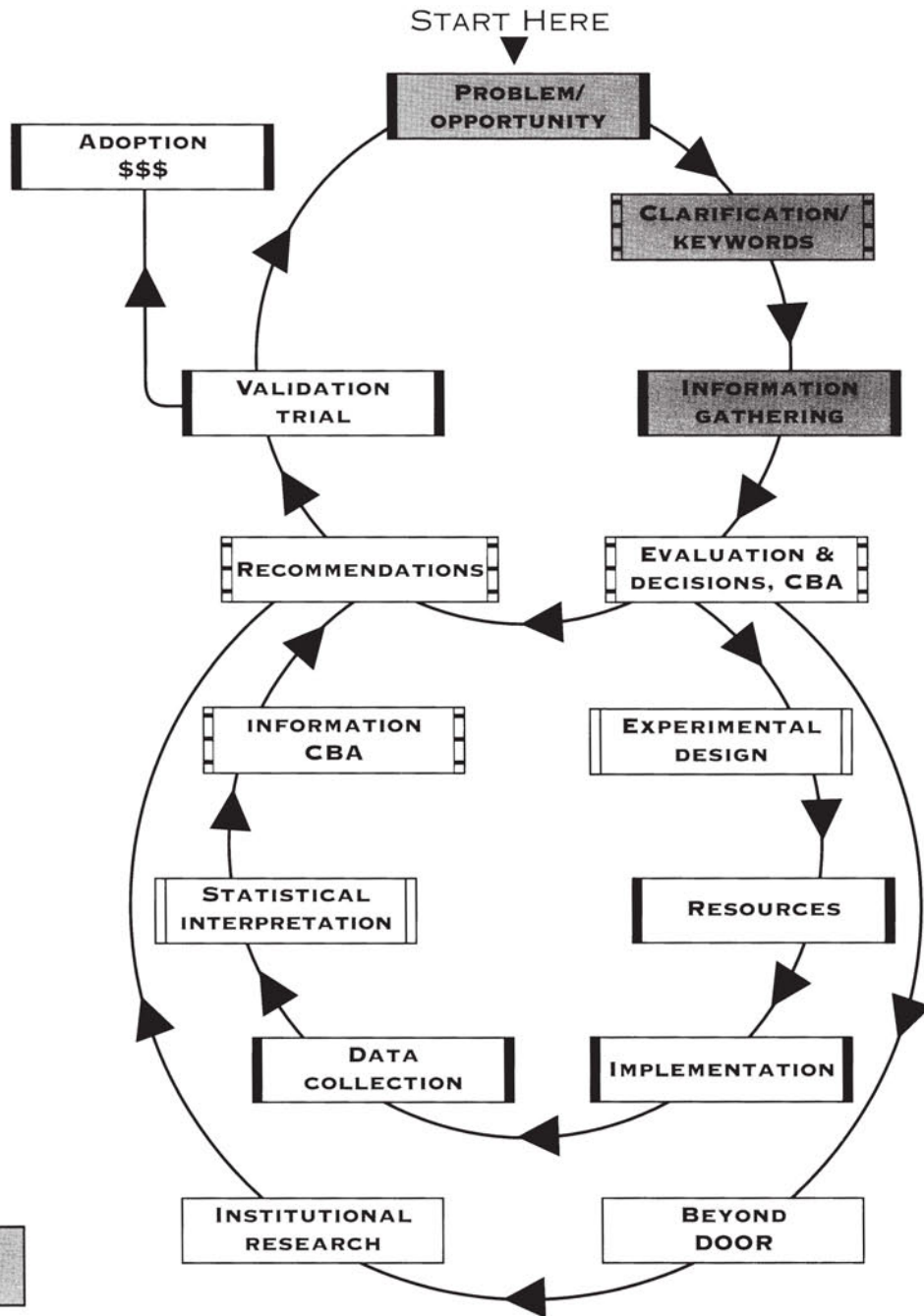
**PROBLEMS,
OPPORTUNITIES AND
GATHERING
INFORMATION**

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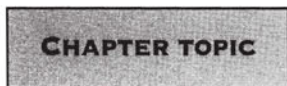
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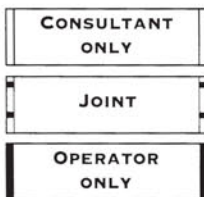
IMPLEMENTATION CYCLE



LEGEND



ACTION KEY



CBA = COST-BENEFIT ANALYSIS

3.1 PROBLEM/OPPORTUNITY

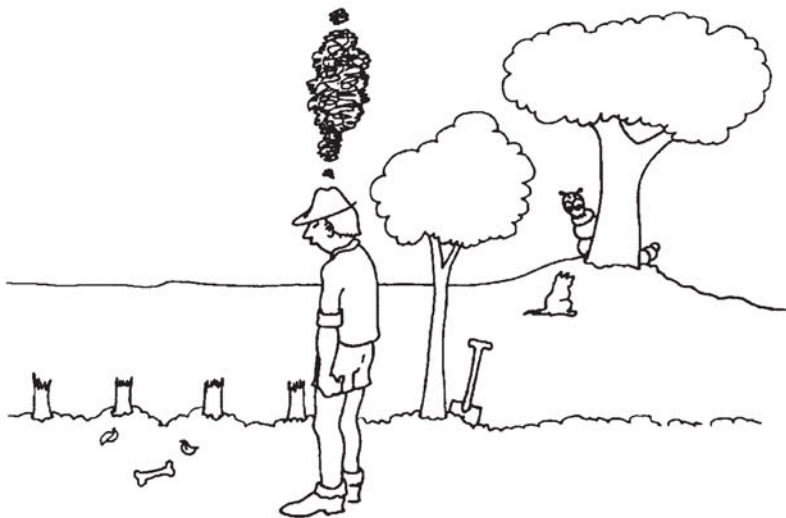
Problems and opportunities are the forerunners to research. They provide the catalysts that advance our knowledge on both small research projects and global breakthroughs. This chapter looks at the problems or opportunities and how to gather the information needed to develop a project.

First you must be aware of the problem's existence. This is the first step of the problem-solving cycle. If there is no perception of a problem, or only a faint "She'll be right mate" awareness of one, this can mean one of three things: there is no issue, or (more dangerously) an opportunity for increased efficiency is being missed, or there is a real problem going unrecognised. If the last, the situation may reduce net revenue and cause serious losses to your business.

Your perception of a problem or opportunity is shaped by what you see and hear, what you read, people that you come into contact with, your level of education, your motivations and your values.

Factors that shape awareness are important because a problem or opportunity is a discrepancy between what is and what should or could be. Compare the existing situation against another: for example, healthy plants versus diseased ones, or the best available practices versus your own. The "closed-shop" culture of the nursery industry can stop you being aware of possibilities for improvement or change.

Personal knowledge, the involvement and feedback of staff and access to a good range of external information reduce the possibility of the missed opportunity or escalating problem because you "didn't know". Once you are aware of a need and you feel motivated, you can move to the next step in the problem-solving cycle.



3.1 PROBLEM/OPPORTUNITY

The first step in the problem-solving cycle is awareness.

- Perceptions of a problem or opportunity are shaped by experience and environment.
- Comparing situations or products helps you recognise problems.
- Stay informed and seek the involvement and feedback of staff.

3.1.1

CLARIFICATION/KEYWORDS

- Problem diagnosis is vital and often overlooked.
- Examine all the facts.
- Avoid making assumptions.
- Observation and record keeping help identify trends, problems and opportunities.
- Ask what?, where?, when?, who?, how?, and why?.
- Define the problem in writing.
- Use keywords and visual representations such as floor plans, photographs, and flow charts.

3.1.1

CLARIFICATION/KEYWORDS

Once you become aware of a problem, you still have to clarify it fully. Problem diagnosis is a vital and often overlooked phase of problem solving. Do not leap from the problem straight to a solution without examining all the facts. For example a nurseryman might say, "The problem is that we need a new propagation house", when in fact some adjustments to the production schedule would solve a seasonal space shortage.

Most experienced growers have an instinctive feel for the underlying cause of a problem. But avoid making assumptions as you gather the facts of the case. Check facts rather than rely on opinions. The purpose of this step is to clarify and assess the problem, not to look for causes.

By setting boundaries, you can break the problem down into more manageable sub-problems. This makes the process of setting attainable goals for DOOR much easier.

Observational skills help build a picture of what is really happening in a business. Combined with good record keeping, this will establish the history behind your current circumstances and allow you to identify trends. Some of the records that could be useful are listed below.

- **Plant species and variety.** Correct labelling helps you to research the problem, with others and in books and journals.
- **Timing of cultural practices.** For example: Can good growth be reasonably expected from cuttings taken in autumn? Have the plants had adequate exposure to daylengths which would trigger flowering?
- **Growing medium.** What were the chemical and physical properties of the growing medium at the time of planting? Have these changed over time?
- **Irrigation.** How are the plants irrigated? What was the water quality? Is it treated? How? What watering schedules were used? Was the watering uniform?
- **Weather conditions.** For example, incidence and severity of frosts, maximum and minimum temperatures, rainfall and amount of solar radiation. Records for your area can often be purchased from the Bureau of Meteorology.
- **Pest and disease outbreaks.** Are there seasonal factors involved? Does the outbreak coincide with a modification in either your cultural practices or spray program? Is this problem new to your nursery?
- **Applied chemicals.** Record the product name, formulation, rate, method and date of application and any combinations used, including fertilisers, pesticides, fungicides, spray additives and growth regulators.

This stage involves observing and describing the *what?*, *where?*, *when?*, *who?*, *how?* and *why?* of a situation. Here you need to make comparisons and gather all available data, including previous records. When does the problem occur? In what circumstances is it absent? You may wish to call in outside experts or have laboratory tests run to improve on your existing information.

Finally, write the problem down. Do you really know what you mean? For example, a problem defined as "How to improve efficiency in the



dispatch shed” might be rewritten as “How to increase output in the dispatch shed in spring from 100 to 130 trays of plants per hour”. Representing some problems as maps, photographs, floor plans, process flow charts or conceptual diagrams can be valuable. List the key terms that may be used later in the literature search.

Having committed your problem or opportunity clearly to paper, you are now ready to gather together all the available information on the issue.

3.2 INFORMATION GATHERING

3.2.1 USE THE EXPERIENCE OF OTHERS

The value of gathering information is that the experience of others can often shorten the problem-solving process. Do not reinvent the wheel. Try to answer these questions: Have others had this problem? What have they done about it? What is the history of the problem in my nursery, my district, my state and overseas?

Enlist the assistance of experts. Make use of information databases through generalist and specialist libraries, use your contacts and save yourself both time and money.

3.2.2 NETWORKING

It is very difficult to succeed in isolation from others. Cooperative research often encourages the sharing of information. Strong industries are based on unity and trust. Technical secrets rarely make or break a business. Appropriate management of finances, staff and the marketplace are what make the real difference between success and failure. Rarely will any of your secrets mean as much to others as they do to you.

A strong network of informed contacts whose knowledge, experience and advice you can rely on (and in turn supplement) is a great business asset. Information sharing and networking benefits individuals and the industry as a whole.

3.2 INFORMATION GATHERING

3.2.1 USE THE EXPERIENCE OF OTHERS

- Information gathering can shorten the problem-solving process.
- Enlist the help of experts, databases, specialist libraries and fellow growers.

3.2.2 NETWORKING

- Networking is very important for business success.
- Enhance your relationships with colleagues by sharing technical information.

3.2.3

WHERE TO FIND INFORMATION

- Personal libraries
- Institutional libraries
- GrowSearch
- CD-ROM
- Electronic transfer/Internet
- Professional information brokers

3.2.3

WHERE TO FIND INFORMATION

Personal libraries

You may start looking in your own library and collection of journals though it may be difficult to locate an article you saw several years ago (see appendix 6). Indexes will help. You are likely to need to draw on external sources as well.

Institutional libraries

University, college, further education and state departments of agriculture, and CSIRO libraries often offer only limited assistance. Information can be accessed via in-house computer systems, costed on-line searches, on CD-ROM (see below), and in specialist abstracting journals (such as *Ornamental Horticulture* or *Horticultural Abstracts*).

Books are usually classified as a series of numbers, representing related topics, and letters. They can be located on the shelves in numerical sequence, followed by the first three letters of the main author's surname and the year of publication. Ask the librarian to help you.

GrowSearch

This specialist library for the nursery and cutflower industry was established in 1994. Searches are carried out by an experienced librarian. GrowSearch has access to the Internet, is a "one-stop shop" for a complete range of information services and provides access to CD-ROM and on-line searches. This service is easy to access, tailored to your industry and relatively inexpensive. GrowSearch is housed at the Department of Primary Industries Centre for Amenity Horticulture, Redlands Research Station, Delancey Street, Cleveland (telephone or facsimile: (07) 3821 3784). Postal address: Redlands Research Station, PO Box 327, Cleveland, Queensland 4163.

CD-ROM

Library searches on CD-ROM are available for material, largely of a scientific nature, indexed from the mid-1980s to the present time. Look elsewhere for earlier articles and more popular literature. There may be a time delay of six months or longer between publication and indexing on to CD-ROM. For the most up-to-date information, on-line searches of international databases are required.

Electronic transfer/Internet

Computer-aided access to external databases using either modems or the wider Internet has become widely accepted. The modem can be used to directly connect you with a database whose telephone number and access codes are known, or to a computer gateway to the Internet. The Internet is an amorphous international collection of thousands of computer entries whose addresses are located in journals, by word of mouth and by using specialised sites that provide "search engines". Service providers charge for the use of their gateways and access to some of the databases is on a fee-for-service basis.

Some formally refereed scientific papers are now published exclusively on the Internet. Unfortunately most information on the Internet is not subject to peer review and the ratio of "junk" to good information has risen in the last few years. The Internet and electronic information transfer will play an important role in the future.



Professional information brokers

Brokers will facilitate a search and the delivery of documents on a subject(s) of your choosing. This service is personalised but can be very expensive.

3.2.4

REVIEWING THE LITERATURE

Do not neglect this important part of the research cycle. Reading is a simple means of bringing the world beyond your gates home to your business. Local and state association newsletters, Australian and international journals, books and workshop proceedings are all useful.

When reading, ask "How relevant are the findings to my situation?". Check the source of the information and the date of publication. Look for clues as to the credibility of the author. How close are the growing conditions to your own?

If the locality or age of the information reduces its relevance, use it cautiously. Take similar action if you doubt the reputation of an author or journal. Further DOOR experience will sharpen your own judgement in reviewing the literature. Your consultant will be able to help you.

Keywords

Unassisted searches will only be as good as the keywords you select. Select problem-defining words that will open the door, but not the flood gates, on your issue. For example a search on the word "nursery" will turn up records on the care of human infants, fish hatcheries and piggeries! Some libraries provide fact sheets on running a successful search. They may also have a thesaurus of broader and narrower search terms that enhance or confine the search. The use of exclusion terms, for example by searching for "nurseries" but specifically excluding "fish", "primates" and "pigs", can help to exclude irrelevant information from your result.

3.2.4

REVIEWING THE LITERATURE

- Revisit past knowledge and critically evaluate current thinking.
- Consider how relevant the information is to your conditions.
- Keywords should be relevant to your subject and designed to exclude other material.
- Scientific papers have a well-defined structure.
- Once understood, scientific papers are a valuable tool.
- The abstract, introduction, and discussion provide the most important and easily understood information for growers.

How to read scientific papers

Scientific papers may be difficult to read because they may sometimes be poorly written and full of jargon. This should not deter the reader since the information can be readily retrieved despite the style. Listed below are the different sections often found in such papers, with some explanation about the sort of information each section normally contains.

Abstract or summary. Read this, maybe you can skip the rest! The abstract ought to be the first one or two paragraphs of a paper and should contain all the essential findings.

Introduction. Provides background information and reviews the topic briefly. This section is usually able to be read and understood by lay people. It can provide other valuable information and clues to additional references.

Materials and methods. Provides details of how the trial was conducted. Check this section to determine whether the techniques used are applicable to your problem. You may also pick up tips on the design of your trial.

Results. Provides details of what happened during the progress of the experiment. Tables, graphs, and diagrams are often presented here. The statistical significance of the data collected is also reported.

Discussion. Sometimes incorporated as Results and Discussion, this section analyses and interprets the results, along with any conclusions, practical implications, and suggestions for further research. Read the discussion. It will contain the crux of the paper.

References. A list of publications that the author has referred to in the text, listed in alphabetical order by principal author, then publication date. If you want to find further information, look up these references.

3.2.5

REGIONAL SPECIFICITY IN SUBJECT USAGE

- When reading overseas articles, take account of different seasons and climate conditions for plant growth.
- Check that chemicals recommended for use in an article are registered for use in your state.
- Convert fertiliser components phosphorus (P) and potassium (K) in US N:P:K ratios to Australian equivalents.

3.2.5

REGIONAL SPECIFICITY IN SUBJECT USAGE

Hemispheres and seasons

Most overseas articles are from the northern hemisphere, therefore the seasons are reversed. A June planting may equate to anything from a spring through to an autumn planting in Australia, after taking into account the climatic zones and microclimate. US publications frequently refer to United States Department of Agriculture plant "Hardiness Zones". Guidelines for interpreting these for Australian conditions are contained in the article "Plant Hardiness Zones for Australia" by Iain Dawson, *Australian Horticulture*, 1991, Volume 90(8), pages 37-39 (see appendix 5).

Chemical registration

Chemicals recommended for the control of a pest or disease in another country or even interstate may not be registered or approved in your state. The National Registration Authority is presently working towards an Australia-wide registration system. Check with "Peskem" (available from the Centre for Pesticide Application and Safety, University of Queensland, Gatton College, Lawes Q. 4345. Telephone: 074 601 291) for current recommendations and application rates for your state. Check with your state department of agriculture for board approvals.

Fertiliser components

Nitrogen (N), phosphorus (P) and potassium (K) ratios for fertilisers in the USA need to be converted to Australian equivalents. A clue to the need for conversion is a P level greater than 10. The P and K are reported as percentages of phosphoric acid and potash (potassium oxide) respectively. The N level remains unchanged, as elemental nitrogen.

To convert, use the following equation: % P = $0.44 \times \% P_2O_5$; % K = $0.83 \times \% K_2O$. For example a 10:14:10 fertiliser in the US system is equivalent to 10:6.2:8.3 in Australia.

