

# Understanding the Problems of Managing Quality in the Handling Chain For Horticultural Products

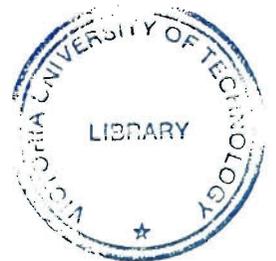
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*A thesis submitted in total fulfilment  
of the requirements for the degree of  
Master of Business*



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April 1995

STA THESIS  
635.04609945 LEE  
30001004467678  
Lee, Karen Wing Sze  
Understanding the problems  
of managing quality in the  
handling chain for

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# Abbreviations

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AHC	Australian Horticultural Corporation
AHQCS	Australian Horticulture Quality Certification Scheme
CCP	Critical Control Point
EG	East Gippsland
EGVIB	East Gippsland Vegetable Industry Broad
HACCP	Hazard Analysis Critical Control Point
MAP	Modified Atmosphere Packaging
QA	Quality Assurance
QC	Quality Control
QM	Quality Management
SEMM	South-East Metropolitan of Melbourne
TQM	Total Quality Management
VFF	Victorian Farmers Federation

# Summary

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In response to the establishment of the East Gippsland Vegetable Industry Board, a major new initiative in fresh vegetable production, marketing and a research program was initiated. It was to examine a number of factors highlighted by the Boston Consulting Group that were inhibiting the industry from becoming world competitive. These factors included the size of individual production units, transport and handling procedures, postharvest care, yield and a poor understanding of the handling chain and market intelligence (Boston Consulting Group, 1992c).

As part of the research program, this study was initiated to analyse the handling chain for fresh horticultural produce. Its purpose was to provide a detailed understanding of the conditions affecting the development of a quality management program. As will be seen in the following literature review, well controlled and operated handling chains are difficult to establish in Australia. Therefore, it is important that this aspect of horticulture be thoroughly understood so that it can be operated efficiently. Such a requirement is rendered more important when it is considered that East Gippsland is at least 300 km from any major port or distribution centre.

This report through the use of a range of methods (i.e. pilot study, survey and case study), and puts forward the thesis that for the long term sustainability of the fresh produce industry in Australia, it is necessary that procedures be established to enable market signals to be better disseminated to all players along the handling chain. This lack of information flow makes it difficult for suppliers to ensure that the product consistently satisfies consumer requirements. Other problems related to material handling, transport efficiency, storage facilities, training needs and quality control procedures are related to the fragmented nature of the industry.

The survey showed a correlation between how well a producer understood the complexity of the handling chain and how he resolved other quality related problems. In overcoming this central issue, three case studies were undertaken to define different kinds of solutions.

While this study makes a number of recommendations, the real challenge for operators in this industry is to put into place as quickly as possible a series of actions that will integrate customers needs into the whole production-distribution-supply system. This suggests the need

## Summary

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for a more coordinated approach to quality management such as TQM (Total Quality Management). To be successful in implementing such a program in this industry frequent communication and co-operation within the whole handling chain would be needed.

In order to achieve the desired industry commitment to quality, there are four major areas which need to be addressed when implementing TQM:

- (a) Importance of regular timely customer feedback
- (b) Formalisation of handling procedures for the entire handling chain
- (c) Importance of education and training
- (d) Avoid the confusing aspects of Quality Assurance (QA) and Total Quality Management (TQM) in quality management.

# Statement of Authorship

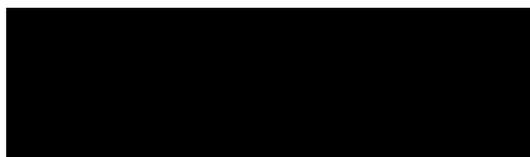
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Except where reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis presented by me for another degree or diploma.

No other person's work has been used without due acknowledgement in the main text of the text of the thesis.

This thesis has not been submitted for the award of any other degree or diploma in any other tertiary institution.

**W.S. Lee**



**Date:**

13/4/95.

# Acknowledgements

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I am most grateful to my parents, for their support and forbearance during my full-time Master study. They made considerable sacrifices to enable me to undertake this study and I greatly appreciate their incessant love and care.

I am indebted to my supervisors, Dr. Denis Nettle of Victoria University of technology and Dr. Wendy Morgan of the Victorian Institute for Horticultural Development, for their invaluable guidance and interest in this study.

This work would not have been possible without the support of the following individuals. I particularly thank Mr. Rob Dimsey of Agriculture Victoria, Bairnsdale, for his advice on the survey design. My thanks to Dino Dioguardi and Connie Shing for their assistance with some of the thesis preparation. I especially appreciated Geoff Cox and Therese Fitzgerald for their contribution in many ways to the creation of this thesis.

Finally, I would like to thank the survey and case study participants and especially the interviewees for their time and co-operation to make this thesis possible. I acknowledge the financial support provided by the Vegco Ltd., Bairnsdale.

# Chapter 1

## Aim and Background

### 1.1 Aim

This study aimed to analyse the handling chain for fresh horticultural produce. Its purpose was to provide a detailed understanding of the conditions affecting the development of a quality management program. The specific aims of the research were divided into three major sections:

#### Part I:

- 1) to determine the characteristics of the entire handling chain from producer to consumer
- 2) to determine the rationale for current practices
- 3) to define options for change and management of quality in the chain

#### Part II:

- 1) to focus on the more complex problems determined in Part I to develop an in-depth understanding of these problems in order that change (if appropriate) can be facilitated

#### Part III:

- 1) to produce recommendations for improved skilling and aspects of a quality management program

### 1.2 Background

#### 1.2.1 East Gippsland Vegetable Industry Board (EGVIB) Program

The closure of the Edgel/Birds Eye's vegetable processing operations in East Gippsland provided an opportunity/threat to the growers and related industries in the region. As most vegetables were traditionally grown on a "broad-acre" scale, a new approach to crop production was required if the vegetable industry was to survive. The establishment, in East

Gippsland, of a major new initiative in fresh vegetable production and marketing, will require a well-organised handling chain. A major portion of the produce will be value-added for domestic and export markets and will rely on new technology such as Modified Atmosphere Packaging (MAP) for its success.

Successful use of MAP requires a well controlled and operated handling chain from production to marketing. As will be seen in the following literature review such a chain has, to date, been difficult to establish in Australia. It is thus important that this aspect of horticulture be thoroughly understood so that it can be operated efficiently. Such a requirement is rendered more important when it is considered that East Gippsland is at least 300 km from any major port or distribution centre.

### **1.2.2 Interaction with other research programs**

This project is part of a program designed to facilitate the establishment of a fresh vegetable industry in East Gippsland. Other areas of research within the program include:

- 1) Agronomic requirements for quality e.g. irrigation and nutrition for broccoli production
- 2) Modified Atmosphere Packaging (MAP) to improve shelf life of lettuce products
- 3) Devising an appropriate postharvest packaging protocol to maximise the shelf life of produce with minimal loss of quality
- 4) Understanding the potential market for fresh packaged branded vegetables

Interaction with these research areas was important for this project as all aspects of the chain have an impact on a quality product for consumers.

In conclusion, this project seeks to determine the current practices of the chain and their rationale. Further analysis will be conducted on some key problem areas and their inter-relationship and finally, an implementation strategy will be produced for quality improvement within the handling chain. Since export of fresh produce is to be the major market outlet, the operation of the extended handling chain must be fully understood and the need to "get it right all the time", in respect of quality, will be essential.

## Chapter 2

### Literature Review

#### 2.1 Introduction

In order to meet the consistent demand of high quality products for both Australian and overseas consumers, it has become necessary to move beyond the inspection of our products at the point of despatch to a broader philosophy such as provided by Total Quality Management (TQM). This concept has been in place in the manufacturing sector for a long time (Anonymous: Australian Horticultural Corporation, 1992). However, there is still a lot of progress to be made in the fresh produce industry due to a number of unique characteristics faced by this sector. These include: the biological nature of the production process; difficulties in setting quality standards and the fragmented nature of this industry.

Total Quality Management (or Total Quality Control in Japanese terms) is defined as:

... the system for integrating the quality development, quality maintenance, and quality improvement efforts of groups in an organisation enabling production and service at the most economical levels which allow for full customer satisfaction (Feigenbaum, 1956, p.93).

In other words, TQM is a management philosophy or performance which makes quality pre-eminent in the culture of the enterprise and in the way it is operated (Sharkey & Cadman, 1989). This commitment to continuous improvement in quality is the priority within the organisation (Bowles & Hammond, 1991).

The manufacturing sector in Australia has adopted this approach with successful outcomes in various industries, but only recently has it penetrated the fresh produce sector (Anonymous: Australian Horticultural Corporation, 1992). In developing such a quality system, one must take into account the features of the industry. Ogier & Dillon noted that:

There are significant differences between manufacturers and the situation facing individual farmers and growers in their development of quality systems, in scale, scope, post harvest response to environment and the level of expertise available (1994, p.91).

Ogier & Dillon further explained how a quality system can be applied to horticulture (Figure 2.1).

There is no business more complex than growing fruit and vegetables. Unlike most manufacturers, growers must achieve their productivity within a variable environment, due to the perishability and the biological nature of the production process. There are difficulties in scheduling the supply of fresh produce to market demands (Peirce, 1987; Kohls & Uhl, 1990). In addition, variability in quality and seasons combine to make most fruit and vegetables subject to considerable fluctuations in price from time to time (Malcolm, 1983). The volatility of prices has led many growers to observe that they 'made their best prices from their worst produce.' This in turn has discouraged them from incurring extra costs in quality control and from selling only top quality produce.

The complex bundle of fresh produce quality attributes creates extreme difficulty in developing quality standards. Wills *et al.* (1989, p.88) pointed out that "the term quality defies complete and objective definition, and for the consumer it is largely a subjective judgement". This view was supported by Peirce (1987), who further noted that many of these quality attributes are perceived quite differently by different people.

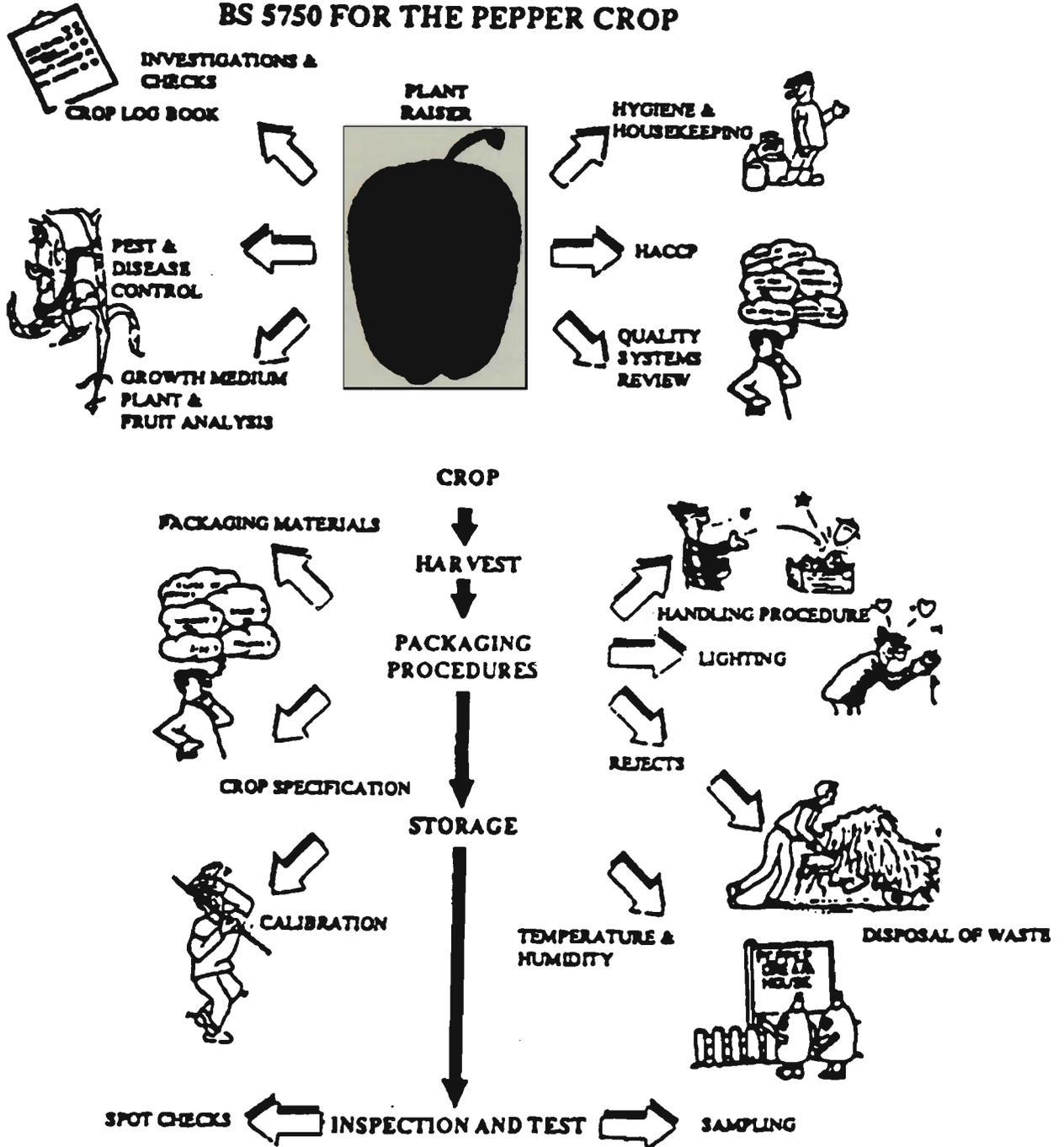
Product quality will also depend on the position of the recipient in the distribution chain (Wills *et al.*, 1989). As an example, a good quality tomato to the transporter is a hard green one i.e. capable of being transferred from farm to retail outlet. To the consumer of the fresh fruit it is a firm, ripe product with flavour.

Unlike their fresh produce counterparts, most manufacturers can determine produce quality in a more objective manner. However, in the case of producing fresh fruit and vegetables, the final product is going to be judged by the consumers, who often have a subjective view. These judgements on quality are also highly affected by the price and seasonal factors. Therefore, in such a dynamic environment, it is essential to have adequate communication of market signals from consumer to producer.

**Figure 2.1** Quality systems applied to horticulture

*(Source: Ogier, J.P. & Dillon, M. (1994), p.83)*

# BS 5750 FOR THE PEPPER CROP



The problem of managing quality is further complicated by the fragmented nature of the horticulture industry (Dench McClean Associates, 1992; Sully & Coffey, 1992). The operation of the handling chain is often complex and there are many parties involved, Clayton-Greene noted that:

The sector is characterised by a diffuse and complex handling chain, a lack of ownership and responsibility for the produce and an often ambivalent attitude toward both quality and the consumer (1993, p. 2).

The gathering and distribution of market signals, as means of operator control and coordination of pre- and post-harvest activities have been difficult (Dench McClean Associates, 1992). In many cases, growers and packers do not receive detailed information from the market place on quality outturn and market trends (Horticultural Policy Council, 1994). This lack of information makes it difficult for suppliers in adjusting production procedures to ensure that the product consistently satisfies consumer requirements.

Information is as perishable as the product which grower produces. It is a vital commodity especially within the dynamic environment faced by horticultural operators. Without adequate feedback of market information, many producers cannot adjust their production procedures accordingly. Other quality problems relate to material handling, transport efficiency, storage facilities, training needs and quality control procedures. The aim of the following review is to investigate what current research says about these issues of importance. Since little work has been done or reported in these areas, the following review serves as path-breaking instrument in this respect.

### **2.1.1 Chain Complexity**

Chain complexity issues include: poor market intelligence and communication from consumer to producer; a lack of ownership and responsibility for the produce; and an uncertain attitude toward both quality and the consumer amongst the chain's participants.

Centres of consumption of fresh produce are usually remote from production areas, hence a handling chain is often involved in the delivery of produce to the consumer. The operation of

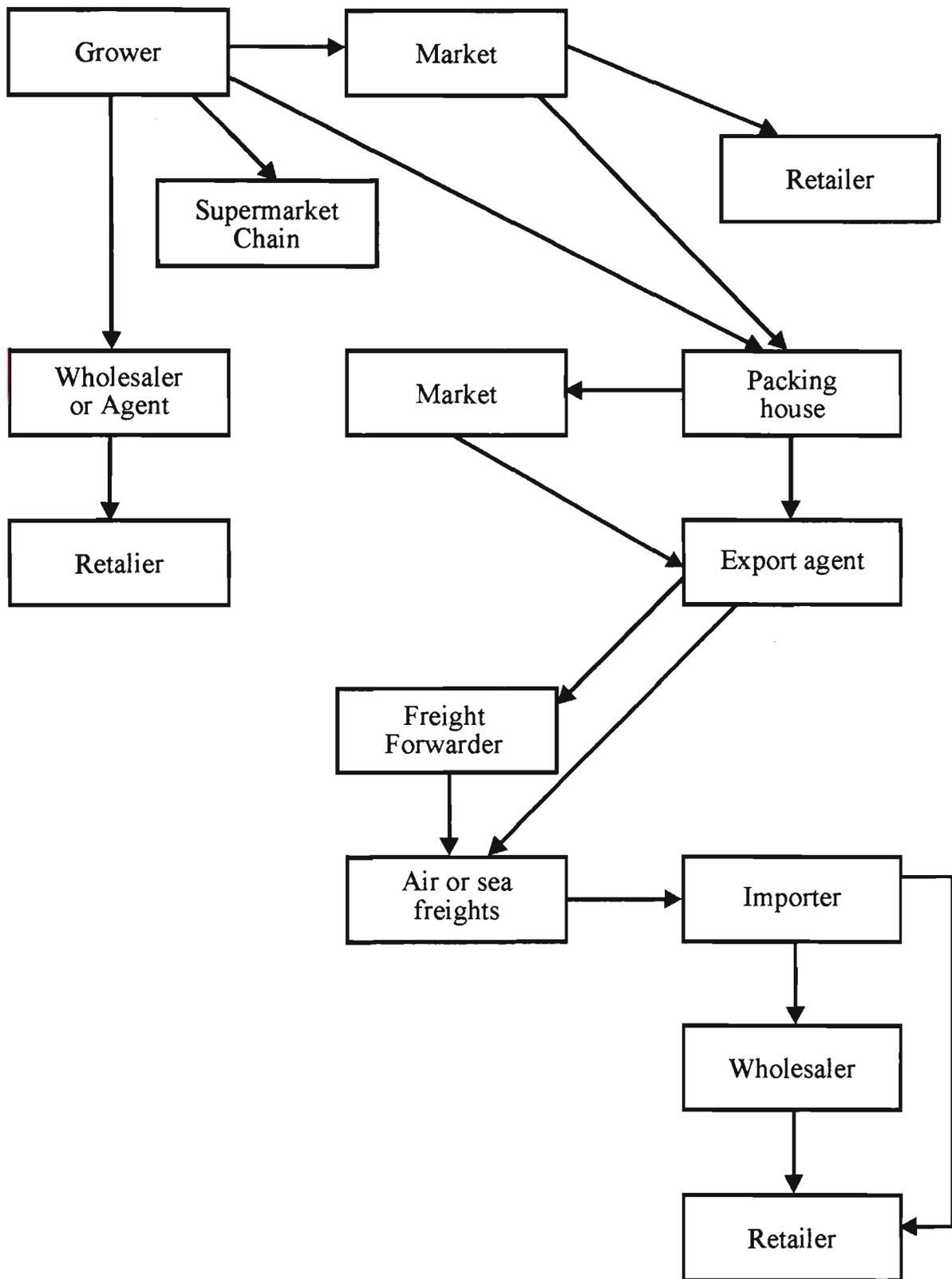
the handling chain is incredibly complex and there are many parties involved. This has been summarised in Figure 2.2. Wills *et al.* suggested that:

The costs of distribution in both money and energy terms, which includes handling, packaging and transportation, often exceed those of production. Careful management of the distribution system will ensure that produce retains its quality and that economic returns are maximised (1989, p.132).

The Australian fresh fruit and vegetable industry has also experienced severe cost pressure particularly in the postharvest area. Poor understanding of the handling chain is a key contributor to the problem (Dewey, 1985; Sharkey 1985; Witcombe, 1989; Clayton-Greene, 1993). Other workers also noted that the complexity of the handling chain, distorted market signals, and gave inadequate feedback to producers (Sully & Coffey, 1992; Horticultural Policy Council, 1994). The gathering and distribution of market information to improve control and coordination of pre- and post-harvest activities have also been minimal (Dench McClean Associates, 1992).

In the horticulture industry, many growers believe that they grow their crops for wholesalers or retail chains and their responsibility ends once their produce is sent to the market (Armstrong, 1992). This production-oriented approach is still prevalent in many sectors of agriculture (Malcolm, 1983). It appears that growers in Australia infrequently visit the markets to establish face-to-face relationships with their agents (Biggs, 1994b).

Without an understanding of consumer's requirements, growers are also at the mercy of middlemen such as agents, who may not necessarily have a strong commitment (especially on quality) to the success of a particular product in the market (Sully & Coffey, 1992). For export activities, Sharkey & Cadman (1989) also suggested that communication of information on markets signals has been limited to a narrow audience (i.e. exporters and industry leaders). Other parties such as distributors and retailers are also less committed to quality issues since distribution and marketing losses in produce, regardless of where they occur, reflect back on the producer who has few or no other options for income (Dewey, 1985). Sully & Coffey (1992) noted that the current distribution system produces competition between the various sectors and it appears that the only way one sector can obtain maximum profit is at the expense of other sectors of the industry. Clayton-Greene (1993) took a similar view that an all



**Figure 2.2** Handling chain for fresh produce

too prevalent attitude exists in all sectors of the industry, to 'fingerpoint' and avoid blame for any problem or difficulty that may arise.

### 2.1.2 Material Handling

Correct produce handling is essential for exporting. Several reports conducted by Australian Horticultural Officers have outlined the problems of outturn of Australian exports (e.g. Keenan, 1990; Wall, 1991). These reports have shown a variety of problems in material handling from farm to retail levels.

Dewey (1985) also noted that produce losses through the handling and distribution chain could be very high. The nature of these losses varies and can happen at any stage of the handling chain. For activities from on-farm to factory, problems range from: improper pre-harvest practices (Ryall & Lipton, 1979; Dewey, 1985; Simons, 1989); physical damage and inefficient handling during harvesting (Simons, 1989); poor temperature management at pre-cooling, storing, loading and unloading during transport (Dewey, 1985; Simons, 1989; Wills *et al.*, 1989; Irving, 1990), unsanitary practice at packing shed and factory (Story, 1989a; Department of Agriculture, 1993).

Marketing losses at the wholesale and retail levels are also significant (Anderson, 1974; Ryall & Lipton, 1979; Kasmire & Ahrens, 1992). The cool chain is often broken from the moment the produce is unloaded onto the sellers stands in the wholesale markets (McGlasson, 1991). Kasmire & Ahrens (1992) also reported that facilities in most wholesale market centres are inadequate for proper product handling, especially with respect to temperature maintenance, sanitation and ethylene concentration in storage atmosphere (caused by propane-powered forklifts). Rough handling by unskilled workers during unloading further aggravates product quality (Lipton & Ryder, 1989; Kasmire & Ahrens, 1992).

Produce quality is further decreased by mishandling by unskilled staff, such as delays in transferring the received produce to the cool room and rough handling at receipt (Ryall & Lipton, 1979; Lipton & Ryder, 1989; Kasmire & Ahrens, 1992). Wills *et al.* (1989) also noted that reduction in quality can occur in produce displayed for lengthy periods because of poor organisation of marketing.

It is already apparent that there is a wide variability in quantity of product loss through the handling chain. Attempts to assign the causes seem to be difficult since this damage will not necessarily show up immediately and the effects of rough handling can be cumulative (Dewey, 1985). Symptoms may not be obvious until the consumer uses the product. In addition, Dewey (1985) also noted that losses which result from physiological disorders are extremely difficult to diagnose and assign as to cause and responsibility. Many record-keeping systems employed by retailers are inadequate for tracking product losses and hence to identify causes of lost sales (Kasmire & Ahrens, 1992).

### **2.1.3 Transport Efficiency**

The literature has highlighted a number of issues need further attention in the transport area including: unrefrigerated transport facilities; inefficient facilities for sea or airfreight produce handling and; produce handling by transport personnel.

Even when care has been taken in material handling, Story (1989b) noted that rapid and reliable transport is an essential element in the distribution and marketing of horticultural products. Fresh produce is living and therefore it must be loaded and transported at or close to its optimum storage temperature and relative humidity (International Trade Centre, 1988; Story, 1989; McGlasson, 1991). Domestically, road transport is becoming an increasingly important link in the postharvest chain as produce is grown further and further from terminal markets. Although distances to market are not always great, the employment of unrefrigerated transport by some growers may have considerable effect on the post-delivery quality of produce (Dewey, 1985).

With export, medium to highly perishable produce is primarily transported by air shipment which is expensive, suitable for limited volumes and justified only for produce of superior quality and high value. The problems with air transportation are usually associated with the ground operations in which produce is left in the hot sun and/or is improperly handled (Anderson, 1974; International Trade Centre, 1988). Availability of airfreight exacerbates the former problem. Seafreight offers the opportunity of exporting large quantities of less perishable produce at more reasonable costs than air. However, the dependability factor for dock handling and ship availability, must be taken into account (Dewey, 1985). Numerous problems associated with shipping have been highlighted (Wall, 1991).

Although growers in Victoria produce a major part of the nation's fresh fruit and vegetables, Victoria's fragmented transport system seems to represent a major problem for its expanding role in export trade. A report conducted by Dench McClean Associates (1992, p.9) pointed out that "Victoria has a fragmented transport system, with poor interfaces between various land modes, as well as poor off-shore support by conference lines". It further highlighted that no standards and performance measures are available for postharvest storage, transport and distribution.

There are other problem areas in transportation such as damage to cartons caused by poor palletisation and stowage on the vehicle; freezing or overheating of refrigerated loads caused by incorrect thermostat setting and poor air circulation in the trucks; impact and vibrational damage to produce caused by poor vehicle suspension (Anderson, 1974; Sharkey, 1985; Irving, 1987; Story, 1989b; Wills *et al.*, 1989; McGlasson, 1991). Anderson (1974) also noted that produce is often not protected adequately during its delivery from warehouse to retail outlets. A 'reasonable' average temperature is set for mixed loads of products which may have different storage requirements. More often, produce is delivered in unrefrigerated delivery vehicles. A major factor was that a high proportion of wastage associated with road transport could be avoided with more responsibility on the part of the transport operator/driver.

#### **2.1.4 Storage Facilities**

Storage facilities for produce whilst moving through the chain are usually inadequate. Dewey noted that:

Many growers go to considerable expense and effort to remove field heat only to lose its benefits because of the subsequent lack of suitable facilities or interest in maintaining the desirable temperatures through the various phases of distribution and marketing (1985, p.11).

While many growers appreciate the importance of removing field heat from produce as soon as possible after harvest, the goal is not always accomplished. The use of room cooling rather than forced air cooling by some growers to achieve optimum storage temperature is notoriously slow (Anderson, 1974).

Dewey (1985) further identified that there was considerable quality depreciation due to inadequate cool storage facilities at airport/wharf loading areas. Provision for storage facilities (or even shaded cover) at the locations seems essential.

Many of the storage facilities at wholesale and retail levels are inadequate and inefficient (Anderson, 1974; Ryall & Lipton, 1979; Wills *et al.*, 1989; Kasmire & Ahrens, 1992). Because of limited storage space, temperature is usually maintained at a compromise between 0 °C and 10 °C for leafy vegetables and for chilling sensitive items (Ryall & Lipton, 1979; Kasmire & Ahrens, 1992). The mixing of ethylene-generating and ethylene-sensitive products in the same storage facilities is common (Wills *et al.*, 1989). Kasmire & Ahrens (1992) also noted that most retailers basically rely on quick turnover to overcome handling and storage problems.

### 2.1.5 Training Needs

There has been a lack of spending on training in this industry due to the common practice of employing unskilled labour and casuals at all levels.

Training is not seen as important in all sectors of the horticulture industry. Dewey noted that:

The lack of interest and the disregard of procedures to minimise depreciation and condition changes were widely observed and need attention throughout the chain of events from production to consumption (1985, p.18).

Although there is an increasing awareness of the growing importance of education and training, no hard data exist by which to relate the level of skills already possessed with those needed by the sector (Horticultural Policy Council, 1992). Compared with Australia's major international horticultural competitors (Chile and New Zealand), the level of education and training in our industry is generally considered to be low (Horticultural Policy Council, 1994). It was reported that informal training is also inadequate by international standards.

In order to improve the knowledge and skills of people at all levels in this sector, a report conducted by Horticultural Policy Council (1992) suggested that training programs be developed which will include not only growing and postharvest handling, but also business and financial management, marketing skills, information handling and communication. However,

difficulties exist in achieving such a goal since rapid turnover in produce handling personnel is highly prevalent in all sectors of the industry.

Shewfelt (during an interview with Biggs, 1993, p.9) expressed his view that "... the weakest link in the whole chain is retail outlet". Kasmire & Ahrens (1992) also noted that retail staff need more training in horticultural product-handling requirements. Although these education programs are available, they are not adequately used. For smaller retailers, their expertise is mostly internalised (Clayton-Greene, 1993). Because many businesses follow a family lineage, knowledge is passed from father to son or self-learnt, hence it would take a long time to effect changes.

### **2.1.6 Quality Control Procedures**

Quality management in the horticultural industry has been characterised by inconsistent product quality and wastage of resources due to the use of the traditional method of end-point inspection. Despite the fact that major competitors such as New Zealand have been implementing TQM for years, the adoption of this new approach has been patchy in Australia. To be successful in implementing such a program, requires frequent communication and co-operation within the whole handling chain.

Quality control methods have also been criticised for being insufficiently pro-active. A lot of companies are still using quality control (QC) i.e. product defect detection through post-production inspection. The obvious problem with this approach is that defects are identified late in the process, namely, when the final product has been packed for despatch and at its highest value (Howard, 1992; Anonymous: Australian Horticultural Corporation, 1992; Ledger & Bagshaw, 1993). By adopting end-point inspection, New Zealand's experience in the early 80's demonstrated that industry tended to adopt minimum standards rather than provide the market place with the quality required (Sharkey & Cadman, 1989).

Variability and inconsistency in the grading procedures and standards for horticultural products are widely observed in this industry (Sully & Coffey, 1992; Ledger & Bagshaw, 1993). Ryall & Lipton (1979) also reported that many of the product characteristics which affect grade are determined subjectively by the inspector. Grade standards in many of our products are inappropriate for the 1990s and limited knowledge has been available for our consumers in

judging quality (Sharp & Morey, 1984; Biggs, 1992). Recent changes in this industry have led to a change of attitudes on product quality on the demand side. The rise in consumer standards and the increase of direct marketing from grower to supermarket chains has led to the imposition of standards to pre-determined specifications requested by these parties (Malcolm, 1983; Wills *et al.*, 1989; Ledger & Bagshaw, 1993).

These problems suggest the need for a more coordinated approach to quality management such as TQM. As defined in the introduction, TQM is aimed at improving the performance of the organisation so that the product and services not only meet the specifications but also are constantly improved (Ledger & Bagshaw, 1993).

TQM is different from the traditional practice of quality control (QC) and quality assurance (QA), because it switches the focus from a process driven by external control through procedure compliance to a process where improvement is given by the culture of the organisation (Brown, 1991). Table 2.1 shows how TQM contrasts with its predecessors i.e. QC and QA (Garvin, 1988).

The manufacturing sector has adopted this approach in Australia with successful outcomes in various industries, and it is now being used in the fresh produce sector. However, growers, retailers etc. may make the claim that "TQM is not really applicable to our business." The major fundamental concern in applying TQM in the handling chain, is that the management philosophy has been largely focused on the organisation ( i.e. integrated production-retailing) rather than on several supplier-customer relationships (i.e. from grower to retailer) with different functional activities involved (Ogier & Dillon, 1994).

To be successful in implementing such a program, Armstrong (1992) identified that the commitment to quality must be shared by growers, packers, transporters, wholesalers, retailers and customers in handling process. This commitment to quality also creates an interdependence between segments of the chain which requires the sharing of information and co-operation amongst these participants (Sully & Coffey, 1992).

By implementing TQM within the chain, benefits can be derived such as: the provision of some consistent quality and recognition (Sharkey & Cadman, 1989); improved customer-supplier relationships (Anonymous: Australian Horticultural Corporation, 1992); improvements in

efficiency; increased consumer confidence and perhaps the benefit of boosting grower's access to overseas markets (Armstrong, 1992). Australia's major competitor, New Zealand, has been implementing TQM for many years has recognised the importance of clear market signals to all participants in the chain from grower to consumer for achieving quality (Sharkey & Cadman, 1989). New Zealand's approach to export appears to be that quality not price is the "bottom line". If a product is up to a consistent standard, then a satisfactory price will be obtained.

Although the Australian Horticultural Corporation and some individual Australian firms (such as Yandilla Park - a citrus packer) have already adopted this pro-active approach to address the issue of quality, many in the industry are yet to be convinced of the advantages of such schemes (Horticultural Policy Council, 1994). Ledger & Bagshaw (1993) also noted that the benefits of such a system are difficult to demonstrate in the short term due to lack of monitoring in quality costs. They (1993, p.38) also identified that " there are few people who really understand what the terms mean and how QA/TQM help them run their businesses more effectively".

An important aspect of TQM is identifying critical control points (CCP). A CCP is defined as "any point in the chain of food production from raw materials to finished product where the loss of control could result in an unacceptable food safety risks" (Bauman, 1994, p.68). In the horticulture industry, CCP includes temperature management, hygiene practice; handling procedure and time factors. The essence of TQM is to develop ownership, written responsibility and quality culture within the organisation.

### **2.3 Summary**

In conclusion, handling for the delivery of fresh produce to consumer is highly complex and poorly understood. This literature review has revealed that there are a number of problems with the current organisation of the handling chain which require further investigation including: chain complexity; material handling; transport efficiency; storage facilities; training needs and quality control procedures. In general terms, it is concluded that the horticultural industry is highly fragmented in nature. This has caused difficulties in quality outturn due to the problems outlined above. However, no previous work has been conducted that relates these problems and considers how they are inter-connected for the fresh produce industry. This issue will be highlighted in the empirical research.

**Table 2.1** The four major quality eras\*

Identifying Characteristics	Stage of the Quality Movement			
	<i>Inspection</i>	<i>Statistical Quality Control</i>	<i>Quality Assurance</i>	<i>Strategic Quality Management/TQM</i>
Primary concern	detection	control	coordination	Strategic impact
View of quality	a problem to be solved	a problem to be solved	a problem to be solved, but one that is attacked proactively	a competitive opportunity
Emphasis	product uniformity	product uniformity with reduced inspection	the entire production chain, from design to market, and the contribution of all functional groups, especially designers, to preventing quality failures	the market and consumer needs
Methods	gauging and measurement	statistical tools and techniques	programs and systems	strategic planning, goal-setting, and mobilizing the organisation
Role of quality professionals	inspection, sorting, counting, and grading	troubleshooting and the application of statistical methods	quality measurement, quality planning, and program design	goal-setting, education and training, consultative work with other departments, and program design
Who has responsibility for quality	the inspection department	the manufacturing and engineering departments	all departments, although top management is only peripherally involved in designing, planning, and executing quality policies	everyone in the organisation, with top management exercising strong leadership
Orientation and approach	“inspects in” quality	“controls in” quality	“builds in” quality	“manages in” quality

\* Source: Garvin, D.A. (1988) *Managing Quality: The Strategic and Competitive Edge*, pp. 37. (New York: Free Press.)

# Chapter 3

## Research Methodology

### 3.1 Introduction

In order to meet the aims of this study, that is to analyse the handling chain for fresh horticultural produce and to provide a detailed understanding of the conditions affecting the development of a quality management program, this project investigated the key problems identified in the literature review (i.e. chain complexity; material handling; transport efficiency; storage facilities; training needs and quality control procedures) using a range of methods. The purpose of using multiple methods was to increase the validity of the findings. This approach was taken because as Sekaran (1992, p.219) points out "...almost all data-collection methods have some biases associated with them, collecting data through multimethods and from multisources lends rigour to research."

There are some obstacles to conducting scientific research in the management area (Gay & Diehl, 1992; Sekaran, 1992). As noted by Gay & Diehl (1992), the major difference between research of different disciplines is the nature of the phenomena studied. It is considerably more difficult to explain, predict and control situations involving human beings. In addition, there are so many variables operating in an organisation that are extremely difficult to replicate (Gay & Diehl, 1992; Sekaran, 1992).

The nature of the problems investigated in this research project deal with organisational reality. The variables relating to this setting are contingent and situational in nature. Therefore the methods chosen must be appropriate to what this study is investigating. It is intended that this research can only act as a general guideline to the sort of problems this industry is facing in terms of quality management. These guidelines could be the basis for more definitive studies.

In the course of this study, three methods were used to analyse the handling chain for fresh produce: a pilot study, a survey and case studies.

### 3.2 The Pilot Study

A pilot study was conducted with unstructured interviews and observation of key participants who have a direct impact on quality problems. The purpose of this exercise was to expose some preliminary issues so that the researcher could formulate a good idea of what issues needed further in-depth investigation.

In this study, two major companies were examined to determine the characteristics of the chain by:

- i) detailing the handling procedures of a major transport company, Linfox, on its delivery of Costa's produce (a wholesaler in fresh produce) to Coles and Bi-Lo stores around Melbourne, Victoria
- ii) investigating the handling procedures of fresh produce at the Safeway Supermarket distribution centre in Mulgrave, Victoria

The participants included; growers/sellers at the wholesale market; truck drivers; operators for produce loading/unloading; staff at retail outlets; quality inspectors at the distribution centre and buyers for retail chain stores. At this initial stage of the research only broad open-ended questions in relation to handling procedures were asked. The type and nature of the questions asked of the individuals varied according to the job level and type of work done by the respondents. After identifying critical areas, they were discussed with the management in each operation, in order to ascertain their attitudes to these findings.

It became apparent that there are a number of areas within the handling chain which require further investigation and are causing difficulties. These included: unclear definition of responsibility; problems of training; quality control methods and fragmentation of the handling chain. The following examples give an insight to these problems:

- Truck drivers and loaders are not sure who should be responsible to switch on the refrigeration unit in the trucks once loading is finished or before loading is commenced.

- There is little formalisation of training for example on produce handling and temperature management and most produce knowledge is learnt by experience.
- There is variation amongst growers in grading and sizing of produce. Also different produce managers reject stocks by using different standards.
- Due to the remote location of some growers, they are less sensitive to market signals and have inadequate feedback about consumer's requirements.

Although a number of problems were identified by the researcher, the chain's participants seem to have different perceptions towards these problems. For instance, some participants do not seem to understand the perspective of other participants in the handling chain. Everyone just does their job and quality is not seen as their responsibility. This suggested that underlying all these problems, there is a key variable i.e. chain complexity affecting quality management in the handling chain. A hypothesis was established that there are a number of problems relating to the organisation of the handling chain and it is the fragmented characteristic of the chain which seems to be the problem source.

**Note:** The findings established by the pilot study will be discussed in the relevant survey chapters.

### 3.3 The Survey

Based on the hypothesis established by the pilot study, this study attempted to test whether chain complexity is the key variable affecting all the related problems in managing quality in the chain. The following approach was used:

#### 3.3.1 The Sample

Structured surveys via interviews were conducted to determine the current practices of the entire handling chain and the rationale from producer to consumer. From the pilot study, it was already apparent that the handling chain consists of a whole range of players with different attitudes towards quality problems. In addition, some participants do not seem to understand the perspective of other parties in the chain. Therefore, it is important to investigate the problem issues from different perspectives. Five different groups of key participants in the

handling chain, all of whom have a direct impact on quality problems were involved. These included growers; packers; truck drivers; agents and retailers.

Judgement sampling ( a non-probability sampling design) was used in this case. This is due to the fact that the type of information for this study can only be obtained from a sample of experts (as listed above) who possesses the knowledge and can give the information sought. Since judgement sampling is restricted in generalizability, this may sometimes be the best choice, especially when there is a limited population that can supply the information needed (Sekaran, 1992).

A sample of growers in the region were surveyed from November 1993 to January 1994. The sample was selected from a list of 60 (approximately) fresh produce growers registered with the East Gippsland region of the Victorian Farmers Federation (VFF). The list was subsequently refined with assistance from Mr. Rob Dimsey, Extension Officer at Agriculture Victoria, Bairnsdale. The sample was stratified to include representative growers from the 3 regions of Lindenow, Maffra and Orbost (Table 3.1). The sample stratification process was based on the following:

- \* size of the farm
- \* the region where the crops are grown
- \* the involvement of the grower in other functional activities (besides growing) such as packing and distribution of produce
- \* the major outlets of the grower's main crops e.g. fresh market; food manufacturer

**Table 3.1** Distribution of respondents from the 3 growing regions in East Gippsland

<i>Growing Region</i>	<i>Number of Respondents</i>
Lindenow	12
Maffra	4
Orbost	3

Although 30% (approximately) of the fresh produce growers from these regions were involved in this study, a representative sample of growers was chosen by taking into account the characteristics of the sample subjects during the sample stratification process. The researcher was then able to generalise the properties or characteristics to the population elements.

Grower respondents were also asked to nominate their major contacts i.e. the participants (e.g. packer; transporter; agent; retailer) in the subsequent stages of the handling chain. Due to the high degree of integration in other functional activities such as packing, transport and merchandising, a number of growers also participated in other surveys. By following up these grower nominees, the sample base for other surveys (i.e. packer; transporter; agent and retailer) was established.

In the course of establishing a sample base, the researcher was only interested in choosing participants who were involved with a comprehensive sample of grower subjects. Rather than conducting surveys of fresh produce transporters or agents of a particular produce in isolation from each other, the researcher had identified samples of the handling chain for conducting surveys.

In order to ascertain if there is any distinctive feature of the handling practice of the East Gippsland grower sample, the same survey was also conducted with 4 fresh vegetable growers in the south-east metropolitan region of Melbourne. Cranbourne and Baxter were chosen in this case. These growers were nominated by Dr. Wendy Morgan, Industry Manager at Institute for Horticultural Development, Agriculture Victoria, Knoxfield. The purpose of this survey was to identify features of the metropolitan market gardeners handling chain. Hence, this small sample was only used as a point of comparison with the East Gippsland growers and the survey results should not be taken as representative of the market gardener population.

The final sample comprised as follows: 23 growers; 15 packers; 17 transporters; 8 agents and 11 retailers.

### 3.3.2 The Procedures

To investigate the key problems identified in the literature review and the pilot study, a questionnaire was designed to determine the attitudes of different participants in the handling chain towards chain complexity and the related problems. The survey consisted of 9 main sections which were: background information; market situation; quality awareness; chain complexity; material handling; transport efficiency; storage facilities and quality control methods (refer to Appendices 1,2,3,4,5). The format varied to a certain extent depending on type of work done by the respondents. As identified during the pilot study, some participants did not understand other participants perspective of the handling chain. These surveys were designed in such a way that the researcher would be able to make comparisons between participants perceptions of certain quality problems.

These interviews were administered on a personal basis by the author. According to Sekaran (1992), the main advantage of interviews is that researchers can clarify doubts on the spot, and ensure that the responses are properly understood by explaining the questions. The questionnaire was also designed in such a way that under each leading question, follow-up questions including prompts were used to help clarify doubts in the interviewee's mind.

The time horizon for data collection of this research was around six months, that is between November 1993 to May 1994. Through an introductory letter to explain the purpose of the survey and a follow-up phone call, the researcher arranged to conduct the meetings mostly in the work place around tea break. This particular location was chosen so as not to interfere with the normal daily workflow of respondents. For example, with the grower's survey, most interviews were conducted in the grower's home during lunch time or evening.

The survey consisted of a mixture of questions: some were qualitative in nature; others could be expressed in quantifiable terms (e.g. multiple choice questions). This process of deriving quantitative statements from qualitative information is largely employed in the studies employed by Ajzen & Fishbein (1980) on predicting behaviour from intention.

One of the major tasks involved was the classification of data gathered from the surveys into information for subsequent analysis and assessment. The objective of this process was to establish how the respondents perceived the problems in the handling chain. The data

collected was qualitative in nature since the process was conducted through interviews. Nevertheless, the researcher derived some quantitative figures from the surveys as well as some qualitative information.

### 3.4 Case Study

The pilot study highlighted several key issues affecting quality outturn and the surveys established how different participants perceived the chain complexity and the related problems in the handling chain. It became apparent that the central issue is the degree of fragmentation caused by poor communication amongst the chain's participants. Without perfect communication amongst the participants, there seems to be no benchmark for formalising handling procedures. It is further realised from the surveys that growers are working in different types of handling chains and that each had different responses to the key problems outlined above. It is necessary to understand the different situations in order to realise any solutions.

#### 3.4.1 The Sample

Based on the key issues identified from the pilot study and the surveys, three case studies were undertaken in order to develop an in-depth understanding of these issues and to define different kinds of solutions in overcoming the chain fragmentation. Structured interviews and observation were used and three different types of handling chains were investigated:

- 1) A major celery grower from Cranbourne (with an integrated operation from growing to merchandising);
- 2) An export-oriented asparagus grower from Lindenow and
- 3) Two Lindenow growers who supply lettuce heart for minimal processing via an agent

Besides these growers and their employees, other participants (e.g. packers, transporters, agents etc.) in the subsequent stages of the handling chain were also involved in these studies.

#### 3.4.2 The Procedures

In relating to the key issues identified by the pilot study and the surveys, the case studies were designed to determine how different types of growers handle the chain complexity and the related problems in practice. By "walking through the process" from growing right through

the chain to marketing with these participants, a questionnaire was designed to illustrate how quality could be implemented through every phrase in the whole production-distribution system. For instance, in the process of packing, the objective was to investigate whether the packer has incorporated the ultimate consumer's requirements in his practice.

The case study consisted of 10 main sections (approximately) which were: background; crop establishment; harvesting; cooling; packing; storage facilities; transport; marketing; presenting for sale (refer to Appendices 6,7,8,9). The format varied to a certain extent depending on the position of the respondents in the chain. In the packer's study, for instance, the crop establishment section was deleted whereas more emphasis was placed on the process of packing. By the same token, for the transporter and agent studies, the delivery and merchandising procedures were focused on.

These interviews were administered on a personal basis. The time horizon for data collection of this research was around 3 months, that is from November 1994 to January, 1995. The study is cross-sectional in nature but it coincides with the busiest period of growing and harvesting of most vegetables. Through an introductory letter and a follow-up phone call to explain the purpose of the case study, the researcher arranged to conduct the meetings mostly in the work place. In order to develop a general picture of each operation, the researcher arranged to interview the manager first (e.g. grower, packing shed manager etc.). As well as the manager, it was also important to conduct a similar survey with various employees since different participants may have perceived the key issues differently. Once a better understanding was obtained, the subsequent visits served to explore the attitudes of employees in these operations towards issues on quality and handling procedures through structured interviews and observations of these processes. Rather than tracing the product through the chain physically during observation, it was intended to highlight any specific problem relating to handling procedures and to investigate its underlying causes.

The case study approach has limitations of its own. Given certain conditions, these problems will arise and hence certain recommendations will be applicable.

### 3.5 Limitations of the Research

These are a number of factors which limit the scope and the results of the study apart from time, costs and labour. The major limitations are delineated as follows:

- i) The case studies were organised in such a way that the major focus was placed on the process itself i.e. how the overall handling procedures on each operation are related to the final market. Therefore, any issues that are specific to the vegetable crop itself (e.g. specific procedures relating to crop management etc.) are beyond the scope of this study.
- ii) The sample size for both surveys are relatively small. For example, the researcher only looked at a small subset of the growing sector i.e. East Gippsland and South-east metropolitan area of Melbourne. The results of the survey are not representative of the whole population of Victorian growers. Thus, the survey results could be treated as indicative rather than conclusive.
- iii) Recommendations that might apply to a particular case study may not apply to any other case.
- iv) The surveys were conducted over a specific time period and are only applicable to that season.

Although there are a number of limitations in this research, the value of this study is to provide some general suggestions to the sort of problems faced by this industry in terms of quality improvement. As an investigation of the handling chain for fresh produce, this study is quite exhaustive in terms of the process and the types of participants involved. Similar research has not been done before as other workers usually looked at companies in isolation rather than focusing on analysis of the whole production-distribution system. Nevertheless, it would be difficult to conduct a definitive study since no single industry is completely representative. There are too many growers out there and they are usually diversified into different crops.

## Chapter 4

# The Grower's perspective of the handling chain

### 4.1 Introduction

As part of the study to determine the current practices of the entire handling chain from producer in East Gippsland (grower) to the consumer and identify the key issues related to quality outturn, a sample of growers in the region were surveyed from November 1993 to January 1994. As explained in section 3.3.1, a representative sample of growers from the three growing regions of East Gippsland (EG) consisting of 19 growers was chosen.

The survey which was conducted, took the form of a personal structured interview of 33 questions (Appendix 1: Survey for growers). Respondents were also asked to nominate their major contacts (e.g. packer; transporter; agent; retailer) in the subsequent stages of the handling chain. Subsequently, ten growers were asked to participate in the packer's survey and five of them were interviewed in the transporter's survey.

In order to ascertain if there is any distinctive feature of the handling practice of the growers in EG, the same survey was also conducted with four fresh vegetable growers in the south-east metropolitan region of Melbourne (SEMM). The purpose of this survey was to identify features of the metropolitan grower's handling chain. Hence, this small sample is only used as a point of comparison with the EG growers and may not be representative of metropolitan market gardeners. Due to the high degree of integration in other functional activities such as packing and transport, the four growers also participated in the packer's and transporter's survey and one grower was interviewed in the agent's survey.

### 4.2 The Survey's Results

The interview had several sections of opened and closed questions in order to determine work practices and channel for selling main crops; quality awareness; chain complexity; material handling; transport efficiency; storage facilities and training needs as well as quality control methods.

### 4.2.1 Background

Most EG respondents have extensive experience in the vegetable industry with 79 percent of them having ten or more years of experience. Indeed, three growers (16%) have a business which has been in the family for three to four generations. Due to the mild climate, these growers are able to produce a variety of quality vegetables most of the year. Cauliflower (53%); broccoli (42%) and sweet corn (32%) are the most common crops.

With respect to the degree of integration in the handling chain, 10 (53%) have their own packing shed and five (26%) currently deliver produce to customers. Of the nine growers without packing facilities, most send produce to an independent packer/agent in Lindenow whilst others utilise the facilities of a nearby grower/packer. One grower has made arrangements with a distant packer in Beaconsfield (involves a 2-hour-trip one way).

Most growers (76%) operate on a farm size of over 100 acres where the process is highly labour intensive. Most growers (79%) employed less than 20 staff for general farm work and they are mainly casuals. This number fluctuates depending on the harvesting schedule. One interesting point to be noted is that for the three growers with farm size over 300 acres, they were more capitalised in packing and transport facilities.

The four growers in SEMM are more integrated in their fresh produce handling chain. All of them are involved in growing, packing, transport and also merchandising of fresh produce. Regarding farming experience, these respondents have extensive experience with all of them having fifteen or more years of experience. Three of them are second or third generation growers. Facing a different climatic condition and a closer proximity to the Melbourne Central Market, all four growers are specialised in fresh market crops such as celery and broccoli. There is a range of farm size with two growers operating on farm size of only 30 acres and the other two operating an area of over 250 acres. Again the process is not highly labour intensive and the number of staff employed fluctuates depending on the harvesting season. The two larger growers employ more permanent staff (up to 35) in general farm work than their counterparts in the EG region.

### 4.2.2 Market Situation

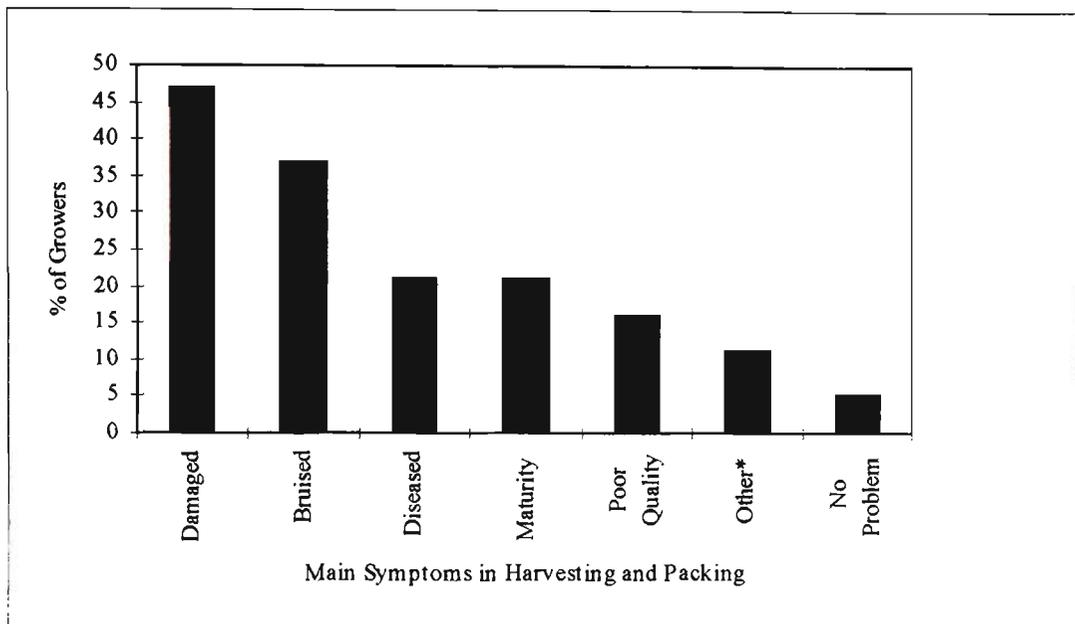
This section reveals that the EG respondents are highly dependent on agents in the domestic market. Produce is usually sold under consignment to agents in the central markets (such as Sydney or Melbourne). It is normally their agent's or buyer's decision to place the crops on the domestic or export markets. Fifty percent of these growers were not aware whether their crops would be exported. One interesting point to note is that even for the domestic markets, 90 percent of the respondents were not aware of the final destination (i.e. the retail outlets) for their produce. One grower expressed his view that "if I am aware this lot will be for export and its quality requirement, I will put more emphasis at time of cutting". The exception is one large grower in the region, with a relatively large operation, who has exporters approaching him directly. He believes this will become a trend in the future.

Ten growers (53%) believe that "export is the way to go" for future survival, especially with the situation of an oversupplied domestic market. When packing export crops, these growers have adopted measures to enhance quality such as proper cooling; ensuring the crop is pest-free and; better presentation. Of the nine growers who currently are not considering export, the main reasons given are that there is no guaranteed price and outlet for exported crops and the final destination of their produce is their agent decision.

The SEMM growers face a similar market situation to their EG counterparts, being highly dependent on the domestic market. However, the channel of selling differs in that these metropolitan growers manage to distribute a major portion of their crops at the Melbourne Market. Only a small portion is sold under consignment to agents in the interstate terminal markets. Since most of their crops are sold through their own stand, all four growers are usually aware of the final destination of their produce. However, these growers do not put as much emphasis on export. Although two growers have been approached directly by exporters in the central market, they don't have a positive view about exporting. One grower explained that " export is a challenge, which usually requires full commitment from the grower and we have to compete with the Americans on prices." Another reason given is that with their direct involvement in fresh produce marketing, they usually have a list of regular customers to absorb the major portion of their production.

### 4.2.3 Quality Awareness

Respondents were asked to identify the main problems and their rationale involved in harvesting and packing of produce (Figure 4.1).



**Figure 4.1** Problems Identified by the East Gippsland Growers in Harvesting and Packing

*\*Other: Lack of cool room facility*

Reasons given for encountering "damaged" and "bruised" produce is mainly improper harvesting practice. Adverse weather conditions is also a major factor in affecting crop yield e.g. heavy rain can damage acres of crops overnight.

In quantifying how much produce they lose at different stages in the handling chain, most growers (53%) estimate loss at less than 10 percent of produce at harvest. The growers who supply lettuce to a major fast food chain, have to follow the customer's guidelines by trimming the outer leaves to a uniform size lettuce heart. Similarly, for the asparagus grower, the Australian Export Standard requires the grower to cut the crop to a consistent length which usually involves wastage of 20 - 25 percent. Other growers (63%) believe they hardly lose any in the subsequent stages i.e. at packing and in the market. One grower believes that "it should be in the interest of retailers to keep the produce in good condition".

The SEMM growers have identified a variety of problems involved in produce harvesting and packing. These are namely "bruised" (1); "diseased" (2); "damaged" (1); "poor quality" (1); maturity (1). The causes given for these problems are adverse weather conditions and

improper harvesting practice. One grower has mentioned problems caused by market fluctuations. He expressed the view that "it's hard to value my produce due to fluctuating supply and demand." In quantifying how much produce they lose at different stages in the handling chain, three respondents said they lose less than 10% of produce at harvest. The other grower has experienced a higher rejection rate (sometimes up to 50%) for all three stages (i.e. harvest; packing; in the market). He explained that "if the market is weak, there will be more rejection."

#### 4.2.4 Chain Complexity

Due to the differences in farm size, organisational structure and the extent to which the EG grower integrates into other functional activities, the handling chain is organised in several ways. The structure of these major chains are detailed in Table 4.1. The number of outlets of these growers vary with seasons depending on the types of crops they handle. On an average basis, the EG respondents have four outlets per year. However, two growers had 6 outlets and one grower only had one.

Because of the distant location of these growers to the terminal markets, most of them rely on agents or packer/agents to sell the major portion of their crops. With respect to the allocation of crops for each market, Sydney is the dominant location due to its large size, ability to handle large volumes and higher returns for the growers.

Four growers (21%) are supplying a major portion of their crops to manufacturers (on a contract basis) for processing purposes. Supplying to food processors was the major source of income for most growers in the past. The closure of the "Gardenland factory" meant most growers had to source other outlets e.g. sending crops to the fresh market. One grower has made an interesting comment about this major change: "some growers try to change the fresh market produce to suit them rather than change their growing practices more intensively to meet the fresh market requirements."

In organising the export chain, 13 growers (68%) leave the decisions to their agents. This may explain that most growers are usually not aware of the final destination for their crops. Another reason is that some exporters buy produce from the agent's stand in the market without informing the agents about their export intention. Only two growers make direct

arrangements with exporters. One of them is a relatively large grower who has a stronger bargaining power than other growers.

**Table 4.1** Structure of the Handling Chain of East Gippsland Growers

<i>Number of Growers</i>	<i>Structure of the Handling Chain</i>
5	Grower ⇒ Transport ⇒ Local Retailer
1	Grower ⇒ Transport ⇒ Chain store's centralised depot in Melbourne
7	Grower ⇒ Transport ⇒ Agent's stand in Melbourne Market
1	Grower ⇒ Transport ⇒ Packer/Agent in Beaconsfield ⇒ Transport ⇒ Chain store in Melbourne
1	Grower ⇒ Transport ⇒ Packer/Agent in Lindenow ⇒ Interstate Transport ⇒ Agent's stand in Sydney Market
4	Grower of lettuce ⇒ Packer/Agent in Lindenow ⇒ Interstate Transport ⇒ Processing plant ⇒ Shredded lettuce for the major fast food chain
1	Grower ⇒ Interstate Transport ⇒ Produce Broker in Sydney Market
1	Grower ⇒ Transport ⇒ Large grower/packer ⇒ Interstate Transport ⇒ Agent in Sydney
1	Grower ⇒ Transport ⇒ Large grower/packer ⇒ Interstate Transport ⇒ Other interstate terminal markets e.g. Brisbane; Newcastle
1	Grower ⇒ Transport ⇒ Packer/agent in Lindenow ⇒ Interstate Transport ⇒ Other interstate terminal markets e.g. Brisbane, Newcastle
4	Grower ⇒ Transport ⇒ Processing Plant e.g. canning

In assessing their agent's performance, 13 growers (68%) believe that perfect communication (i.e. adequate feedback of market and quality information) is very crucial. This is followed by the agent's ability to pay promptly (47%) and his/her specialisation in handling a particular type of produce (32%). Only four growers (21%) believe their agent is doing a good job in feedback communication. Most growers have a less than satisfactory view of their agent's performance. Comments such as "is there such a thing as a good agent?" or "the majority of agents are second grade businessmen" are widely given. One grower had a bad experience with his agent when exporting and he had to telephone his agent five times to find out why the importer was not satisfied with his produce. With this limited communication of quality issues,

one grower feels the only way to survive is to sell direct to chain stores. He is currently following this policy: " if you can't sell to the final customers, just don't grow it."

When communicating with the customer, most growers are still at the mercy of middlemen such as agents. Most growers (78%) believe that their agents only communicate negative feedback and make no positive suggestions. There is no formal feedback mechanism e.g. in-house market research for analysing consumer trends. Growers had similar comments on agent practice: " agents only tell you when there is a problem, they'll never praise you if the quality outturn is satisfactory." However, a group of small growers and their agent have put effort into solving this communication problem. In organising the lettuce handling chain for the fast food chain, all three parties i.e. grower; packer/agent and customer meet together regularly to discuss quality issues such as quality outturn. This enables every participant to have a better mutual understanding of the quality requirement.

One interesting point to be noted is that the few larger growers in the region are relatively more satisfied with their agent's performance than the smaller growers. This may be due to the fact that larger growers usually have stronger bargaining power than their counterparts. Agents usually prefer to deal with larger growers who can supply large quantities of produce.

Without perfect communication with customers about the quality requirements, it is not surprising that quality standard fluctuates from one grower to another (78%). At the moment, standards are usually set by the individual growers (47%), or the agent (21%). Also in times of shortage in the market, quality requirements drop off because some growers believe they can sell whatever they produce. One grower explained that " there is no incentive for some of them to be quality conscious because usually buyers pay them on the basis of quantity rather than quality when there is a shortfall of supply". Few growers have also made the comment that " Due to the fluctuating supply and demand condition, I usually receive the highest price for the ordinary quality produce". Currently, there is only one grower following a conformable industry standard set by Agriculture Victoria for asparagus. He is able to export consistent quality produce by following this "non-flexible" guideline. There are no export standards for lettuce, broccoli and other crops.

Lastly, in evaluating their own performance, 10 growers (53%) gave "repeat orders from customers" as the benchmark for satisfaction, followed by "profit" (37%) and "quality of produce" (16%).

The most salient points that emerge from a comparison with the SEMM growers are that all these growers are highly integrated from farming to selling. They have all been selling fresh market crops for years. The structure of their major chains are detailed in Table 4.2.

**Table 4.2** Structure of the Handling Chain of SEMM Growers

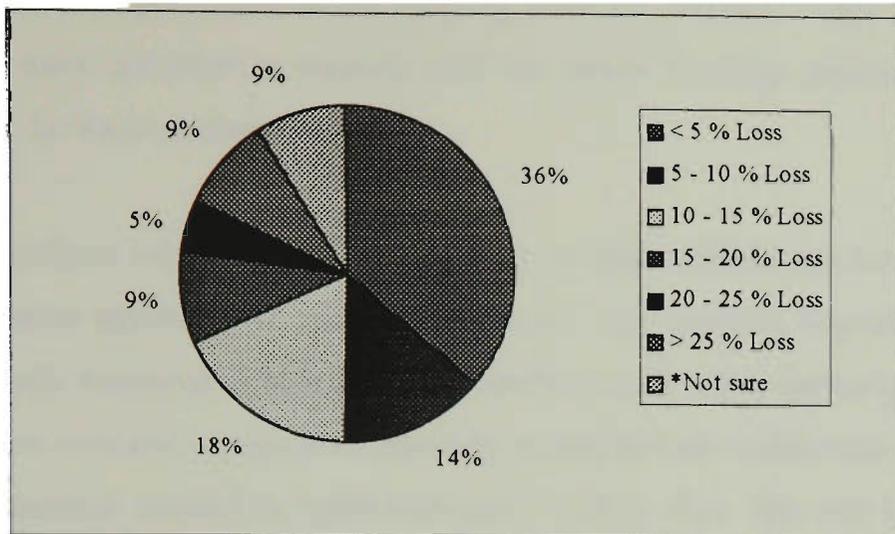
<i>Number of Growers</i>	<i>Structure of the Handling Chain</i>
1	Grower ⇒ Transport ⇒ Local Retailer
4	Grower ⇒ Transport ⇒ Melbourne Wholesale Market (own stand)
1	Grower ⇒ Transport ⇒ Chain store's centralised depot in Melbourne
3	Grower ⇒ Interstate Transport ⇒ Agent in Sydney
3	Grower ⇒ Interstate Transport ⇒ Other interstate terminal markets

Due to the close proximity to the Melbourne market, the SEMM growers tend to sell the larger portion of their crops there. One grower explained that he could get higher returns by participating in the price negotiation himself. Another reason is that half of these growers are not satisfied with their agent's performance. They feel they will be better off if they sell as much produce as they can in Melbourne. Similarly, all these growers believe that perfect communication with their agents i.e. adequate feedback of market and quality information is very important. When communicating with their customers, these growers appear to be more knowledgeable in understanding consumer's requirements since they can ask them directly and frequently.

#### **4.2.5 Material Handling**

Of the 53 percent of the EG growers who admitted to having quality problems, the two most important issues raised were adverse weather conditions and improper harvesting. Other causes identified are inadequate storage facility; delay in pre-cooling produce after harvesting and their previous emphasis on processed crop market (i.e. broad-acre type growing practice) rather than on fresh market crop (which requires higher labour intensity).

Respondents were also asked to quantify how much produce they throw away prior to packaging. The results are detailed in Figure 4.2.



**Figure 4.2** Rejection Rate of Produce Identified by the East Gippsland Growers

*\* Always have the processed crop market to absorb the sub-standard crop.*

Most growers (58%) named pre-harvest factors as the number one reason affecting the rejection rate, followed by mishandling by harvesters. Rejection rate also varies depending on the type of crops handled and the harvesting method. Some perishable crops e.g. lettuce and asparagus have to be harvested at the right maturity in order to maintain the best quality. As mentioned in the previous section, with the flexible quality standards due to fluctuating market demand, the assessment of quality cost in these circumstances i.e. how much produce they have to throw away prior to packaging, is questionable. In a strong market situation, some growers tend to harvest all crops from the paddock to capture the maximum returns. One grower has an interesting comment in assessing quality: " rejection rate does vary amongst growers. It depends on what quality standard you are packing in the box." Under these circumstances, the high rejection rate of some respondents does not necessarily mean rejecting poor quality. It may reflect the opposite i.e. maintain a strict standard in quality inspection and hence incur more rejections. Mechanical harvesting usually results in a higher wastage percentage than hand-picking since the latter can be more selective and usually extra care can be taken by the harvesters in preventing damage.

When tackling the above problems, some growers have made a few suggestions for improvement e.g. better growing practices and variety; pack sub-standard produce for lower class; training for staff; putting a quality system in place; new technology for packaging and so

on. Due to the small amount of loss involved, 39 percent of growers do not recognise the loss as a significant problem. However, two growers have shown concern about the handling practice of the final participant in the handling chain i.e. retailers. They believe the retailers should pay more attention to training staff on proper handling practice e.g. temperature management for fresh produce in the shops.

Lastly, respondents were asked to describe their cooling methods and facilities. The cooling procedure varies depending on the crops involved. For example, vegetables such as lettuce which is usually harvested in bulk bins, is normally cooled before further grading and packing whereas sweet corn and capsicum are normally packed before cooling (due to easier handling). The most common method is "pick-cool-pack" (79%), then followed by "pick-pack-cool" (16%). Five growers (26%) have to rely on the packer/agent's facility to cool their produce. For those growers who have their own cooling facility, ten(53%) utilise forced air cooling with a "Thermfresh" unit (a high humidity cooler to apply moisture automatically when required) to apply moisture; others use conventional room cooling (32%) or hydro-cooling (11%). Time to cool produce also varies depending on the volume and the method involved. Forced air cooling is widely employed due to its better cooling efficiency (and hence, better quality) than room cooling. However, growers with capital constraint have to sacrifice efficiency by using room cooling.

All SEMM growers also admitted that they have a quality problem with their produce. Adverse weather conditions (3) is the main reason given, followed by mishandling during harvesting and packing (2). With regard to the rejection rate prior to packaging, it varies from < 5 percent (2 growers) up to 20 percent (1 grower) depending on the crops and market situations. One grower has made the comment " if the market is poor, quality has to be better and vice versa." When tackling the above problems, these growers have suggested a few options e.g. better harvesting practice; better postharvest temperature management; random checks on labour. One grower feels the problem caused by fluctuating supply and demand cannot be solved at all. With respect to the cooling procedure, the most common one is "pick-pack-cool" (3), then followed by "pick-cool-pack" (1). All growers have their own cooling facility and three of them utilise forced air cooling, and the other one uses conventional room cooling. Similarly, time to cool produce also varies depending on the volume and method involved.

#### 4.2.6 Transport Efficiency

Five growers (27%) are currently involved in delivering produce to customers (interstate/local retailers). Other growers organise the transport by relying on the packer/agent's facility (74%); or an independent local transporter (32%). The delivery time also varies depending on the destinations. For example, for Sydney Market, produce can be delivered anytime from early morning to early evening. It involves a 10-hour-trip on average and is the only stop from the farm.

Nine growers (47%) employ a refrigerated semi-trailer for Sydney delivery. Of the nine growers, only 4 of them use their own transport facilities. The refrigeration unit is on all the time. However, only five growers maintain records for produce temperature during transit. A few growers are not sure about the delivery procedure e.g. temperature setting; loading procedures; number of despatching points etc. for transporting produce. Due to the shorter distance travelled, seven growers use a non-refrigerated taut-liner for Melbourne delivery. With respect to the transport efficiency, 15 growers (79%) stated they have no problem in transporting produce. For those growers who have problems with delivery, they suggested they were due to rough handling in loading; lack of co-operation between the deliverer and the receiver e.g. leaving produce unattended.

The SEMM growers have taken a more integrated approach in the delivery of produce. They are all involved in transporting produce to local customers. However, for the interstate delivery, they hire an independent transporter. For the Melbourne market, it is usually delivered in the early morning. Due to the short distances travelled (only a 1.5-hour-trip average), all respondents use non-refrigerated trucks for Melbourne delivery. On the other hand, for interstate delivery, they all employ refrigerated trucks (with the refrigerated unit turned on all the time). However, there is no record keeping for produce temperature during transit. One grower was not sure about the interstate delivery procedure e.g. temperature setting for his produce. As regards to transport efficiency, three growers think they have no problems in transporting produce. The other grower thinks his transporter(s) have handled produce roughly. One grower mentioned that "some Werribee growers don't bother to cool produce before loading onto refrigerated trucks".

### 4.2.7 Storage Facilities

Most growers (90%) use a cool room to store produce with a few (5 growers) relying on the packer/agent's facilities. Thirteen growers (68%) find the facilities adequate for storing produce in peak season. Depending on the type of crops, growers usually store different produce at a compromise temperature. They normally keep produce for as little time as possible in order to enhance shelf life for marketing. For instance, produce harvested in the morning will be delivered on the same day to the Sydney market during peak season.

All the SEMM growers utilise their own cool room for storing produce. Three growers find the facilities adequate enough in peak season. They also keep produce for as little time as possible in order to enhance shelf life.

### 4.2.8 Training Needs

Clearly there is a vast range of expertise in the industry but it is mostly internalised with little input outside the growing sector. Most respondents (90%) have never had any special training in produce handling. There is little formalisation within this area and most produce knowledge is learnt by experience although 74 percent of growers believe that training is necessary for the growing sector. The areas of concern would be growing , harvesting and handling practices; understanding market requirements; new developments such as in packaging; fertiliser; irrigation and cooling etc.

With regard to industry communication, the most common source of knowledge is from “magazine and newspaper articles” (74%); “Department of Agriculture” (68%) and “other fruit & vegetable growers” (58%).

Most growers (47%) have a positive attitude toward quality management but only one grower (5%) had heard of the AHQCS (Australian Horticulture Quality Certification Scheme) before. Some growers believe there are obstacles involved in implementing quality management such as the common practice of most buyers of not rewarding growers with quality.

It was interesting to note that most SEMM growers (3) have had some sort of training such as diploma course in agriculture; industry seminar; overseas conference etc. These growers have also heard of AHQCS before and they are also positive about the scheme.

### 4.2.9 Quality Control Methods

Most growers (84%) have implemented some sort of quality control (QC) procedure in their premises. Out of this group, 14 growers find their existing methods adequate. The procedure generally involves a visual check on quality and grading and sorting by harvester or packer according to the farm standard. Of those growers (2) who are not satisfied with the existing procedure, one of them expressed the view that "there is individual interpretation of what quality is. Differences already exist within the farm i.e. between myself and my staff". As found previously, it is not surprising that QC method is subjective given 79 percent of growers believe "quality standards are flexible". However, the lettuce grower group supplying the fast food chain has implemented a system for monitoring consistent quality. All the participants involved i.e. grower, packer/agent and processor, assess the lettuce quality and its temperature at each stage in the handling chain. All results are documented and available to all participants.

Sixteen growers (84%) provide product specifications with quality parameters such as size; colour; grade etc. for customers. This group believes that customers are currently satisfied with their specification. However, given that the majority (90%) of growers are not aware of the final destination of their crop, there seems to be difficulty in arriving at a product specification which best suits consumer requirements.

Lastly, in ascertaining at what stage damage is occurring in the incidence of customer's complaint, 39 percent of respondents have no idea of the events happening beyond the farm gate. Two growers have shown concern about the handling practice of the retailers. They believe damage occurs mostly at the retail end of the chain which is mainly caused by rough handling and temperature management problems in the retail store. With the high dependence of growers relying on their agent's or packer/agent's facilities, feedback from these participants is the only source of information on product traceability. Other than that, few growers put effort into analysing the types of complaints by communicating with the participants involved in the handling chain.

The SEMM growers have implemented similar procedures in maintaining produce quality. All carry out quality control involving visual checks on quality; grading and sorting by harvester or packer according to farm standard. These growers are satisfied with their existing procedures. With respect to product specification, similar quality parameters are provided to customers.

Three growers believe they can normally identify at what stage the damage is occurring. This may be due to the fact that these growers are able to communicate with their customers directly and frequently.

### **4.3 Discussion and Analysis**

From the results, the following points have been identified as key factors which affect the characteristics of the handling chain from the grower perspective:

- 1) Poor communication between grower and other participants in the handling chain
- 2) Lack of knowledge about consumer's requirements
- 3) Lack of formalisation in handling procedures
- 4) Quality control procedure is insufficiently pro-active

The growing sector (both EG and SEMM) is facing a vast range of problems in which some issues are specific to the country growers. The following cause-and-effect diagram has been devised to classify the various factors thought to cause the unsatisfactory quality outcome in the domestic market, indicating with arrows the cause-and-effect relationship among them (refer to Figure 4.3).

#### **4.3.1 Poor communication between grower and other participants in the handling chain**

This seems to be the key problem facing the country respondents in relation to their practices in organising the handling chain. The EG growers tend to be less integrated in other functional activities such as packing and delivery of fresh produce. This may be due to the fact that the EG vegetable growing area is at least 300 km from any major port/distribution centre. Hence these growers tend to rely on middlemen such as agents and independent transporters when distributing their crops.

The historical connection of most growers to the "Gardenland factory" is another major factor affecting communication. With the closedown of the factory, most growers had to source new outlets for their crops. This could have been viewed as an ideal opportunity to set up good communication channels.

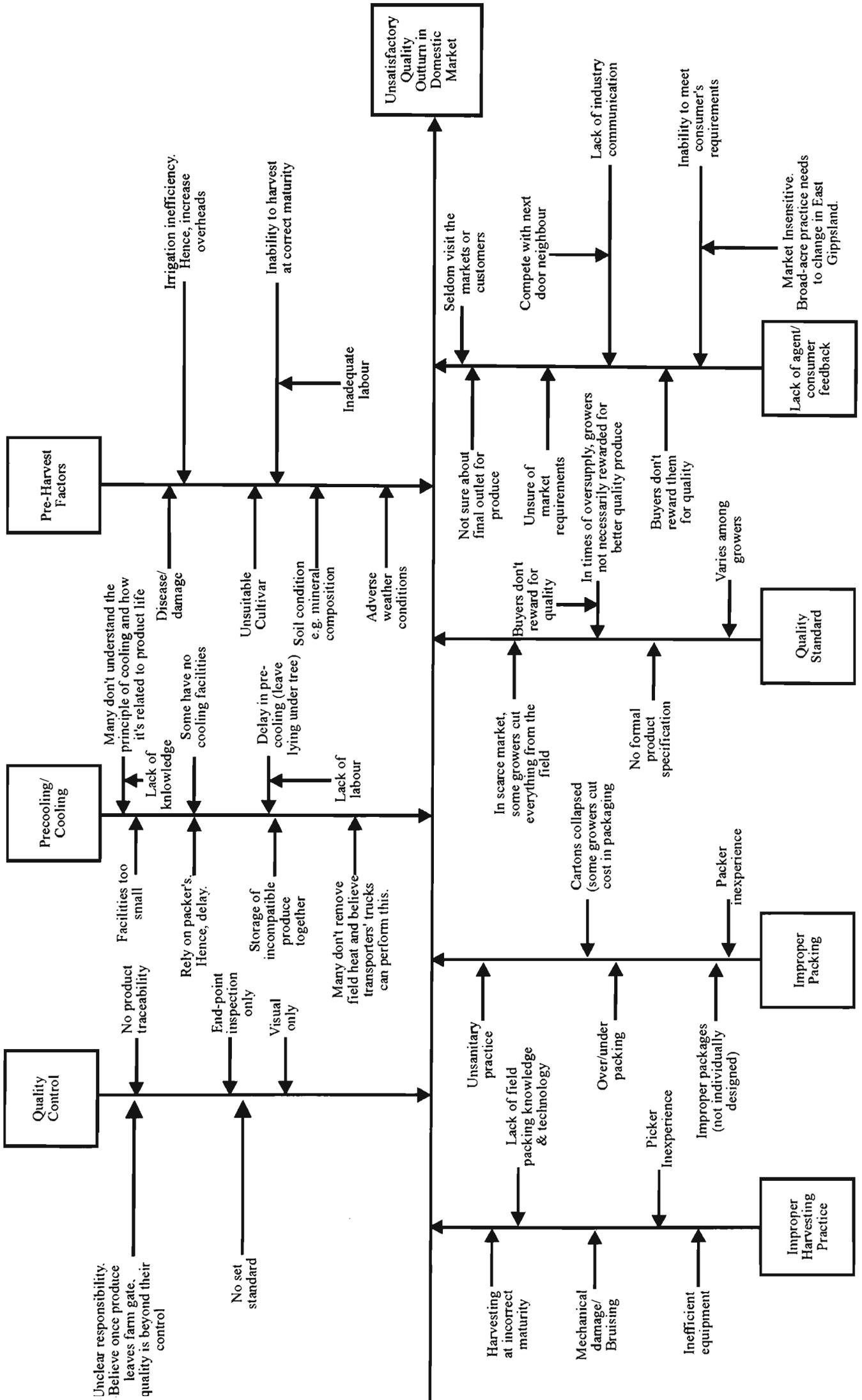


Figure 4.3 The grower's perspective of the fresh produce handling chain.

Once again, they have to rely on agents. Most growers in the region tend to sell a major portion of their crops to the Sydney market whereas the SEMM respondents sell most crops themselves in Melbourne. The extended handling chain organised by the EG growers seems to be more difficult in maintaining produce quality. Due to the reliance on middlemen such as packer, transporter and agent, most growers find it hard to control events happening beyond the farm gate. Some small size growers have additional difficulties due to their capital constraints rendering it impossible to invest in expensive packing and cooling facilities. Most growers have limited communication with other participants in the chain especially the agent and believe agents only communicate negative feedback and no positive information. There is no formal feedback mechanism e.g. in-house market research for analysing consumer trends.

#### **4.3.2 Lack of knowledge about consumer's requirements**

Given the high percentage of growers (90%) who are not aware of the final destination (i.e. the retail outlets) for their produce, this seems to be an obvious difficulty in meeting consumer requirements. Another obstacle is that the characteristic of the domestic market (which is highly susceptible to fluctuating supply and demand due to adverse weather conditions) discourage some growers from providing consistent quality produce all year round. Indeed most growers believe that they usually receive the highest return for ordinary quality produce. Agents tend to accept the fact too. The SEMM growers are facing a similar market situation. However, with their highly integrated organisational structure (from farming to selling of produce) and closeness to the market place, these growers tend to be more knowledgeable about consumer requirements than their country counterparts. The historical connection to the "Gardenland factory" and the distant geographical location also make the EG growers cut off from their fresh produce customers. As commented by one grower, some of his counterparts in the region do not have much experience in supplying the fresh market due to their broad-acre type growing practice.

#### **4.3.3 Lack of formalisation in handling procedures**

Lack of procedures for handling produce from producer to consumer is another major factor in affecting quality outturn at each stage of the chain. This is not surprising since most EG growers find it difficult to control events happening beyond the farm gate. Without perfect communication with other participants in the chain, there seems to be no benchmark in

formalising the handling procedures. Most respondents believe that they grow their crops for wholesalers or retail chains and their responsibility ends once their produce is sent to market.

#### **4.3.4 Quality control procedure is insufficiently pro-active**

Quality control methods are also insufficiently pro-active. Current procedures generally involve visual checks on quality and grading and sorting by harvester or packer according to the farm standard. As mentioned previously, quality standards are flexible according to the market demand as reflected by the low percentage of wastage prior to packaging of most growers. In a strong market situation, some growers tend to harvest all crop from the paddock to capture the maximum returns. This may be one reason why most growers do not put more emphasis on export markets. To maintain a long-term business in exporting produce, it requires growers to achieve high quality and low cost, but the way they handle business in the domestic markets, does not provide the incentive for achieving that goal. Most growers usually want to sell everything they can produce. The vegetable industry is highly different from the manufacturing sector. Consumer expectation is much higher where there is no market at all for badly manufactured products. But for poor quality produce, there is always an outlet due to the fluctuating market situations. In imposing a conformable standard for each crop enormous wastage may be expected in the initial stage. Another obstacle is the problem of benchmarks since participants (including final consumers) tend to judge quality subjectively. Similarly, if a grower is implementing proper handling procedure by training every participant such as harvester, packer and transporter in the entire chain then, it costs time, effort and of course more investment.

#### **4.4 Conclusion**

In conclusion, the handling chain for the delivery of fresh produce is highly complex and poorly understood. The nature of the industry and the characteristics of the domestic market do not encourage growers to implement quality standards. Other issues such as limited communication with other participants especially agents; lack of knowledge about consumer requirements; lack of formalisation in handling procedures and the grower's attitude towards growing quality produce are also highlighted. Regarding the EG growers, some specific issues such as its geographic location; the connection to the "Gardenland factory"; grower's capital constraint and also lack of experience to supply to fresh market are also mentioned. With an oversupply situation in Australia, export seems to be "the way to go" and hence, the above

problems must be tackled. Ultimately, it is necessary to develop some industry wide quality standards and handling procedures for specific product in order to achieve long term success overseas.

## Chapter 5

# The Packer's Perspective of the Handling Chain

### 5.1 Introduction

Postharvest quality control begins with selection of optimum harvest maturity, careful harvesting and packing, rapid cooling to optimum storage and transport temperatures. As noted by McGlasson (1991), the consequences of mismanagement become more costly as the produce moves along the supply chain. Hence packing becomes the final stage in monitoring the quality control process before produce leaves the farm. In the packing house environment some produce is field-packed and brought to the facility to be cooled, while other produce is brought to be graded, washed and packaged before transport. These operational procedures are summarised as follows:

\* Harvest (by hand) ⇒ Field Packing ⇒ Cut, trim, sort and size ⇒ Pack into bins or containers ⇒ Palletise ⇒ Transport to cooling facility

\* Harvest (by hand) ⇒ Packing house ⇒ Unload from bulk bin (some cooled in here) ⇒ Trim ⇒ Wash if necessary with water ⇒ Sort & Grade ⇒ Wrap if required and pack ⇒ Palletise ⇒ Cool

In order to understand these complex operations, growers were asked to nominate the major packers they dealt with. The following participants were interviewed in this survey:

- \* Ten EG grower/packers (all of them were interviewed as growers previously)
- \* One major independent packer/agent in Lindenow (used by a number of growers in the region)

As a point of comparison with the EG packers, some SEMM grower/packers were chosen to participate in this survey. With the high degree of integration in other functional activities such as packing and transport, the four SEMM growers were interviewed in their capacity as

packers. One of them also packs for some EG growers. Another major independent packer/agent in Beaconsfield also participated in this survey.

## 5.2 The Survey's Results

The packer survey took a similar format to the grower survey with several sections of opened and closed questions in order to determine work practices and channels for selling main crops; quality awareness; chain complexity; material handling; transport efficiency; storage facilities and training needs as well as quality control methods. (Appendix 2: Survey for Packers)

### 5.2.1 Background

Compared with their growing experience, these respondents had less experience in packing with only 46 percent of them having ten or more years of experience. Indeed two packers (18%) have operated the packing shed for less than two years. Most grower/packers (80%) employ the packing facilities for their own crops with the exception of two relatively large growers who pack for other growers who don't have such a facility. The independent packer/agent in Lindenow packs for 30-40 vegetable growers in the region. With respect to the degree of integration in the handling chain, five (46%) currently deliver produce direct to customers and one is involved in fresh produce merchandising. Again, the process is not highly labour intensive. Most packers (91%) employ less than 20 staff for their packing operation and they are mainly permanent casual. Most grower/packers (82%) employ the same staff for harvesting and packing of produce. Two growers prefer this arrangement since they believe their staff can have a better understanding about the whole process from planting to packing, resulting in a better handling practice.

As mentioned in the previous chapter (Chapter 4.2.1), the SEMM growers are more integrated in handling fresh produce. They have more experience than their EG counterparts with all of them having 20 or more years experience. Three of them employ the packing facilities only for their own crops. Two packers (i.e. one grower/packer and one packer/agent in Beaconsfield) also pack for some of the EG growers. The process is not highly labour intensive as the number of staff employed fluctuates depending on the harvesting schedule. Three of them employ the same crew for harvesting and packing of fresh produce. The larger grower/packers tend to employ more permanent staff (up to 35) in general farm work than the EG respondents.

### 5.2.2 Market Situation

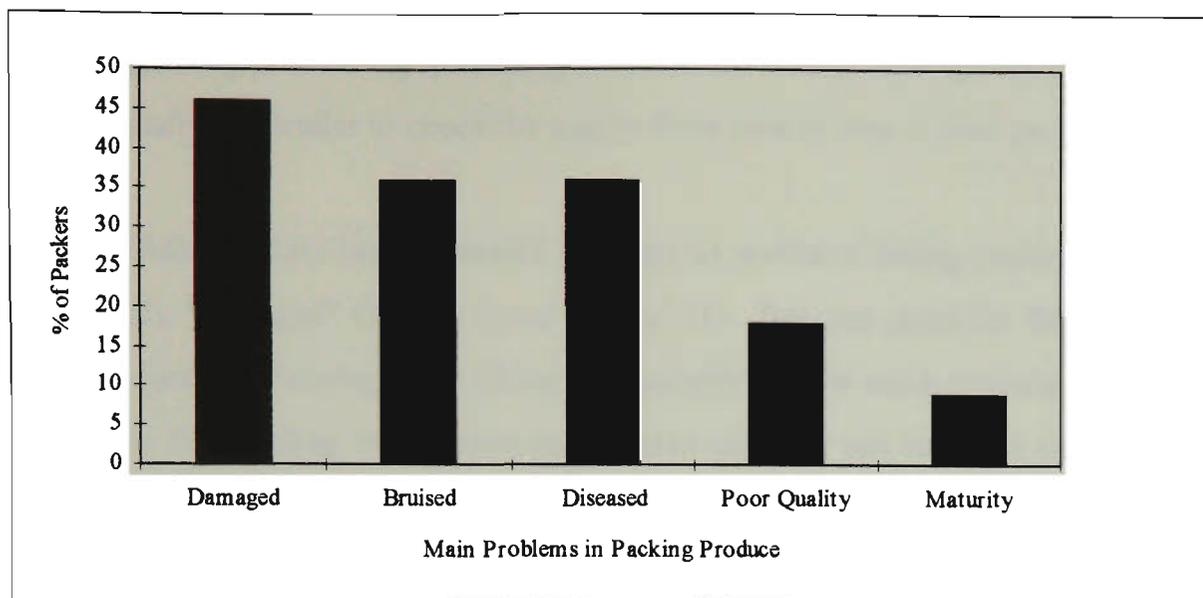
The EG respondents are highly dependent on the domestic markets with 82 percent of them selling the major portion of their crops to the Sydney market through agents. As mentioned in Section 4.2.2, most growers in the region are not aware of the final destination (i.e. the retail outlets) for their produce and leave it up to their agents or buyers to place the crops. Even the independent packer/agent has this problem. He expressed his view that "on many occasions, we just prepare a product which we anticipate to sell in the markets. It's normally up to the buyers to determine whether the produce sells on the domestic or export market".

Only three packers (27%) have the intention to put more emphasis on the export market. For export crops, these respondents have adopted measures to enhance quality such as better crop presentation; more stringent quality control and grading of crops; temperature management right through the whole chain and the use of specially designed cartons. Of the eight packers who currently are not considering export, the main reasons given are: no guaranteed price and outlet and no reliable exporter to deal with. It is also normally up to the agents to decide the final destination for their produce.

The SEMM respondents faced a similar market situation to their EG counterparts being highly dependent on the domestic market. Due to their close vicinity to Melbourne, four grower/packers sell the major portion of their crops in the Melbourne Wholesale Fruit and Vegetable Market. Since most of their crops are sold through their own stand, they are usually aware of the final destination of their produce. These packers do not put much emphasis on export. The main reasons given are that there is no guaranteed price and outlet and they usually have a list of regular customers to absorb the major portion of their production. The exception is the independent packer/agent in Beaconsfield, who manages to export significant amounts of crops (e.g. cauliflower) direct from the shed.

### 5.2.3 Quality Awareness

Respondents were asked to identify the main problems and the rationale involved in produce packing (Figure 5.1).



**Figure 5.1** Problems identified by the East Gippsland Packers during Packing

It is interesting to note that five packers (46%) believe they don't have any problems at the packing stage. Reasons given for sustaining "damaged" and "bruised" produce were improper harvesting and packing practices. For example, some growers cut everything from the field in times of short supply. Packers who also pack for other growers, seem to encounter more problems than those who pack for themselves. The independent packer suggested that "it would be nice to have QC staff running from farm to farm to make sure quality is good right from the stage of planting. However, cost does not justify the employment of that particular position. We can afford that for contracts where the return is guaranteed."

In quantifying how much produce they lose at different stages in the handling chain, most packers (82%) estimate they lose less than 10% of produce at the packing stage. This may be due to the fact that most growers have done the major quality control in the paddock. The independent packer, normally rejects up to 20 percent for the domestic market and even higher for export crops (up to 30%). Most packer respondents (73%) believe they hardly lose any in the subsequent stage i.e. in the market (returns; unsold etc.).

Respondents were asked to give a score (from 1 - 10) on quality of the produce they have to pack. Most are satisfied with the quality with a rating of 8 or above (82%). The lowest score was 6. It is interesting to note that packers generally give a lower score for other growers' produce. These grower/packers believed that they can't exercise control on other grower's crops especially on harvesting and cooling. One independent packer handles this problem by

monitoring the growing process e.g. providing seed and harvesting crew for his growers. He also employs a quality controller to check the quality from time to time in their paddock.

Similarly, the SEMM packers have identified a variety of problems during packing: “bruised” (2); “diseased” (2); “damaged” (3); and “poor quality” (1). Reasons given for these problems are mishandling during harvesting and packing. In quantifying how much produce they lose at different stages in the handling chain, three respondents said they lost less than ten percent at packing. One independent packer has experienced losses of up to twenty percent due to the trimming involved for supermarket's tray-packed vegetables. Another grower/packer encountered a high rejection rate (sometimes up to 50%) for all stages. He explained that “if the market is weak, there will be more rejection.” In giving a score on the quality of produce, most (3) are satisfied with a rating of 8 or above. One grower/packer found it difficult to give a rating since “the quality always fluctuates depending on the seasonal factors”.

#### 5.2.4 Chain Complexity

When communicating with customers, most packers are still deal with middlemen such as agents. Most EG packers (73%) believed that agents only communicate negative feedback not positive information. There is no formal feedback mechanism e.g. in-house market research for analysing consumer trends. The independent packer/agent believes that some irresponsible agents do not anticipate market trend in the marketing of fresh produce. He explained that “some agents in Sydney stock-pile produce and try to find a market for it. They don't try to match up the sale with the end market. There is no concern whatsoever about the perishability factor of produce.” However the lettuce grower network in which all 3 parties co-ordinate supply and demand i.e. grower; packer/agent and customers meet together regularly to discuss quality issues such as quality outturn.

Without perfect communication with customers about quality requirements, it is not surprising that quality standards fluctuate from one packer to another (78%). At the moment, standards are usually set by the individual grower/packers (46%) and to a lesser extent the agent (27%). As mentioned in the previous chapter (section 4.2.4), only the asparagus grower/packer follow a “non-flexible” standard for packing produce. Most packers believe the reason for encountering “flexible quality standards” is due to the fluctuating market situations. In times of shortage, there is less concern about quality. The packer/agent (who packs for a number of

growers in the region) handles this inconsistency problem by educating his growers and rewards them by higher returns. He expressed his concerns that "the reward system doesn't always work as 90 percent of the time growers get best money for ordinary quality produce. Hence, some growers don't always follow our standard when the market is short."

Lastly, in evaluating their own performance, 55 percent of respondents use "repeat orders from customers" as the benchmark for satisfaction, followed by "profit" (36%) and "quality of produce" (27%). In defining their responsibility as a packer, ten packers (91%) believe they have to physically pack produce properly; 73 percent said quality control and 73 percent sizing and grading.

As mentioned in the previous chapter, the SEMM grower/packers have been selling fresh market crops to Melbourne for years. The independent packer/agent also has extensive experience in supplying the fresh market and retail chain stores pre-packed vegetables. All prefer to sell a large portion of crops in the Melbourne market since they can participate in the price negotiation themselves. When communicating with customers, they mainly rely on direct feedback from customers during trading in the market. They all believe "quality standard is flexible" due to unpredictable weather conditions and the fluctuating market situations.

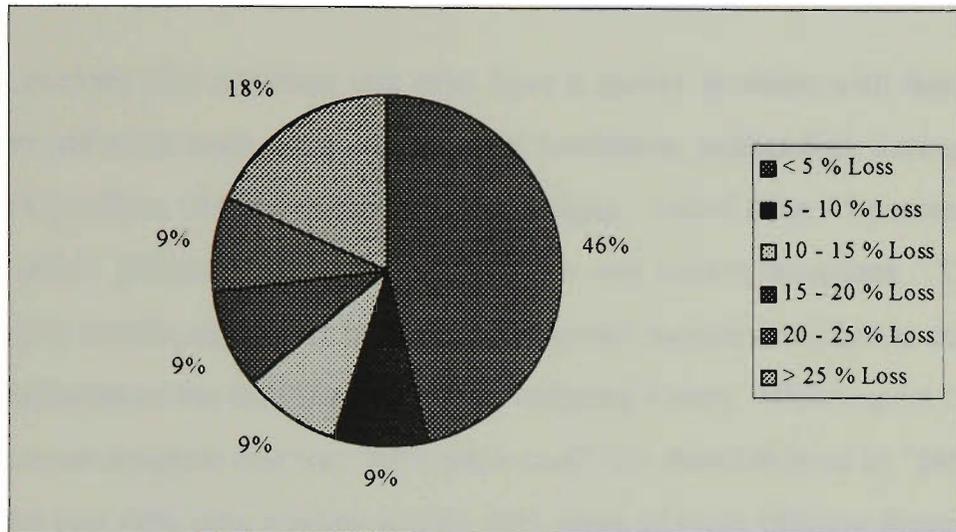
### **5.2.5 Material Handling**

Respondents were asked to describe the procedures for packing their main crops. As mentioned previously in Section 4.2.5, the majority of quality control is done in the field where manual harvesting is employed. Some grower/packers pack produce in the field at harvesting. In this process produce is selected for maturity and quality, cut and trimmed, packed into bins, cartons or crates and transported to the cool room. In some situations packing in the shed is preferred. Such situations include selection for size and trimming and wrapping of individual vegetables to meet particular market requirements. In other cases (such as packing of broccoli) there may be a need to pack pre-cooled produce into polystyrene boxes and to add crushed ice.

Of the 46 percent of the EG packers who admitted to having quality problems, the most frequent cause they raised for is mishandling by staff during packing. Other causes are

temperature management problems (such as from harvest to cooling); over-packing and the pre-harvest factors which affect the quality of produce.

Respondents were also asked to quantify how much produce they throw away prior to packaging. The results are detailed in Figure 5.2.



**Figure 5.2** Rejection rate of produce identified by the East Gippsland packers

The main reasons given for rejection are mishandling by harvesters (46%) and adverse weather conditions (18%). It is also interesting to note that 18 percent of respondents identified a loss of greater than 25 percent. As found in the previous chapter (section 4.2.5), the rejection rate also varied depending on the type of crops handled and the harvesting method. Similarly the assessment of quality cost in these circumstances i.e. how much produce they have to throw away prior to packing is questionable (Chapter 4.2.5). The high rejection rate of some respondents does not necessarily mean rejecting poor quality. It may reflect the opposite i.e. maintain a strict standard in quality inspection.

When tackling the above problems, some packers made a few suggestions for improvement e.g. better growing and handling practice; pack sub-standard produce for lower class; more education for participants in the whole chain. Due to the small amount of loss involved (i.e. < 5 %), 46 percent of the packers do not think they have a problem. One grower/packer expressed his view " we have to accept a small loss because we are dealing with perishable products."

Lastly, respondents were asked to describe their cooling method and facilities. The cooling facilities varied depending on the crops involved (refer to Chapter 4.2.5). The most common

one is "pick-cool-pack" (73%), then followed by "pick-pack-cool" (27%). All respondents have their own cooling facility, seven (64%) utilise forced air cooling with a "Thermfresh" unit (refer to chapter 4.2.5) to apply moisture; other use conventional room cooling (46%) or hydro-cooling (9%). Some larger grower/packers employ more than one method to remove the field heat. Forced air cooling is widely used due to its better efficiency. However, packers with capital constraint, have to sacrifice that by using room cooling.

Three SEMM packers also admitted that they have a quality problem with their produce. A few causes were identified such as adverse weather conditions, mishandling during packing and over-packing of produce. Rejection rate prior to packing, varied from <5 percent (4 packers) up to 20 percent (1 packer) depending on the crops and market situations. These packers suggested random checks on labour; harvesting at correct maturity and better communication with other participants in the chain as methods of reducing losses. With respect to the cooling procedure, the most common one was "pick-pack-cool" (3), then followed by "pick-cool-pack" (2). All packers had their own cooling facility with three of them utilising forced air cooling, and the other two conventional room cooling. One grower/packer (who serves a number of EG growers) has operated a depot in Lindenow for cooling produce before delivery to his shed in Baxter. The other independent packer in Beaconsfield believes that "produce has to be cooled at grower's level i.e. straight after harvesting. Otherwise, it will be too late to remove field heat at the packing shed."

### 5.2.6 Transport Efficiency

Seven packers (64%) are currently involved in delivering produce to their customers (interstate/local retailers). Others organise transport by relying on the packer/agent's facility (27%) or the independent local transporter (36%). The delivery time also varies depending on the destinations. For example, for the Sydney Market is a 10-hour-trip. Some transporters have to stop at Orbost to collect more produce. Ten packers (91%) employ refrigerated semi-trailers for Sydney delivery. The refrigeration unit is on all the time. However, only three packers maintain records for produce temperature during transit. Due to the shorter distance travelled (a 4-hour-trip), only three packers (27%) use refrigerated semi-trailers for Melbourne delivery. With respect to transport efficiency seven packers (64%) believe they do not have a problem in transporting produce. For those packers who have problems in delivery, they

suggested rough handling in loading; lack of co-operation between the deliverer and the receiver (e.g. leaving produce unattended) and time delay for delivery as the causes.

All SEMM respondents are involved in transporting produce to local customers but for interstate delivery, they hire an independent transporter. For the Melbourne Market, produce is usually delivered in early morning and because of the short distances travelled (only a 1.5-hour-trip average), four respondents use non-refrigerated trucks. The other packer employs a refrigerated van for Melbourne but the refrigeration unit is only turned on in warmer months. On the other hand, for interstate delivery, they all employ a refrigerated truck with continual cooling. Only two packers record produce temperature during transit to Sydney, with one of them having taken one step further by assigning responsibility to the unloading agent at the terminal market to check produce temperature upon arrival. With respect to transport efficiency three packers do not think they have problems in transporting produce. The two packers who raised problems in delivery suggested rough handling by driver and communication problems as the causes.

### **5.2.7 Storage Facilities**

All EG packers use a cool room to store produce. Eight respondents (73%) find the facilities adequate enough for storing produce in the peak season. The independent packer finds his facilities inadequate and has to borrow space from other growers. He explained that "this is a common practice in the region to share storage since our cost structures don't justify having a large cool room". Depending on the type of produce, packers usually store different produce at a compromise temperature. They normally store produce for as little time as possible in order to enhance shelf life for marketing.

All SEMM respondents utilise their own cool room for storing produce and find their facilities adequate enough in peak season. They also keep produce for as little time as possible in order to enhance shelf life.

### **5.2.8 Training Needs**

Most respondents (91%) in EG have never had any special training in produce handling. There is little formalisation of training and most produce knowledge is learnt by experience. Indeed, given the common practice of employing casuals in this industry, employees commitment to the

job and their attitude towards training is questionable. Eight packers (73%) believe that training is necessary for the packing sector. The areas of concern would be proper handling and packing practices; understanding market requirements and new developments such as in packaging and cooling etc.

With regard to industry communication, the most common source of knowledge is the "Department of Agriculture" (73%); "magazine and newspaper articles" (55%) and "other packers" (36%).

Most packers (55%) have a positive attitude towards quality management but only one packer (9%) has heard of the AHQCS (Australian Horticulture Quality Certification Scheme) before. The independent packer/agent expressed his opinion on this issue "if every shed or farm works towards the scheme, this will stop rubbish going into the market. Agents and buyers would be a lot more happier because there is an assurance in consistency of quality". However, some grower/packers believe there are obstacles involved in implementing quality management in view of the common practice of most buyers of not rewarding growers with quality produce.

It was interesting to note that most SEMM packers (3) have had some sort of proper training such as diploma course in agriculture; industry seminar; overseas conference etc. Four of them have also heard of AHQCS before and they are also positive about the scheme.

### **5.2.9 Quality Control Methods**

Nine packers (82%) have implemented some sort of quality control (QC) procedures in their premises. Out of this group, eight packers find the existing methods adequate. Similar procedures were involved as in harvesting by the respondents according to their own standard. As mentioned in the previous chapter (section 4.2.9), one grower/packer believed that "there is individual interpretation of what quality is". It is not surprising that QC is subjective given 78 percent of packers believe "quality standard is flexible". Only the lettuce grower/packer network has implemented a system in monitoring consistent quality (refer to chapter 4.2.9).

Ten packers (91%) provide product specifications with quality parameters such as size; colour; grade etc. for customers. This group believes that customers are currently satisfied with their specification. However, given the majority of packers are not aware of the final destination of

their crop, their product specifications may not suit their consumer requirements. Only one packer has had discussion with agents and buyers in developing product specification. It is also interesting to note that the specification varies from shed to shed even for the same crop. Table 5.1 shows the variations in product specification amongst the packing sheds for broccoli. In general broccoli and most other crops are hand-graded at farm/shed level according to the management's decision, the standard of which differs from one to another. The asparagus grower/packer follows a conformable industry standard set by the Agriculture Victoria. All his crop is trimmed to a consistent length by machine and the packing crew grade the produce according to its diameter, quality, tightness of head, colour and free from damage etc. Sub-standard produce is rejected or packed for a lower class product such as canning.

Currently, only one packer (the one who is involved in the lettuce program) has employed batch coding for identification of different lots of produce. He believes this system works well in tracing problem lots. Other packers (10) believe it is not necessary to implement such a system. One packer explained that "the existing system is adequate for traceability since we are not talking about months of production. If the batch sent on Sunday has a problem, it can be traced back to when they were picked and packed". Other packers use consignment notes to follow the batch. Apparently, customers have not requested them to implement a batch coding system.

Even the large supermarket chains have requested suppliers to declare their address; date of delivery; grade/count/weight (depending on type of crop) on the cartons as identification of different lots, but it is still not a common practice to specify "best before date" on the label (only used currently in some pre-packed vegetables).

Lastly in trying to ascertain at what stage damage is occurring as the cause of customer's complaints, 73 percent of respondents had no idea of the events happening beyond the packing shed. With the high dependence of packers relying on agent's or packer/agent's facilities, feedback from these participants is the only source of information in product traceability. Other than that, a few packers do put effort in analysing the type of complaint by communicating with the participants involved in the handling chain.

**Table 5.1** Instructions given by the grower/packer in assessing quality of broccoli during harvesting/packing

<i>Grower/packer</i>	<i>Instructions given to the staff</i>
A	<ul style="list-style-type: none"> <li>* Pick produce in large bin ⇒ Cool ⇒ Pack into foam box with ice (8 kg/box)</li> <li>* Quality parameters: length; uniform head (~ 250 mm in diameter); no damage; colour</li> <li>* All grading is conducted in the shed</li> <li>* Usually the picking/packing crew have knowledge about the quality standard</li> </ul>
B	<ul style="list-style-type: none"> <li>* Hand-picked by cutting knives ⇒ field-packing</li> <li>* If pack produce into cartons, some grading is conducted but very minimal as the pickers aim to harvest carefully to avoid rejection</li> </ul>
C	<ul style="list-style-type: none"> <li>* Quality parameters: head size (100 -125 mm in diameter); stalk length ~ 100 mm from tip to top of the head; free from disease &amp; pest</li> <li>* Pickers are instructed by grower to pick a certain size &amp; colour; then transfer produce to the shed for cooling</li> <li>* Grading is conducted in the shed where the packing crew pack the cooled produce into 8 kg foam box ⇒ Weigh ⇒ Add 4 kg of flake ice</li> <li>* Quality parameters: ~ 3" butt (size); no leaves; free from disease; colour</li> <li>* Pick produce at a specified dimension in the field for overseas market</li> </ul>
D	<ul style="list-style-type: none"> <li>* Pick and pack produce according to the sample set by the grower</li> </ul>
E	<ul style="list-style-type: none"> <li>* Quality parameters: size; colour; grade</li> <li>* Sorting during picking</li> <li>* Quality parameters: size (uniform); colour</li> </ul>
F	<ul style="list-style-type: none"> <li>* Crops must be mature; clean and free from weed and foreign matter when picked. Picking aid is used for harvesting.</li> <li>* Pick ⇒ Cool ⇒ Pack ⇒ Transport (within 1 hour). No lead time is involved.</li> <li>* On-line check during packing</li> <li>* Quality parameters: size (uniform); colour; visual appearance; length; free from foreign matter and dirt; grade; no damage; cooled</li> <li>* Workers are told, "if your wouldn't buy it, don't pack it."</li> </ul>

The SEMM packers have implemented similar procedures in maintaining produce quality. All have conducted quality control which involves visual checks on quality and grading and sorting by harvester or packer according to shed standard. These packers are satisfied with their existing procedure. With respect to product specification similar quality parameters are provided to customers. Currently none of them have employed batch coding systems for identification of different lots. In the incidence of customer's complaint, three packers believe they can normally identify at what stage the damage is occurring. This may be due to the fact that these packers are able to communicate with their customers directly and frequently at the market.

### **5.3 Discussion and Analysis**

As far as packing is concerned, the following points have been identified as key factors which affect the characteristics of the handling chain for this packing sector. These are namely:

- 1) Lack of knowledge about consumer's requirements
- 2) Quality Control procedure is insufficiently pro-active
- 3) Tendency for the packers not to take responsibility for problem in their own area

Clearly there is a large range of common problems faced by the growers and packers as these two sectors are so closely related in the handling chain. In this study there is some bias as majority of packer respondents were also interviewed as growers. A cause-and-effect diagram is defined to classify the various factors thought to affect the unsatisfactory quality outturn in the domestic market (Figure 5.3). Nevertheless, there are some issues specific to these packers which inhibit satisfactory quality outturn in the market:

#### **5.3.1 Lack of knowledge about consumer's requirements**

Within the handling chain for fresh produce, one would think that packers should be more knowledgeable about the market requirements than growers as they are physically closer to the customer than the growers. However, it seems that the packing sector is still as much in the dark as the growers given the high percentage of these respondents who are not aware of the final destination of their produce. This may be due to the fact that the country packers also place high reliance on their agents in deciding crop destination. Another aspect is that the characteristic of the domestic market (which is highly susceptible to fluctuating supply and

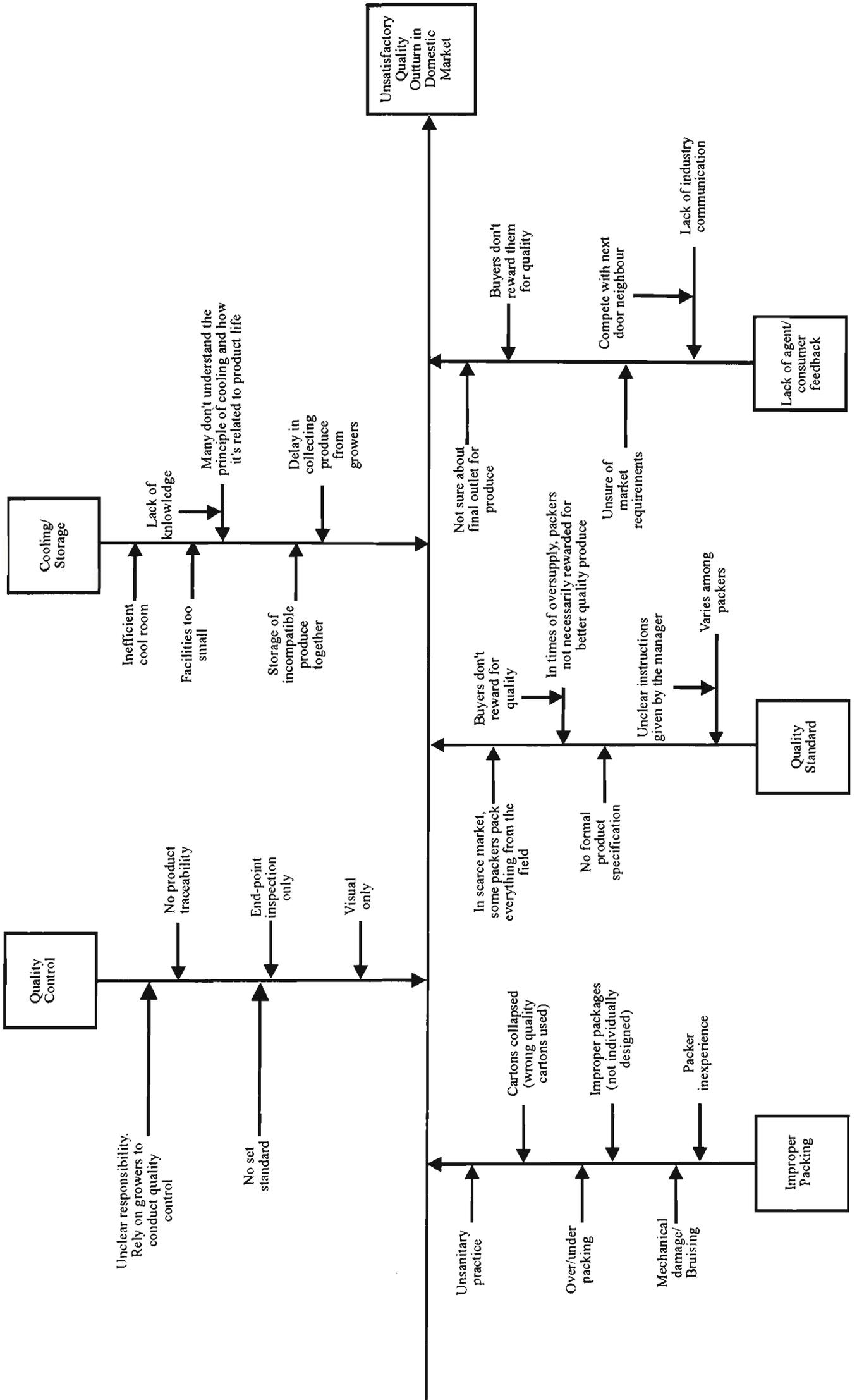


Figure 5.3 The packer's perspective of the fresh produce handling chain.

demand due to adverse weather conditions) discourage some packers from providing consistent quality produce all year round. Indeed, most packers have experienced the highest return for ordinary quality produce.

### **5.3.2 Quality control procedure is insufficiently pro-active**

There is scope for improving the quality of the products through better quality procedures. Currently, the respondents have not put much emphasis on this area as they principally rely on the growers to do that. Even when quality control has been implemented in the shed, only simple procedures are involved (such as visual check on quality; grading and sorting according to the shed standard). As mentioned previously quality standards are flexible depending on the market demand (Section 5.2.3). This is reflected in the low percentage of wastage prior to delivery of most packers'. The common practice of employing casual labour in this sector also poses another problem in maintaining consistent quality. Without proper training in inspection procedures and background knowledge of the quality standard, consistency of quality seems to be difficult to achieve even within the same packing house. There is little formalisation within this area and most produce knowledge is learnt by experience. There is a common belief amongst the respondents that their staff are well-trained and experienced enough to distinguish good or bad quality produce. Although most packers have issued instructions to staff relating to quality assessment criteria some of these instructions are too ambiguous. Examples such as the head size dimension is not always specified quantitatively by every packer or what degree of damage is acceptable. There are also variations amongst the packers in grading the same crop such as broccoli (Section 5.2.9). Similarly these respondents have not put much emphasis on product identification and traceability. At the moment, title of product; product brand; supplier's address; grade/count/weight (depending on type of crop) are usually declared on the carton. Most packers believe that a consignment note is adequate enough for product traceability. Only the large supermarket chains buyers have requested suppliers to implement a batch coding system such as putting date code as date of delivery on the outer packaging.

### **5.3.3 Tendency for the packers not to take responsibility for their problem in their own area**

There has been a prevalent attitude amongst these packers in shifting the blame to growers when problems arise. Examples such as improper harvesting practice and lack of cooling for

produce are widely given by these packers as the major cause of the problems. However the destruction of produce as a consequence of physical damage during a particular handling operation can be readily observed, provided it is immediately detected (Dewey, 1985). Dewey (1985) further noted that this damage (such as due to adverse physiological changes) becomes apparent after subsequent operations so that the cause and true blame cannot be accurately assigned. Hence, it is very important for these packers to measure the condition of the goods before packing so that appropriate corrective measures can be considered.

#### **5.4 Conclusion**

It is already apparent that both the growers and packers are suffering a major problem where the nature of the industry and the characteristic of the domestic market do not encourage them to implement quality standards. Other issues such as lack of knowledge about consumer's requirements, lack of formalisation in handling and training procedures are also highlighted. Obviously, these packers need to pay special attention on the quality control procedures at the shed level where the continuous quality inspection is highly essential in maintaining good quality grading. After all, consistency of quality is of prime importance to attract more users.

## Chapter 6

# The Transporter's Perspective of the Handling Chain

### 6.1 Introduction

Centres of consumption of fresh produce are usually remote from production areas. For the EG region road transport plays an important role in the various stages of the handling chain. In delivering produce from producer to consumer the operation is complex and there are many parties involved. Table 6.1 summarises the channels for organising delivery by the respondents.

In order to understand these complex operations, the grower/ packer respondents were asked to nominate the major transporter they deal with in the delivery of their produce. The following participants were interviewed in the survey:

- \* 5 EG grower/ transporters
- \* 1 Packer/agent in Lindenow
- \* 1 Transport Manager in Sydney (referred by the Packer/agent)
- \* 1 Transport Manager in Lindenow (referred by a grower/packer)
- \* 1 Depot Manager in Lindenow (represents the grower/agent in Baxter)
- \* 3 interstate truck drivers

As a point of comparison to the EG transporters, some SEMM grower/packer/transporters were chosen to participate in this survey. The four growers/packers and the independent packer/agent in Beaconsfield were interviewed.

**Note:** The findings established by the pilot study on the investigation of handling procedures of Linfox and Safeway will also be discussed in the following sections.

**Table 6.1** Channels for organising delivery by the East Gippsland respondents

<i>At Farm level</i>	<i>At Wholesale Market level</i>	<i>At Retail level</i>
* Grower ⇒ Ute/ Open truck ⇒ Own pack house	* Grower ⇒ Agent's truck ⇒ Agent's stand in the Melbourne Market	* Grower ⇒ Ute/ Open truck ⇒ Local retailers
* Grower ⇒ Ute/ Open truck ⇒ Grower/packer in Lindenow	* Packer/agent ⇒ Trucking sub-contractor ⇒ Refrigerated Transport ⇒ Agent's stand in the Melbourne Market	* Grower ⇒ Trucking sub-contractor ⇒ Chain store distribution centre in Melbourne ⇒ Retailer's own trucking team ⇒ Unrefrigerated van ⇒ Supermarket outlets
* Grower ⇒ Ute/ Open truck ⇒ Packer/agent in Lindenow	* Grower ⇒ Refrigerated transport (organised by the agent) ⇒ Agent's stand in the Sydney Market	* Grower ⇒ Refrigerated van (organised by the grower) ⇒ Chain store distribution centre in Sydney
* Grower ⇒ Ute/ Open truck ⇒ Packer/agent in Beaconsfield	* Grower/packer ⇒ Refrigerated van (organised by the grower) ⇒ Agent's warehouse in Sydney	* Agents in Wholesale markets ⇒ unrefrigerated truck ⇒ Retailers
* Grower ⇒ Open truck ⇒ Agent's cool room in Lindenow ⇒ Unrefrigerated truck ⇒ Packer/agent in Baxter	* Packer/agent ⇒ Refrigerated transport (organised by the packer) ⇒ Processing plant for lettuce	* Greengrocers ( who collect produce from the Wholesale markets) ⇒ Open truck ⇒ Own retail outlet
	* Grower ⇒ Refrigerated Transport (organised by the grower) ⇒ Agent's stand in other interstate terminal markets	
	* Packer/agent ⇒ Interstate transport ⇒ Agent's stand in other interstate terminal markets	

## 6.2 The Survey's Results

The transporters survey which was conducted, adopting a similar format to the growers and packers surveys, had several sections of opened and closed questions in order to determine work practices and major outlets of the crops; quality awareness; chain complexity; material handling and transport efficiency as well as training needs (Appendix 3: Survey for Transporters).

### 6.2.1 Background

Most respondents (83%) have been involved in the transport business for less than ten years. Only two (17%) have operated for more than 20 years. Four grower/transporters (33%) employ the transport facilities for delivering their own crops only. One relatively large grower/packer and two independent packer/agents in Lindenow also serve other growers transport needs in the region. For those (5) who concentrate on the transport operation only, two are transport managers and three are truck drivers. Out of the whole group, three (25%) are owner-drivers. Transport is not labour intensive. Three growers are involved in transporting themselves and they normally hire drivers (up to 3) to operate the truck. The independent packer/agent and the independent transporter in the region employ up to 25 full-time truck drivers in their organisation. Most drivers (42%) are paid by a piece-rate system, another by distance travelled (17%) and wages (17%).

Most SEMM growers have more experience in transporting than the EG respondents, all of them having more than 10 years of experience. Three employ transport facilities for their own crops only. Two also serve a number of the EG growers. Labour intensiveness is similar to the EG counterparts with all of them employing less than four drivers. Out of this group, two are owner-drivers. Most drivers (3) are paid by a piece rate system.

### 6.2.2 Market Situation

All EG transporters are only involved in delivering fresh produce domestically to such places as wholesale markets; chain store distribution centres and local retailers. The Sydney market (50%) is the major destination for their produce. Most transporters (92%) are involved in transporting only EG grown produce, with the exception of one independent transporter whose drivers also collect produce from other growing districts (e.g. Werribee). These respondents deliver a variety of produce from perishable to non-perishable crops. These are

namely asparagus; broccoli; cabbage; lettuce; pumpkin and berries. Half of the transporters believe the volumes handled fluctuate depending on seasonal factors and weather conditions. In delivering produce to interstate markets four transporters (33%) have adopted measures to maintain produce quality such as securing the loads by shrink wrapping or employ separation boards in the containers to stop pallets moving.

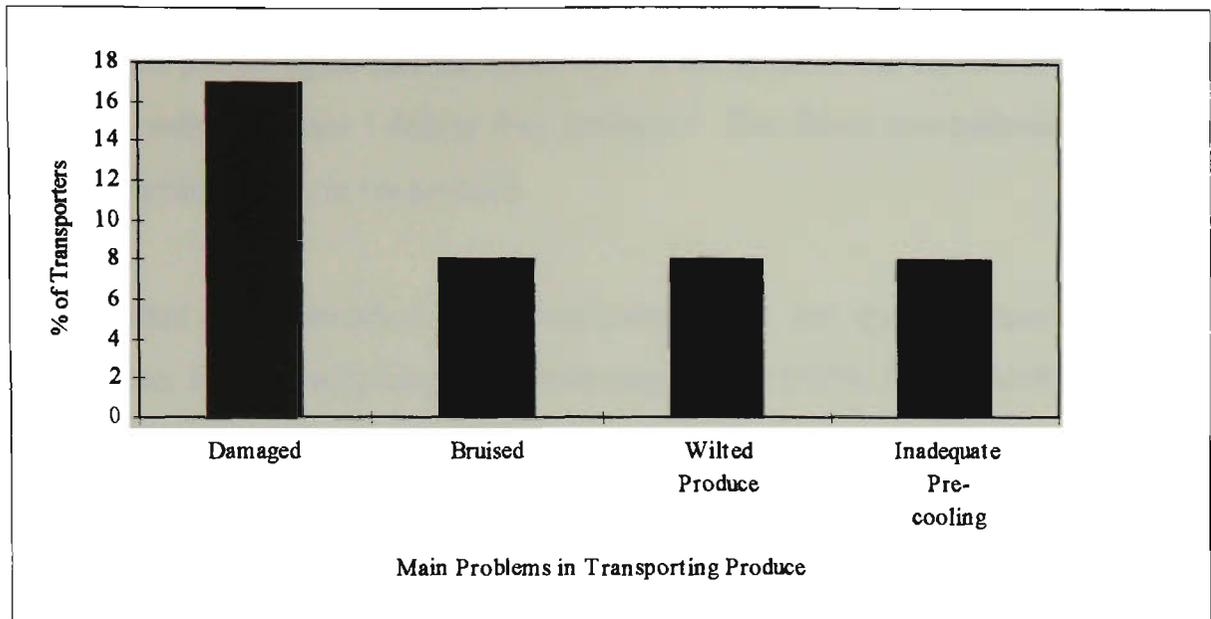
The SEMM respondents face a similar market situation to those in EG, being highly dependent on the domestic market. Due to the vicinity to Melbourne four grower/packers deliver a major portion of their crops themselves, with the exception of the independent packer/agent in Beaconsfield who exports a significant amount direct from the shed. However for the interstate delivery, all of these growers hire an independent transporter. Some extra measures have been adopted in securing loads for interstate/exported crops. These are namely shrink wrapping; standard palletisation of loads; netting and the maintenance of proper air flow in container.

### 6.2.3 Quality Awareness

Half of the respondents believe they don't have any major problems in transporting produce. Of those who admitted having quality problems, only a few symptoms were identified. The results are detailed in Figure 6.1.

The reasons for encountering "bruised" and "damaged" produce are poor stowage pattern; inferior quality of packaging material and rough handling by drivers during loading. One independent transporter believes that "it should not be our responsibility for product breakdown which is due to improper pre-cooling by the grower. In a strong market situation, some growers harvest all saleable crops even in bad weather conditions. They also ignore the stage of pre-cooling before delivering of crops."

In quantifying how much produce they lose at different stages in the handling chain, most respondents (75%) believe they hardly lose any in the delivery process and the others (25%) have losses of less than five percent.



**Figure 6.1** Problems identified by the East Gippsland transporters in produce delivery

Respondents were asked to give a score (out of 10) for the quality of produce they have to work with. Most (67%) are satisfied with the quality with a rating of 8 or above. It is interesting to note that for those transporters who serve a number of growers in the region, they generally give a lower score for these grower's produce than their own. This may be due to the fact that they cannot exercise control on other grower's crops especially on cooling and packing. One independent transporter expressed his view that "the biggest problem is some growers try to cut corners such as not pre-cooling produce properly or using cheap cartons." One truck driver finds it difficult to give a score since he never has the opportunity to see the produce himself.

Three SEMM transporters have identified "damaged" as the major symptom at produce delivery. Reasons given for this problem are mainly due to rough handling during loading/unloading of stocks; incorrect temperature setting; careless driver; rough road conditions and poor vehicle suspension. In quantifying how much produce they lose at different stages in the handling chain, four respondents believe they hardly lose any in transporting produce. In giving a score on the quality of produce, all are satisfied with a rating of 8 or above.

#### 6.2.4 Chain Complexity

When communicating with customers, most transporters just rely on complaints as a source of feedback. There is no formal feedback mechanism e.g. in-house market research in analysing consumer trends. Information is usually channelled through the grower, agent and retailer.

One independent packer/agent had the belief that "if the produce can be sold for a high dollar, growers don't really care how I deliver their produce." One driver also believes that feedback is not that important to him in his position.

Without perfect communication with customers about the quality requirements of the transport service, it is not surprising that most respondents (67%) find difficulty in setting the quality standard. One independent transporter believes that the market place sets the standard of the service and that it should not be flexible. Another driver believes that every driver sets his own standard.

Lastly in evaluating their own performance, 42 percent of respondents use "repeat orders from customers" as the benchmark for satisfaction, then followed by "turnover" (17%) and "profit" (17%). In defining their responsibility as transporter, nine respondents (75%) believe they have to deliver produce in good condition and promptly; 50 percent securing the load and temperature management in the truck and 17 percent maintaining vehicle in good condition.

The SEMM transporters mainly rely on direct feedback from customers during trading in the market. Four respondents believe "quality standard is flexible" and is set by the competition between transport operators. The other packer/agent takes an opposite view "quality standard should be fixed for example on timing and keeping produce in good condition. It's virtually a standard practice."

### **6.2.5 Material Handling**

Of the 67 percent of the EG transporters who admitted having quality problems, a list of causes were detailed in Table 6.2.

Four transporters have expressed their concerns about the growers mishandling produce prior to delivery. One independent transporter explained that "If they get produce broken down before being loaded onto trucks, we can't do much about it. Sometimes we have to inspect the goods before they load them. Normally, we have to rely on trust since most growers have been in business with us for years." Similar situations also happen at the other end of the chain. From the pilot study it was identified that some truck drivers have complaints about the order pickers in a chain store distribution centre stacking loads improperly. Sometimes they

try to absorb the truck space by stacking loads too high, thus blocking the air circulation. Other problems such as poor vehicle suspension and inferior quality of packaging materials are widely given. There are no formal procedures for instructing drivers/order pickers on correct temperature setting of the truck or proper stacking of loads.

When tackling the above problems, some transporters have made a few suggestions for improvement e.g. keeping temperature records for produce during transit; employ better packaging materials by grower or packer; implement Total Quality Management in the transport organisation. Due to the small amount of loss involved, 83 percent of transporters don't recognise loss as a problem.

**Table 6.2** Problems identified by the East Gippsland transporters in material handling

<i>Problems Identified in Material Handling</i>	<i>(%)</i>
Inferior quality of packaging material	17
Stacking loads improperly	17
Temperature management problem in terminal market e.g. leaving produce unattended	8
Temperature management problem of retailer's cool room	8
Improper cooling of produce by grower before delivery	8
Lack of expertise of trucking sub-contractor in produce handling	8
Delay in loading produce	8

Lastly, respondents were asked to describe their work practices and the delivery procedure for transporting produce. Most respondents (58%) only employ one size of truck for delivery. The facility varies from a ute to 22-pallet-refrigerated truck. Other transporters assign different size of trucks depending on the volume involved. When asked to describe delivery procedures, the respondents mentioned that the most common one is:

Removed from cool room ⇒ forklifted into trucks ⇒ set the appropriate temperature ⇒ switch on the refrigerated unit ⇒ deliver to the destination.

The grower or packer (33%) is usually responsible for setting the required temperature and checking the condition of the stocks after loading whereas the driver (42%) plays an important

role in checking produce temperature during transit. One grower/transporter mentioned that the cooling unit should be on during loading in hot weather. Only one transporter keeps records for produce temperature during transit. Most respondents (67%) are satisfied with the stowage pattern of the stocks and loading procedures by order packers. Three transporters have shown concerns about the mishandling practice by order packers. Problems such as stacking loads too high in the truck; cartons collapsing during transit and forklift damages etc. happen from time to time. Similarly, these transporters had few complaints about the receiving procedures at retail level, due to the fact that only two respondents are involved in delivering retail stores. One of them believes that "it should be in the retailer's interest to keep produce in good condition." One driver also had complaints about the operation in the terminal market in Sydney where the unloading agent left the produce unattended for a few hours at room temperature. This information was reported back to the grower.

Four SEMM respondents also admitted that they have quality problems with their produce. Causes were identified such as rough handling during loading/unloading; inability to meet schedule; temperature management in the truck and poor vehicle suspension. When tackling the above problems these transporters have suggested a few options e.g. more education for drivers and frequent maintenance for the trucks. With respect to the delivery procedure the most common practice is:

Removed from cool room  $\Rightarrow$  forklifted into trucks  $\Rightarrow$  deliver to Melbourne.

Due to short distance travelled (only a 1.5-hour-trip) four respondents use non-refrigerated trucks for Melbourne delivery. For interstate crops the growers organise refrigerated transport with sub-contractors. The grower/packer is usually responsible for switching on the refrigerated unit after loading. Currently all respondents are satisfied with the stowage pattern of the produce on the trucks and the loading procedures of those who load produce from the packing shed or the farm. One independent packer believes the use of plastic crates for storing produce (supplied by chain stores) solves the palletisation problem since these crates can be stacked evenly on the pallet. Two respondents identified problems in the receiving procedure at retail level such as rough handling by unskilled retail staff and leaving produce unattended. Indeed it was observed that at the chain store depot mishandling at the last link of the chain happened frequently (refer to Chapter 8.2.5).

### 6.2.6 Transport Efficiency

Five respondents (42%) admitted having problems in meeting the delivery schedule. They handle the problem by communicating the delay with other participants such as unloading agents in the market; agents and grower/packers. Two transporters believe "even if there is a delay in loading, I don't try to rush for the schedule, because this would damage the product."

As mentioned in section 6.1, these respondents deliver produce to several destinations from local retail shops to the interstate terminal market such as Sydney. The delivery time varies depending on the destinations. For the Sydney market, it involves a 10-hour-trip on average and is usually the only stop from the farm. Some transporters have to stop at Orbost to collect produce from there as well. Eight respondents (67%) employ refrigerated semi-trailers for Sydney delivery. The refrigeration unit is kept running for the complete trip. However, only one transporter maintains records of produce temperature during transit. The grower usually gives instruction to transporter as to setting the required temperature. These respondents hold the produce from 1 to 6 °C depending on the crops involved. Due to the shorter distance travelled for moving produce to Melbourne (a 4-hour-trip), only two transporters (17%) use a refrigerated semi-trailer for delivery. One of them only turns on the unit in warmer months. Although distances to market are not extreme, the temperature conditions during highway transport to Melbourne during summer, without refrigeration, may have considerable adverse effect on the post-delivery quality of produce.

With respect to transport efficiency, all respondents think they have no problems in transporting produce. One relatively large grower/packer expressed his concern about the trucking route to Sydney "East Gippsland is not on a major trucking route. Therefore, growers need to have their own transport since no trucking company will collect produce for half a load." Lastly respondents were asked how they handle the situation if a vehicle breaks down. Most transporters (58%) believe they would contact the related participants such as grower/packer; unloading agent, or agent immediately and keep the refrigeration unit running. Some respondents (33%) would try to fix the truck on the road as quickly as possible.

All SEMM respondents are involved in transporting produce to Melbourne customers. Produce is usually delivered in the early morning. Only one respondent has employed refrigerated vans for Melbourne delivery but the unit is only turned on in the warmer months.

Most growers rely on sub-contractors to deliver produce in refrigerated vans for the interstate markets with continual refrigeration. Two of them maintain records for the produce temperature during transit. With respect to transport efficiency, three respondents think they have no problems in transporting produce. The two respondents who have problems in delivery suggested they were caused by rough handling by the driver and communication problems. If a vehicle breaks down these respondents believe they would keep the refrigerated unit running and try to shift the load to another truck.

### 6.2.7 Training Needs

All respondents in EG have never had any special training on produce handling. There is little formal training within this area and most produce knowledge is learned by experience. Seven transporters (58%) believe that training is not necessary for this sector. One driver explained that "it's not in my job to learn about fruit and vegetable handling." Other transporters (42%) believe that training is necessary for truck drivers. The areas of concern would be produce knowledge and handling, temperature management as well as driving skills.

With regard to industry communication the most common source of knowledge is from "Department of Agriculture" (42%) and "magazine & newspaper articles" (42%); then followed by "other such as growers" (33%). Lastly these respondents were asked whether they know about AHQCS (Australian Horticulture Quality Certification Scheme). Only one grower/transporter (8%) has heard of the scheme and he is positive about it.

With the SEMM respondents, three transporters believe that training is necessary for drivers. The areas of concern are similar to their EG counterparts. Four of them have also heard of AHQCS before and they are also positive about it.

The pilot study identified a mixture of opinions with regard to training needs for the Metropolitan transporters. Senior management of the transport company believes that training is necessary for drivers on produce knowledge and handling; temperature management etc. Some respondents (such as middle management and some drivers) take an opposite view. One respondent believes that "driver's main responsibility is to deliver stock from A to B in the safest possible manner. As to what is in that vehicle, is of no concern to them." Currently, training has been provided for drivers by the company but mainly on driving skills. There is

also a lack of clear definition of responsibility for the drivers. In some cases this leads to conflict. For example, truck drivers and loaders are not sure who should be responsible to switch on the refrigeration unit in the trucks once having finished loading the produce.

### 6.3 Discussion and Analysis

From the results the following points have been identified as key factors which affect the characteristics of the handling chain for the transport sector:

- 1) Substantial losses related to material handling during transport phase have not been recognised
- 2) Lack of formalisation in handling procedures
- 3) Lack of clear definition of responsibility of transporters

The transport sector (EG; SEMM and Metropolitan) is facing many problems in which some issues are specific to the EG participants. The following cause-and-effect diagram is presented below (Figure 6.2) in classifying the various causes thought to affect the unsatisfactory quality outturn in the domestic market.

#### 6.3.1 Substantial losses related to material handling during the transport phase have not been recognised

Product losses through mishandling during transport have been considerable (Dewey, 1985; Sharkey, 1985; Wills *et al.*, 1989). However the perception of little product loss amongst the transporters in this study is inconsistent with what the literature reported. Given seventy-five percent of the respondents believe they hardly lose any produce at different stages (i.e. loading stocks; in transit and in store) in the handling chain, most transporters do not recognise that they have a problem. Even when produce has been bruised or damaged upon arrival at destinations, most of them believe this is mainly caused by growers or packers trying to cut cost in the packaging materials. Nevertheless, there are other factors in relation to material handling during the transport phase which results in "damaged" produce. Examples such as rough handling by drivers or order pickers during loading/unloading of produce or improper practice in securing the loads are widely observed.

At the moment their clients such as growers or packers also believe that the transport sector is well-organised and losses are minimal. It seems that there is no way to prove there is a problem until someone cares to turn rumour into facts. Hence measuring the condition of the goods when loaded at the farm and at the destination is strongly recommended for the categorisation of the problem that may occur and the cost involved.

### **6.3.2 Lack of formalisation in handling procedures**

Clearly there is a need for proper handling procedures and a measuring system to clarify the cost of quality and hence, take corrective action. Without formalising the handling procedures for delivering produce, it is not surprising that most EG growers find it difficult to control events happening beyond the farm gate. Since EG is not on the major trucking route, there are not many options left to the growers/packers in delivering their crops. Due to the substantial financial commitment of owning the transport facility most small size growers in the region tend to rely on an independent transporter or their agents to fulfill this function. However, these transport companies usually deliver different kinds of goods. Some of them are inexperienced about the delivery process for fresh produce such as temperature management during transit; correct handling procedures for loading/unloading stocks; appropriate palletisation pattern for the produce etc. Since some growers usually share the service from the same transport operator, a problem gets worse where there are mixed loads involved. Examples such as pre-cooled pallets from one grower were stacked beside produce from another grower which was not cooled. Therefore, it's really up to the clients to specify more clearly what they expect from their transporters. However, the grower/packers do not have enough knowledge about the appropriate packaging material and the kind of transport facility needed, let alone, the best method in relation to the transport system.

The SEMM transporters are highly integrated in their organisation hence, it is easier for them to implement systems where specific requirements for the delivery process can always be better communicated.



### 6.3.3 Lack of clear definition of responsibility for transporters

In order to ensure there is a procedure in place for the delivery process these transporters need to have some kind of involvement in monitoring the quality of fresh produce. Currently there is not much responsibility taken by the transporter in this process in which these drivers tend to shift blame to other participants in the chain when a problem arises. Given 58 percent of the respondents believe "training is not necessary for our sector" it is not surprising to know that the above agenda is not highly emphasised even in the large transport companies. Thus, it seems likely that the transporter's only responsibility will be to pick up and deliver goods unless their clients have specified clearly what their expectations are.

## 6.4 Conclusion

Centres of consumption of fresh produce are usually remote from production areas as in the case of EG. The cost of distribution often exceeds those of the cost of production. Careful management of the distribution system is necessary to ensure that the produce is retained in optimum condition. Clearly there is a need for proper procedures and a measuring system to clarify the cost of quality and corrective action. Both the transporters and their clients must work hand in hand in designing such a system. In order to achieve this system, the transporter's responsibility must be clearly specified by their clients. Hence the transporter can be involved in monitoring quality whilst the produce is in his care. At the end of the day, information of any problem can be related back to the client and hence appropriate remedial action can be taken.

## Chapter 7

# The Agent's Perspective of the Handling Chain

### 7.1 Introduction

Agents of fresh produce at destination markets are an integral link between producers and consumers especially for EG where its location is far from any major port/distribution centre. Produce is usually sold under consignment and delivered to agents in the central markets. Within the agent segment of the handling chains there is a lot of material handling involved. When the produce reaches the market centres, the unloading agent (who is usually a sub-contractor of the grower) receives and divides the load to the designated agents. Samples of produce are then presented for sale to customers at the agent's stand. Although by-passing of the central wholesale market is currently a worldwide trend there are still plenty of buyers who purchase supplies from the market. These include chain store buyers (who usually seek small quantities for topping up an order); greengrocers; jobbers; purveyors; institutional buyers; food service wholesalers; fellow merchants; freight forwarders and exporters. In some instances re-packing of produce may be involved after purchase (e.g. produce designated for export is usually re-packed under the exporter's brand). The responsibility of the agent ends once produce is delivered to their customers.

It is already apparent that one of the most confusing aspects of marketing of fresh produce is the complexity of the wholesaling function. Almost all customers named above are engaged in wholesale transactions. There are lots of permutations and combinations of pure wholesaling and pure retailing. Taking such a broad perspective in this chapter, we have to consider every form of marketing at every level in this channel other than retailing. Our intention is to determine the characteristics of the handling chain from farm to retail outlet where the agent, broker and merchant appears to be a crucial link between growers and consumers. An attempt at distinguishing between the functions of these three is made below - all of them being classifications for intermediaries. The distinctions are to a certain extent artificial and the categories merge into each other. This is especially so when the activities of any particular company are considered. By definition merchant wholesalers take ownership of goods in which they deal. Merchant wholesalers operate independently from suppliers and retailers. They are compensated for their services on a profit margin basis. Unlike merchant

wholesalers, agent wholesalers do not take ownership, and rarely take possession, of the products they market. These intermediaries are primarily involved in the buying and selling of goods and services. The main marketing tasks they participate in are negotiation (mainly), market information, promotion and ordering on behalf of the growers. Agents receive a commission for performing these functions. Under the current State Legislation, anyone who is involved in wholesaling of fresh produce must be licensed as a "farm produce wholesaler". These intermediaries can handle the full proceeds of the sale. They can deal as a merchant or on agency basis depending on the market situation.

There is considerable confusion about the demarcation between the functions of an agent and a broker. Except for legislative purposes, a broker is not allowed to handle the full proceeds of the sale unless they register as "farm produce wholesaler". The chief function of a broker is to bring buyers and sellers together and assist in negotiation. They are paid by the grower on a commission basis. The word "broker" has been used widely in the US fresh produce industry. As by-passing central wholesaling markets is currently a worldwide trend, it is believed that wholesalers in Australia must expand their horizon and become brokers as is occurring overseas (Anonymous, 1993; Biggs, 1992; Cadman per. comm.). It is no longer a matter of waiting for buyers to come to the market stand, it is up to the wholesalers to create new 'markets' for themselves. In US, brokers of the 1990s are so market-oriented that they offer more services than ever before (Burfield, 1994; Urein, 1993a; Zind, 1993). From traditional brokers to distributor/marketers to sales agents, the US brokers are taking on additional roles such as information specialist, transportation manager, consumer educator and in-house inspector. More often, they have a strong link right through the chain where they act as intermediaries between growers and chain stores or food service sectors. However there has been doubt as to whether the Australian brokers are true marketers or just using this label as a trendy name to label themselves (Cadman per. comm.).

In the course of this study, investigations have focused largely on agents and brokers. The EG growers and packers were asked to identify their main agents by name so as to enable the researcher to determine the appropriate agent sample frame prior to administering the "agent" questionnaire. As a result, seven agents were interviewed. These consist of:

\* 2 agents from Sydney market

- \* 1 Sydney broker
- \* 1 grower/agent from Melbourne
- \* 2 Melbourne packer/agents
- \* 1 agent in Melbourne market
- \* 1 major produce wholesaler (the buying representative of a major supermarket chain in Victoria)

This sample frame is relatively small due to the unwillingness of some major agents who refused to participate in this survey. In order to further explore the characteristics of fresh produce wholesaling, two market specialists from Agriculture Victoria were also consulted on certain issues.

## **7.2 The Survey Results**

The interview had several sections of opened and closed questions in order to determine work practices and channels for selling fresh produce; quality awareness; chain complexity; material handling; transport efficiency; storage facilities and training needs as well as quality control methods (Appendix 4: Survey for Agents).

### **7.2.1 Background**

Most respondents have extensive experience in fresh produce merchandising with 63% having ten or more years of experience. Besides merchandising, some respondents are involved in other functional activities such as importing/exporting (2); packing (2) and growing (2) of fresh produce. This process is not highly labour intensive as most respondents (80%) employ less than 10 permanent staff in their sales departments.

### **7.2.2 Market Situation**

These respondents are largely focused on the domestic market and 67 percent of them sell a major portion of crops off their stands or by prior arrangement over the phone with their customers. As mentioned previously in other chapters most suppliers are not aware of the final destination (i.e. the retail outlets) for their produce (refer to Chapters 4.2.2 and 5.2.2). This is not surprising since all respondents serve a wide cross-section of customers such as greengrocers; institutional buyers; jobbers; purveyors; fellow merchants; freight forwarders and

exporters etc. Four respondents have made arrangements when supplying chain stores or processors (e.g. shredded lettuce for the fast food chain) to supply the final customer directly. One of these organisations finds it hard dealing with supermarket chains where consistent quality and low price are the basic requirements of supply.

Currently most produce is usually taken as consignment and then the agents sell them on a commission basis. There are other arrangements where some respondents take ownership of the products they carry and assume the risks of selling these goods at a profit. As mentioned before, anyone who is registered as a "farm produce wholesaler" can deal as a merchant or an agent. Unfortunately some of them sometimes mix the two functions and tend to work towards their own advantage. One of the market specialists further explained that, "This is one of the problems for our growers. When the agents sell, they never say who bought the produce. Very often the agent will say, 'I sold your product and I got this price for you.' What they are saying is, effectively, 'I took your produce and I am the one who actually bought at that price. Then, I re-sell it at a much higher price because I can see there will be a big profit margin.' This happens very often under a strong market situation." (Cadman per. comm.)

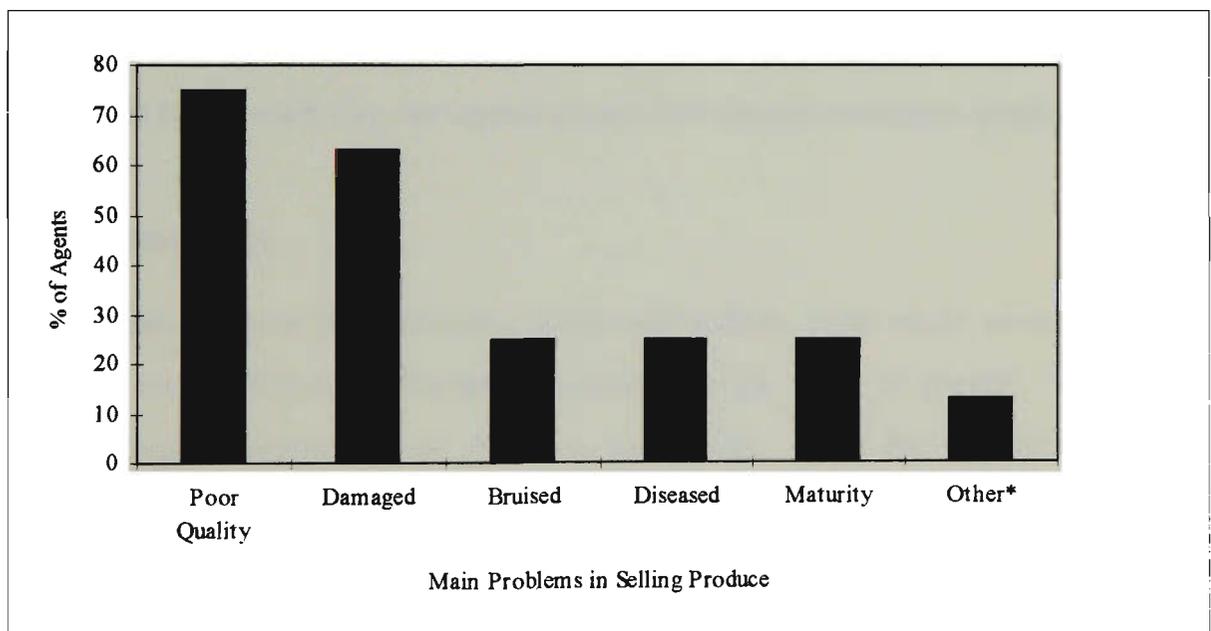
There is an increasing trend in this industry for wholesalers to become brokers as is prevailing overseas (Anonymous, 1993; Biggs, 1992; Cadman per. comm.). Under this new system brokers unite buyers and sellers by collecting market information including what produce particular suppliers have available what produce specific buyers demand and what both the general and specific price levels are. One respondent who has engaged in the brokerage system and has a smooth running operation explained that, "Our job is different from an agent in that we are able to monitor the price on the market. We also give our growers an idea about the competition and quality information in the markets. Our growers are happy with this system since they can usually receive a higher return." However, there has been doubt whether this new group of players will act as a true marketer or just use a trendy name to label themselves (Cadman per. comm.).

Half of the respondents believe that "export is the way to go" for future survival. Indeed, two respondents are supplying moderate amounts of produce for export. At the time of packing crops for export some extra measures have been adopted to enhance quality such as better presentation and packaging, selective grading and proper cooling of crops. Indeed one agent

has run a growing schedule for regular suppliers of exported produce. However, another agent does not normally inform growers when the produce is exported. Few respondents are still reluctant on the export market. One of them believes "Our company does not have the expertise to understand the export market and hence, we have to rely on the exporter to do the job." With the highly fluctuating market situations one of the market specialists believes that most of the relationships between grower and his agent are extremely flexible. "There is no contractual agreement that ties up the grower and his agents. They do suggest the growers to supply but they don't always agree on the way to pay. They rather look at the going price on that day" (Cadman per. comm.).

### 7.2.3 Quality Awareness

Respondents were asked to identify the main problems and then causes involved in selling produce. The results are detailed in Figure 7.1.



**Figure 7.1** Problems identified by the agents in selling produce

The reasons given for encountering "poor quality" produce are mainly due to adverse weather conditions and the seasonal factors. One agent explained that, "In a scarce market, some growers tend to pack sub-standard crops. This may be due to the fact that many of them only have one grade to offer." Some agents also believe that "damaged" produce is mainly due to rough handling at the grower level and during transit and improper packing practice. This belief amongst agents seems to contradict what the EG growers or packers are saying. Most

growers and packers believe that they hardly lose any produce in the subsequent stages (i.e. packing; in transit) of the handling chain.

In quantifying how much produce the respondents lost at different stages in the handling chain half of the respondents said they lose less than five percent across the board. Three respondents (38%) found it difficult to quantify the loss. However they believed that any incurred loss should be minimal. One of them took this view "Something happens but it is usually not our fault. For example, produce usually not in a good condition commonly is caused by not keeping them cool or handling improperly at the other end."

Lastly respondents were asked to give a score (out of 10) on the quality of produce they have to work with. Most are satisfied with the quality with a rating of 7 to 8 (75%). However, one agent finds it hard to give a score due to fluctuating market situations. He further explained that, "I can give a score from 1 to 10. Especially in scarce market, some growers just try to pack everything they can produce." Another respondent (wholesaler of fresh produce) also believes that consistency of quality is a big issue in this industry. He explained that, "With the large volume we handle each day, we cannot expect 100 percent consistent quality."

#### **7.2.4 Chain Complexity**

In sourcing fresh produce for customers these respondents have taken several approaches. Agents usually receive consignments from growers through 'word of mouth'. Most of them have a list of regular suppliers they prefer to work with. Once the relationship has been established some agents have taken a further step by running set programs with these growers. One agent believes this trend is increasingly popular, "Growers should benefit from this because they are able to know roughly the price structure of the crops and hence send produce accordingly." Once the agents have gathered all the information about the availability of produce for the next trading period they then ring up the customers and try to match up the supply and demand (especially the top quality produce for demanding customers). As mentioned before because the respondents tend to serve a wide cross-section of customers the existence of customer loyalty is quite questionable. The degree varies depending on the type of customers the agent is serving. One respondent explained that "In a scarce market small retailers tend to chase for the dollar difference and hence switch to another agent."

The wholesaler respondent also sources supplies of produce by running set programs with a regular list of growers. However there is no written contract drawn up between the buyers and suppliers. They usually rely on a general understanding of the required volume.

Currently only two respondents (25%) are actively involved in the exporting of fresh produce. They tend to source the best quality produce from their established growers. One of them prefers to work with one grower for a particular export order. She explained that "Customers from overseas prefer to buy from one particular grower when they have recognised the quality of that brand." Another agent also takes the opportunity to meet the overseas buyers personally about twice a year.

Most respondents (72%) carry around 10 - 15 lines. Only one agent tends to carry as many lines as he can depending on the customer's request. All agents tend to specialise in merchandising a few crops only. They believe buyers normally prefer to deal with an agent on the basis of speciality. One agent explained that, "Buyers do prefer to go to an agent who handles one particular produce all the time. Keeping the consistency of supply is very important." As mentioned in the next chapter (refer to Chapter 8.2.4) some chain store buyers believe some agents are too diversified in carrying too many lines (some carry up to 40 - 50 lines) and they are usually more concerned to clear the stock at the time.

When communicating with customers most agents (86%) believe that the ultimate test is whether the buyers will keep on buying the produce or not. There seems to be a common belief amongst these respondents that 'no news is good news'. Whenever there is a complaint from a customer all respondents reflect this information to the relevant participants back in the chain. Only two agents have conducted formal feedback mechanism such as running market research overseas; locating field representative and qualified horticulturists in various growing areas. Unfortunately as reported in the previous chapter, most of the EG growers have less than a satisfactory view on their agent's performance (refer to Chapter 4.2.4). Many of them (78%) believe that their agents only communicate negative feedback not positive information. On the other hand due to the remote location of these growers, it is seldom that they meet their buyers. The chain store buyers tend to take the opportunities to visit their suppliers but only on an occasional basis. In response to communication problems, the wholesaler respondent has employed staff dealing with feedback from the stores on a daily basis. All the information

is recorded and related to the relevant parties such as buyers; quality controllers and warehouse manager etc. in order to ensure that growers will receive the message.

In the present situation where there is lack of sound communication with customers or suppliers about the quality requirements it is not surprising that quality standards fluctuate from one agent to another (100 %). At the moment standards are usually set by the customer (50%) then followed by the grower (38%). Also in times of shortage in the market, quality requirements drop because some growers believe they can sell whatever they produce. One agent explained that, "the higher the price, the more flexible the quality is." Even the wholesaler respondent accepted the fact that in a tight market situation, they have to settle with the best products available. It is interesting to note that half of these agents are more concerned to clear the stocks at the time rather than selling the best quality product to customers. This may be due to the fact that most agents rely on a quick turnover to overcome storage problems. The scarce storage facilities do not allow them to keep any left-over stocks. The broker respondent took a different approach in marketing produce. She usually fulfills as many orders as she can rather than getting produce on consignment. Therefore she is not forced to sell.

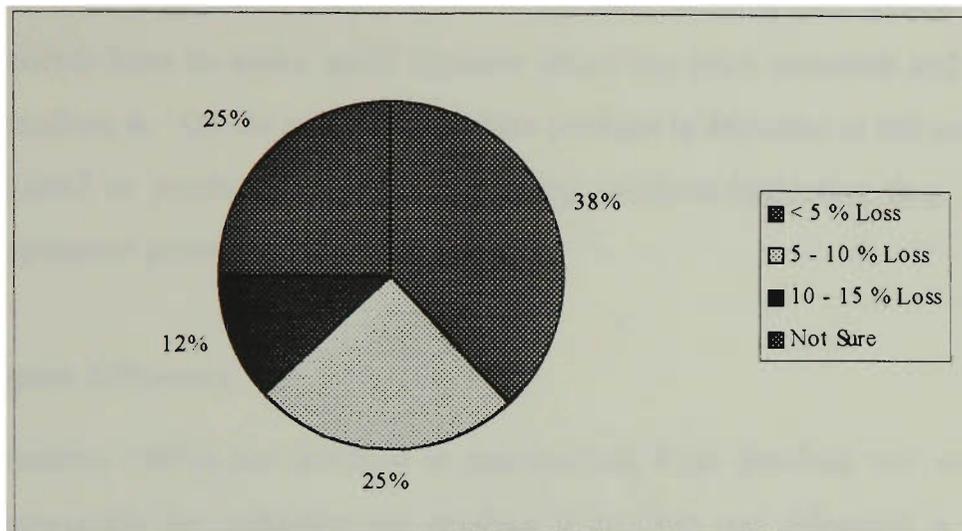
Lastly in evaluating their own performance, five agents (63%) use "repeat orders from customers" as the benchmark for satisfaction, then followed by "profit" (38%) and "customer satisfaction" (25%).

### **7.2.5 Material Handling**

Of the 88 percent of the respondents who admitted having quality problems, a variety of causes were identified. The two most important issues that are raised are inconsistent quality of produce (due to fluctuating market situations) and temperature management problems (e.g. inadequate pre-cooling after harvesting). Other causes are over/under packing of produce; mishandling by order pickers and improper stowage patterns. One agent has shown concern about the mishandling practice at the farm level, "There are variations amongst growers in defining the quality standard. In a scarce market they just pack everything." Another agent made an interesting comment about this inconsistency issue. "Theoretically, there are buyers looking for different grades of quality depending on the customers they are catering for. Due

to the nature of this business no one can supply and maintain high quality for a long period of time. However if the quality is not special, it's very hard for us to sell."

Respondents were asked to quantify how much produce they normally have rejected. The results are detailed in Figure 7.2



**Figure 7.2** Rejection rate of produce identified by the agents

There are a number of reasons given for rejecting sub-standard produce. The two most important issues that are raised are seasonal factors and market situations. For those who are not sure about the rejection rate, made an interesting comment, "We don't normally reject produce because there is always a market for sub-standard stocks especially in scarce market situations. On the other hand our customers start to become choosy in an oversupply situation."

When tackling the above problems, some respondents have made a few suggestions for improvement: on-going education for agents and suppliers concerning consumer's requirements; better awareness by everyone in the supply chain; and putting quality system in place. However most respondents (63%) believe that problems cannot be solved at all due to the nature of the business.

Lastly, respondents were asked to describe their receiving procedures. It varies depending on the location they receive produce from. For those agents who operate in the terminal market, the most common procedure is described as follows:

\* Grower ⇒ Produce arrives in trucks (with or without refrigeration) ⇒ Unloaded by unloading agent ⇒ Deliver to the agent's stand ⇒ Check the incoming stocks (both quality and quantity) ⇒ Display at sales ⇒ Order made up ⇒ Deliver to the retailer's trucks or warehouse.

Since most of the consignments usually arrive in the early morning (just before trading starts), these respondents have to make quick decision about the price structure and what clientele they target produce at. On the other hand, where produce is delivered to the warehouse, these respondents tend to emphasise more on incoming produce inspection (e.g. weight check; grading; temperature probe on some lines).

### 7.2.6 Transport Efficiency

Seven respondents (88%) are involved in transporting fresh produce one way or another. Some are responsible for collecting the produce from farm and delivering it to the market, whereas others are involved in delivering produce to customers such as chain store distribution centres. Length of the trip and delivery times also vary depending on the destinations. For example, a trip may take up to 28 hours if produce is delivered from interstate. For long distance delivery, produce is kept under continual refrigeration during transit. With regard to temperature management only two respondents keep records. For delivery from the agent's stand to various retail outlets, only two respondents employed refrigerated vans. One of them only turns on the unit during summer. With respect to transport efficiency, 75 percent of the respondents do not think they have a problem in transporting produce. For those agents who have a problem in delivery, it is mainly due to rough handling in loading and poor temperature management during transit. In tackling this temperature issue it is expected that the wholesaler respondents will request every supplier to deliver produce in refrigerated transport in the near future.

### 7.2.7 Storage Facilities

All respondents employed a cool room to store produce. Although seven of them (88%) find the facilities adequate for storing produce, in the peak season, it was observed that many cool rooms were tiny (especially those located at the central markets) and are not proportional to the volumes they handle each day. One agent explained that, "95 percent of the storage is only short term. Therefore, limited facilities are not that critical to us." The temperature employed

in keeping produce ranges from 1 to 10 °C. Due to the limited facilities most respondents normally set one specific temperature for keeping all kinds of produce. However, two respondents (25%) managed to run several cool rooms in order to keep produce at the most suitable temperature. The wholesaler respondent made a further effort at putting a temperature chart on each fridge door to direct warehouse personnel to store produce at the right temperature. Nevertheless, all respondents keep produce for as little time as possible in order to enhance shelf life for marketing.

### 7.2.8 Training Needs

Most respondents (88%) have never had any special training in produce handling. There is little formal training within this area and most knowledge is learnt by experience. Seventy-five percent of the respondents believe training is necessary for their sector. The areas of concerns are: produce knowledge and handling; temperature management; and consumer education etc. In relation to consumer education, one agent made an interesting comment, "Since nobody has ownership of the chain, I don't know who should be responsible to educate our final consumers. Since we are not dealing with a branded product in which one can measure the direct results. I would suggest that this should be done by the retailers because they are the closest to the customers."

With regard to industry communication, the most common source of knowledge is from "growers and producers" (75%); "Department of Agriculture" (75%) and "magazine and newspaper articles" (50%).

Lastly most respondents (88%) have a positive attitude towards Quality Management but only three of them (38%) have heard of the AHQCS (Australian Horticulture Quality Certification Scheme) before. Indeed the wholesaler respondent has started to implement a similar program in their organisation. Another agent has expressed his opinion on this issue, "An overall Australian standard is a good idea. However, it's difficult for this industry because of its nature. It is hard to have consistent quality because usually problems such as those caused by disease do not show up straight away."

### 7.2.9 Quality Control Methods

All respondents have implemented some sort of quality control (QC) procedure in their organisation. All of them find the existing methods adequate. The procedure generally involves visual check on quality; size and grading upon arrival at the destination. Only two respondents (25%) record produce temperature as part of the incoming inspection procedures. Two agents showed concern about the quality control procedure at the farm level. One of them explained that, "Perception of quality is different from one to another. Some growers have problems in keeping consistent quality."

Only three respondents (38%) provide product specification with quality parameters such as size; colour; grade; visual appearance and temperature etc. As for those who do not provide product specifications, it is because their customers have not requested them. Although the wholesaler respondent has made an effort in defining the specification by discussion with their customers their buyers tend to accept sub-standard stocks in times of short supply.

Currently, only two respondents have employed batch coding for identification of different lots of produce. Both of them believe this system works well in tracing problem lots. However, one agent believes his systems do have shortfalls "We usually put a code on each pallet of produce. However if the pallet has to be broken down into different orders, it becomes difficult to trace the stock." Other agents (6) don't think it's necessary to implement such a system. They normally use the consignment note or supplier's identification on the container to follow the batch. Apparently, their customers have not requested them to implement a batch coding system.

Lastly, in ascertaining at what stage damage is occurring in the incidence of customer's complaint these respondents usually react by analysing the type of complaint. They then communicate with the relevant participants in the handling chain. The wholesaler respondent has taken a better approach in dealing with complaints. A customer liaison officer is responsible for communication with customers' complaints. All the relevant information is documented and given to relevant parties in the chain. However, if it happens to be their customer's fault such as casual employees mishandling stocks at a store level, the respondent believes it's not their responsibility to deal with this problem.

### 7.3 Discussion and Analysis

From the results, the following points have been identified as the key factors which affect the characteristics of the handling chain for the merchandising sector. These are namely:

- 1) Unclear definition of responsibility for the fresh produce merchandiser
- 2) Lack of knowledge about consumer's requirements
- 3) Lack of formalisation in handling procedures

Clearly there are many problems faced by the merchandising sector. The following cause-and-effect diagram is presented below in classifying the various factors to affect the unsatisfactory quality output in the domestic market (Figure 7.3). However, with the relatively small sample size one has to clarify to some extent that the results are indicative rather than definitive. The survey results can only be used as a guide to illustrate certain features of the merchandising sector and they should not be taken as representative of this population.

#### 7.3.1 Unclear definition of responsibility for fresh produce merchandiser

It is already apparent that one of the most confusing aspects of marketing fresh produce is the complexity of the wholesaling function. This can be reflected by the lack of considerable demarcation between the functions of agent and merchant. Under the current situation the way these functions are organised allows some operators to have the maximum flexibility in optimising their own income (Cadman per. comm.). This is often the case when the price is high and there is a chance to make a very considerable profit margin. Agents will "buy cheap and sell dearer" without rewarding the growers with the right price. Under these circumstances the confusion about their role in the market creates lots of potential problems mentioned in the other sectors. Especially for the distant growers (such as the EG respondents) it is very difficult for them to know where they stand with the limited amount of feedback from their agents. This may be one of the reasons to explain why agents are the least willing group to participate in this study. The agents may have difficulties in providing information upstream and downstream.

There is evidence to suggest that the role of a central market (such as Melbourne Wholesale Market) is diminishing in importance (Chandler and Hirsh, 1987; Fanning per. comm.). A high percentage of all fruit and vegetables is now bypassing the market and much of this can be

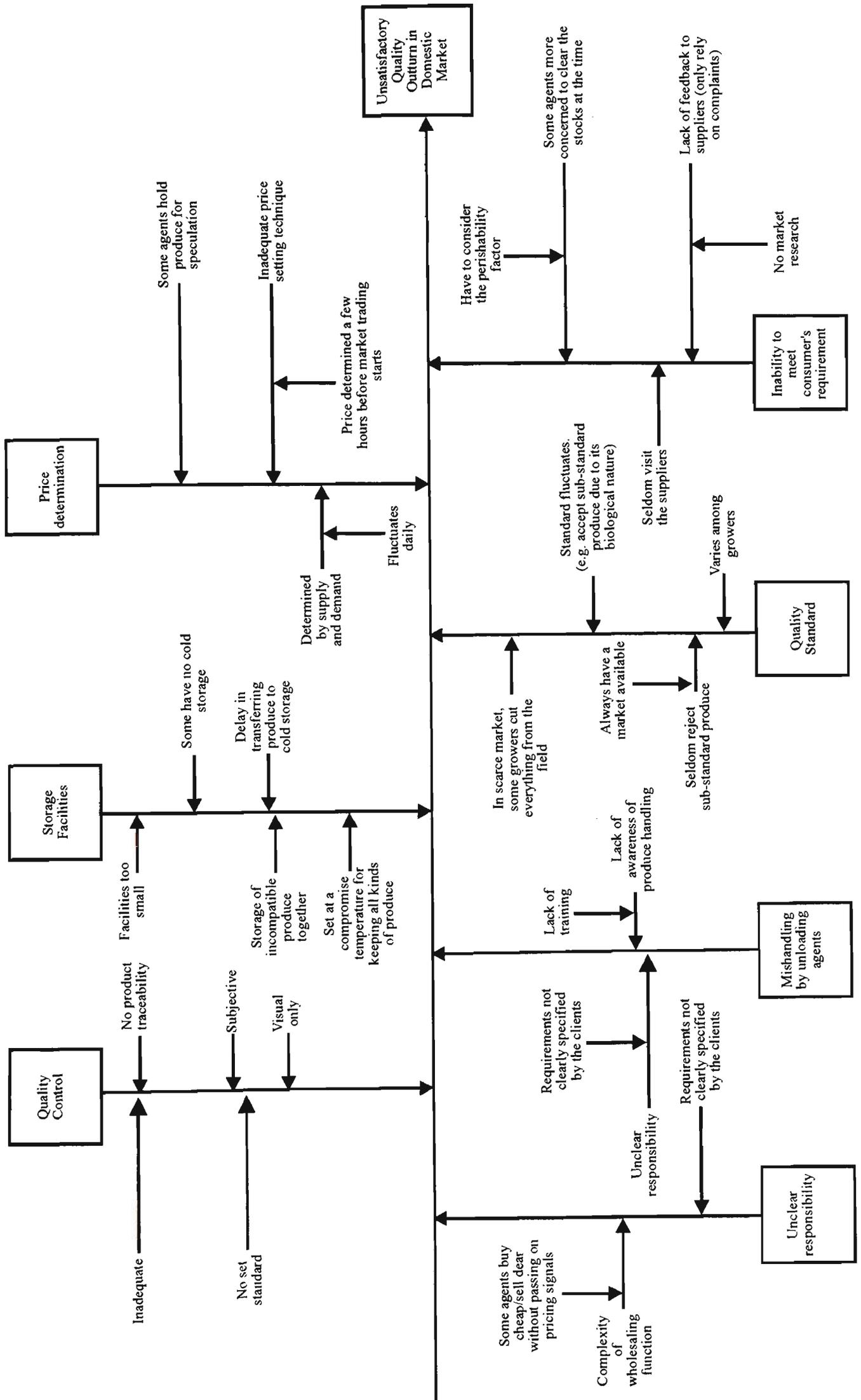


Figure 7.3 The agent's perspective of the fresh produce handling chain.

attributed to the development of the supermarket chains. Both major chain stores have a declared policy of increasing their direct buying from producers to the optimum possible. They use the market largely as a source of information in terms of both quality and price and to audit their retail activities as well as their buying negotiations. However the current trends are likely to encourage the development of larger growers who can offer the supermarkets a sufficiently large quantity of standardised product to meet their needs. Nevertheless growers who are not satisfied with the wholesale market operation, focus themselves on supplying chain stores where the consumer requirement is often clearly specified.

There are many ways in which growers can obtain price information about the fresh market. Outlets include the press, radio, TV, teletext and recorded telephone facilities. The prices however, are daily averages and ranges. This information can conceal wide variations about quality premiums that are of importance to the growers, their agents and packers and their value in decision-making is widely questioned (Industry Commission, 1993). There are also concerns about the effect of supermarket direct buying. Since major chain stores are seeking product of a high quality and of uniform size this will leave the central market with the role of disposing of the remainder (Cadman per. comm.; Chandler and Hirsh, 1987; Henderson, 1983). As trading volume thins, it increases the potential for misleading or inefficient prices to emerge at central markets. At some point, such prices will no longer represent marketwide trading conditions. Agents should no longer restrict themselves to this price information in governing their merchandising plan.

### **7.3.2 Lack of knowledge about consumer's requirements**

For years in the horticulture industry, most produce merchandisers have taken a kind of "Products Anonymous Approach" where they put all the apples in one bin and expect people to sort them out. That means there is little predictability about what the customer is buying (Henson, 1992). Many of them believe marketing is just another name for advertising, selling or manipulation (Pearce, 1993). According to the classic article "Marketing Myopia", Levitt drew a perceptive contrast between the selling and marketing concepts:

Selling focuses on the needs of the seller; marketing on the needs of the buyer. Selling is preoccupied with the seller's need to convert his produce into cash; marketing with the

idea of satisfying the needs of the customer by means of the product and the whole cluster of things associated with creating, delivering and finally consuming it (1960, p. 45).

Currently, most agents have not much interest in marketing fresh produce. They basically assume the product is what the customers want. Their need for market information seems to be very restricted. Price information seems to govern what they can do. Other requirements such as consumer needs, product quality and distribution tend to be neglected. There is no formal feedback mechanism e.g. in-house research in analysing consumer trends.

As bypassing central wholesaling markets is currently a worldwide trend, it is believed that wholesalers in Australia must expand their horizon overseas (Anonymous, 1993; Biggs, 1992; Cadman per. comm.). Consistent quality and continuity of supply is what today's chain stores are seeking. This trend will also favour the development of middlemen such as brokers who will act on behalf of food chain in combining supplies from various sources to meet the needs of the chain (Anonymous, 1993). In US, brokers in the 1990s are very market-oriented and perform more functions than ever before (Burfield, 1994; Urein, 1993a; Zind, 1993). From traditional brokers to distributor/marketers to sales agents, they are taking on additional roles such as information specialist, transportation manager, consumer educator and in-house inspector. More often they have strong links right through the chain, where they act as intermediaries between growers and chain stores, or the food service sector. Since Australia has such a small population comparing to the US, this type of function (i.e. brokerage) may not be suitable to our environment (Fanning per. comm.). Others believe that whether it is an agent or a broker, the industry desperately needs operators who are prepared to interact between suppliers and buyers and pass market signals through the whole marketing chain (Cadman per. comm.). In that way, the market will become bigger through the effort of these true marketers. Ultimately this will be beneficial to everyone in the chain.

### **7.3.3 Lack of formalisation in handling procedures**

Considerable variation exists in product handling practices. Facilities in many operations are inadequate for proper produce handling, especially with respect to temperature maintenance, sanitation, and ethylene concentrations in storage atmospheres. Most agents basically rely on quick turnover to overcome handling problems. Little effort has been put into product

traceability. Perhaps a batch coding system should be employed to trace back to where damage is occurring.

Products are sometimes not of uniform quality. Quality control at the receiving points need to be improved. There is a need for better more objective communication of product quality through the whole chain.

## **7.4 Conclusion**

The many elements of produce marketing and merchandising are complex and not readily understood. The price paid to the growers for the day's sales remains subject to considerable dispute. Perhaps an establishment of a closer and more long term relationship between growers and merchandisers will overcome the problem. The increasing trend of direct supply of fresh produce to supermarkets clearly indicates that some growers are not satisfied with how the market is operating. Unless our wholesalers become pro-active and move quickly to develop new roles in the changing produce distribution chain (such as becoming brokers as is occurring overseas) they may well be 'terminal'.

## Chapter 8

# The Retailer's perspective of the handling chain

### 8.1 Introduction

As outlined in the previous chapters, the delivery of high quality produce to the consumer requires a complex handling chain and there are often conflicting demands between produce requirements, market requirements, infrastructure limitations and commercial priority. There has also been a prevalent attitude in all sectors of the industry to 'fingerpoint' and avoid blame for any problem or difficulty that may arise. An example is the widespread belief amongst growers or packers, that retailers are largely ignorant of how to handle fresh produce (Clayton-Greene, 1993). Although most participants believe some "unskilled" retailers have undermined the value of fresh produce, this last member of the chain still plays an important role especially due to their closeness to the final customers.

Traditionally the customers mainly buy fresh produce from greengrocers and market stalls. During the past 10 years there has been considerable change in the distribution system for horticultural products. This is mainly due to the fact that retailing has shifted from a lot of small retailers to fewer, larger supermarket chains (Ledger & Bagshaw, 1993). It is also noted that the handling practice and the distribution channel varies amongst these retail outlets. In order to determine the current practices of the last link of the chain, two important groups of retailers i.e. the greengrocers and produce managers of a large supermarket chain, were interviewed. Due to the grower/packer lack of knowledge about the final destination of their produce, this sample was chosen according to the consumption pattern of today's consumers where more emphasis on one stop shopping has meant that the supply of produce is becoming increasingly channelled through large supermarket chains. The retailer sample comprised of the following:

- \* 4 average greengrocers from suburban areas of Melbourne
- \* 1 country greengrocer from Bairnsdale, Victoria
- \* 5 produce managers from suburban areas of Melbourne
- \* 1 country produce manager from Sale, Victoria

Note: Some of the findings gathered by the pilot study with Linfox and Safeway will also be discussed in the subsequent sections when appropriate.

## 8.2 The Survey's Results

The survey, adopted a similar format to the other surveys and had several sections of opened and closed questions in order to determine work practices; quality awareness; chain complexity; material handling; transport efficiency; storage facilities and training needs as well as quality control methods (Appendix 5: Survey for retailers).

### 8.2.1 Background

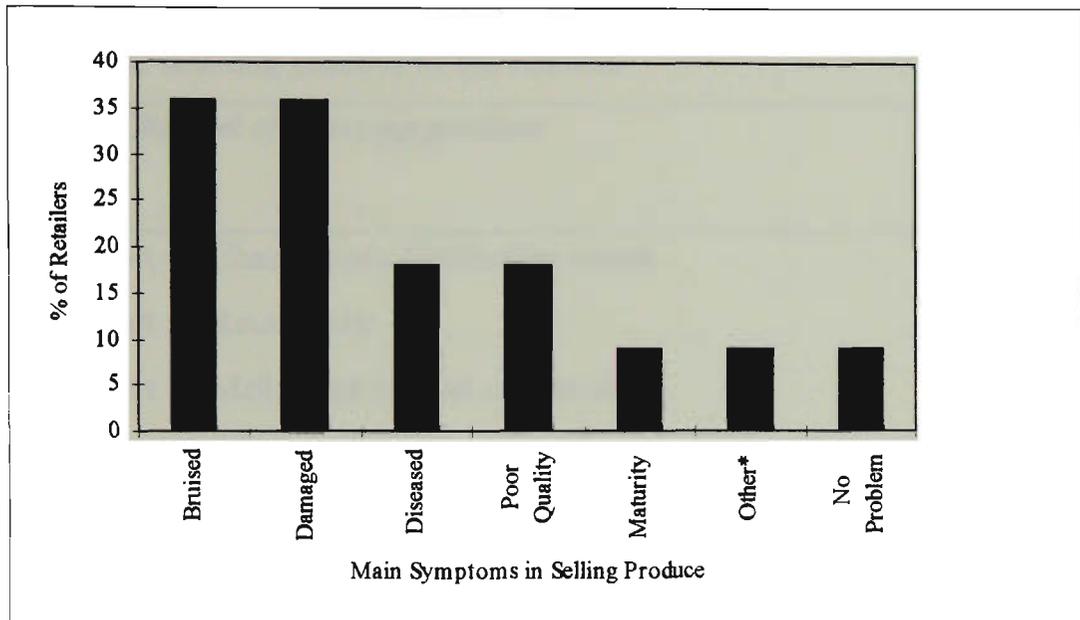
Most respondents (64%) have only been involved in the fresh produce business for less than ten years. However, many of these greengrocer businesses follow a family lineage and two respondents are actually the owners of their shops. Despite different locations (7 free standing stalls; 4 are attached to shopping centres), all of them focus their business on the local community. Only one greengrocer has integrated backwards as a wholesaler in supplying pre-cut vegetables for restaurants and institutions. Again, this process is not highly labour intensive. Four greengrocers (36%) employ less than five full time staff and family members seem to be the major labour force. For the supermarket chain four respondents (36%) had more than five permanent staff in their department and casual staff were usually employed for night shift and weekend operations.

### 8.2.2 Work Practices

It was apparent that these respondents rely on quick movements of stock to keep their business running. Fresh produce is usually supplied to the stores once a day/ five times a week and sometimes on Saturday. Monday, Thursday and Friday are the busy days for receiving produce due to the high trading volume. For special occasions such as Easter, Christmas and long weekends there is generally a higher demand for fruit and vegetables. The survey also revealed that the average fruit and vegetable retailers worked very long hours. Especially for greengrocers some of these respondents (27%) have to work up to twenty hours a day. Produce managers are more fortunate since they can delegate part of their responsibilities to night fill staff.

### 8.2.3 Quality Awareness

Respondents were asked to identify the main problems with quality and the cause involved in selling produce. The results are detailed in Figure 8.1.



**Figure 8.1** Problems identified by the retailers in selling produce

\* Other: Irregularity in fruit size

The reasons given for having "bruised" and "damaged" produce is mainly due to mishandling at the farm level and during transit as well as over-packing of fresh produce in cartons. As with other groups in the chain, retailers also pass the blame for any problem which has arisen to other chain participants. Indeed one greengrocer expressed his concern about the handling practices of his suppliers, "These days growers are looking for more production than quality."

In quantifying how much produce they lose at different stages in the handling chain, most retailers (82%) lose less than 10 percent across the board. One produce manager has experienced a loss of up to 20 percent due to inappropriate stock rotation at store level. Most respondents (73%) have to reduce prices occasionally to shift products. Reasons such as hot weather (27%) and slow sales due to unseasonal conditions (55%) are widely given. Lastly, respondents were asked to give a score (out of 10) on quality of produce arriving at the store. Most are satisfied with a quality rating of 8 or above (55%). The lowest score is 6. Most retailers (73%) believe that their suppliers know how they feel about the quality. However, one greengrocer takes an opposite view, "Don't expose yourself too much to the suppliers even if the quality is excellent. Otherwise, I'll lose my bargaining power."

### 8.2.4 Chain Complexity

In sourcing fresh produce for customers, the retail respondents have taken the following channels:

**Table 8.1** Channels of sourcing produce by the retailers

<i>Channel of sourcing produce</i>	<i>Number of Retailers</i>
Grower ⇒ Transport ⇒ Chain store's distribution centre	6
Grower ⇒ Transport ⇒ Retail store	1
Grower ⇒ Transport ⇒ Melbourne Market ⇒ Retailer	11
Agent ⇒ Transport ⇒ Melbourne Market ⇒ Retailer	11
Agent ⇒ Interstate Transport ⇒ Chain store's distribution centre	6
Interstate terminal market ⇒ Greengrocer's own transport ⇒ Retail store	1

It is already apparent that the Melbourne wholesale market is the major source especially for greengrocers. These respondents usually have a list of regular suppliers they prefer to work with. Indeed three greengrocers have a preference in sourcing from a grower. One of them explained that, "Produce seems to be fresher buying direct from growers since produce changes hands less involved." Some respondents took a neutral view, "Depending on the time of the year, for example, in winter I seem to deal with agents more since not much is grown in Victoria." When sourcing their supply for a particular item, they generally use up to 10 suppliers to fill an order, depending on the volume and quality available.

Due to their different organisational structure, produce managers organise the supply chain in several ways. Within this operation, there is a central buying office located at the centralised depot where a group of buyers is responsible for sourcing the supply for all the supermarket outlets. Fresh produce is mainly delivered direct from the grower's farm or agent's cool room where buyers usually make arrangements with a regular list of suppliers over the phone. The Melbourne market is only a secondary source for topping up the order and for special buys. There is also a substantial amount of produce from interstate or overseas especially for less abundant items in Victoria (e.g. bananas and tomatoes). These buyers have a preference for buying direct from growers since they believe some agents are too diversified in carrying too many lines (some carry up to 40-50 lines) and they are usually more concerned to clear their

current stocks. When sourcing supply for a particular item the buyers may use up to 30 suppliers to fill up an order. One produce manager believes this is a common practice for large volume items such as bananas, " It does not surprise me if I find 5-6 suppliers when receiving one pallet load of bananas."

There has been a mixture of opinions amongst the grower/packer respondents about supplying supermarket chains direct. Most of them believe that the large chains aim at a monopoly in both retailing and sourcing. Once they achieve that, they will screw grower/packers on price. Beside undermining the price setting function of the central market system some growers also believe that the large chains manipulate consumer's decisions on quality. An example is hard and tasteless tomatoes supplied at chain stores because of easy handling.

Due to their closeness to customers these respondents seem to have a better understanding of the market requirements than other players in the handling chain. Positive comments such as "quality is good" (82%), "value for money" (56%) and "good servicing" (36%) are widely given by customers. One interesting point to note is that customers seem to be more satisfied with the personal service offered by the greengrocer. This may be due to the fact that with the small size operation, the greengrocers can be more attentive to this area. On the other hand customers do have complaints too. The major concern is with quality (36%) especially at the end of the season when the retailers don't have much control. They usually deal with these concerns by replacing the item and trying to teach customers how to distinguish good and bad quality. However there is not much feedback to the suppliers because of the small amount of loss involved. Indeed the chain store's managers only inform the buying office about the complaint if a large quantity is involved.

When communicating with customers these retailers mostly rely on frequent discussion with shoppers on quality issues. Currently only the supermarket chain has implemented some formal feedback mechanism that is in-house market research by the buying team for analysing consumer trends. A suggestion box is also located at every store to collect customer's comments. Despite their better understanding about consumer requirements than other participants in the handling chain, the quality standard still fluctuates from one retailer to another (73%). At the moment standards are usually set by the greengrocer or produce manager (73%). Even within the same organisation quality standards also fluctuate as they are set by staff from different levels (e.g. buyer; quality controller at the warehouse; produce

manager and receiving staff at store level) in the supermarket chain. Also in times of shortage in the market quality requirements drop and the retailers tend to accept the best available stocks.

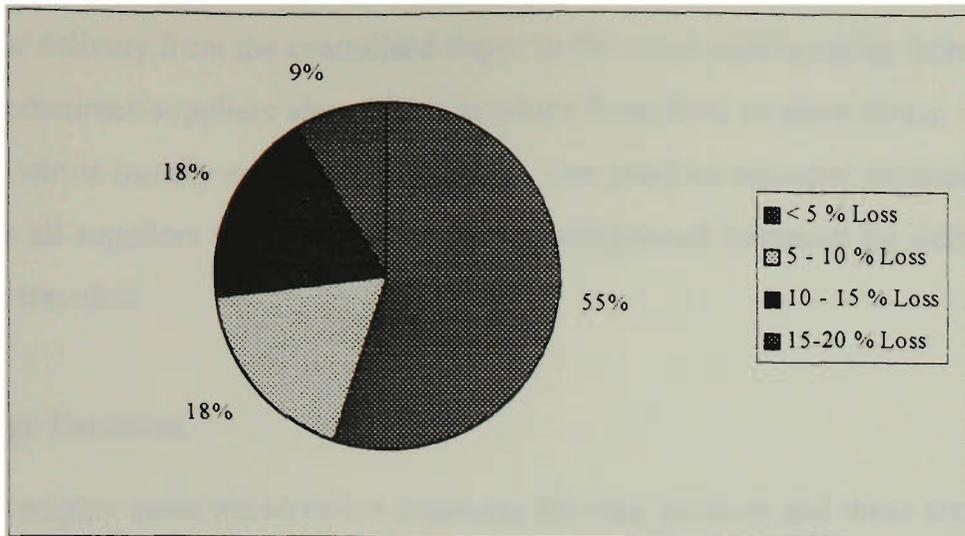
### 8.2.5 Material Handling

Of the 64 percent of the respondents who admitted having quality problems, the two most important issues raised are inconsistent quality of produce (e.g. some suppliers try to hide sub-standard produce at the bottom of the pallet) and inefficient handling by order pickers at the supermarket's distribution centre when stacking loads (e.g. putting hard line produce on top of soft fruit). Other causes are poor temperature management at the store level; over-buying of produce by retailers and unsanitary practice at receivals. One greengrocer has shown concern about the mishandling practice at the farm level, "We can't do much about the quality if the grower has mistreated the produce such as not keeping them cool to start with." One interesting point to note is that the produce managers tend to encounter more problems than the greengrocers. This may be due to the fact that they have to handle a larger volume and variety of produce.

Respondents were also asked to quantify how much produce they normally have rejected\*. The results are detailed in Figure 8.2.

There are a number of reasons given for rejecting sub-standard produce. The two most important issues raised are seasonal factors and inappropriate stock rotation. One greengrocer who has experienced a high rejection rate (sometimes up to 20%) named "mishandling by the choosy customers" as the main reason for rejecting stocks.

Besides the above problems it was also observed (during the pilot study) that receipt of produce at store level is quite disorganised. Rough handling by unskilled staff, leaving produce unattended, and unsanitary practices in the produce preparation area was quite substantial. However, the participants at the other end of the chain (such as grower and packer), are unaware of this substantial loss occurring at the retail outlet.



**Figure 8.2** Rejection rate of produce identified by the retailers

*\*Note: % of losses (of any type) are recorded by each produce manager under a single category called "shrinkage". This figure is presented to their senior periodically as a method of monitoring sales trend.*

When discussing the above problems some retailers have made a few suggestions for improvement such as: training for staff on proper handling procedures; stock rotation and quality awareness; making sure the supplier is aware of the responsibility to stack the loads properly for transit. However, a number of retailers (27%) believe that the problem cannot be solved due to the seasonality and perishability factors of fresh produce.

Lastly, respondents were asked to describe their ordering procedures. Greengrocers consider experience is the golden rule in deciding the ordering schedule and the quantity required. There is only one respondent (the retailer who is also involved in the wholesaling of produce) who has implemented a computerised stock control system in reviewing the necessary level. On the other hand, the supermarket chain has taken a more systematic approach. Order frequency has been set out (i.e. two days in advance) by the company for each store. Produce managers usually have to make stock counts in the cool room before ordering. One produce manager found it difficult to predict the volume before long holidays breaks, in which orders have to be placed well in advance (sometimes one week before the delivery).

### 8.2.6 Transport Efficiency

Most greengrocers (46%) purchase produce from the Melbourne wholesale market. This means trips from 15 minutes to 4 hours. Four greengrocers (36%) used open unrefrigerated vans for delivery. For the supermarket chain, covered and unrefrigerated vans are usually

employed for delivery from the centralised depot to the retail outlets taking from 10 minutes to 2 hours. Sometimes suppliers also deliver produce from farm to store direct. Again, a non-refrigerated van is usually employed. However, one produce manager mentioned that in 12-months-time all suppliers will be required to use refrigerated transport for delivery, whatever the distance travelled.

### 8.2.7 Storage Facilities

All retailers employ some preservation measures for their produce and these are listed in Table 8.2.

All retailers use a cool room to store produce. However, at store level, only the large chain stores have installed refrigerated display cases for some lines. Although eight of them (73%) find their facilities adequate for storing produce in peak season, it was observed that many cool rooms are tiny and are not in proportion to the volume they handle each day (especially supermarkets), probably relying on high turnover to get rid of produce which otherwise might have to be kept in the general storage area without refrigeration. One interesting point to note is that there is a large difference in the storage temperature employed by retailers, ranging from 2 - 15 °C. They normally set one specific temperature for keeping all kinds of produce. A temperature probe is installed in most supermarket outlets to monitor temperature.

**Table 8.2** Preservation Measures Used by Retailers

<i>Preservation measure</i>	<i>% of Retailers</i>
Separation of various incompatible lines	73
Keeping green vegetables moist	73
Refrigeration of some produce e.g. soft fruits; leafy vegetables	64
Protecting produce from the sun (Not relevant for indoor retail outlets)	27
Refrigeration of all produce	18
Other - trim & crisp program (for preserving leafy vegetables)	18
- put paper on top of mushrooms to stop them absorbing moisture	9

In allocating space for keeping produce in the cool room, the respondents normally stack produce by items: put soft lines on top without blocking air circulation; and separate dry and

wet items. Generally, there is no real rule for allocating the space. Fresh produce is normally kept in the store room for 2 - 3 days. For produce which is not sold during the day the greengrocers generally leave them on the shelves and remove the poor quality the next day. Produce managers remove perishable items from the shelves back to the cool room overnight. Over the weekend, the greengrocers tend to run down the volume of stock on Saturday afternoon. Otherwise, they just throw the produce out. Supermarket staff normally pack the left-over stocks into cool room and sort out the quality on Monday.

### 8.2.8 Training Needs

Clearly there is a vast range of expertise in the industry, but it is mostly internalised with little input outside the retail sector. Especially for the greengrocers their businesses usually follow a family lineage and the knowledge is passed from father to son or self-learnt. Only six produce managers (55%) had some sort of training in produce handling (provided by the company). Forty-six percent of the retailers believe that training was necessary for this sector. Their areas of concern are produce knowledge; proper produce handling and keeping; temperature management and stock rotation. However, it is usually up to the produce manager to decide whether sufficient training on produce handling has been provided to their subordinates. There have been concerns from other sectors of the handling chain (such as growers and transporters) about the way young casuals handle produce in supermarkets. However, large chains do not seem to put much emphasis on training for these unskilled operators.

With regard to retail industry communication the most common source of knowledge is from "growers and producers" (55%), "others such as company resources" (55%) and "magazine and newspaper articles" (36%).

Lastly, all retailers had not heard of the AHQCS (Australian Horticulture Quality Certification Scheme) before, but they are all positive about it. One produce manager believes that "if the grower or packer is implementing this, more people will know about their responsibility."

### 8.2.9 Quality Control Methods

Most retailers (73%) have implemented some sort of quality control (QC) procedure in their premises and all of them find their existing methods adequate. The procedures generally involve a visual check on quality in the market and upon arrival at the retail outlets. This is usually done by the greengrocer and the produce manager or the receiving staff at the store level. The supermarket chain also employs two to three quality controllers at the distribution centre for incoming produce inspection. Produce samples are taken randomly by the QC staff upon arrival. During summer, produce temperature is also checked when necessary. Three produce managers find the incoming produce inspection at the warehouse level inadequate as there are occasions when sub-standard produce have slipped through the inspection. However, these managers admitted that it is physically impossible to inspect everything as the volume the warehouse receives each day is enormous. Due to the fluctuating market situation it is not surprising that QC method is subjective and that 73% of retailers believe "quality standards are flexible". These retailers will take the best available quality when there is a short supply of produce. It was also observed that there are variations in standards amongst the produce managers in rejecting sub-standard produce.

Ten retailers (91%) require suppliers to provide product specification with quality parameters such as size; colour; grade; storage requirement and shelf life etc. This group is currently satisfied with the existing specification. Although the supermarket chain has specified its produce requirements by providing regular suppliers with information quoted from its own produce knowledge product manual, the buyers tend to accept sub-standard produce in times of short supply.

Besides product specification, the retailers also prefer their suppliers to provide product information for in-store displays. The areas of interest are recipes, nutritional information and storage hints for customers. The supermarket has initiated product promotion by designing information leaflets (includes recipes, storage hints and nutritional information) itself for shoppers.

The greengrocers report customers complaints to suppliers in the wholesale market the next day. Usually, it is left to the supplier to sort out the problem. On the other hand, the supermarket chain has put effort into analysing the type of complaint by employing a batch

coding system. This system has been designed to trace back the date of arrival. A different colour sticker is put on each unit (containers such as plastic crates or wooden bins are normally employed) by the order pickers in distinguishing different working days. Suppliers are also required to declare the date of packing on the produce cartons and hence the produce age can be traced-back. Despite these efforts, produce managers usually make complaints only if a large quantity of stocks is involved. Otherwise they just replace the goods or give a refund to customers when a problem arises.

### **8.3 Discussion and Analysis**

From the results the following points have been identified as key factors which affect the characteristics of the handling chain for the retail sector. These are namely:

- 1) Limited knowledge for final consumers to judge what good quality is
- 2) Lack of formalisation in handling procedures
- 3) Quality control procedure is insufficiently pro-active

Clearly there are many problems faced by the retail sector i.e. the greengrocers and chain store's produce managers. The following cause-and-effect diagram is presented below in classifying the various factors thought to affect the unsatisfactory quality outcome in the domestic market (Figure 8.3).

#### **8.3.1 Limited knowledge for final consumers to judge what good quality is**

Consumer demand patterns have changed remarkably over the past two decades, affording opportunities for growth in the fresh produce industry while creating excessive capacity and economic disincentives for its processing counterparts (Jolly, 1987). Nowadays consumers attach a much greater value to the 'quality-of-life', in which improved health plays an important part.

Additionally, with a significant percentage of households having a combination of high educational levels and high incomes this 'upscale' segment of the market manifest an increased demand for higher, more consistent quality (Anonymous, 1994; Jolly, 1987).

With the increasing trend of consumers being more discriminating in their taste, the existing market does not seem to deliver what they want. First of all limited knowledge has been available to judge what good quality is. The term "quality" defies complete and objective definition and for the consumer it is largely a subjective judgement. There has been little published work concerning produce quality (especially for vegetables) and what has been published has some argument as to what are the most important quality attributes (Corry, 1991). Riggs (1989) separates quality characteristics into two distinct groups - related to market standards and to nutritional value. Basically, he defined market standards to be the external factors (shape, colour and freshness) whilst nutritional standards refer mainly to chemical constituents.

Research leaves no doubt that people think 'fresh is best' - consumers tend to place more emphasis on the external characteristics (e.g. appearance; colour; ripeness) in making purchase decisions (Corry, 1991; Anonymous, 1994; Martens *et al.*, 1984). Martens (1984) also found that the female consumers place greater emphasis on colour and appearance, external characteristics which they hope will relate to internal quality. How the consumer determines internal characteristics of the fruit and vegetables before purchasing is unclear (Corry, 1991). Currently, only visual criteria are used but these can be misleading. One of the classic examples is that many housewives complain about tomatoes with high quality external appearance but poor internal quality (McKinna, 1980). This is due to the fact that many suppliers tend to increase shelf life by harvesting green, pink or immature tomatoes with the expectation that ripening would occur during the marketing and storage period.

As the current Australian standards for produce are poorly defined and are often judged subjectively, consumers are left to assess the values by trial and error followed by a limited opportunity for replacement of choice items. Under these circumstances, final consumers don't seem to have enough impact in the market. As mentioned in the result's section, most big retailers only report the complaint back through the supply chain if a large volume is involved. Obviously consumers tend to allow this situation to continue. According to Holbrook and Howard's extended system of classification of goods, fresh produce is defined as convenience goods which the consumer is willing to exert only a limited physical effort shopping for such goods, and is generally unwilling to systematically acquire brand information before shopping (Horton, 1984). This author further argued that although consumers do not actively seek detailed information on convenience goods, brand name recognition is quite important

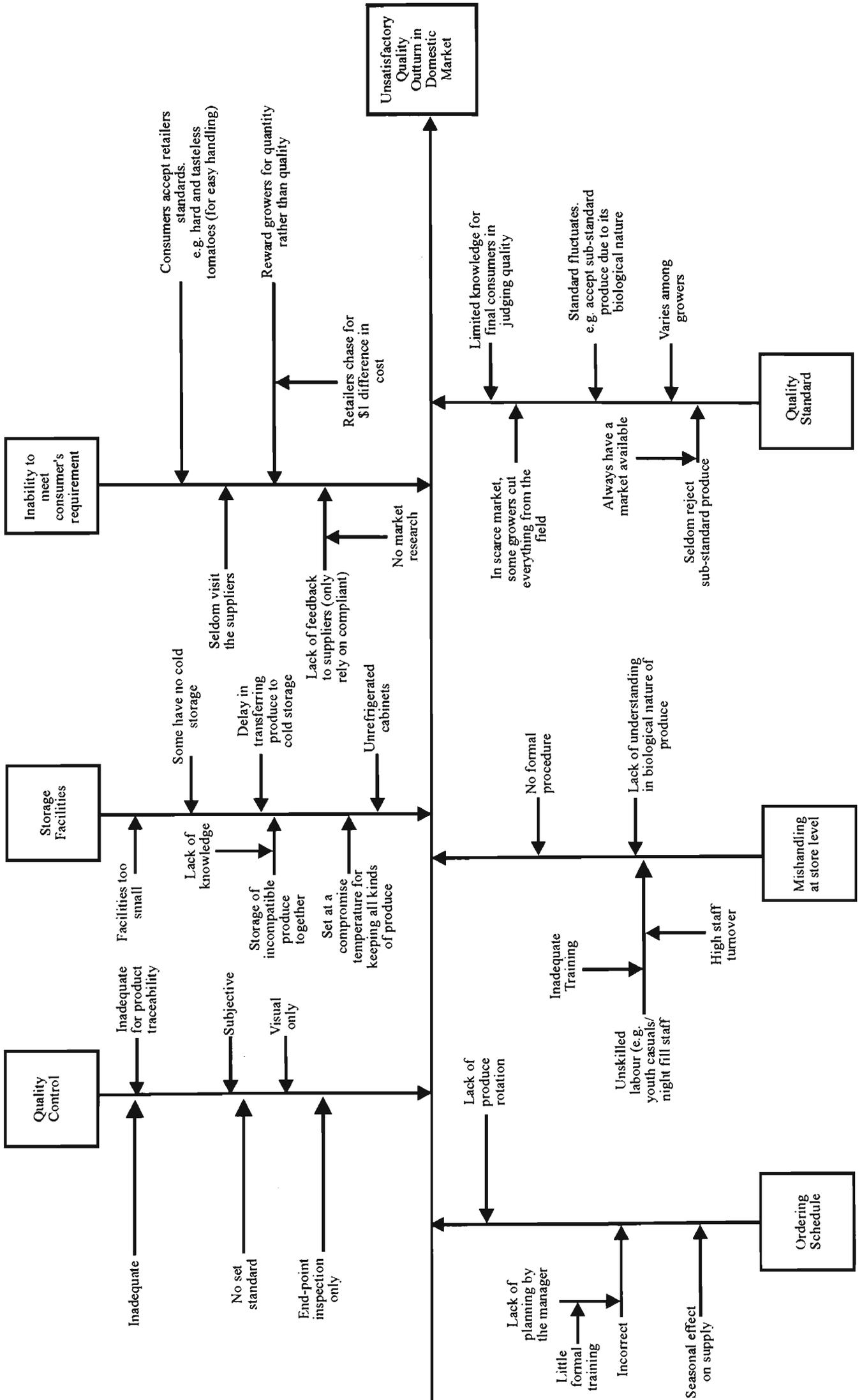


Figure 8.3 The retailer's perspective of the fresh produce handling chain.

precisely because the consumer is not highly ego-involved in their purchase. This aspect is further investigated by another classification system developed by Broody and Cunningham (Horton, 1984). Their system was to identify those situations in which personality variables could be expected to predict brand choice. For convenience goods, this is the situation where the risk of making a poor brand choice is low, due to low performance risk and low social risk, specific self-confidence is not relevant; therefore, the consumer can rely primarily on exogenous variables (such as price and purchase convenience) when making a brand choice (Horton, 1984; Malhotra, 1983). Under these circumstances, fruit and vegetables are low value items (compared with consumer durable item). Most of the time, there is no feedback to the retailers regarding problems. Most chain store outlets have installed customer suggestion boxes for communicating feedback but only 10 percent of these responses are related to fresh produce.

To remove the above obstacles to communication between producers and consumers, one strategy is to create brand awareness. There is a world wide trend away from a commodity approach to marketing. Promotions involving undifferentiated products are less popular and the trend is to a branded product approach involving differentiated produce targeted at niche markets (Horticultural Policy Council, 1994). Particular examples of this include Sunkist (oranges), Chiquita (bananas), Dole (a range of produce lines) and Washington (Washington State Apples) etc. A successful product differentiation campaign may lead to an increase in the average quality of the marketed produce. This could occur through competition between major brands and the ripple effects on bulk produce as national advertising and promotion programs generate additional demands for higher quality (Jolly, 1987). Indeed many large- and medium-sized retailers have already started working in this direction by providing point-of-sale materials for shoppers. As retailers increasingly attempt to differentiate their retail outlets, a higher quality of produce is required. Experience of North American and United Kingdom chain stores suggest that Australian supermarkets will quickly become highly focused on their expanded role. Produce procurement, supply and monitoring will be researched and designed to provide customers with horticultural product according to rigorous specifications and standards. In other words, quality control throughout the whole chain is a key concept to all of this. In recent years, some innovative growers in Australia have adopted this marketing strategy by conducting generic promotion and brand development (e.g. Queensland mango and I.Q. mandarin). Of course, some kind of industry intervention such as, imposing an agreed quality control system and labelling will be beneficial in establishing a national brand.

Compulsory labelling of produce at retail level will include information such as variety of produce; storage instructions; nutritional information; presence of any artificial treatments; origins and harvesting dates and will be helpful for consumers in making purchase decisions.

### **8.3.2 Lack of formalisation in handling procedures**

Considerable variation exists in product handling practices. Good temperature management is essential for proper handling and providing consumers with produce of the best possible quality. Unfortunately, some practices and facilities used result in produce warming or chilling, both of which cause marketing losses. Examples such as inadequate storage facilities and an improper temperature regime at the store level are widely given. These retailers basically rely on a quick turnover to overcome the handling problem. Product temperature management is minimal to nonexistent in many roadside markets. Another major problem associated with poor retail handling is the lack of product handling education programs in this industry. Although major chain stores tend to place emphasis on training, it is usually up to the individual produce manager at each store to determine whether sufficient training on produce handling has been provided to staff (Biggs, 1993). Because for the greengrocers businesses are usually family-owned, knowledge is passed from father to son or self-learned, it would take a long time to change the knowledge and skills base of this sector, unless active measures are utilised (Clayton-Greene, 1993).

### **8.3.3 Quality control procedure is insufficiently pro-active**

Quality control methods are insufficiently pro-active. Current procedures generally involve a visual check on quality; size; grade; colour and sometimes produce temperature through incoming produce inspection. Even when large chain stores have employed quality controllers at the distribution centre for incoming inspection, there are occasions where sub-standard produce is missed. There is also confusion as to what quality standard is appropriate. One of the biggest problems in determining the quality standards for fruit and vegetables is the definition of quality. This difficulty stems from an individual's perception of the word and the biological nature of the product makes it difficult to expect production of produce to achieve the same degree of uniformity as that achieved by manufactured goods. Nevertheless, there is a desperate need for better quality assurance programs at the retail and consumer level and the advocacy of consumer on produce labelling will help to define the quality parameters more clearly.

Lastly, there is also a lack of system for corrective action and traceability. Record-keeping systems used in most stores for tracking product losses at the retail level are inadequate and do not allow retailers to identify causes of lost sales. Currently all losses of any type, from physical injury to physiological break down and decay, are absorbed in the general category of "shrinkage". It seems necessary to classify type of losses into more categories and perhaps a better batch coding system should be employed to identify at what stage damage is occurring.

## 8.4 Conclusion

The growing and marketing of horticultural products needs to be driven by market-based decisions with the wishes of consumers becoming the most important consideration. It will require the industry to put more emphasis on consumer taste and preference. Consumers however will be educated on varieties, storage and preparation by effective promotional campaigns. In order to create brand and quality awareness some kind of industry intervention imposed on grading and labelling of fresh produce is necessary. Marketing will also be assisted by the fact that the produce has been subjected to effective quality assurance (QA) programs. As retailers are an integral link between producers and consumers, mechanisms (such as provided by QA programs) should be in place for each product to provide speedy and accurate transmission of market signals back to growers.

## Chapter 9

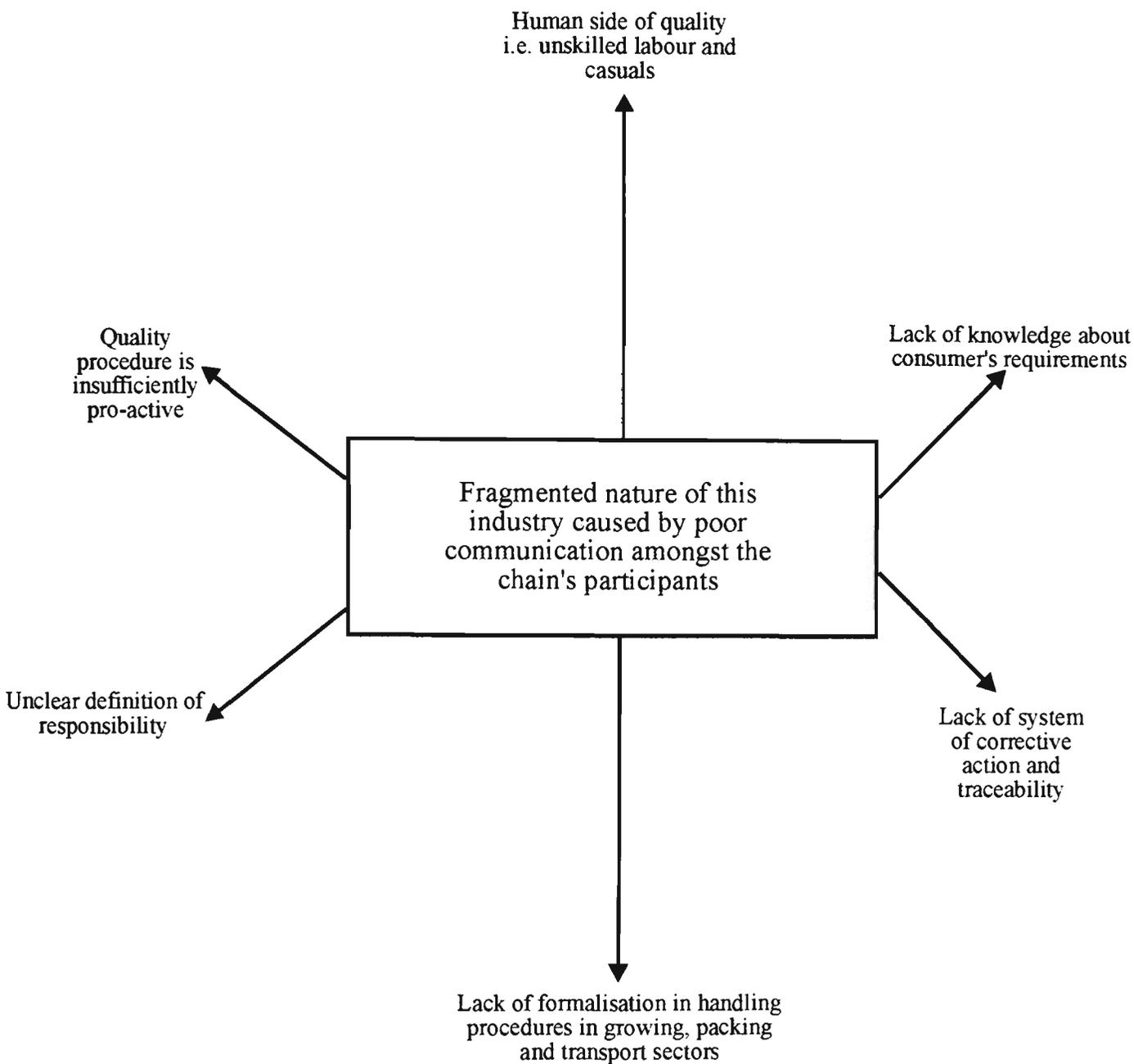
# Three Case Studies on The Handling Chain for Horticultural Products

### 9.1 Introduction

The growing and marketing of horticultural produce needs to be driven by market-based decisions with the wishes of consumers becoming the most important consideration (Horticultural Policy Council, 1992). However many of the existing operations are not working adequately in satisfying consumers' needs. The survey's findings established that there are a number of issues affecting the future growth in this industry including: communication problems, quality procedures, limited knowledge about consumer's requirements; unclear definition of responsibility; unskilled labour and casuals; handling procedures and product traceability. Figure 9.1 summarises the factors affecting quality output at each stage of the handling chain .

At the centre of these key issues is the degree of fragmentation caused by poor communication amongst the chain's participants (Dench McClean Associates, 1992; Sully & Coffey, 1992; Horticultural Policy Council, 1994). Frequently, there are too many players handling too many products without the ability to do justice to the product they are handling (Sully & Coffey, 1992). Without better communication amongst these participants, it is difficult to benchmark handling procedures. With the greater emphasis upon quality and satisfying of the consumer needs, all segments of the chain will be required to work more closely together. In other words the more interest the producers take in the fate of their product, the more they learn about consumer requirements the more they will strive to influence how all the participants along the chain perform their function (Henson, 1992).

The unique nature of horticultural produce (e.g. seasonality and perishability) and differing labour and production requirements for each crop necessitated the assessment of a number of different growers. Three case studies were chosen:



**Figure 9.1** Factors affecting quality outcome at each stage of the handling chain.

- 1) A major celery grower from Cranbourne (with integrated operation from growing to merchandising);
- 2) An export-oriented asparagus grower from Lindenow and
- 3) Two Lindenow growers who supply lettuce hearts for minimal processing via an agent

(Note: These growers all participated in the survey of growers attitudes towards quality problem in the handling chain.)

Investigations were undertaken in order to develop a greater understanding of the above key issues and to examine the links and relationships within the fresh produce handling chain. Besides the growers and their employees, other participants (e.g. packers, transporters, agents etc.) in the subsequent stages of each handling chain were also involved in these studies.

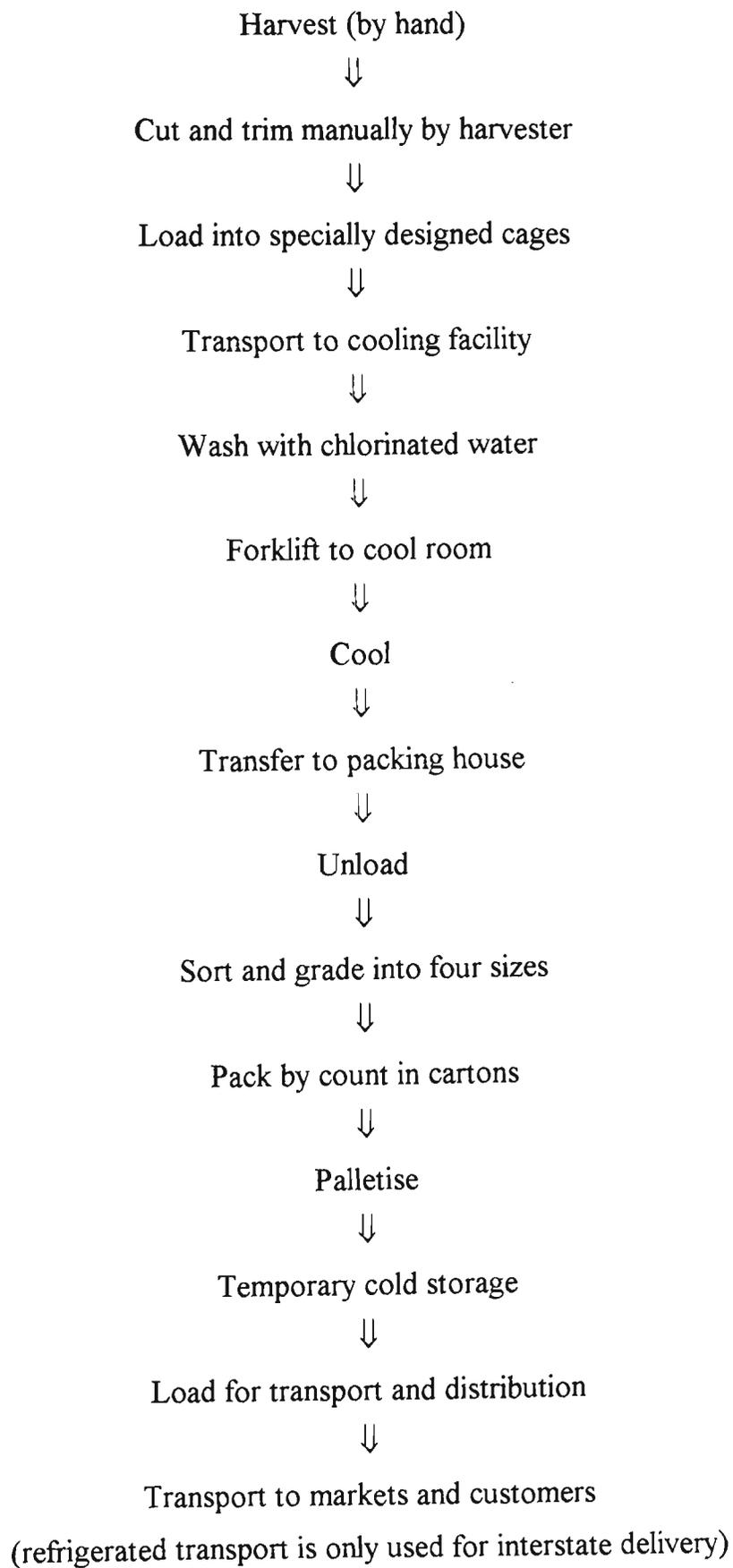
The objectives of these case studies were to detail the overall handling procedures on each operation and identify areas needing attention within these handling chains and to help identify general issues and principles which may apply to the wider industry. These 3 samples are different so each chain's participants tend to show different responses to the key problems identified in the surveys. In order to emphasize these issues, the case studies were organised in a way which placed the major focus on the process itself. Therefore any issues that are specific to the vegetable itself (e.g. specific procedures relating to crop management etc.) are not discussed.

## **9.2 Celery Production: A Case Study**

### **9.2.1 Background**

This case study investigated a major celery growing operation located in Cranbourne, Victoria. Celery, a major salad crop in Victoria, is largely grown on the lighter soils of south east Melbourne. Figure 9.2 summarises the handling system for celery.

The grower's farm is relatively large (approximately 470 acres). Celery is cropped on a major portion of this farm with 52 plantings a year. Production is geared to maintain year-round continuity of supply. A variety of crops such as brussels sprouts, cabbage, lettuce and parsnip are rotated with celery for control of soil-borne disease and to maintain soil structures.



**Figure 9.2** Handling system for celery

This grower's organisation is highly integrated in structure. Besides growing, he is involved in other functional activities from packing to merchandising. With activities from farm to market, he currently employs over 40 permanent staff with different job responsibilities. A team-based approach is employed in which different teams of staff specialise in areas such as transplanting, crop management, harvesting and packing etc. Training is the key element in the success of this approach in which the supervisory staff (the grower interviewed, his brother and their sons) place full emphasis on newcomer's job skills. Most of his staff are fully committed to this organisation with a number of them working there for over 5 years.

Established as a high volume producer for fresh market crops, the grower feels he needs a variety of outlets to absorb his production. A large portion of the celery crop (40%) is sold in Victoria either through his own stand in the Melbourne Wholesale Market or by prior arrangement with supermarket chain stores and greengrocers. The rest is sent interstate under consignment to various terminal markets with Sydney as the major destination. An agent represents him in that situation whereas his sons and nephew are responsible for selling in Melbourne. Concentrating on domestic supply is the main goal for this grower since he believes "exporting is a different ball game" in which total commitment from the grower is highly essential.

## **9.2.2 Production Practice**

### *9.2.2.1 Crop Establishment*

The celery crop is established from transplants which are planted manually on raised beds. These transplants are contract grown by a private company, however the grower has a direct input into this procedure by supplying seed of a preferred variety. His cultivar knowledge has been acquired by conducting numerous variety trials on his property. The most noticeable aspects of the planting procedure are the depth of dimple for transplants and the unique plant spacings. The grower, through input from the celery planting and harvesting teams, has worked out an even distribution for ideal plant establishment. The grower considered he developed his technical expertise by communicating with and receiving feedback from his staff.

The crop production schedule is totally governed by the market requirement for all year-round production. However, there is no speculation on market fluctuation since the grower has a list of regular customers to absorb his production. Summer is the main consumption period for

celery, with larger batches planted for that particular season. The same schedule has been employed for over 5 years.

Pre-planting bed preparation consists of a series of techniques applied to modify the crop micro environment, thereby enhancing plant productivity and quality. These involve a well-prepared seedbed and rigid fertiliser and spray programs. A raised seedbed is formed, which allows sufficient water infiltration and retention while providing ample air space (Plate 9.1A). Sometimes lime is used to adjust soil to the desired pH. Prior to bed formation, complete fertiliser and fowl manure are added to provide a balance of nutrients. Pelleted fertiliser is the preferred type since it does not cause fertiliser burn of young plants.

Celery is transplanted every week, weather permitting (Plate 9.1B). Immediately after planting, crops are watered by fixed overhead irrigators. These are more expensive but offer more precise control of water application and a reduced risk of spreading fungal disease than movable pipes. Frequent watering is required during the early weeks after transplanting. An irrigation schedule is constantly monitored by the soil moisture manually. Another mix of fertiliser and fowl manure is applied as a side-dressing during the early growth stage. A chemical spray program is used to prevent pest, disease and weed. Well grown celery will become sufficiently vigorous to shade and out-compete any other weeds.

#### *9.2.2.2 Harvesting*

Harvesting takes place five days a week and perhaps on a sixth day in peak periods. Maturity determination is decided by the grower and the crop is always cut at its prime condition by his standard.

Harvesting begins in early morning when temperatures are low and plants turgid. Celery is selected for maturity and quality, cut, trimmed and placed in bulk containers (specially designed cages), then transported to the packing house for all subsequent handling operations (Plates 9.1 C & D). Since celery usually reach maturity uniformly, only one harvest from a field is undertaken. Teams of staff with specialised knowledge in harvesting and handling are employed for this process. Clear instructions are given by the grower and supervisors for assessing crop quality. Clean, tight, firm stalks are trimmed to the desired length (approximately 60 cm - judged by the length of the harvesting knife), and those with defects

such as discolouration, bruising, bolting seed stalks, presence of side shoots, pest or disease damage are discarded.

Celery must always be handled carefully, placed gently into the bulk containers and never thrown into bins. This aspect is strongly emphasised by the grower when training newcomers.

It is important that the entire postharvest chain of operations is carefully designed to ensure the components of one of the operations do not cause problems later. For example, celery is stacked into the cages in a special pattern that allows ease of handling at the packing line. The cage mesh design also allows air to pass through the crop during cooling.

### *9.2.2.3 Cooling and Packing*

The grower appreciates the importance of removing field heat from celery as soon as possible after cutting. As soon as there are six full cages they are sent to the shed. They are then dipped into a large tank of chlorinated water for washing off the dirt (Plates 9.1 E & F). Each cage is then forklifted to the forced air cool room to reduce produce temperature to 2 °C (Plate 9.2 A). This system is also equipped with a "Thermfresh" unit for maintaining moisture content of the crops. Celery is cooled for at least two hours depending on the delivery schedule.

Cooled produce is then transferred to the shed next door for grading and packing. This process is not operated under a temperature-controlled environment. Celery packing is labour intensive and is the major cost area in the operation. The grower is pleased with his team and believes upfront training and clear instructions are essential for effective inspection. In order to maintain inspection accuracy, packers are given performance feedback on a frequent basis. Packers are asked to identify themselves on cartons in a particular batch. Performance feedback, good or bad, is then related from customers accordingly.

A team of 5-6 packers line up in front of the conveyor belt from which they hand grade the crop and pack into wax cartons or chain store's plastic crates (Plates 9.2 B,C,D). Celery is packed in four size grades i.e. 9, 12, 16 and 20 per carton. This is requested by customers and is better for presentation purpose. The grower also packs a few 100 kg bulk wooden bins for larger independent fruit shops in Melbourne with the same grading criteria (e.g. butt size).

Regular input from the packing team is also highly encouraged. The grower derives a better picture about the harvester's performance by communicating and receiving feedback from his packing staff.

#### *9.2.2.4 Storage*

Being a perishable commodity, storing celery is not recommended. Storage period normally ranges from 12 to 24 hours. Produce is kept at 2 °C in another cool room (conventional type) designated for despatch items (Plate 9.2 E). The grower's son rotates the stock according to date coding on each pallet.

#### *9.2.2.5 Distribution*

The grower sends his celery to both Melbourne and interstate outlets. For local delivery it is transported in an unrefrigerated van with insulation (Plate 9.2 F). Produce is usually loaded from the cool room in late afternoon and transported to the Melbourne Market in early am. There is a time gap in which celery is out of refrigeration for up to 7 hours. The produce is also kept at ambient temperature during trading in the market. The grower believes it is not economically justifiable to improve the transport facility with refrigeration or loading schedule.

Refrigerated road transport is employed for interstate delivery (Plate 9.2 G). Produce is transported by a local sub-contractor, however the grower has a direct input into this procedure by specifying temperature requirement during transit and checking the temperature recorder before delivery.

#### *9.2.2.6 Marketing*

Being a high volume producer, the grower needs a variety of outlets to absorb his production. In order to capture a large demand, the grower understands the importance of implementing on farm QA in maintaining a continuous supply of good quality product. His brand is highly recognised by a variety of buyers and hence most stocks are pre-ordered materials. This also enables him to have a better correlation of production with marketing for the next season.

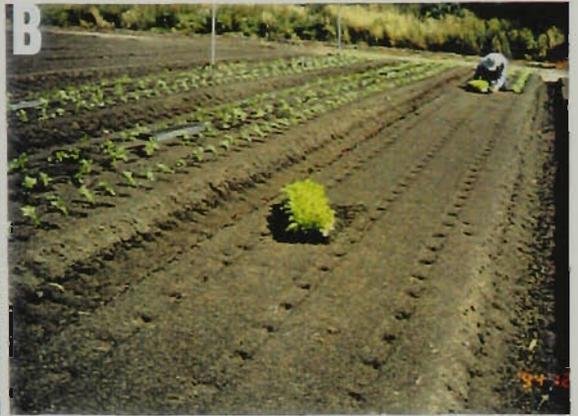
**Plate 9.1 A**                      Raised seedbed is formed for sufficient water infiltration.

**Plate 9.1 B**                      Transplanting of celery.

**Plate 9.1 C**                      Harvesting of celery.

**Plate 9.1 D**                      Specially designed cages for harvested crops.

**Plates 9.1 E,F**                      Pre-cooling of celery.



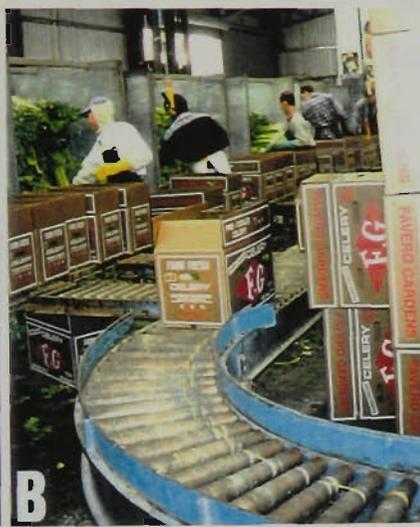
**Plates 9.2 A**            Cooling of celery by forced-air system

**Plates 9.2 B,C,D**      Grading and packing of celery.

**Plate 9.2 E**            Storing of despatch items.

**Plate 9.2 F**            Use of unrefrigerated transport for local delivery.

**Plate 9.2 G**            Refrigerated road transport is employed for interstate delivery.



Regular feedback from customers and agents is essential. The grower believes the key to success is understanding the market. His sons and nephew representing the company in the Melbourne Market, play an invaluable role in liaising face-to-face with buyers and checking product performance.

Timely feedback from customers has had a marked effect on the way his product performs. They can react very quickly if there is a customer complaint or request particularly with his company presence in the market daily which helps to establish a better relationship with his buyers. For interstate business, daily communication with his agent is highly encouraged by the grower. He has been in business with his Sydney agent for over 25 years and a relationship based on trust has been cemented. Besides regular communication the grower also visits the interstate markets on a frequent basis and his major customer outlets when the opportunity arises.

### 9.2.3 Conclusion

This grower has addressed some of the problems of fragmentation in the handling chain through his greater knowledge about the market requirements through several channels. Being close to the central market geographically, allows him to have staff present on the spot. These staff play an invaluable role in liaising face-to-face with buyers and checking product performance. This enables the company to take much greater control over the destiny of their produce. His system also facilitates regular and timely feedback from buyers to staff at the farm. This helps to adjust production procedures to ensure that the product consistently satisfies consumer quality requirements.

A long-term relationship has been established between the grower and his Sydney agent through frequent communication on customer requirements and together they make more informed decisions so that they can be partners in higher profit. This together with the grower's presence in the Melbourne Market enables the company to tie up a lot of business in forward contracts. This enables him to anticipate demand in advance and organise on-farm activities and labour resources in a more co-ordinated manner. In a typical grower situation in which the producer does not know what the market requires, he is never able to plan what he will plant for each year. Therefore, this grower's approach to the market is very crucial to all the good practice he is conducting on the farm.

The success of this organisation also relies upon good communication between the grower and his staff. The employment of full-time workers, develops a sense of belonging and commitment amongst staff to this organisation. Intensive training programs allow staff to have the ability and specialised knowledge in carrying out specific tasks. This also enables the grower to improve technical expertise by communicating with and receiving feedback from them. He realises commitment to quality must also be of vital importance to everyone in his organisation.

Quality assurance seems to be the major challenge faced by this grower and the development of a quality management program would be an excellent objective. Many of the parameters are already in place to enable such a program to be developed. Although this grower is vigilant with quality throughout the chain more attention needs to be placed on the transport area. This would further strengthen the company's position in existing markets and be of great assistance when expanding into new outlets.

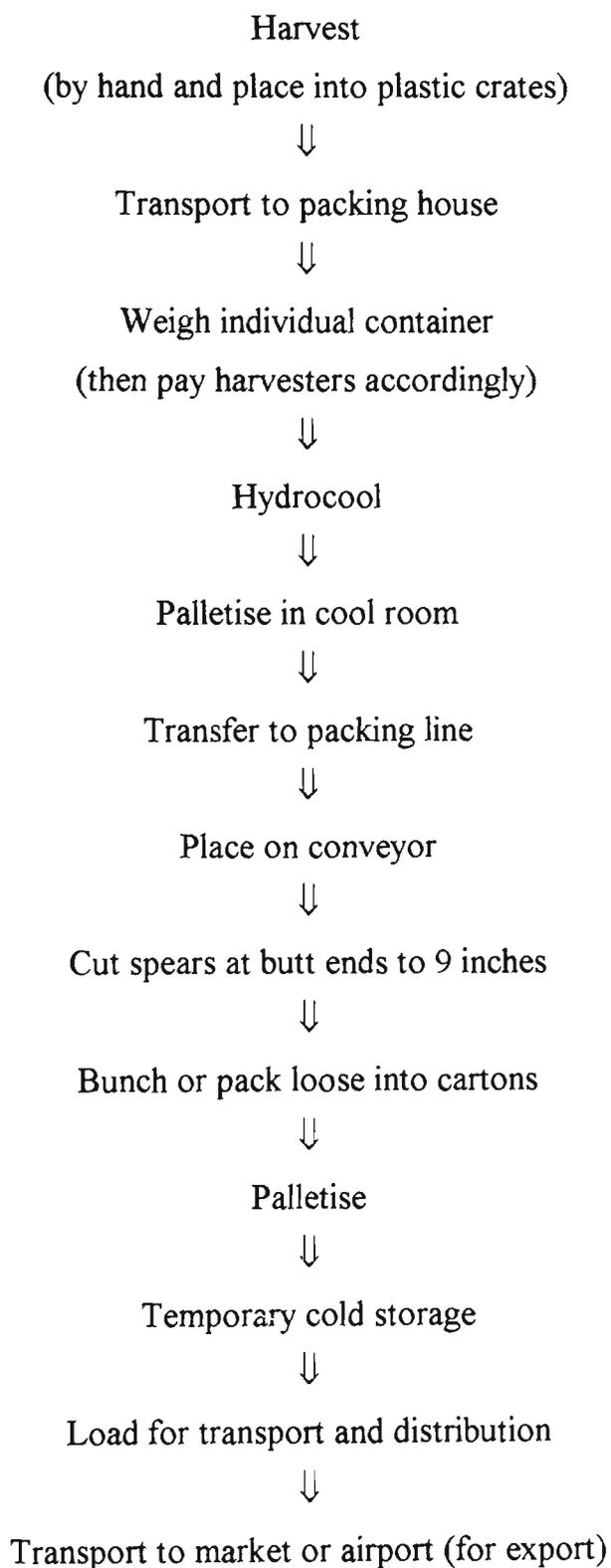
## **9.3 Asparagus production: A Case Study**

### **9.3.1 Background**

This case study investigated an asparagus growing operation located in Lindenow (East Gippsland), Victoria. Asparagus, although an important Victorian horticultural crop for export, has only been successfully grown in this district since the mid-80's (Belder, 1985). Figure 9.3 summarises the handling system for asparagus.

The grower's farm is of medium size (approximately 80 acres) with 25 acres permanently dedicated to asparagus production. As it is considered to be a cool season crop, production is only favourable in spring (i.e. from August to December). Due to this seasonal factor and market opportunities, a variety of crops such as cauliflowers, cucumbers and gherkins are also grown to sustain the farm's income. Some of these crops are contract grown mainly for processing.

The grower's organisation is fairly integrated in structure. Besides growing, he also operates a packing shed. Asparagus packing is labour intensive and is the major cost area in the operation. Although a team of eighteen staff is currently employed mainly for harvesting and packing, only three of them have a permanent position.



**Figure 9.3** Handling system for asparagus

Being a high volume crop, the grower sends a major portion of asparagus (~ 50 %) direct from this farm overseas every season. A marketing co-operative has been set up recently where a number of producers in the Lindenow district formed a co-operative to market asparagus and broccoli and this grower is the marketing manager. For domestic outlets the crop is sent under consignment to a broker in the Sydney Market. He has previously represented the grower in export activities before the co-operative was formed.

### 9.3.2 Production Practice

#### 9.3.2.1 *Crop Establishment*

Asparagus is a permanent crop, established from seeds or crowns which are planted on raised beds. These seeds are brought from a USA company from which the grower has requested a QA report for each incoming batch. It is expensive to establish a permanent asparagus bed, and no cash returns are generated until the third year of growth. It is therefore important to establish the plants properly to ensure a permanent bed (Peirce, 1987). Prior to planting, a complete fertiliser is added to the seedbed, before tilling deeply. Pre-emergence herbicide is used.

Due to the nature of the crop, the production schedule is totally governed by the growing season. Although environment plays a big part in yield, the grower usually has a rough idea of what it will be and has a permanent booking for airline space to Japan. Only first grade asparagus is sent to Japan and other overseas destinations. Second grade asparagus is sold in domestic outlets and rejects go to a cannery.

Once asparagus is established, productivity and longevity depend on maintenance of soil fertility and pest control (Peirce, 1987). Each spring, prior to spear emergence, the field is rotary-hoed to a depth that will avoid damaging crowns. This process reduces perennial weed populations and, in conjunction with an herbicide, can maintain a field relatively weed free for the entire season. However, it was observed that the weed problem was considerable in the field (Plate 9.3 B). After harvest, with all spears and stubs removed below the soil line, herbicide is applied again to control weed growth.

Maintaining proper nutrient balance in the asparagus bed is also important (Peirce, 1987). After the cutting season, fertiliser is applied before fern growth is allowed to resume.

Managing a healthy asparagus crop seems to be less labour intensive than some annual crops such as celery or lettuce as far as irrigation is concerned. Depending on weather conditions, irrigation is applied three times over summer. The grower monitors the schedule by checking soil moisture manually. For crop maintenance procedures, only the grower and two permanent staff are involved.

#### *9.3.2.2 Harvesting*

Asparagus is harvested manually by cutting spears below the ground with a special knife (Plate 9.3 A). The spear length should be approximately 25 cm at cutting, with spear tips tightly closed. An emerging spear may reach that length in 2 days under warm temperatures and good soil moisture. Hence, harvesting takes place nearly every day, in the early morning.

A team of 9 people are employed for harvesting. A field supervisor (the only permanent staff) is responsible to oversee this operation. These workers are paid by the amount they harvest. When they first started cutting the grower had shown them samples of what an acceptable asparagus should be. A special mark (~25 cm from blade tip) is placed on the harvesting knife to aid them in judging the length of spears.

Asparagus must always be handled carefully, placed gently into the plastic crates, then transported to packing house for all subsequent handling operations. This aspect is strongly emphasised by the grower when training newcomers.

#### *9.3.2.3 Cooling and Packing*

Once spears have been harvested, they are transferred to the shed within two hours and then cooled by the hydrocooler to 1 - 2 °C (Plate 9.3 C). This also serves to clean the product. They are then transferred to a conventional cool room for holding (Plate 9.3 D).

Asparagus packing is labour intensive and is the major cost area in the operation. Harvested spears are prepared for market by grading, sizing and bunching. The grower follows the standard outlined by the Agriculture Victoria and only top quality product is allowed for export. Grades are based on freshness, length and diameter of the stalk, colour of spear, tightness and straightness of the spear tip, and extent of bruising. Sizing is based on spear diameter and each batch is trimmed to a standard length of 22 cm, using cutting equipment.

Export asparagus spears are placed vertically in pyramid wooden crates whereas domestic spears are tied in bunches and placed into cardboard boxes (Plates 9.3 G & 9.4 A). Vented holes designed to allow air to pass through the product during storage. The same procedure is applied when packing for other asparagus growers.

A team of nine workers (mainly regular casuals) are employed for this operation in which five of them focus mainly on grading. Only two of them are also involved in harvesting. A packing shed supervisor (full-time staff member) is responsible to oversee this process. The grower is pleased with his team and believes upfront training is essential. The most noticeable aspect of the packing procedure is the gauges on the packing line (for size determination) and the display of a poster showing the Department standard (Plates 9.3 E,F). These handy guides are exceptionally useful for packers in grading the product. Despite these, most packers believe that it is easy to follow the grading instructions only when there is a clear demarcation. In the case of borderline situation between grades, they still feel confused in making a decision on which grade they should pack for. Even the shed supervisor relies on the individual grader to make a decision.

Regular input from the packing team is highly encouraged who believes he derives a better picture about the harvester's performance by communicating and receiving feedback from his staff. For example, there were occasions where some harvesters cut everything from the field in order to increase the amount they cut. The packers then had to discard more produce during grading. This was reflected by the packers to the grower and now the situation has improved.

#### *9.3.2.4 Storage*

Asparagus is very perishable crop, and prolonged storage is not recommend (Peirce, 1987). Storage normally ranges from 12 to 24 hours at 4 °C in the conventional cool room. High humidity is maintained by regularly wetting cool room floor. The shed supervisor rotates the stocks according to date code on each pallet.

**Plate 9.3 A** Harvesting of asparagus spears

**Plate 9.3 B** Weed problem is quite considerable in the field.

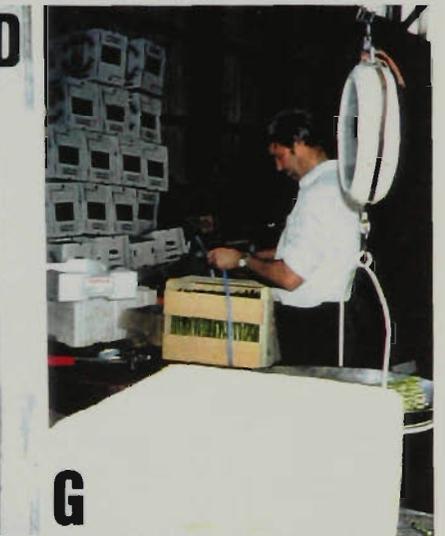
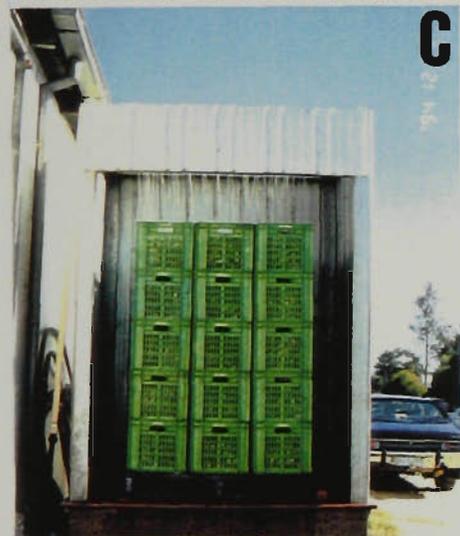
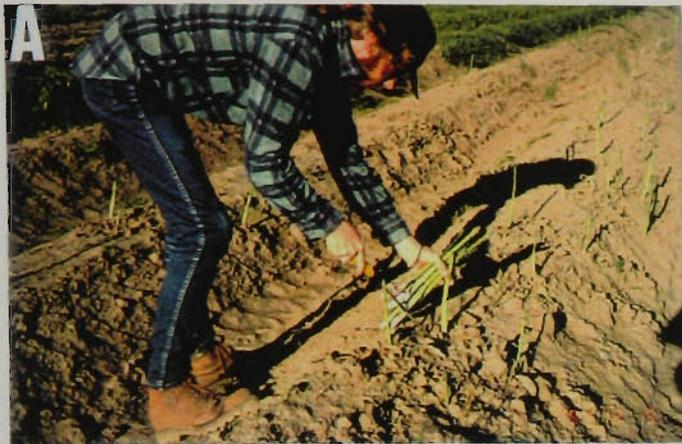
**Plate 9.3 C** Pre-cooling of asparagus by a hydrocooler.

**Plate 9.3 D** Holding of harvested crops in a conventional coolroom.

**Plate 9.3 E** Gauges on the packing line for size determination.

**Plate 9.3 F** Poster showing the Agriculture Victoria standard.

**Plate 9.3 G** Export asparagus spears are packed vertically in pyramid wooden crates.



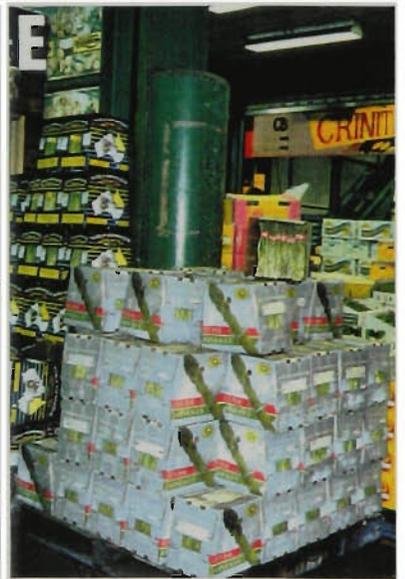
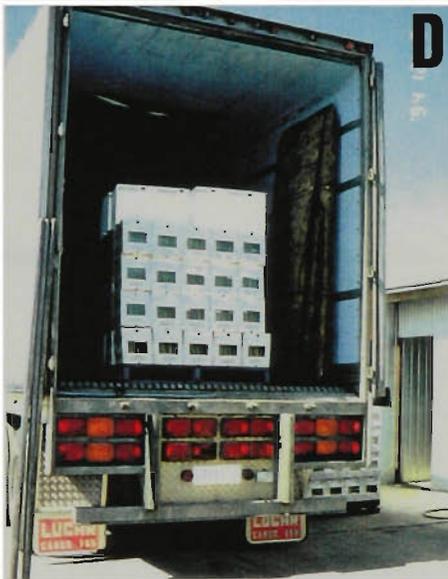
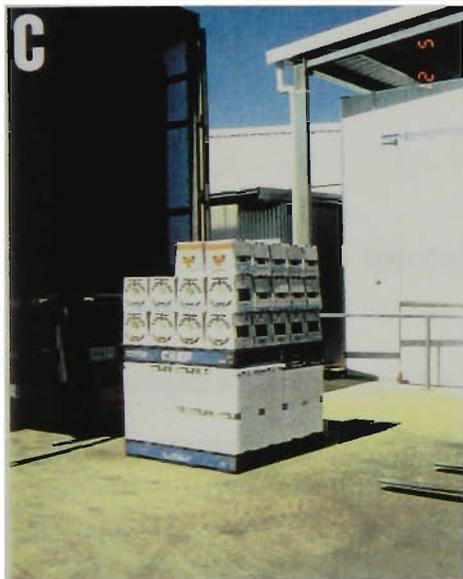
**Plate 9.4 A**            Weighing and bunching of spears for domestic markets.

**Plate 9.4 B**            No shrink wrapping is used for securing the loads for interstate delivery.

**Plate 9.4 C**            Mixed loads of produce are delivered for interstate markets.

**Plate 9.4 D**            Loading of produce onto a refrigerated truck.

**Plates 9.4 E,F,G**        Inadequate facilities for proper product handling in the Sydney Market.



### 9.3.2.5 Distribution

Asparagus is distributed to both the airport and wholesale market in Sydney nearly every day. Produce is loaded in early afternoon and arrives in Sydney in the early morning (~10-hour-trip). There is no special procedure in securing the loads for interstate delivery. For example, no shrink wrapping or netting is employed (Plate 9.4 B).

Refrigerated road transport is employed for delivery. Produce is transported by a number of local sub-contractors, depending on whoever has space available. There are mixed loads (such as broccoli, cauliflower, lettuce) involved (Plates 9.4 C,D). The transit temperature is set at a compromise temperature ( $\sim 4^{\circ}\text{C}$ ) for most crops. Since the bulk of this produce is scheduled for Sydney market which is the first destination, the asparagus is usually loaded from the farm first and then unloaded last at the airport. There is no procedure specified by the grower with regard to transport.

### 9.3.2.6 Marketing

The grower uses two different approaches when marketing asparagus:

- i) a growers co-operative for export activities;
- ii) a brokerage service for domestic markets.

#### 9.3.2.6.i Growers Co-operative

The co-operative gives this grower and his members more control over the destiny of their products. In fact, a lot of these co-operative growers believe the traditional channels for marketing fresh produce i.e. through an agent or exporter cannot cope with the communication demands placed upon them. They feel that in many cases, the marketing channels either withhold or distort information for short term commercial advantage. Direct communication with overseas buyers, market signals and feedback from the end-users help the co-operative to gear their production and marketing efforts to satisfy those customers. Once a relationship is established between a buyer and a supplier this enables the growers to increase export and hence obtain more bargaining power in the long run.

Besides information sharing, there are other advantages in forming a co-operative. For example, through economies of scale, unit costs can often be reduced in grading, packing,

storage and transportation (Biggs, 1994a). Although this co-operative is still at its infancy, the grower is planning to develop a district QA program to maintain consistency of quality. Ultimately, the co-operative plans to extend their supplies to domestic outlets such as supermarket chain stores.

#### *9.3.2.6.ii Brokerage Service*

Domestic business is undertaken with a broker in the Sydney Market. The broker's responsibility is to place the grower's produce to the best advantage of his client's. Asparagus is currently consigned through the broker to a major asparagus agent in the market. He is also responsible for communicating feedback to the grower about market situation, exploring new market opportunities and dealing with customers complaints.

In choosing an outlet for the produce, the broker believes "it's not always the one who can offer you the highest price. A lot of this involves personality issues and trustworthiness, whether you can develop a long term relationship with that person is very crucial."

Instead of sending asparagus to the agent direct the grower is satisfied with the existing arrangement. This is because through the broker's market expertise asparagus is placed into an outlet possibly receiving the highest return. There is also regular feedback from the broker about the market situation to help adjust production procedures. Indeed the broker works closely with the grower in exploring new market opportunities. For example, a new "short cut" asparagus spear has been developed recently for food service outlets. The broker also helps growers to explore other outlets as the grower changes from supplying summer to winter crops. If the crop is not what he specialises in, the broker will then refer his grower to a more suitable agent. He realises this will allow the continuity of a business relationship with a good grower even he is not directly involved in that deal.

With any incidence of customer complaint, the broker also follows up the sale by searching for the cause of dispute. However he sometimes has difficulty in identifying the nature of these losses as they can happen at any stage of the handling chain. During the market visit it was observed that most facilities are inadequate for proper product handling, especially with respect to temperature maintenance and ethylene concentration caused by propane-powered forklifts in storage atmosphere (Plates 9.4 E,F,G). Moreover, there is not much or no

responsibility taken by the unloader (a sub-contractor who is hired by a lot of growers) in checking product condition upon arrival.

### 9.3.3 Conclusion

Inadequate feedback of market signals from the markets is a major challenge for a lot of primary producers especially those in a remote location. This grower has addressed the problems of fragmentation in the chain by adopting two approaches. Firstly the set-up of a co-operative helps growers to have accurate, useful and reliable market intelligence and information about the consumer needs shared amongst themselves. Secondly, the exploring of brokerage service also allows the grower to overcome the market distance problem through the market expertise of his broker.

As noted by Sully & Coffey (1992), the economy of marketing can be a significant barrier to many of the smaller industry players having access to this information. By growers working more co-operatively, unit costs can often be reduced through economies of scale in grading, packaging, storage, transportation and marketing (Biggs, 1994a). Growers in this way are much more likely to make use of advanced marketing methods such as market research, quality assurance programs, brand promotion and so on.

Despite the co-operative approach appearing attractive to some growers, the track record for a successful horticultural marketing co-operative in Australia seems to be patchy. Reasons for failure seem to be with inherent individualism and lack of support services (Biggs, 1994a). Too often growers tend to see their neighbours as competitors rather than working as a team. Moreover Australian agricultural co-operatives have also been criticised for their poor marketing performances (Horticultural Policy Council, 1994). The management of co-operatives have often been strongly grower biased and lacked good marketing and managerial skills. Growers need to learn from some US counterparts in which these organisations are often strongly market-orientated and employ top management with professional marketing training to the overall benefits of growers. This new co-operative in East Gippsland may need to consider this carefully as it grows.

Although this grower does not have the mixture of elements as acquired by the celery grower (i.e. his ability to anticipate the market through his staff presence and orderly marketing) in

addressing marketing issues, the employment of a broker provides a similar function. The broker plays an invaluable role in liaising face-to-face with agents and checking product performance. He has a feel for the market and knows how the system operates. Through his market expertise, he is in a good position to make decisions on the placement of produce with agents to obtain the best possible returns for the grower. The broker also assists the grower in following up on sales and exploring new marketing opportunities. His desire to have long-term dealings with both growers and buyers should facilitate good relationships between all members of the chain.

There have been a lot of complaints by growers (those who participated in the grower's survey) in East Gippsland as to how their agents operate. Often these agents are being criticised for withholding or distorting information for short term commercial advantage. This case study has shown that there are a variety of tasks a broker can perform for their suppliers in understanding market requirements. Even agents can perform those functions as long as they have a determination to service customers more effectively with real sensitivity to their needs and a desire to develop long-term business relationships. On the other hand most growers do not realise the brokering option their agents can offer. They keep on complaining about their agent and not telling the agent what they want. Nevertheless it is essential for the grower to negotiate what he wants from the agent upfront.

In order to strengthen the grower's position in existing markets there are some areas he needs to put more emphasis on. There is a lack of transport procedure in the existing organisation. The co-operative needs to co-ordinate better to solve these problems. The increased bargaining power achievable through working co-operatively may be used to exert more pressure on the transporters e.g. decrease mixed loads; cool truck before loading; unload at airport first etc.

In the harvesting and packing operations the skilling of these operators appears to be the most necessary requirement in monitoring consistent quality. However, the common practice of employing casuals in the pre-harvest, harvest and packing operations sometimes creates difficulties for management. Because casual staff do not have a sense of belonging to the organisation, their commitment to ensuring quality may be questionable. This lack of spending on training is reflected by the confusion of grade standards amongst packers. Perhaps the co-operative can organise training of casuals from all farms involved.

## 9.4 Lettuce Production: A Case Study

### 9.4.1 Background

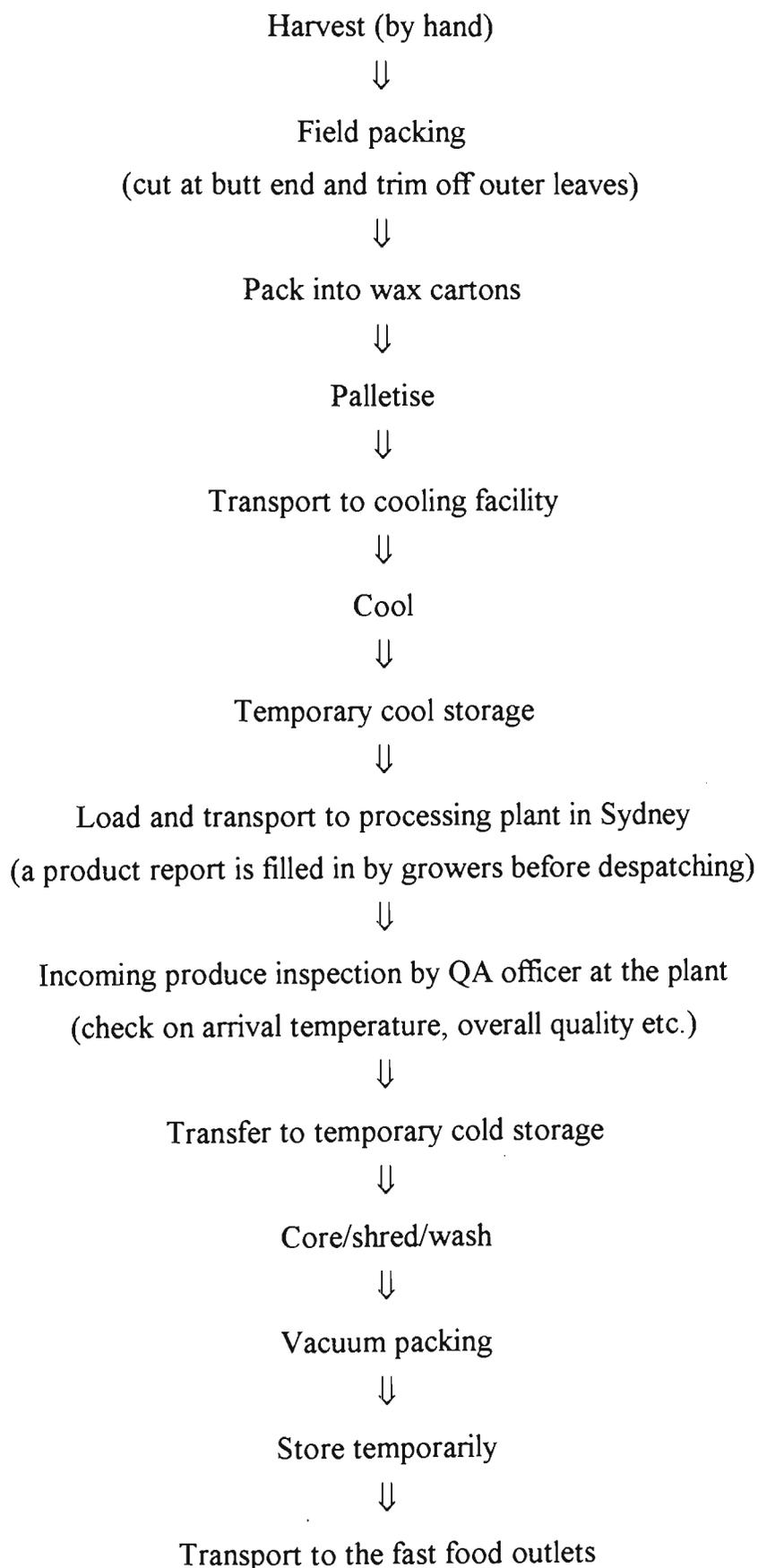
This case study investigated two lettuce growing operations located in Lindenow (East Gippsland), Victoria. These two growers are part of a network of approximately 12 growers in the district which supplies iceberg lettuce hearts to an agent located in Flemington markets, Sydney. The agent is responsible for co-ordinating supply to a lettuce processor in Sydney who shreds the product and markets the lettuce through a major fast food chain. Figure 9.4 summarises the handling system for lettuce.

Although lettuce grows best at a relatively cool temperature, its tolerance range is sufficiently wide to allow production from a number of different places around Australia (Dioguardi, 1995). Lettuce, although an important crop in Victoria, has only recently been grown in the district with the lettuce heart project initiated three years ago. Besides the East Gippsland region, lettuce is also sourced from Werribee, Victoria and other districts interstate. This guarantees the customer year round supply.

Both growers' farms are of medium size (approximately 70-100 acres). Lettuce is cropped on areas of 30 acres with approximately 30 plantings a year (i.e. from September to February). The production schedule is totally governed by the customer's request. Volume produced is programmed in advance for a growing season based on the advice from the fast food chain. The lettuce are grown according to an agreement between the supplier and the customer and growers receive a fixed price throughout the season. A variety of other crops are grown on both properties. Grower A is more diversified, growing vegetables (such as cauliflower, beans and broccoli) and fruits (e.g. apple and berries). Grower B focuses mainly on vegetable crops such as sweet corn and navy beans and all of his crops are contract grown for processors.

Grower A's organisation is fairly integrated in structure. Besides growing he also operates a packing shed. A team of 10 staff are currently employed for crop establishment, harvesting and packing. Only 2 of them are permanent.

Grower B is only concentrating on growing. As he is engaged in other non-farm activities, a full-time paddock manager is employed to oversee the operation. A team of 9 staff (mainly regular casuals) is currently employed for crop establishment and harvesting.



**Figure 9.4** Handling system for lettuce heart (for minimally processing)

Lettuce from both farms is solely grown for the fast food chain. A stringent program with regard to the volume produced and quality requirement is specified to the growers from the customer. Regular meetings are conducted discussing quality issues amongst the growers, field representative, agent and the customer. There is also a formal feedback mechanism in which growers are required to fill in a product report sheet for every consignment, describing quality condition before despatching. The same exercise is conducted by a quality inspector upon arrival. This arrival report is related back to the grower for comparison.

## 9.4.2 Production Practices

### 9.4.2.1 Crop Establishment

The lettuce crop is established from transplants which are planted mechanically on cultivated ground (Plate 9.5 A). The growers source transplant supplies from different nurserymen, however both of them have a direct input into this procedure by specifying their preferred varieties (Plate 9.5 B). This knowledge has been acquired by conducting numerous variety trials on their properties. Representatives from the customer assist growers in this procedure to a certain extent by introducing new varieties. However, it's up to individual grower to decide which variety best suits their production site. Since lettuce is a relatively new crop to this district, both growers admitted that they are still in the process of searching for the right variety.

The crop production schedule is totally governed by the customer's requirement. Production volume is programmed in advance for a growing season based on market forecast. Summer is the main consumption period for lettuce with larger batches planted for that particular season. There are occasions where the customer requests more than the assigned volume (e.g. running a special promotional campaign) hence the growers usually plant a bit extra. Both growers are satisfied with the program since a guaranteed income allows them to work out the cash flow and plan in advance accordingly. They both believe the traditional system of marketing fresh produce does not allow growers to have much control over the fate of their product. Price volatility in the market place has led many growers to observe that they 'made their best prices from their worst produce.' In turn this phenomenon has discouraged producers from incurring extra costs in grading and selling only top quality produce (Malcolm, 1983).

**Plate 9.5 A** Mechanical transplanting of lettuce.

**Plate 9.5 B** Lettuce transplants.

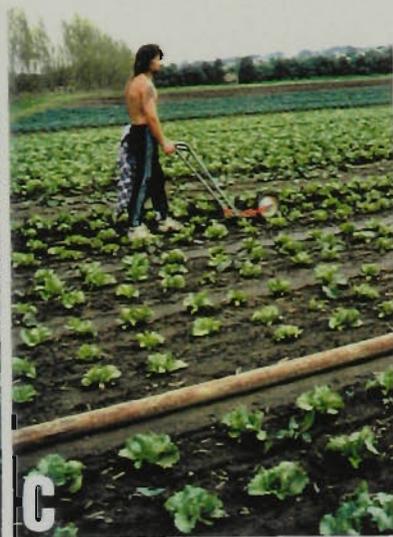
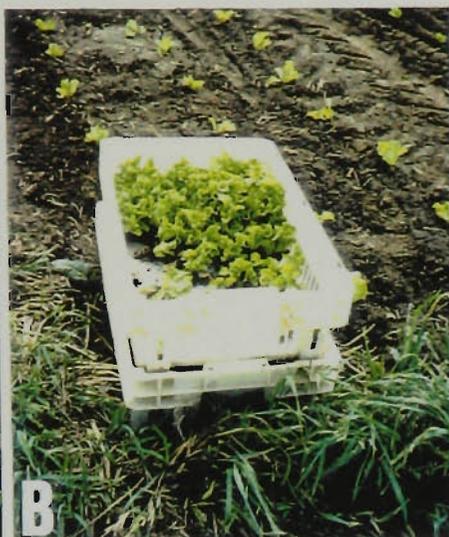
**Plate 9.5 C** Hoeing of weeds between rows of young lettuce.

**Plate 9.5 D** Crop establishment.

**Plate 9.5 E** Harvesting and field packing.

**Plate 9.5 F** Overpacking of lettuce into cartons.

**Plate 9.5 G** Symptoms of viral disease in lettuce.



**D**



**E**



**F**



**G**



**Plates 9.6 A,B,C,D** Transfer of harvested crops from field to cool room.

**Plate 9.6 E** Cooling of lettuce by a forced air system.

**Plate 9.6 F** Storage of despatch items in a cool room.

**A****B****C****D****E**

A series of techniques are used in pre-planting preparation for instance well-prepared seedbed, rigid fertiliser and spray programs. Although lettuce is commonly grown on raised beds where drainage is aided by sufficient water infiltration and retention, both growers choose to plant on unformed cultivated ground. To ensure rapid growth, lettuce requires a liberal supply of readily available nutrients in the soil during production (Peirce, 1987). Soil analysis is conducted at regular intervals which serves to give a full picture about the soil nutrient level. In general, the standard procedure is to incorporate a complete fertiliser into the ground before bed formation. Pre-emergence herbicide is also applied to ensure a weed-free bed before planting.

Lettuce is transplanted every week or fortnight, depending on the production program. Immediately after planting, crops are watered by movable overhead sprinklers. Although this is a more economical system than fixed overhead sprinklers, there is some risk of delay in watering transplants and increased chance of spreading fungal spores. Lettuce is a demanding crop as far as irrigation is concerned. A constant supply of moisture during the growing season is essential for high-quality lettuce (Dioguardi, 1995). Even in areas with adequate total rainfall, irrigation is essential to avoid physiological problems in mature heads (Peirce, 1987).

There is a noticeable difference between the two growers in their fertiliser programs. Grower A incorporates the initial fertiliser application at transplanting, whereas Grower B found this application was too dramatic for young seedlings. He prefers to start his application 2 weeks after transplanting when the crop is more established. A chemical spray program is used for preventing pests, diseases and weed problems on both farms and the early stage of crop establishment weed is eradicated by hoeing between rows of young plants (Plate 9.5 C,D). In conjunction with the other lettuce growers and the agent's representative in the district a horticultural officer is employed to give growers any technical advice on crop management.

#### *9.4.2.2 Harvesting and Field Packing*

Harvesting normally takes place 2-3 days a week and is mainly governed by the customer's request. Due to its high perishability, lettuce is always cut at its prime condition. Lettuce is selected for maturity and quality, and then cut by hand, trimmed to several wrapper leaves and packed in a 58-litre waxed carton (Plate 9.5 E). Because lettuce heads do not reach maturity uniformly, several harvests from one field are often undertaken. There are occasions in which

freshly harvested lettuce are packed into cartons and stored in the cool room for a longer period before they are ready for despatching to processing plant.

The customer has direct input into this procedure by specifying requirements such as time of harvesting, maturity and quality determination, cutting method and box presentation etc. The growers then explain these requirements to their staff. Teams of 8-10 casuals are employed for this process. A field supervisor (permanent staff member) is employed at both farms to oversee the operation. Both growers believe that most of their workers have acquired enough experience in assessing the quality which meets the above requirements and that training is only essential for newcomers.

Although specific requirements are given clearly by the customer for the harvesting process, correct interpretation of these standards is essential for effective inspection. There are occasions where unclear instructions may give rise to ambiguity. For example, a firm lettuce is specified as the right maturity for picking. Despite the fact that the growers have been shown what the firmness standard is, individual harvesters feel that they have to decide what degree of firmness is acceptable (such as based upon the external feel of the lettuce). No specific inspection method for official testing of firmness has been agreed upon by the growers and customer. Perhaps more objective methods such as the one employed by the US Department of Agriculture in assessing firmness will be applicable (United States Department of Agriculture, 1975).

Lettuce must always be handled carefully, placed gently into the cartons and never thrown into them. This aspect is strongly emphasised by both growers. However, with high head size variations even in a single harvest, produce are usually placed in cartons in a random manner. Although the customer prefers to have 24 heads in each box, packers usually fill the box to a level where the top flaps of the carton can be closed. There are occasions where the lids do not fit down tight, this can make it more difficult to stack cartons evenly on pallets and bruising may occur from pressure of the lids (Plate 9.5 F). Postharvest decay, principally caused by bacterial soft rots can be a problem if lettuce is bruised and or stored at high temperatures and high relative humidity (Dioguardi, 1995). Evidence of a bruise may not be immediately apparent at the time it is incurred and the actual bruise may not become evident until later in the handling process. There are also signs of viral disease found in some lettuce (Plate 9.5 G).

### *9.4.2.3 Cooling*

Lettuce is a highly perishable crop and deteriorates rapidly after harvest if not handled properly (Dioguardi, 1995). Prompt and thorough cooling to 0-1°C is therefore necessary to remove field heat and prolong the shelf-life of the product (Plates 9.6 A, B,C,D).

This is usually accomplished by forced-air cooling as in Grower A's farm (Plate 9.6 E). However, without such a facility, Grower B has to rely on the agent's facility in Lindenow. An open truck is employed for produce collection, usually 2 hours after harvesting.

### *9.4.2.4 Storage*

Being a perishable commodity, the holding of lettuce in storage is not recommended. The usual storage period ranges from 12 to 24 hours. Produce is kept at 4 °C as specified by the customer. Sometimes lettuce may be stored for a longer period due to mismatch between harvesting time and re-ordering (Plate 9.6 F).

### *9.4.2.5 Distribution*

Lettuce is distributed from the Lindenow depot to the processing plant in Sydney every week. A full load is usually organised for delivery since the customer does not like lettuce mixed with other produce. There is a specified loading procedure. For example, produce must be palletised in a standard pallet load (i.e. 48 boxes on one pallet). However, no shrink wrapping or netting is employed.

Both growers rely on the agent's facility to organise delivery from Lindenow to Sydney. Refrigerated road transport is employed. Truck temperature is set at 4°C as specified by the customer. Before despatching, the grower or field representative is required to fill in a product report sheet for the consignment. The despatching temperature for each load is also recorded.

### *9.4.2.6 Processing and Marketing*

Upon arrival of the lettuce at the processing plant, the QA officer completes an incoming raw produce scoring sheet. One box from each pallet is randomly selected and used to assess the arrival temperature, box damage, appearance of the lettuce and overall quality. These criteria are of equal importance. Information from this report is related back to the grower. Each

grower's produce is also weighed and payment is made accordingly. Accepted lettuce are stored in a cool room until used.

Although the QA standards are fairly stringent, there was very little rejection for the last season. Through regular meetings and frequent performance feedback to the growers, the agent believes all suppliers have a thorough understanding of the quality requirements. The few rejections were because of insect infestation or arrival temperature being too high. Both growers recalled incidences of reported arrival temperatures as high as 13°C, but they believe they have little control over the subsequent activities after produce has left their farms.

The processing plant is a major operation producing a substantial amount of shredded lettuce per week. Of this, a significant portion is exported overseas. With such a high production throughput, there are occasions when the quality standard may be relaxed to a certain extent due to extreme weather conditions or when running a promotional campaign.

The plant operates at a temperature of approximately 12°C. Lettuce is cored, shredded, washed and cooled. Shredded lettuce is then vacuum packed, labelled, and packed into cardboard boxes. Palletised loads are then transferred to the cool room for further distribution. Temperature management is highly emphasised throughout the whole processing operation.

Batch coding is employed to identify all different suppliers. Product traceability can go as far as the store level when identifying a problem lot. This information can be related to a particular grower.

### **9.4.3 Conclusion**

The ability to solve the problems at the farm level depends on how well a producer overcomes the fragmentation of the chain. This case study has demonstrated an example in which the growers are aware of the market. The customer's requirements on handling and quality procedures are well-defined. Both growers do not have to be concerned about marketing since their only responsibility is to abide by these standards. On the other hand, there are still potential problems with regard to this quality system since meeting the specifications is the primary concern. Within this dynamic industry, instead of paying lip service to a non-maintained standard continuous improvement of quality goals seems to be necessary.

High perishability, variability in quality and the seasonal nature all combine to make most fruit and vegetables subject to considerable fluctuations in availability and therefore in price, both within the season and from one year to another (Malcolm, 1983). The volatility of market prices has led many growers to observe that they 'made their best prices from their worst produce.'

Indeed both growers presented in this case study, find the alternative i.e. working on agreed volume for a guaranteed income very attractive. However, both growers have to realise that working for processors places them in a very different situation from the celery and asparagus growers presented in other case studies. To growers A & B, the customer's requirements are well-defined since the quality standards and handling procedures are already set down by the processor. Their main responsibility is to abide with these standards. Despite this they are not exposed to a consumer who makes a judgement about the overall quality of the product. According to Bowles & Hammond (1991, p. 205), " quality must be perceived to be what the buyer says it is - not what the engineer, marketer, or general manager says it is ". Therefore quality standard needs to be maintained all the time in order to meet the dynamic market requirements.

On the other hand, growers who work directly with the market have to be responsive all the time, since the requirement is always changing. Effective marketing of a product is all about delivering customer satisfaction. Consumers are the sole reason for the existence of the industry and their needs and wants must be met (Armstrong, 1992.) However, for Growers A & B they are marked by a culture of production in which it is considered essential to grow more. They tend to put considerably more effort into producing rather than marketing. There is a danger of becoming unresponsive to a rapidly changing market environment. Therefore, once the customer's requirements are well-defined there is a potential problem of growers becoming slack if the standard is not frequently maintained.

The existing marketing arrangements place a strong emphasis on good communication along the supply chain. Through regular meetings amongst the chain's participants and formal feedback system both the producers and customer can have a better picture of how the chain or system operates. This issue is identified as being very important to the improvement of horticultural product marketing. Besides two-way communication all segments of the chain need to realise that they are all important parts of the chain which needs to have commitment

to total consumer satisfaction, if they are each to remain viable. However, the common practice of employing casuals in the pre-harvest and harvest operations sometimes creates difficulties for management. Because casual staff do not have a sense of belonging to the organisation their commitment to ensuring quality may be questionable. This commitment is also of vital importance once produce has left the farm. Transporters, agents and processors all have an important role to play in this process (Armstrong, 1992).

In terms of enforcement of quality standard in the lettuce handling chain, there are some positive issues as outlined above. From the standpoint of Total Quality Management, there are some potential concerns that the chain's participants need to put more emphasis on. As explained earlier, standards can create a barrier between the producers and the market, if they do not represent what the consumers want. Therefore, both the growers and customer need to discuss and revise the standards when necessary in order to be more market-responsive. There are some concerns as to whether the processor is enforcing the standard completely (e.g. size and firmness issues) especially in situations of excess demand. This may be partly due to the fact that this lettuce project is still at its infancy in which considerable effort is required from the growers and agent to improve quality. With regard to inspection standards and procedures, correct interpretation is essential for effective inspection. It will be of great assistance to the growers if the customer can state the correct inspection method for each quality criterion in operational terms. Each packer will then know his or her particular area of responsibility within the inspection operation.

## Chapter 10

### Conclusion and Recommendation

With the greater demand on high quality horticultural products for both Australian and overseas consumers, it has become necessary to move beyond the inspection of our products at the point of despatch, to broader philosophies such as provided by Total Quality Management (TQM). This concept has been in place in the manufacturing sector for a long time. However, there is still a lot of progress to be made in the fresh produce industry, due to a number of unique characteristics faced by this sector. These include, the biological nature of the production process, the difficulties in setting quality standards and the fragmented nature of this industry.

As defined in the literature review (Feigenbaum, 1956), the crucial aspect of TQM is to integrate customer needs into the whole production-distribution-supply system. In other words TQM is a management philosophy which makes quality pre-eminent in the culture of the enterprise and in the way it is operated (Sharkey & Cadman, 1989). This commitment to continuous improvement in quality is the priority within the organisation (Bowles & Hammond, 1991). To be successful in implementing such a program in the horticulture industry would require frequent communication and co-operation along the whole handling chain. To achieve such a goal in quality management the findings of this research established that there are a number of areas within the handling chain which are causing difficulties. These include:

- Importance of regular timely customer feedback
- Formalisation of handling procedures for the entire handling chain
- Importance of education and training
- Confusing aspects of QA and TQM in quality management

#### 10.1 Importance of regular timely customer feedback

The operation of the handling chain is complex and there are many parties involved. The gathering and distribution of market signals, as a means of operator control and coordination of pre- and post-harvest activities has been difficult (Dench McClean Associates, 1992). This

can be reflected by the survey that shows a significant number of East Gippsland growers find it difficult to control events happening beyond the farm gate due to their lack of knowledge about consumer's requirements or in fact who their customers are (refer to Chapter 4.2.9). Operating in this lengthened supply chain, these growers are still at the mercy of middlemen such as transporters and agents, who may not necessarily have a strong commitment (especially on quality) to the success of a particular line of produce. This lack of information flow makes it difficult for suppliers to adjust production procedures to ensure that the product consistently satisfies consumer requirements.

Information is as perishable as the product that the grower produces. It is a vital commodity, especially within the dynamic environment faced by the horticultural operators. This is due to the fact that the complex bundle of quality attributes of fresh produce creates extreme difficulty in developing quality standards. Unlike manufactured products, the end-user element is very important in making judgements about produce quality. More often these judgements are subjective and are also highly affected by the price and seasonal factors. Without continuous feedback of market information from the consumer to the producer, many growers cannot adjust their production procedures accordingly. Other problems relate to materials handling, transport efficiency, training needs and quality control procedures which are all central to the fragmented nature of the industry.

In overcoming this degree of fragmentation caused by poor communication amongst the chain's participants, the celery and asparagus growers, presented in the case studies, adopted different approaches:

1) The celery grower from Cranbourne:

This grower is a good example of how high quality outturns reflect how important it is to keep close to the customers. Being close to the Melbourne Market geographically, allows him to have staff present on the spot. These staff play an invaluable role in facilitating regular and timely feedback from buyers to producer and helping him adjust production procedures to ensure that the product consistently satisfies consumer quality requirements. Furthermore, the way he co-operates vertically with the rest of the distribution chain (such as through regular communication with his agent) is vital if orderly marketing is to occur. Together with the grower contact in the Melbourne market, this enables the company to tie up a lot of business in

forward contracts. This way he can anticipate demand in advance which allows him to organise on-farm activities and labour resources in a more co-ordinated manner.

2) The asparagus grower from Lindenow:

This grower has overcome the degree of fragmentation to a certain extent by co-operating horizontally and by exploring the brokering service.

i) The set-up of the co-operative for export activities allows growers to have accurate, useful and reliable market intelligence and information about the consumer needs shared amongst themselves. This is vital if orderly marketing is to occur (Malcolm, 1983). Besides information sharing, unit costs can often be reduced through economies of scale in grading, packaging, storage and transportation (Biggs, 1994a). The increased bargaining power through working co-operatively may exert more pressure on his transporters. Nevertheless the patchy record of successful horticultural marketing co-operatives in Australia has reminded these growers that issues such as inherent individualism, lack of support services and lack of marketing expertise have to be dealt with before further expansion can occur (Biggs, 1994a; Horticultural Policy Council, 1994).

ii) Through the broker's marketing expertise, he is in a good position to make decisions on the placement of produce with agents/ customers to obtain the best possible returns for the grower. Other services such as following up sales and exploring new market opportunities are also provided. The broker's desire to have long-term dealings with both growers and customers facilitates a good relationship with all members of the chain. There have been a lot of complaints by growers in East Gippsland on how their agents operate (refer to Chapter 4.2.4). Often these agents are criticised for withholding or distorting information for short term commercial advantage. This case study has demonstrated that there are a variety of tasks a broker or even an agent can perform for their suppliers in understanding market requirements. On the other hand, most growers do not realise the brokering option their agents can offer. Since everyone in this industry is obsessed about price, only a few operators seem to be concerned about obtaining good customers. This requires more long-term thinking. It may cost more in the short term, but in the end, better prices and better customers or higher volume are the likely result. This is only possible if the grower and his agent have a determination to service customers more effectively with real sensitivity to their needs. This

also implies that growers should start to make better use of their agents by specifying what they require from them upfront.

## 10.2 Formalisation of handling procedures

Lack of procedures for handling produce from producer to consumer is another major factor in affecting quality outturn at each stage of the chain. Both the pilot study and the surveys have identified that there is a lack of clear definition of responsibility for the chain's participants (refer to Chapter 5.3.3; Chapter 6.3.3; Chapter 7.3.1). Role ambiguity does occur where the role occupant is uncertain about what he or she is supposed to do. This results in a prevalent attitude in all sectors of the industry to 'fingerpoint' and avoiding blame for any problem or difficulty that may arise (Clayton-Greene, 1993). Under these circumstances attempts to assign the cause and true blame seem to be difficult since this damage will not necessarily show up immediately and the effects of rough handling can be cumulative (Dewey, 1985). Moreover, as identified by the survey (Chapter 8.3.3), record-keeping systems used in most stores for tracking product losses at the retail level are inadequate and do not allow retailers to identify causes of lost sales. Without having full product traceability, it is extremely difficult to make any corrective action.

The survey findings established that the key variable affecting the whole quality system is the degree of fragmentation in the handling chain (refer to Chapter 9.1). Depending upon how well a producer handles this chain complexity problem, this will affect his ability to solve other problems evolving from the chain's activities (such as handling procedures, training and transport efficiency etc.). As demonstrated by the celery grower in the case study, the extent to which he can institute good practice on the farm depends upon his relationship with the customers. Regular and timely feedback of market requirements helps adjust production procedures to ensure that product consistently satisfies consumer needs. In co-ordinating the delivery and marketing activities the way he specifies his expectations and requirements to the transporter and agent upfront avoids any role ambiguity problem.

## 10.3 Importance of education and training

There has been a lack of spending on training in this industry due to the common practice of employing unskilled labour and casuals at all levels in this sector. As identified by the surveys, training does not seem to be strongly emphasised in some sectors for instance in the transport

area, a significant number of respondents believed "training is not necessary for our sector" (refer to Chapter 6.2.7). Even if training programs are available, they might not be adequately used. For example, the packer's survey has shown that the common practice of employing casual labour in this sector poses problems in maintaining consistent product quality (refer to Chapter 5.2.9). Without proper training in inspection procedures and background knowledge of quality standards, consistency of quality seems to be difficult to achieve even within the same packing house. There is little formalisation within this area and most produce knowledge is learnt by experience.

Training is essential for all sectors in this industry as quality ultimately depends upon people. As noted by Bowles & Hammond (1991, p.158), "a profound lesson of the quality movement is that worker satisfaction is inseparable from customer satisfaction." The "celery" case study has shown that the grower's well-trained and specialised teams of workers enable him to derive a technical expertise by communicating with, and receiving feedback from these members.

#### **10.4 Confusing aspects of QA and TQM in quality management**

Quality management in this industry has been characterised by inconsistent product quality and wastage of resources due to the use of traditional methods of end-point inspection. On the other hand even when the customer's requirements on handling and quality procedures are well-defined (as demonstrated by the "lettuce" case study), there are still potential problems with regard to such QA systems (refer to Chapter 9.4.3). As presented in this case study quality was still regarded simply as a "control" issue. Little attention is paid to the link in customers' minds, between quality and product characteristics other than conformance (Garvin, 1988). In addition, these growers are not exposed to a consumer who makes a judgement about the overall quality of the product. According to Bowles & Hammond (1991, p.205), "quality must be perceived to be what the buyer says it is - not what the engineer, marketer, or general manager says it is". Therefore, quality standards need to be maintained all the time especially in a dynamic environment such as the horticulture industry. QC & QA are merely the first step in the continuous process (Bowles & Hammond, 1991). These problems suggest the need for a more co-ordinated approach to quality management such as provided by TQM. The essence of TQM is well-summarised by Garvin:

... the strategic approach to quality is more comprehensive than its predecessors, more closely linked to profitability and basic business objectives, more sensitive to

competitive needs and the consumer's point of view, and more firmly tied to continuous improvement. Many companies mistakenly think they have adopted the new approach when their programs merely include elements of quality assurance and quality control. For the most part, these companies are still thinking defensively about quality. They have yet to see its competitive potential (1988, p.27).

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# Appendix

## APPENDIX 1: SURVEY FOR GROWERS

### Opening Questions

- 1) How long have you worked for this organisation? Are you self-employed?
- 2) Have you had any other position/job?
- 3) How many people generally work here? What is the size of this farm? (Manager only)

### Background

- 4) Were you aware at time of packing that all of the produce you harvested, would be exported?

*Objective:*

- Try to find out the allocation of each crop for export and local markets
- Does the company put more emphasis on export market? Are they export-oriented?

- 5) What, if any, extra measures were adopted at time of packing for exported crops?

### Quality awareness

- 6) What is/are the main problems with the fruit and vegetables that you harvest and pack?

- a) bruised
- b) diseased
- c) damaged
- d) poor quality
- e) maturity (both immature or over mature)
- f) no problems
- g) other, specify

*Objective:*

- Try to find out the extent of quality problems due to
  - i) improper pre/postharvest practice
  - ii) physical damage and inefficient handling during harvest
  - iii) inadequate cooling facilities

- 7) Will you be able to quantify how much produce you lose at i)harvest; ii)packing and iii)in market (i.e. returns; unsold etc.)?

*Objective:*

- Try to find out the stage at which damage is occurring most and quantity

### Chain Complexity

- 8) Do you sell your main crops direct to retailers; through central market system or via appointed agent/s to local customers?

*Objective:*

- To see if there is any preference on the existing channel of selling the main crops to customers and its rationale e.g. geographical location of the farm
- Try to find out the structure of the handling chain

- *Who are the participants involved?*

9) What about the practice for overseas market?

*Objective: Same as Q 8.*

10) If you sell your main crops via an agent/s. on what basis will you choose a particular agent to represent you? How do you assess your agents' performance?

*Objective:*

- *What are the growers' expectations on the role of an agent (especially on feedback of market information and quality concerns etc.)?*

11) During the last season, did you have any expression of concern or complaints from local/overseas buyers about the quality of produce that you grew? If yes, what was the problem and action did you take to satisfy your local/overseas buyers?

*Objective:*

- *What are the major quality problems concerned by customers?*

- *Is there any market information flowing back to growers?*

- *Are these information distorted by some middlemen?*

12) How do customers feel about the quality of your produce? How do you get feedback from customers?

*Objective:*

- *Are there any formal feedback mechanisms e.g. in house market research channelling information back to the growers? Do they just rely on complaints?*

- *Who sets quality standard for produce? Is this flexible?*

13) Is the benchmark for satisfaction based on turnover or profit or repeat orders of the Dept., wholesaler, agent or store? What other measures do you have?

*Objective:*

- *Try to find out how they evaluate their own performance.*

### **Material Handling**

14) Do you think you have a problem with the quality of the produce that you grow?

a) yes

b) no

c) not sure

d) not bothered

e) never thought about it

if yes, what sort of problems?

*(Examples of problems: mishandling during harvesting; delay in pre-cooling; inadequate storage facilities; pre-harvest factors; unsanitary practice)*

15) How much produce do you normally throw away prior to packaging? What are the reasons for rejection?

a) <5%

b) 5-10%

c) 10-15%

d) 15-20%

e) 20-25%

f) >25%

*Objective:*

- *To see if one can obtain or verify if reasons for rejection are same as previous question.*

16) Have you got some thoughts to fix these problems? Do you perceive any obstacles in fixing these problems?

*Objective:*

- Try to find out any suggestions for improvements
- any cultural factors involved
- any priority in fixing these problems

17) What sort of cooling facilities do you employ for your produce? How do you cool the produce after harvesting (e.g. pick-cool-pack; pick-pack-cool; pick-grade-cool-pack etc.)?

*Objective:*

- Try to find out the method of cooling, whether it is suitable/efficient a particular produce.
- Do they have forced air cooling? What is the typical cooling time?
- Do they have a high humidity cooler (e.g. Thermfresh)?
- How long until produce goes from picking to harvesting?

### **Transport efficiency**

18) Do you do deliveries to your customers?

- a) yes
- b) no (Go to question 19)

19) Who is responsible for your produce delivery?

20) What is/are the delivery time? When do you/your deliverer normally deliver(e.g. night:am/pm; day:am/pm)? How often is produce dispatched?

*Objective:*

- Try to quantify the time and the number of stops involved for delivery.

21) What sort of transport facilities do you/your deliverer employ for delivery?

*Objective:*

- whether it has refrigerated unit (turn on all the time/only in summer)
- any record keeping for produce temperature/storage temperature

22) Do you think you/your deliverer have a problem in transporting produce?

- a) yes
  - b) no
  - c) not sure
  - d) not bothered
  - e) never thought about it
- If yes, what sort of problems?

*Objective:*

- Try to find out problem due to transport efficiency
- Do they aware the importance of refrigerated facility for their trucks?
- Any rough handling problems involved in loading/unloading?

### **Storage facilities**

23) What sort of storage facilities do you employ for your produce?

24) Do you find the facilities adequate enough to store all the produce during peak season?

25) At what temperature do you keep your produce?

26) How long do you normally keep the produce in the store room?

*Objective:*

- Try to find out the type of storage facility
- whether it is adequate or not
- storage temperature
- any mixed storage involved

### **Training needs**

27) Have you ever had any special training in fruit or vegetable handling and growing?

- a) no
- b) yes - please specify.

*Objective:*

- Try to find out whether they see if there is training need
- which area is the prime concern for training

28) What are the main sources of information for you about fruit and vegetable handling and keeping?

- a) other fruit & vegetable growers
- b) friends or family
- c) Department of Agriculture
- d) magazine and newspaper articles
- e) other - specify
- f) not sure

29) The Australian Horticultural Corporation (AHC) has introduced a Quality Certificate Scheme (AHQCS). What do you think about it? How do you think it operates?

*Objective:*

- Try to identify their attitude to Quality Management (QM)
- Are they interested in implementing any QM program in their organisation?

### **Quality Control Methods**

30) Do you have any sort of quality control procedure implementing in your premises?

- a) no (Go to question 31)
- b) yes - please specify (Go to question 32)

*Objective:*

- what are the QC procedures
- any in sorting and grading
- Do they find the existing QC methods adequate? If not, what is the major concern in quality matters which needs immediate attention?

31) How is quality assessed in your premises?

*Objective:*

- Try to evaluate the extent of formalisation of quality procedure.
- What are the quality parameters involved?

32) Do you have a product specification (e.g. size; colour; grade; storage requirement etc.) in most of your major crops for your customers?

- a) no

b) yes - please specify

*Objective:*

*- What are the quality parameters listed in the specification?*

*- Are the customers satisfied with the existing specification? If not, what other parameters should be involved?*

33) In the incidence of customers' complaint, how do you know at what stage (e.g. harvesting; packaging; in transit; rough handling at retail stores) damage is occurring?

*Objective:*

*- Try to find out the system of product traceability*

**Thank you for your assistance.**

*Ask contact details for their packer, transporter, agent etc. (if applicable)*

## APPENDIX 2: SURVEY FOR PACKERS

### Opening Questions

- 1) How long have you worked for this organisation?
- 2) What position/jobs have you had?
- 3) How many people generally work here? (Manager only)

### Background

- 4) Were you aware at time of packing that all of the produce you packed, would be exported?

*Objective:*

- Try to find out the allocation of each crop for export and local markets
- Does the company put more emphasis on export market? Are they export-oriented?

- 5) What, if any, extra measures were adopted at time of packing for exported crops?

*Objective:*

- Ask general staff especially on how or what is done differently between export and domestic produce.

### Quality awareness

- 6) Are you aware of any problems with the fruit and vegetables that you pack?

- a) bruised
- b) diseased
- c) damaged
- d) poor quality
- e) maturity (immature or over mature)
- f) no problems
- g) other, specify

*Objective:*

- Try to find out the extent of quality problems due to
  - i) mishandling during packing
  - ii) poor temperature management in store room
  - iii) unsanitary practice in packing area
  - iv) improper stowage/palletisation into trucks or containers

- 7) Will you be able to quantify how much produce you lose at i) packing and ii) in market (i.e. returns; unsold etc.)?

*Objective:*

- Try to find out the stage at which damage is occurring most and the quantity

- 8) How would you rate/score (out of 10) the quality of produce, you have to work with?

*Objective:*

- To what extent are produce defects a key quality problem?
- How are these problems handled?

**Chain Complexity**

9) During the last season, did you have any expression of concern or complaints from local/overseas buyers about the quality of produce that you pack? If yes, what was the problem and action did you take to satisfy your local./overseas buyers?

*Objective:*

- *Who or what did they get their information from?*
- *Are these information distorted by some middlemen?*
- *What do they do with the information once they have it?*
- *What are the main problems that they have, or they get feedback about?*

10) How do customers feel about the quality of your produce? How do they get feedback from customers?

*Objective:*

- *Are there any formal feedback mechanisms e.g. in house market research channelling information back to them?*
- *Do they just rely on complaints?*
- *Who sets quality standard for produce ? Is this flexible?*

11) Is the benchmark for satisfaction based on turnover or profit or repeat orders of the Dept., wholesaler, agent or store? What other measures do you have?

12) What do you see as the responsibility of packer? *(For both manager and general staff)*

*Objective:*

- *Try to find out the responsibility of packer such as packing produce properly; sizing and grading; washing; quality control etc.*

**Material Handling**

13) Do you think you have a problem with the quality of the produce that you pack?

- a) yes
- b) no
- c) not sure
- d) not bothered
- e) never thought about it

if yes, what sort of problems?

*(Examples of problems: mishandling during packing; poor temperature management in store room; unsanitary practice in packing area; over/under packing for produce; improper stowage/palletisation into trucks or containers)*

14) How much produce do you reject prior to packaging? What are the reasons for rejection?

- a) <5%
- b) 5-10%
- c) 10-15%
- d) 15-20%
- e) 20-25%
- f) >25%

*Objective:*

- *To see if one can obtain or verify if reasons for rejection are same as previous question.*

15) Have you got some thoughts to fix these problems? Do you perceive any obstacles in fixing these problems?

*Objective:*

- *Try to find out any suggestions for improvements*

- any cultural factors involved
- any priority in fixing these problems

16) What sort of cooling facilities do you employ for your produce? How do you cool the produce after harvesting (e.g. pick-cool-pack; pick-pack-cool; pick-grade-cool-pack etc.)?

*Objective:*

- Try to find out the method of cooling, whether it is suitable/efficient for a particular produce.
- Do they have forced air cooling? What is the typical cooling time?
- Do they have a high humidity cooler (e.g. Thermfresh)?
- How long until produce goes from harvesting to packing?

### **Transport efficiency**

17) Who is responsible for your produce delivery?

18) What is/are the delivery time? When do you/your deliverer normally deliver (e.g. night: am/pm; day: am/pm)? How often is produce dispatched?

*Objective:*

- Try to quantify the time and the number of stops involved for delivery.

19) What sort of transport facilities do you/your deliverer employ for delivery?

*Objective:*

- whether it has refrigerated unit (turn on all the time/only in summer)
- any record keeping for produce temperature/storage temperature

20) Do you think you/your deliverer have a problem in transporting produce?

- a) yes
- b) no
- c) not sure
- d) not bothered
- e) never thought about it

If yes, what sort of problems?

*Objective:*

- Try to find out problem due to transport efficiency
- Do they aware the importance of refrigerated facility for their trucks?
- Any rough handling problems involved in loading/unloading?

### **Storage facilities**

21) What sort of storage facilities do you employ for your produce?

22) Do you find the facilities adequate enough to store all the produce during peak season?

23) At what temperature do you keep your produce?

24) How long do you normally keep the produce in the store room?

*Objective:*

- Try to find out the type of storage facility
- whether it is adequate or not
- storage temperature
- any mixed storage involved

**Training needs**

25) Have you ever had any special training in fruit or vegetable handling?

- a) no
- b) yes - please specify.

*Objective:*

- Try to find out whether they see if there is training need
- which area is the prime concern for training e.g. hygiene practice; packing operation; grading/sorting of incoming produce etc.

26) What are the main sources of information for you about fruit and vegetable handling and keeping?

- a) other packers
- b) friends or family
- c) Department of Agriculture
- d) magazine and newspaper articles
- e) other - specify
- f) not sure

27) The Australian Horticultural Corporation (AHC) has introduced a Quality Certificate Scheme (AHQCS). What do you think about it? How do you think it operates?

*Objective:*

- Try to identify their attitude to Quality Management (QM)
- Are they interested in implementing any QM program in their organisation?

**Quality Control Methods**

28) Do you have any sort of quality control procedure implementing in your premises?

- a) no (Go to question 29)
- b) yes - please specify (Go to question 30)

*Objective:*

- what are the QC procedures for
  - i) incoming produce inspection
  - ii) sorting/grading of produce
  - iii) on-line check
  - iv) final produce inspection
- Do they find the existing QC methods adequate? If not, what is the major concern in quality matters which needs immediate attention?

29) How is quality assessed in your premises?

*Objective:*

- Try to evaluate the extent of formalisation of quality procedure.
- What are the quality parameters involved?

30) Do you have a product specification (e.g. size; colour; grade; storage requirement etc.) in most of your major crops for your customers? How do you arrive at a product specification?

- a) no
- b) yes - please specify

*Objective:*

- What are the quality parameters listed in the specification?
- Are the customers satisfied with the existing specification? If not, what other parameters should be included?

31) Do you employ batch coding for identification of different lots of produce?

- a) no
- b) yes - please describe the system briefly.

*Objective:*

- Try to find out whether the batch coding system is adequate for product identification and traceability of problem lot.
- Do their customers request for a better system?

32) In the incidence of customers' complaint, how do you know at what stage(e.g. packaging; in transit; rough handling at retail stores) damage is occurring?

*Objective:*

- Try to find out the system of product traceability.

**Thank you for your assistance.**

*Ask contact details for transporter and agents etc. (if applicable)*

## APPENDIX 3: SURVEY FOR TRANSPORTERS

### Opening Questions

- 1) How long have you worked for this organisation? Are you an owner/driver?
- 2) What position/jobs have you had?
- 3) How many people generally work here? (Manager only)
- 4) Do you earn by a piece rate system i.e. calculate earning by the number of loads you deliver? (Drivers only)

### Background

- 5) What is the approximate volume (in tonnes) of fruit & vegetable did you handle last season? What are they? Are they mainly from Victoria or interstate? What are the major outlets for these produce?
- 6) Do the volumes fluctuate much from season to season (% range)?

*Objective:*

- Try to get an overview of the horticultural market. What are the volume, varieties and destinations?

- 7) What, if any, extra measures were adopted by you at time of delivery for interstate/ exported crops?

### Quality awareness

- 8) What is/are the main problems with the fruit and vegetables that you transport?
  - a) bruised
  - b) diseased
  - c) damaged
  - d) poor quality
  - e) maturity (immature or over mature)
  - f) no problems
  - g) not our problem
  - h) other, specify

*Objective:*

- Try to find out the extent of quality problems due to

- i) poor temperature management in trucks
- ii) rough handling during loading/unloading stocks
- iii) inability to meet schedule
- iv) delay in loading produce
- v) unsanitary practice in trucks
- vi) poor stowage pattern
- vii) poor vehicle suspension

- 9) How would you rate/score (out of 10) the quality of produce, you have to work with? Do you think the suppliers know how you feel?

*Objective:*

- To what extent are produce defects a key quality problem?
- How are these problems handled?

**Chain Complexity**

10) During the last season, did you have any expression of concern or complaints from clients about the way you transport produce? If yes, what was problem and action did you take to satisfy your clients?

*Objective:*

- *What are the major problems in handling concerned by customers?*
- *Is there any market information flowing back to them?*
- *Are these information distorted by some middlemen?*
- *How often do their managers meet their clients (i.e. growers/retailers)?*
- *Where complaints came from, who handled them and what they were for as well as what they do about them.*

11) How do customers feel about the quality of your service? How do you get feedback from customers?

*Objective:*

- *Are there any formal feedback mechanisms e.g. in house market research channelling information back to them?*
- *Do they just rely on complaints?*
- *Who sets quality standard for service? Is this flexible?*

12) Is the benchmark for satisfaction based on turnover or profit or repeat orders of the dept., grower, retailer, shipper or exporter? What other measures do you have?

13) What are the major responsibilities as a truck driver?

*Objective:*

- *Do they feel that they just have to transport the load of produce in a safest possible manner disregard to the quality issue of the produce?*
- *Should they be responsible for securing the load and the temperature management in the trucks?*
- *Is 'meeting the time schedule for the delivery' the only prime concern?*

**Material Handling**

14) Do you think you have a problem with the quality of the produce that you transport?

- a) yes
  - b) no
  - c) not sure
  - d) not bothered
  - e) never thought about it
  - f) not our problem
- if yes, what sort of problems?

*(Examples of problems: poor temperature management in trucks; rough handling during loading/unloading stocks; inability to meet schedule; delay in loading; unsanitary practice in trucks; poor stowage pattern; poor vehicle suspension etc.)*

15) Will you be able to quantify how much produce you lose at i) loading stocks; ii) in transit and iii) in store (i.e. returns etc.)?

*Objective:*

- *Try to find out the stage at which damage is occurring most and the quantity.*

16) Have you got some thoughts to fix these problems? Do you perceive any obstacles in fixing these problems?

*Objective:*

- *Try to find out any suggestions for improvements*
- *any cultural factors involved*
- *any priority in fixing these problems*

17) How is different size of truck assigned for delivery? (*Manager only*)

18) What are the delivery procedures for transporting produce?

*Objective:*

- Who is responsible for checking temperature, hygiene condition of containers? Any record keeping?
- Who is responsible for switching on the refrigerated unit of the truck after finish loading?
- Any difference for delivering interstate/exported crops?

19) Do you observe any problem in stowage pattern of the stocks and loading procedure by order picker (give examples)? How do you communicate this with your clients?

*Objective:*

- Try to find out the problems involved in loading stocks e.g. putting too much load in the truck and block air circulation etc.
- Do they see this as a responsibility to raise the issue to their clients?

20) Upon arrival of stocks at retail stores, do you observe any problems involved in receiving by retail staff (give examples)? How do you communicate this with your clients?

*Objective:*

- Try to find out the problems involved in receiving by retail staff e.g. rough handling by unskilled staff; leaving produce in ambient environment; unhygienic practice in storage and preparation areas etc.
- Do they see this as a responsibility to raise the issue to the clients?

### **Transport efficiency**

21) Do you think you have a problem in meeting the delivery schedule? If yes, how are these problems handled?

*Objective:*

- What are the reasons for missing the schedule?

22) What is/are the delivery time? When do you normally deliver (e.g. night:am/pm; day:am/pm)? How often is produce dispatched?

*Objective:*

- Try to quantify the time and number of stops involved for picking up produce.

23) What sort of transport facilities do you employ for picking up produce? At what temperature do you hold produce at?

*Objective:*

- whether it has refrigerated unit (turn on all the time/only in summer)
- any record keeping for produce temperature/storage temperature
- Who is responsible for checking the temperature?
- Who sets the temperature requirement for keeping a particular kind of produce? Is this flexible?

24) Do you think you have a problem in transporting produce?

- a) yes
  - b) no
  - c) not sure
  - d) not bothered
  - e) never thought about it
  - f) not our problem
- If yes, what sort of problems?

*Objective:*

- Try to find out problem due to transport efficiency
- Do they aware the importance of refrigerated facility for their trucks?
- Any rough handling problems involved in loading/unloading?

25) What happens if vehicle breaks down (especially for interstate delivery)?

*Objective:*

- How do they maintain the temperature of the truck?

### **Training needs**

26) Have you ever had any special training in fruit or vegetable handling?

- a) no
- b) yes - please specify.

*Objective:*

- Try to find out whether they see if there is training need
- which area is the prime concern for training
- e.g. Logistics; hygiene; temperature management; produce knowledge; driving skills etc.

27) What are the main sources of information for you about fruit and vegetable handling and keeping?

- a) other drivers
- b) friends or family
- c) Department of Agriculture
- d) magazine and newspaper articles
- e) other - specify
- f) not sure

28) The Australian Horticultural Corporation (AHC) has introduced a Quality Certificate Scheme (AHQCS). Do you know about it?

*Objective:*

- Try to identify their attitude to Quality Management (QM)
- Are they interested in implementing any QM program in their organisation?

**Thank you for your assistance.**

*Ask contact details for their agent, shipper, retailer etc.*

## APPENDIX 4: SURVEY FOR AGENTS

### Opening Questions

- 1) How long have you worked for this organisation?
- 2) What position/jobs have you had?
- 3) How many people generally work here? (Manager only)

### Background

- 4) What % of your major lines did you export last season? What are they?

*Objective:*

- Try to find out the allocation of each crop for export and local markets.
- Does the company put more emphasis on export markets? Are they export-oriented?

- 5) What, if any, extra measures were adopted at time of packing for exported crops?

### Quality awareness

- 6) What is/are the main problems with the fruit and vegetables that you sell?

- a) bruised
- b) diseased
- c) damaged
- d) poor quality
- e) pre-mature
- f) no problems
- g) other, specify

*Objective:*

- Try to find out the extent of quality problems due to
  - i) mishandling
  - ii) poor temperature management
  - iii) over/under packing
  - iv) improper stowage/palletisation pattern
  - v) problem due to transport
  - vi) poor quality produce

- 7) Will you be able to quantify how much produce you lose at i) picking order; ii) in transit and iii) in store (i.e. returns; unsold etc.)?

*Objective:*

- Try to find out the stage at which damage is occurring most and the quantity.

- 8) How would you rate/score (out of 10) the quality of produce, you have to work with? Do you think the suppliers know how you feel?

*Objective:*

- To what extent are produce defects a key quality problem?
- How are these problems handled?

### Chain Complexity

- 9) How do you source your main crops for local customers?

*Objective:*

- *To see if there is any preference on the existing channel of sourcing the main crops to customers and its rationale.*
- *Try to find out the structure of the handling chain*
- *Who are the participants involved?*
- *How many suppliers they may use to fill up an order?*

10) What about the practice for overseas market?

*Objective:*

- *Same as Q 9.*
- *How often they personally meet overseas buyers overseas?*

11) How many lines do you normally carry? Do you specialise in any particular crops?

*Objective:*

- *Try to find out the degree of specialisation in any particular crops.*
- *Any preference for buyers to choose a particular agent on the basis of specialised produce knowledge involved.*

12) During the last season, did you have any expression of concern or complaint from local/overseas buyers about the quality of produce that you sell? If yes, what was problem and what action did you take to satisfy your local/overseas buyers?

*Objective:*

- *What are the major quality problems concerned by customers?*
- *Is there any market information flowing back to growers?*
- *Are these information distorted by some middlemen?*
- *How often do their suppliers (i.e. growers) meet their buyers?*

13) How do customers feel about the quality of your produce? How do you get feedback from customers? What do you do with this information?

*Objective:*

- *Are there any formal feedback mechanisms e.g. in house market research channelling information back to them?*
- *Do they just rely on complaints?*
- *Who sets quality standard for produce? Is this flexible?*
- *Are they more concerned to clear the stock at the time rather than selling the best quality produce to customers?*

14) Is the benchmark for satisfaction based on turnover or profit or repeat orders of the Dept., wholesaler or store? What other measures do you have?

*Objective:*

- *Try to find how they evaluate their own performance.*

### **Material Handling**

15) Do you think you have a problem with the quality of the produce that you sell?

- a) yes
  - b) no
  - c) not sure
  - d) not bothered
  - e) never thought about it
- if yes, what sort of problems?

*(Examples of problems: mishandling; poor temperature management; over/under packing ; improper stowage/palletisation pattern; problems due to transport; poor quality produce etc.)*

16) How much produce do you normally have rejected? What are the reasons involved?

- a) <5%
- b) 5-10%
- c) 10-15%
- d) 15-20%
- e) 20-25%
- f) >25%

*Objective:*

- To see if one can obtain or verify if reasons for rejection are same as previous question.

17) Have you got some thoughts to fix these problems? Do you perceive any obstacles in fixing these problems?

*Objective:*

- Try to find out any suggestions for improvements
- any cultural factors involved
- any priority in fixing these problems

18) Please describe the normal procedure for receiving produce.

*Objective:*

- Try to find out where, when and how they receive produce.
- What do they do with it after receipt?
- How they transport it (if they do)?

### **Transport efficiency**

19) Do you do deliveries or collect produce to/from customers/suppliers?

- a) yes
- b) no (Go to question 20)

20) Who is responsible for your produce delivery?

21) What is/are the delivery time? When do you/your deliverer normally deliver (e.g. night:am/pm; day:am/pm)? How often is produce dispatched?

*Objective:*

- Try to quantify the time and number of stops involved for delivery.

22) What sort of transport facilities do you/your deliverer employ for delivery? At what temperature do you/your deliverer hold produce at?

*Objective:*

- whether it has refrigerated unit (turn on all the time/only in summer)
- any record keeping for produce temperature/storage temperature
- Do they keep various lines separate?

23) Do you think you/your deliverer have a problem in transporting produce?

- a) yes
  - b) no
  - c) not sure
  - d) not bothered
  - e) never thought about it
- If yes, what sort of problems?

*Objective:*

- Try to find out problem due to transport efficiency
- Do they aware the importance of refrigerated facility for their trucks?
- Any rough handling problems involved in loading/unloading?

**Storage facilities** (applicable to agents with cool room facilities)

- 24) What sort of storage facilities do you employ for your produce?
- 25) Do you find the facilities adequate enough to store all the produce during peak season?
- 26) At what temperature do you keep your produce?
- 27) How long do you normally keep the produce in the store room?

*Objective:*

- Try to find out the type of storage facility.
- Whether it is adequate or not.
- storage temperature?
- any mixed storage involved?

**Training needs**

- 28) Have you ever had any special training in fruit or vegetable handling and keeping?
- a) no
- b) yes - please specify.

*Objective:*

- Try to find out whether they see if there is training need
- which area is the prime concern for training
- e.g. fruit & vegetable handling; temperature management; consumer education etc.

- 29) What are the main sources of information for you about fruit and vegetable handling and keeping?
- a) other fruit & vegetable handlers
- b) growers and producers
- c) friends or family
- d) Department of Agriculture
- e) magazine and newspaper articles
- f) other - specify
- g) not sure

- 30) The Australian Horticultural Corporation (AHC) has introduced a Quality Certificate Scheme (AHQCS). What do you think about it? How do you think it operates?

*Objective:*

- Try to identify their attitude to Quality Management (QM)
- Are they interested in implementing any QM program in their organisation?

**Quality Control Methods**

- 31) Do you have any form of quality control procedure implementing in your organisation?
- a) no (Go to question 32)
- b) yes - please specify (Go to question 33)

*Objective:*

- *what are the QC procedures*
- *Do they find the existing QC methods adequate? If not, what is the major concern in quality matters which needs immediate attention?*

32) How is quality assessed in your organisation?

*Objective:*

- *Try to evaluate the extent of formalisation of quality procedure.*
- *What are the quality parameters involved?*

33) Do you have a product specification (e.g. size; colour; grade; storage requirement etc.) in most of your major lines for your customers?

- a) no
- b) yes - please specify

*Objective:*

- *What are the quality parameters listed in the specification?*
- *Are the customers satisfied with the existing specification? If not, what other parameters should be included?*

34) Do you employ batch coding for identification of different lots of produce?

- a) no
- b) yes - please describe the system briefly.

*Objective:*

- *Try to find out whether the batch coding system is adequate for product identification and traceability of problem lot.*
- *Do their customers request for a better system?*

35) In the incidence of customers' complaint, how do you trace problems (i.e. at what stage damage is occurring) and how do you ascertain what they are?

*Objective:*

- *Try to find out the system of product traceability.*

**Thank you for your assistance.**

*Ask contact details for transporter and retailer etc. (if applicable)*

**APPENDIX 5: SURVEY FOR RETAILERS****Opening Questions**

- 1) How long have you worked for this organisation?
- 2) What position/jobs have you had?
- 3) How many people generally work here? Is there a particular staff responsible for fruit and vegetable Department? What is the size of this store? (Manager only)

**Background**

- 4) On which days of the week is fresh produce supplied to/purchased for this store?

Monday	( )	Thursday	( )
Tuesday	( )	Friday	( )
Wednesday	( )	Saturday	( )

*Objective:*

- Any busy day for receiving produce? Why?
- Frequency of receipt
- Any special occasion which would require a large volume of produce supplies

- 5) What are your typical daily hours of work?

**Quality awareness**

- 6) What is/are the main problems with the fruit and vegetables that you sell?

- a) bruised
- b) diseased
- c) damaged
- d) poor quality
- e) pre-mature
- f) no problems
- g) other, specify

*Objective:*

- Try to find out the extent of quality problems due to
  - i) inefficient handling
  - ii) poor temperature management in cool room
  - iii) unsanitary practice
  - iv) mixed storage
  - v) inappropriate procedure in receipts
  - vi) inappropriate ordering schedule

- 7) Will you be able to quantify how much produce you lose at i) in transit; ii) rough handling by staff; iii) inappropriate stock rotation?

*Objective:*

- Try to find out the stage at which damage is occurring most and the quantity.

- 8) Are you forced to mark down produce because of poor quality?

- a) regularly, on some lines every week
- b) sometimes, such as in hot weather
- c) sometimes, when it is not selling well due to unseasonal conditions

- d) rarely, perhaps once a month or so on a few lines  
e) never

9) How would you rate/score (out of 10) the quality of produce, you have to work with? Do you think the suppliers know how you feel?

*Objective:*

- *To what extent are produce defects a key quality problem?*
- *How are these problems handled?*

### **Chain Complexity**

10) How do you source your produce?

*Objective:*

- *To see if there is any preference on the existing channel of sourcing the produce to customers and its rationale.*
- *Try to find out the structure of the handling chain.*
- *Who are participants involved?*
- *How many suppliers the buyer use to fill up a particular item's order?*

11) What are the main comments (both positive and negative) that you receive from customers/clients? What action did you take to satisfy your customers?

*Objective:*

- *What are the main concerns expressed by customers?*
- *Is there any market information flowing back to growers?*
- *Are these information distorted by some middlemen?*
- *How often do they (i.e. buyers) meet their suppliers?*

12) How do customers feel about the quality of your produce? How do you get feedback from customers?

*Objective:*

- *Are there any formal feedback mechanisms e.g. in house market research channelling information back to them?*
- *Do they just rely on complaints?*
- *Who sets quality standard for produce? Is this flexible?*

### **Material Handling**

13) Do you think you have a problem with the quality of the produce that you sell?

- a) yes
- b) no
- c) not sure
- d) not bothered
- e) never thought about it

if yes, what sort of problems?

*(Examples of problems: inefficient handling; poor temperature management in cool room. unsanitary practice in receivals; inappropriate ordering schedule etc.)*

14) How much produce do you normally have rejected? What are the reasons involved?

- a) <5%
- b) 5-10%
- c) 10-15%
- d) 15-20%
- e) 20-25%

f) >25%

*Objective:*

- To see if one can obtain or verify if reasons for rejection are same as previous question.

15) Have you got some thoughts to fix these problems? Do you perceive any obstacles in fixing these problems?

*Objective:*

- Try to find out any suggestions for improvements  
- any cultural factors involved  
- any priority in fixing these problems

16) How do you decide your ordering schedule?

*Objective:*

- Try to find out the order frequency  
- any peak season for ordering  
- Buy in bulk quantity for a group of stores due to contractual arrangement?

17) What do you do with produce on the shelves which is not sold during the day?

*Objective:*

- Probe overnight/over the weekend.

### **Transport efficiency**

18) Do you do your own produce pick-up?

a) yes (Go to question 19)

b) no (Go to question 20)

19) What sort of transport facilities do you employ for your produce pick-up?

*Objective:*

- whether it has refrigerated unit (turn on all the time/only in summer)  
- any record keeping for produce temperature/storage temperature  
- Try to quantify the transit time involved.

20) What sort of transport facilities do your suppliers employ for delivery?

*Objective:*

- whether it has refrigerated unit (turn on all the time/only in summer)  
- any record keeping for produce temperature/storage temperature  
- Try to quantify the transit time involved

### **Storage facilities**

21) What sort of preservation measures do you employ for your produce?

- a) refrigeration of all produce
- b) refrigeration of some produce, give examples
- c) separation of various incompatible lines e.g.) pears from bananas
- d) keeping green vegetables moist
- e) protecting produce from the sun
- f) other - please specify
- g) none

22) If you employ refrigerated facilities, do you find the facilities adequate enough to store all the produce during peak season?

23) At what temperature do you keep your produce?

24) How do you allocate space for keeping produce? Do you separate various incompatible lines e.g.) pears from bananas?

25) How long do you normally keep the produce in the store room?

*Objective:*

- Try to find out the type of storage facility
- whether it is adequate or not
- storage temperature
- any mixed storage involved

### **Training needs**

26) Have you ever had any special training in fruit or vegetable handling and keeping?

- a) no
- b) yes - please specify.

*Objective:*

- Try to find out whether they see if there is training need
- which area is the prime concern for training  
e.g. hygiene practice; receiving of produce; temperature management; in-store display; consumer education etc.

27) What are the main sources of information for you about fruit and vegetable handling and keeping?

- a) other fruit & vegetable handlers
- b) growers and producers
- c) friends or family
- d) Department of Agriculture
- e) magazine and newspaper articles
- f) other - specify
- g) not sure

28) The Australian Horticultural Corporation (AHC) has introduced a Quality Certificate Scheme (AHQCS). What do you think about it? How do you think it operates?

*Objective:*

- Try to identify their attitude to Quality Management (QM)
- Are they interested in implementing any QM program in their organisation?

### **Quality Control Methods**

29) Do you have any sort of quality control procedure implementing in your premises?

- a) no (Go to question 30)
- b) yes - please specify (Go to question 31)

*Objective:*

- what are the QC procedures for
  - i) incoming produce inspection
  - ii) sorting/grading of produce
  - iii) rejection of sub-standard produce
- Do they find the existing QC methods adequate? If not, what is the major concern in quality matters which needs immediate attention?

30) How is quality assessed in your organisation?

*Objective:*

- Try to evaluate the extent of formalisation of quality procedure.
- What are the quality parameters involved?

31) Do you require your suppliers to provide a product specification (e.g. size; colour; grade; storage requirement etc.) in most of your major lines?

- a) no
- b) yes - please specify

*Objective:*

- What are the quality parameters listed in the specification?
- Are the suppliers able to satisfy their requirements in the existing specification? If not, what other parameters should be included?

32) Do you prefer your suppliers to provide product information (e.g. cooking instruction; nutritional information etc.) for display in store?

- a) no
- b) yes - please specify the areas of interest for display

*Objective:*

- To see if there is any preference for suppliers to have high sensitivity for market situation.

33) In the incidence of customers' complaint, how do you trace problems (i.e. at what stage damage is occurring) and how do you ascertain what they are?

*Objective:*

- Try to find out the system of product traceability.

**Thank you for your assistance.**

## APPENDIX 6: CASE STUDIES FOR THE GROWING OPERATION

### Part I: Questions to the Manager

#### Background

- 1) What is the size of your farm?
- 2) How many people generally work here? (Both permanent and casual)

*Objective:*

- *What are their jobs?*
- *e.g. transplanting; land preparation etc.*
- *Does the grower employ different people for different tasks?*

- 3) What are your main crops? Please specify the growing period and harvesting time for each crop.
- 4) What are the channels for selling your main crops?

*Objective:*

- *To confirm the structure of the handling chain.*
- *Ask them to name the participants involved (for follow-up purpose).*
- *Have they supplied produce to processors (e.g. Gardenland) before?*

#### Crop Establishment

- 5) How do you source your seed/seedling supplies? Do you ask your supplier to use a particular way to produce the seed/seedling?

*Objective:*

- *Do they set any particular standard for their seed/seedling? If yes, what are they?*
- *Examples of seed/seedling treatment:*
- *e.g. use of raw, pelleted or primed seed; the range of graded seed; seed treatment such as fungicides and hot water; fertiliser and special seedling mix; use of cell-grown seedling etc.*

- 6) What is the preparation involved before planting? Do you consider how you do this will affect crop establishment?

*Objective:*

- *Is the prepared seedbed provide good seed/soil contact, allow sufficient water infiltration?*
- *Any pre-plant fertiliser application? What are they?*
- *Do they remove infected residues from previous crops?*
- *Any pre-emergence weed control?*
- *Are different practices involved for different growing seasons?*
- *Who is responsible for land preparation?*
- *Does the grower supervise his staff himself on this process?*

- 7) What is the usual crop rotation?

*Objective:*

- *What are the reasons for crop rotation?*

- 8) How do you decide your production schedule?

- Objective:* - *Do they plan the schedule on the basis of market requirement?*  
*e.g. by discussion with their agents or customers prior to planting*

- 9) What are the procedures involved for planting your crops? Are there any critical factors that will affect the crop establishment?

*Objective:*

- For direct seeding:

*What type of proper seeding equipment do they employ to place the seed in a pre-determined position? Is the soil temperature suitable for seed germination? How do they overcome disease and pest problems?*

- For transplanting:

*How do they minimise the transplant shock? What type of transplanter?*

- Any use of plastic mulch for weed control?

- Who works up soil?

10) Have you encountered any problem during the planting stage? If yes, what do you do to improve the quality? (such as gaps in row where some plants die off etc.)

11) How do you see "fertiliser" affect the quality of your product?

*Objective:*

- Do they just rely on application of fertiliser to maintain the nutrients level? Any other practices such as erosion control and crop rotation to maintain the required level?

- Who apply fertiliser?

- What types of fertilisers are used? What is the time of application?

- Where do they normally apply each type of fertiliser and why?

- Do you separate seed/transplant and fertiliser to prevent fertiliser burn?

- Do they conduct any soil analysis (by fertiliser company) to determine the rates of application?

- Do they apply any foliar nutrient spray to correct trace element deficiencies?

- Do they employ trickle irrigation (fertigation) to apply fertiliser through the growth period?

12) How do you see 'water' affect the quality of your product? What type of irrigation do you use? What is the frequency and the approximate amount required for irrigation?

*Objective:*

- What factors have to be considered in choosing a particular method of irrigation?

*e.g. soil type, slope, layout on the type of crop to be grown, water infiltration rate, evenness of application etc.*

- How to decide irrigation scheduling?

*N.B. Important to be aware of crop growth stages where moisture supply is critical for the development and the yield of the crop.*

*Other information: soil and weather*

- How to monitor the schedule?

*e.g. by feeling the soil texture; tensiometers; neutron probe (most accurate) and resistivity metering.*

- Who does irrigation?

13) What are your approaches in disease and pest control? Have you encountered any disease problem in the last season? If yes, what action did you take to tackle the problem?

*Objective:*

- Do they just rely on chemical spraying in managing disease?

*N.B. Best disease management is achieved by using as many control methods as possible. Watch crops closely to spot the first signs of disease.*

*Examples of general approaches:*

*Importance of nursery or seedling products; soil & seed treatment; crop scheduling; crop rotation; removal and destruction of diseased plants; insect and weed control; use of disease resistant cultivars; avoid unnecessary handling of plants i.e. do not handle healthy plants after handling infected one; hygienic pruning and removal infected residues from previous crop.*

- Who does spraying?

- Disease & pest identification: how do they know what the problem is?(particularly new crop)

14) What are your approaches in weed control?

*Objective:*

- What method do they use?

*e.g. Hand pulling & hoeing; mechanical weeding (only effective between rows); flame weeding; mulching; use of herbicides*

- How often do they conduct weed control? (Importance of weeding before seed set)
- Who does spraying?

15) How many people (including grower) are employed for the following tasks i.e. seeding/transplanting; irrigation; plant establishment and weed & disease control? Are they permanent or casual staff?

Objective:

- To see whether the operation is labour intensive or not.
- Do they think training is necessary for their staff on the above tasks?
- How do they train staff to weeding/ transplanting etc.?
- Are those casuals employed regularly?

## Harvesting

16) What are the procedures for harvesting your main crops?

Objective:

- A flow diagram for harvesting each crop
- Does the grower supervise this process?
- How many cuts per crops? Do they employ same people for growing and cutting? How about training?
- During this process, how long it's till the produce is cooled? Do they try to keep the produce under shade? At what time of the day do they normally harvest the crops?
- What are the instructions given by the grower in assessing the quality of crops in the field (i.e. maturity determination; stalk length/ colour /compactness of produce/diameter of the head/ disease symptoms/ foreign matter/damage etc.
- What is the method of cutting? Any use of harvest aids?
- Any rough handling involved? If yes, what do they do about it?

17) How often do you harvest your main crops (probe different seasons) ? What are the major criteria to decide whether the produce will be picked or not?

Objective:

- Does the frequency of harvesting affect the quality of the produce?  
e.g. second cuts of side shoots for some customers
- Criteria to decide harvesting schedule e.g. market situation; weather; contract with customers; request by agents

18) What are the procedures for field packing? (for growers who pack produce in the field)

Objective:

- What are the criteria for grading? Does the grower supervise this process himself?
- Do they discard everything suffering from bruises, splits, cracks and soft patches?
- Any trimming involved?
- Do they hose down to cool produce?
- Do they wash produce ( with/without chlorinated water ) as soon as possible after harvest?
- How much produce (by weight or by size) do they put in each container?
- Does the grower conduct any follow-up check to make sure produce been packed properly?
- Do they employ any particular batch coding system to identify different lots of produce?
- Any rough handling involved? If yes, what do they do about it?

19) How many people (including grower) are employed for harvesting? Are they permanent or casual staff?

Objective:

- To see whether the operation is labour intensive or not.
- Do they think training is necessary for their staff on harvesting, postharvest handling, temperature management and storage etc.?
- Are casuals employed regularly?

20) What is the mode of transport from field to packing shed/cool room?

*Objective:*

- Do they keep produce under cover?
- How many trips are required normally for each harvest?
- What is the length in time for each trip?
- How long it's till the produce is cooled?

### Cooling

21) What sort of cooling facilities do you employ for your produce? How do you cool the produce after harvesting?

*Objective:*

- Try to find out the method of cooling, whether it is suitable/efficient for a particular produce.
- Do they wash the produce down with water or apply ice to reduce field heat before cooling?
- What is the typical cooling time? At what temperature produce is cooled to?
- Do they stack produce loosely to allow adequate ventilation?
- How do they maintain the right humidity in the cool room? e.g. Thermfresh; apply moisture manually
- How do they monitor temperature in cool room? (Check if produce is cooled enough)

### Packing

22) What are the procedures for packing in the shed?

*Objective:*

- A flow diagram for packing each crop
- What are instructions given by the grower in assessing the quality of the crops in shed (i.e. stalk length/ colour/ diameter of the head /disease symptoms/ foreign matter/ damage etc.)?
- Does the grower supervise this process himself?
- What are the criteria for grading?
- Do they discard everything suffering from bruises, splits, cracks and soft patches?
- Any trimming involved?
- Do they wash produce (with /without chlorinated water ) as soon as possible after harvest?
- Is temperature comfortable in the shed?
- How often do they clean the shed?
- How much produce (by weight or by size) do they put in each container? Do they overfill the cartons?
- Does the grower conduct any follow-up check to make sure produce been packed properly?
- Do they employ any particular batch coding system to identify different lots of produce? How do they label the produce?
- Any rough handling involved? If yes, what do they do about it?

23) How many people (including grower) are employed for packing? Are they permanent or casual staff?

*Objective:*

- To see whether the operation is labour intensive or not.
- Do they think training is necessary for their staff on packing?
- Do they employ same crew for harvesting and packing?
- Are those casuals employed regularly?
- Who is in charge of the packing process?

### Storage facilities

24) What sort of storage facilities do you employ for your produce? Do you find the facilities adequate enough to store all the produce during peak season?

*Objective:*

- How long do they normally keep the produce in the store room? Does it vary over the year (i.e. summer & winter)?
- At what temperature do they keep produce at?
- How do they monitor temperature in store room?
- How do they maintain the right humidity in the store room? e.g. Thermfresh; apply moisture manually
- Do they transfer the produce into the store room immediately after cooling?
- Where does excess produce go if storage facility is fully occupied?

25) How do you stack produce in the store room?

Objective:

- Do they stack produce on pallets in the store room with space on four sides to allow adequate air flow?
- Do they stack produce in parallel to the air flow? (not in front of the evaporator)
- How often do they clean the store room?

## Transport

26) What are the procedures for loading produce for delivery?

Objective:

- A flow diagram for loading produce for delivery
- Who owns the transport facility?
- Who loads produce onto trucks?
- What are the instructions given by the grower to the order pickers in this process?  
e.g. Stabilisation of a load ( on a per pallet basis) by strapping; corner stays and straps; tension netting or glueing; Loading produce in a pattern that allow air circulation throughout the transit unit (i.e. produce should be loaded tightly and braced in position in order to achieve maximum payloads and stability); Putting soft items on heavy items
- How long does it take normally to fill a truck?
- Do they leave the unloaded produce exposing to the sun?
- Is cooling on when truck stopped?
- Any rough handling involved? If yes, what do they do about it?
- Any mixed loads involved? Do they keep incompatible produce together?
- Any extra measures are adopted for interstate/exported crops?

27) What sort of transport facilities do you /your deliverer employ for delivery? (both local and interstate)

Objective:

- Whether it has refrigerated unit (turn on all the time/ only in summer)
- At what temperature do they hold produce at?
- any record keeping for produce temperature
- How do they maintain the right humidity during transit?
- Try to quantify the time and the number of stops involved for delivery
- How often is the vehicle serviced?
- Do they think they have a problem in transporting produce? If yes, what do they do about it?
- Does the grower always cool produce to the desired temperature before delivery?
- Is the truck equipped with a front return air bulkhead (i.e. an air delivery chute) to carry air to the rear of the truck?

28) What are the responsibilities for transport operator in delivery?

Objective:

- Who is responsible for checking temperature, hygiene condition of containers? Any record keeping?
- Who is responsible for switching on the refrigerated unit of the truck after finish loading?
- Has the client i.e. grower specified particular requirements e.g. palletisation of loads; temperature management; thermostat setting; maintain adequate air circulation; loading/unloading procedures etc. ?

29) Upon arrival of stocks at final destinations, do your deliverer observe any problems involved in receiving by the operator at the other end? How do your deliverer communicate this with you?

*Objective:*

- Try to find out the problems involved by receiving staff  
e.g. rough handling by unskilled staff; leaving produce in ambient environment; unhygienic practice in storage and preparation areas etc.
- Do the deliverer see this as a responsibility to raise the issue to the grower?

**Marketing**

30) Do you sell your main crops direct to retailers/ processors/ food service operators; through central market system or via appointed agent/s to local customers?

*Objective:*

- To see if there is any preference on the existing channel of selling the main crops to customers and its rationale.
- How do they decide the final destination for their produce? Do they just rely on their agents to make the decision?
- For grower/seller only:  
Have they got a list of regular customers to work with? Who are they?

31) What about the practice for overseas market?

*Objective:- Same as Q30.*

32) If you sell your main crops via an agent/s, are you satisfied with his/her performance?

*Objective:*

- What are the grower's expectation on the role of an agent (especially on feedback of market information and quality concerns etc.)? Give examples.
- Are these information distorted by some middlemen?

33) How do customers feel about the quality of your produce? How do you get feedback from customers? What do you do with these information?

*Objective:*

- How often do they communicate with their agent/customers? What issues do they usually discuss about?
- How often do they visit the terminal markets, retail outlets for major customers?
- Are there any formal feedback mechanism e.g. in-house market research channelling information back to them? Do they just rely on complaints?
- Do their agents convey both positive and negative feedback? Give examples.
- Who sets quality standard for produce? Is this flexible? Have they ever had any discussion with their agents/customers on product specification?
- Do their agents/customers ( especially for direct sales) set any growing schedule for them?

**Presenting for sale**

*(For grower/seller only)*

34) How is produce presented for sale?

*Objective:*

- Are samples of produce presented for sale?
- How do they set the price for a particular lot of produce?

35) Have you got a list of major customers to work with? What are the major outlets for these customers?

*Objective:*

- Number of years in business with these customers
- How do they arrange sale with these major customers?
- Are purchases usually made in advance before the stocks are delivered?

- Have they specified any particular requirement for the produce? Are there any discussion between growers and customers on product specification?
- Do their customers recognise their brands and choose that as major supplier?
- Have you ever engaged in any promotional campaign with these customers? Give e.g.
- How often do they visit the major outlets of these customers?
- Have they got strong link with chain stores and food service sector? Is there any contractual arrangement between grower & his customers?
- Will produce be re-packed for certain purposes by their customers?

36) What about the clientele who buy produce off the stand?

*Objective:*

- Who are these customers who usually buy produce off the stand? Are they usually the same each month?
- Will produce be re-packed by customers for certain purposes?
- What are the major criteria of these customers in choosing produce from their stand? (e.g. price; quality; quantity; brand awareness etc.)

37) What % of your major lines did you export last season? What are they?

*Objective:*

- What are the channels for exporting?
- Do their customers usually inform growers beforehand and then plan accordingly?
- What, if any, extra measures were adopted at time of packing for exported crops?

## **Part 2: Questions to the employees**

### **Background**

- 1) How long have you worked for this organisation? Are you employed as a permanent staff or casual? If employed as a casual, what is/are the typical working periods?
- 2) What position/job do you have? What do you like about your jobs?
- 3) How many people generally work here? (Both permanent & casual)
- 4) What are the major outlets for your major crops?

*Objective:*

- Are they usually informed the final destination for the produce?

### **Crop Establishment**

- 5) What is the preparation involved before planting? Do you consider how you do this will affect the crop establishment?

*Objective:*

- What are the instructions given by the grower on land preparation before planting? What are the operations involved (e.g. disc, rip, mould etc.)?  
e.g. prepare seedbed to provide good seed/soil contact and allow sufficient water infiltration; remove infected residues from previous crops; pre-plant fertiliser application; pre-emergence weed control etc.
- Does the practice vary over the year (i.e. for different growing seasons)?

- 6) What are the procedures involved for planting the crops? What are the instructions given by the grower on this process?

*Objective:*

- Instructions such as:
  - i) Direct seeding

*use of proper seeding equipment to place seed in a pre-determined position; check soil temperature suitable for seed germination*

*ii) Transplanting*

*use of a proper planter; use of plastic mulch for weed control*

*- What about tractor speed, gear etc.?*

7) Have you encountered any problem during the planting stage? If yes, what do you do to improve the quality?

8) What are the instructions given by the grower in applying fertilisers?

*Objective:*

*- Do they just rely on application of fertiliser to maintain the nutrients level? What other practices are involved? (e.g. erosion control; crop rotation; soil cultivation before planting)*

*- What types of fertiliser are used? What is the time of application (e.g. pre-planting)?*

*- Where do they normally apply each type of fertiliser and why?*

*- Do they separate seed/transplant and fertiliser to prevent fertiliser burn?*

*- Does the grower conduct any soil analysis (by fertiliser company) to determine the rates of application?*

*- Do they employ trickle irrigation (fertigation) to apply fertiliser through the growth period?*

9) What are the instructions given by the grower on irrigation? What type of irrigation do you use? What is the frequency and the approximate amount required for each irrigation?

*Objective:*

*- How does the grower decide the irrigation scheduling?*

*Factors to be considered e.g. crop growth stages; soil; weather*

*- How to monitor the schedule?*

*e.g. by feeling soil moisture; tensiometers; neutron probe (most accurate) and resistivity metering*

10) What are the instructions given by the grower on pest and disease control? Have you encountered any disease problem in the last season? If yes, what action did you take to tackle the problem?

*Objective:*

*- Do they just rely on chemical spraying in managing disease? Do they watch crops closely to spot the first signs of disease?*

*- What are their approaches in pest & disease control?*

*e.g. use of disease-free planting material; soil & seed treatment; crop scheduling; crop rotation; removal and destruction of diseased plants; insect & weed control; use of disease resistant cultivars; avoid unnecessary handling of plants i.e. do not handle healthy plants after handling infected one; hygienic pruning and removal infected residues from previous crop*

11) What are the instructions given by the grower on weed control?

*Objective:*

*- What method do they use?*

*e.g. hand pulling & hoeing; mechanical seeding; flame weeding; mulching; use of herbicides*

*- How often do they conduct weed control?*

12) How many people (including grower) are employed for the following tasks i.e. seeding/transplanting, irrigation, plant establishment and weed & disease control? Are they permanent or casual staff?

*Objective:*

*- To see whether the operation is labour intensive or not.*

*- Do they think training is necessary for them on the above tasks?*

*- Does the grower employ same crew for all the above tasks?*

*- Are those casuals employed regularly?*

## Harvesting

13) What are the procedures for harvesting your main crops?

*Objective:*

- A flow diagram for harvesting each crop
- Does the grower supervise staff on this process?
- During this process, how long it's till the produce is cooled? Do they try to keep the produce under shade? At what time of the day do they normally harvest the crops?
- What are the instructions given by the grower in assessing the quality of crops in the field (i.e. maturity determination; stalk length/ colour /compactness of produce/diameter of the head/ disease symptoms/ foreign matter/damage etc.) Any diagram or is it verbal?
- What is the method of cutting? Any use of harvest aids?
- Any rough handling involved? If yes, what do they do about it?

14) How often do you harvest your main crops (*probe different seasons*) ? What are the major criteria to decide whether the produce will be picked or not?

*Objective:*

- Does the frequency of harvesting affect the quality of the produce?  
e.g. second cuts of side shoots for some customers
- Criteria to decide harvesting schedule e.g. market situation; weather; contract with customers; request by agents

15) What are the procedures for field packing? (*for growers who pack produce in the field*)

*Objective:*

- What are the criteria for grading?
- Does the grower supervise this process himself?
- Do they discard everything suffering from bruises, splits, cracks and soft patches?
- Any trimming involved?
- Do they hose down to cool produce?
- Do they wash produce ( with/without chlorinated water ) as soon as possible after harvest?
- How much produce (by weight or by size) do they put in each container?
- Does the grower conduct any follow-up check to make sure produce been packed properly?
- Do they employ any particular batch coding system to identify different lots of produce?
- Any rough handling involved? If yes, what do they do about it?

16) How many people (including grower) are employed for harvesting? Are they permanent or casual staff?

*Objective:*

- To see whether the operation is labour intensive or not.
- Do they think proper training is necessary for themselves on harvesting, postharvest handling, temperature management, storage etc.?
- Are those casuals employed regularly?

17) What is the mode of transport from field to packing shed/cool room?

*Objective:*

- Do they keep produce under cover?
- How many trips are required normally for each harvest?
- What is the length in time for each trip?
- How long it's till the produce is cooled?

**Cooling**

18) What sort of cooling facilities do you employ for your produce? How do you cool the produce after harvesting?

*Objective:*

- Try to find out the method of cooling, whether it is suitable/efficient for a particular produce.
- Do they wash the produce down with water or apply ice to reduce field heat before cooling?
- What is the typical cooling time? At what temperature produce is cooled to?

- Do they stack produce loosely to allow adequate ventilation?
- How do they maintain the right humidity in the cool room?  
e.g. Thermfresh; apply moisture manually
- How do they monitor temperature in cooling area?

### Packing

19) What are the procedures for packing in the shed?

Objective:

- A flow diagram for packing each crop
- What are instructions given by the grower in assessing the quality of the crops in shed (i.e. stalk length/ colour/ diameter of the head /disease symptoms/ foreign matter/ damage etc.)? Any diagram or is it verbal?
- What are the criteria for grading?
- Do they discard everything suffering from bruises, splits, cracks and soft patches?
- Any trimming involved?
- Do they wash produce (with /without chlorinated water ) as soon as possible after harvest?
- Is temperature comfortable in the shed?
- How often do they clean the shed?
- How much produce (by weight or by size) do they put in each container? Do they overfill the cartons?
- Does the grower conduct any follow-up check to make sure produce been packed properly? Does he supervise this process himself?
- Do they employ any particular batch coding system to identify different lots of produce? How do they label the produce?
- Any rough handling involved? If yes, what do they do about it?

20) How many people (including grower) are employed for packing? Are they permanent or casual staff?

Objective:

- To see whether the operation is labour intensive or not.
- Do they think proper training is necessary for themselves on packing?
- Does the grower employ same crew for harvesting and packing?
- Are those casuals employed regularly?

### Storage facilities

21) What sort of storage facilities do you employ for your produce? Do you find the facilities adequate enough to store all the produce during peak season?

Objective:

- How long do they normally keep the produce in the store room? Does it vary over the year (i.e. summer & winter)?
- At what temperature do they keep produce at?
- How do they monitor temperature in the store room?
- How do they maintain the right humidity in the store room?  
e.g. Thermfresh; apply moisture manually
- Do they transfer the produce into the store room immediately after cooling?
- Where does excess produce go if there is not enough storage facility?

22) What are the instructions given by the grower on stacking the produce in the store room?

Objective:

- Do they stack produce on pallets in the store room with space on four sides to allow adequate air flow?
- Do they stack produce in parallel to the air flow? (not in front of the evaporator)
- How often do they clean the store room?

**Transport**

23) What are the procedures for loading produce for delivery?

Objective:

- A flow diagram for loading produce for delivery
- Who is responsible for loading? (grower or truck driver)
- What are the instructions given by the grower to the order pickers in this process?  
e.g. Stabilisation of a load (on a per pallet basis) by strapping; corner stays and straps; tension netting or glueing; Loading produce in a pattern that allow air circulation throughout the transit unit (i.e. produce should be loaded tightly and braced in position in order to achieve maximum payloads and stability); Putting soft items on heavy items
- How long does it take normally to fill a truck?
- Is cooling on when truck stopped?
- Do they leave the unloaded produce exposing to the sun?
- Any rough handling involved? If yes, what do they do about it?
- Any mixed loads involved? Do they keep incompatible produce together?
- Any extra measures are adopted for interstate/exported crops?

24) What sort of transport facilities does the grower employ for delivery? (both local and interstate)

Objective:

- Whether it has refrigerated unit (turn on all the time/ only in summer)
- At what temperature do they hold produce at?
- any record keeping for produce temperature
- How do they maintain the right humidity during transit?
- Try to quantify the time and the number of stops involved for delivery
- How often is the vehicle serviced?
- Do they think they have a problem in transporting produce? If yes, what do they do about it?
- Does the grower always cool produce to the desired temperature before delivery?
- Is the truck equipped with a front return air bulkhead (i.e. an air delivery chute) to carry air to the rear of the truck?

**Marketing**

25) Do you sell your main crops direct to retailers/ processors/ food service operators; through central market system or via appointed agent/s to local customers?

Objective:

- To see if there is any preference on the existing channel of selling the main crops to customers and its rationale.
- Number of years they are in business with these operators
- How do they decide the final destination for their produce? Do they just rely on their agents to make the decision?
- For grower/seller only:  
Have they got a list of regular customers to work with? Who are they?

26) What about the practice for overseas market?

Objective: Same as Q25.

27) If you sell your main crops via an agent/s, are you satisfied with his/her performance?

Objective:

- What are the grower's expectation on the role of an agent (especially on feedback of market information and quality concerns etc.)? Give examples.
- Are these information distorted by some middlemen?

28) How do customers feel about the quality of your produce? How do you get feedback from customers? What do you do with these information?

*Objective:*

- How often do they communicate with their agent/customers? What issues do they usually discuss about?
- How often do they visit the terminal markets, retail outlets for major customers?
- Are there any formal feedback mechanism e.g. in-house market research channelling information back to them? Do they just rely on complaints?
- Do their agents convey both positive and negative feedback? Give examples.
- Who sets quality standard for produce? Is this flexible? Have they ever had any discussion with their agents/customers on product specification?
- Do their agents /customers ( especially for direct sales) set any growing schedule for them?

**Presenting for sale***(For grower/seller only)*

## 29) How is produce presented for sale?

*Objective:*

- Are samples of produce presented for sale?
- How do they set the price for a particular lot of produce?

## 30) Have you got a list of major customers to work with? What are the major outlets for these customers?

*Objective:*

- Number of years in business with these customers
- How do they arrange sale with these major customers?
- Are purchases usually made in advance before the stocks are delivered?
- Have they specified any particular requirement for the produce? Are there any discussion between growers and customers on product specification?
- Do their customers recognise their brands and choose that as major supplier?
- Have you ever engaged in any promotional campaign with these customers? Give e.g.
- How often do they visit the major outlets of these customers?
- Have they got strong link with chain stores and food service sector? Is there any contractual arrangement between grower & his customers?
- Will produce be re-packed for certain purposes by them or their customers?

## 31) What about the clientele who buy produce off the stand?

*Objective:*

- Who are these customers who usually buy produce off the stand? Are they usually the same each month?
- Will produce be re-packed by customers for certain purposes?
- What are the major criteria of these customers in choosing produce from their stand? (e.g. price; quality; quantity; brand awareness etc.)

## 32) What % of your major lines did you export last season? What are they?

*Objective:*

- What are the channels for exporting?
- Do their customers usually inform growers beforehand and then plan accordingly?
- What, if any, extra measures were adopted at time of packing for exported crops?

**Part 3: Things to Observe****Crop Establishment**

- 1) - Unnecessary handling i.e. Do they handle health plants after handling infected ones?
- 2) - Is weed control done properly?
  - Are plants well-spaced to allow good air circulation?

- 3) - Do they avoid working in crop when it is wet?
- 4) - Do they clean trash from machinery and disinfect implements after working in diseased crops before working in disease-free crops?

### Harvesting

- 1) - Observe method of cutting, criteria for grading.
  - Do they follow the instructions given by the grower?
  - Are produce of consistent quality?
- 2) - Do they keep produce in the shade?
- 3) Time the following:
  - How long does it take for harvesting a bin; for all bins?
  - How many bins have to be filled before they are transferred to the cool room? How long does that take?
  - How long it's till all the produce is cooled?
  - How long to cooled temperature is reached?
- 4) - Any rough handling involved?

### Packing

- 1) - How is produce tipped from the bins or field boxes? By hand or mechanically? Does that result in skin abrasions?
- 2) - How is the hygiene condition in the packing house overall; specific areas such as sorting table, dip tank (if any), packing lines etc.?
- 3) - Is there a clear separation zone for receipt and cleaning of harvested produce and a zone for grading and packing of clean produce?
  - Is the latter zone fully enclosed and supplied with external filtered air to maintain a slight positive pressure to prevent entry of air borne infectious material and potential insect carriers?
- 4) - Is the packing room air-conditioned?
- 5) - Any trimming involved?
- 6) - Do they discard everything suffering from bruises, splits, cracks and soft patches?
- 7) - Do they wash produce (with/without chlorinated water) as soon as possible after harvest?
- 8) - How much produce (by weight or by size) do they put in each container?
  - Do they maintain consistent quality in different containers?
  - Do they overfill cartons?
- 9) - Does the packer conduct any follow-up check to make sure produce been packed properly?
- 10) - Do they employ any particular batch coding system to identify different lots of produce?
  - How do they label the produce?
- 11) - Any rough handling involved?
- 12) - Check temperature in the packing shed.

**Cooling**

- 1) - Do they wash the produce down with water or apply ice to reduce field heat before cooling?
- 2) - Do they stack produce loosely to allow adequate ventilation?
- 3) - How do they maintain the right humidity in the store room? (e.g. Thermfresh; apply moisture manually)
- 4) - At what temperature do they keep produce at?
  - Any temperature recorder?
  - Check if produce is cooled enough.
- 5) - Do they transfer produce into the store room immediately after cooling?
- 6) - Observe cartons packed 1-2 days after.

**Storage**

- 1) - How is the hygiene condition for the store room overall; specific areas such as wall; floor; evaporative fan etc.?
- 2) - Do they stack produce on pallets in the store room on four sides to allow adequate air flow?
- 3) - Do they stack produce in parallel to the air flow? (not in front of the evaporator)
- 4) - Any temperature recorder?

**Transport**

Have they committed the following abuses?

- 1) - Loading produce packages first, then piling hard lines (or general freight) on top and crushing the produce.
- 2) - Walking over packages during loading/unloading, crushing the produce and weakening cartons.
- 3) - Dropping and throwing packages during loading/unloading. This causes bruises and splits which will subsequently rot.
- 4) - Pulling ropes tight against packages and breaking them. Wooden slats or right-angle corner support should be inserted under ropes.
- 5) - Pulling tarpaulins tight over loads of hot produce. This interferes with ventilation and causes overheating and harmful modification to the atmosphere.
- 6) - Leaving produce unattended at ambient temperature in the shed and upon arrival at the terminal markets.
- 7) - Loading produce tightly. This blocks the air passages in the transit unit.

**Observe the following:**

- 1) - Time how long does it take to fill a transit unit.
- 2) - What is the time gap between finished loading and the start of the journey?
  - Do they turn on the refrigerated unit immediately after finish loading?
- 3) - Do they load produce into pre-cooled trucks?

## APPENDIX 7: CASE STUDIES FOR THE PACKING OPERATION

### Part I: Questions to the Manager

#### Background

1) How many people generally work here? (Both permanent and casual)

*Objective:*

- What are their jobs?
- e.g. packing; loading; transporting etc.
- Does the manager employ different people for different tasks?

2) How many growers you pack for in the East Gippsland region?

3) What are the channels for selling these crops?

*Objective:*

- To confirm the structure of the handling chain.
- Ask them to name the participants involved (for follow-up purpose).

#### Incoming produce inspection

4) How is quality of produce assessed upon arrival in your premises?

*Objective:*

- What are the procedures for incoming produce inspection?
- e.g. sorting/grading; checking produce temperature; checking defects/foreign matter etc.
- How much produce do you reject prior to packaging? What are the reasons for rejection?
- How would you rate/score (out of 10) the quality of produce you have to work with? (Both in general and for the grower who is involved in the case study)
- Do they advise the grower when the produce should be harvested?
- If yes, what are the criteria in assessing the quality of crops in the field (i.e. maturity determination; stalk length; colour; compactness of produce; diameter of the head; disease symptoms; foreign matter; damage etc.)

#### Cooling

5) Is produce usually pre-cooled immediately after harvesting? Who is responsible for this process?

*Objective:*

- If produce is cooled by the grower, does the packer check the temperature upon arrival of the stocks?

6) What sort of cooling facilities do you employ for your produce? How do you cool the produce after harvesting?

*Objective:*

- Try to find out the method of cooling, whether it is suitable/efficient for a particular produce.
- Do they wash the produce down with water or apply ice to reduce field heat before cooling?
- What is the typical cooling time? At what temperature produce is cooled to?
- Do they stack produce loosely to allow adequate ventilation?
- How do they maintain the right humidity in the cool room? e.g. Thermfresh; apply moisture manually.
- How do they monitor temperature in cool room? (check if produce is cooled enough)

#### Packing

7) What are the procedures for packing in the shed?

*Objective:*

- A flow diagram for packing each crop
- What are instructions given by the manager in assessing the quality of the crops in the shed (i.e. stalk length/ colour/ diameter of the head /disease symptoms/ foreign matter/ damage etc.)?
- Does the manager supervise this process himself?
- What are the criteria for grading?
- Do they discard everything suffering from bruises, splits, cracks and soft patches?
- Any trimming involved?
- Do they wash produce (with /without chlorinated water ) as soon as possible after harvest?
- How often do they clean the shed?
- Is temperature comfortable in the shed?
- How much produce (by weight or by size) do they put in each container? Do they overfill the cartons?
- Does the manager conduct any follow-up check to make sure produce been packed properly?
- Do they employ any particular batch coding system to identify different lots of produce? How do they label the produce?
- Any rough handling involved? If yes, what do they do about it?
- Do they blend all growers' supplies together during packing? Or do they keep a particular grower as a separate supplier?

8) How many people (including manager) are employed for packing? Are they permanent or casual staff?

*Objective:*

- To see whether the operation is labour intensive or not.
- Do they think proper training is necessary for their staff on packing?
- Are those casuals employed regularly?

**Storage facilities**

9) What sort of storage facilities do you employ for your produce? Do you find the facilities adequate enough to store all the produce during peak season?

*Objective:*

- How long do they normally keep the produce in the store room? Does it vary over the year (i.e. summer & winter)?
- At what temperature do they keep produce at?
- How do they monitor temperature in store room?
- How do they maintain the right humidity in the store room? e.g. Thermfresh; apply moisture manually
- Do they transfer the produce into the store room immediately after cooling?
- Where does excess produce go if storage facility is fully occupied?

10) How do you stack produce in the store room?

*Objective:*

- Do they stack produce on pallets in the store room with space on four sides to allow adequate air flow?
- Do they stack produce in parallel to the air flow? (not in front of the evaporator)
- How often do they clean the store room?

**Transport**

11) What are the procedures for loading produce for delivery?

*Objective:*

- A flow diagram for loading produce for delivery
  - Who owns the transport facility?
  - Who loads produce onto trucks?
  - What are the instructions given by the packer to the order pickers in this process?
- e.g. Stabilisation of a load (on a per pallet basis) by strapping; corner stays and straps; tension netting or glueing; Loading produce in a pattern that allow air circulation throughout the transit unit (i.e. produce

should be loaded tightly and braced in position in order to achieve maximum payloads and stability); Putting soft items on heavy items

- How long does it take normally to fill a truck?
- Do they leave the unloaded produce exposing to the sun?
- Is cooling on when truck stopped?
- Any rough handling involved? If yes, what do they do about it?
- Any mixed loads involved? Do they keep incompatible produce together?
- Any extra measures are adopted for interstate/exported crops?

12) What sort of transport facilities do you /your deliverer employ for delivery? (both local and interstate)

Objective:

- Whether it has refrigerated unit (turn on all the time/ only in summer)
- At what temperature do they hold produce at?
- any record keeping for produce temperature
- How do they maintain the right humidity during transit?
- Try to quantify the time and the number of stops involved for delivery
- How often is the vehicle serviced?
- Do they think they have a problem in transporting produce? If yes, what do they do about it?
- Does the grower/packer always cool produce to the desired temperature before delivery?
- Is the truck equipped with a front return air bulkhead (i.e. an air delivery chute) to carry air to the rear of the truck?

13) What are the responsibilities for transport operator in delivery?

Objective:

- Who is responsible for checking temperature, hygiene condition of containers? Any record keeping?
- Who is responsible for switching on the refrigerated unit of the truck after finish loading?
- Has the client i.e. grower/packer specified particular requirements e.g. palletisation of loads; temperature management; thermostat setting; maintain adequate air circulation; loading/unloading procedures etc. ?

14) Upon arrival of stocks at final destinations. do your deliverer observe any problems involved in receiving by the operator at the other end? How do your deliverer communicate this with you?

Objective:

- Try to find out the problems involved by receiving staff e.g. rough handling by unskilled staff; leaving produce in ambient environment; unhygienic practice in storage and preparation areas etc.
- Do the deliverer see this as a responsibility to raise the issue to the packer?

## Marketing

15) Do you sell your main crops direct to retailers/ processors/ food service operators; through central market system or via appointed agent/s to local customers?

Objective:

- To see if there is any preference on the existing channel of selling the main crops to customers and its rationale.
- How do they decide the final destination for their produce? Do they just rely on their agents to make the decision?
- For grower/seller or packer/agent only:  
Have they got a list of regular customers to work with? Who are they?

16) What about the practice for overseas market?

Objective: Same as Q15.

17) If you sell your main crops via an agent/s. are you satisfied with his/her performance?

Objective:

- What are the packer's expectation on the role of an agent (especially on feedback of market information and quality concerns etc.)? Give examples.
- Are these information distorted by some middlemen?

18) How do customers feel about the quality of your produce? How do you get feedback from customers? What do you do with these information?

*Objective:*

- How often do they communicate with their agent/customers? What issues do they usually discuss about?
- How often do they visit the terminal markets, retail outlets of major customers?
- Are there any formal feedback mechanism e.g. in-house market research channelling information back to them? Do they just rely on complaints?
- Do their agents convey both positive and negative feedback? Give examples.
- Who sets quality standard for produce? Is this flexible? Have they ever had any discussion with their agents/customers on product specification?
- Do their agents /customers ( especially for direct sales ) set any growing schedule for them?

#### **For Packer/Agent only:**

19) Have you got a list of major customers to work with? What are the major outlets for these customers?

*Objective:*

- Number of years in business with these customers
- How do they arrange sale with these major customers?
- Are purchases usually made in advance before the stocks are delivered?
- Have they specified any particular requirement for the produce? Are there any discussion between growers, packers and customers on product specification?
- Do their customers recognise their brands and choose that as major supplier?
- Have you ever engaged in any promotional campaign with these customers? Give e.g.
- How often do they visit the major outlets of these customers?
- Have they got strong link with chain stores and food service sector? Is there any contractual arrangement between packer & his customers?
- Will produce be re-packed for certain purposes by them or their customers?

20) What % of your major lines did you export last season? What are they?

*Objective:*

- What are the channels for exporting?
- Do their customers usually inform packers beforehand and then plan accordingly?
- What, if any, extra measures were adopted at time of packing for exported crops?

### **Part 2: Questions to the employees**

#### **Background**

- 1) How long have you worked for this organisation? Are you employed as a permanent or casual staff? If employed as a casual, what is/ are the typical working periods?
- 2) What position/ job do you have? What do you like about your jobs?
- 3) How many people generally work here? (both permanent and casual)
- 4) What are the major outlets for these crops?

*Objective:*

- Are they usually informed the final destinations for the produce?

**Incoming produce inspection**

5) How is quality of produce assessed upon arrival in your premises? What are the instructions given by the manager on this process?

*Objective:*

- *What are the procedures for incoming produce inspection?*  
e.g. *sorting/grading; checking produce temperature; checking defects/foreign matter etc.*
- *How much produce do you reject prior to packaging? What are the reasons for rejection?*
- *How would you rate/score (out of 10) the quality of produce you have to work with? (Both in general and for the grower who is involved in the case study)*
- *Do they advise the grower when the produce should be harvested?*  
*If yes, what are the criteria in assessing the quality of crops in the field (i.e. maturity determination; stalk length/ colour/ compactness of produce/ diameter of the head/ disease symptoms/ foreign matter/ damage etc.)*

**Cooling**

6) Is produce usually pre-cooled immediately after harvesting? Who is responsible for this process?

*Objective:*

- *If produce is cooled by the grower, does the packer check the temperature upon arrival of the stocks?*

7) What sort of cooling facilities do you employ for your produce? How do you cool the produce after harvesting?

*Objective:*

- *Try to find out the method of cooling, whether it is suitable/efficient for a particular produce.*
- *Do they wash the produce down with water or apply ice to reduce field heat before cooling?*
- *What is the typical cooling time? At what temperature produce is cooled to?*
- *Do they stack produce loosely to allow adequate ventilation?*
- *How do they maintain the right humidity in the cool room? e.g. Thermfresh; apply moisture manually*
- *How do they monitor temperature in cooling area?*

**Packing**

8) What are the procedures for packing in the shed?

*Objective:*

- *A flow diagram for packing each crop*
- *Does the manager supervise this process himself?*
- *What are instructions given by the manager in assessing the quality of the crops in shed (i.e. stalk length colour/ diameter of the head/ disease symptoms/ foreign matter/ damage etc.)? Any diagram or is it verbal?*
- *What are the criteria for grading?*
- *Do they discard everything suffering from bruises, splits, cracks and soft patches?*
- *Any trimming involved?*
- *Do they wash produce (with /without chlorinated water ) as soon as possible after harvest?*
- *Is temperature comfortable in the shed?*
- *How often do they clean the shed?*
- *How much produce (by weight or by size) do they put in each container? Do they overfill the cartons?*
- *Does the manager conduct any follow-up check to make sure produce been packed properly?*
- *Do they employ any particular batch coding system to identify different lots of produce? How do they label the produce?*
- *Any rough handling involved? If yes, what do they do about it?*
- *Do they blend all growers' supplies together during packing? Or do they keep a particular grower as a separate supplier?*

9) How many people (including manager) are employed for packing? Are they permanent or casual staff?

*Objective:*

- To see whether the operation is labour intensive or not.
- Do they think proper training is necessary for their staff on packing?
- Does the packer employ same crew for packing and loading?
- Are those casuals employed regularly?

**Storage facilities**

10) What sort of storage facilities do you employ for your produce? Do you find the facilities adequate enough to store all the produce during peak season?

*Objective:*

- How long do they normally keep the produce in the store room? Does it vary over the year (i.e. summer & winter)?
- At what temperature do they keep produce at?
- How do they monitor temperature in the store room?
- How do they maintain the right humidity in the store room? e.g. Thermfresh; apply moisture manually
- Do they transfer the produce into the store room immediately after cooling?
- Where does excess produce go if there is not enough storage facility?

11) What are the instructions given by the manager on stacking the produce in the store room?

*Objective:*

- Do they stack produce on pallets in the store room with space on four sides to allow adequate air flow?
- Do they stack produce in parallel to the air flow? (not in front of the evaporator)
- How often do they clean the store room?

**Transport**

12) What are the procedures for loading produce for delivery?

*Objective:*

- A flow diagram for loading produce for delivery
- Who is responsible for loading? (packer or truck driver)
- What are the instructions given by the packer to the order pickers in this process?  
e.g. Stabilisation of a load (on a per pallet basis) by strapping; corner stays and straps; tension netting or glueing; Loading produce in a pattern that allow air circulation throughout the transit unit (i.e. produce should be loaded tightly and braced in position in order to achieve maximum payloads and stability); Putting soft items on heavy items
- How long does it take normally to fill a truck?
- Is cooling on when truck stopped?
- Do they leave the unloaded produce exposing to the sun?
- Any rough handling involved? If yes, what do they do about it?
- Any mixed loads involved? Do they keep incompatible produce together?
- Any extra measures are adopted for interstate/exported crops?

13) What sort of transport facilities do you /your deliverer employ for delivery? (both local and interstate)

*Objective:*

- Whether it has refrigerated unit (turn on all the time / only in summer)
- At what temperature do they hold produce at?
- any record keeping for produce temperature
- How do they maintain the right humidity during transit?
- Try to quantify the time and the number of stops involved for delivery
- How often is the vehicle serviced?
- Do they think they have a problem in transporting produce? If yes, what do they do about it?
- Does the grower/packer always cool produce to the desired temperature before delivery?

- Is the truck equipped with a front return air bulkhead (i.e. an air delivery chute) to carry air to the rear of the truck?

### **Part 3: Things to Observe**

#### **Incoming produce inspection**

1) - How is quality of incoming produce assessed? e.g. produce temperature: checking defects/foreign matter; sorting/grading

#### **Cooling**

- 1) - If produce is cooled by the grower, does the packer check produce temperature upon arrival of stocks?
  - How long it's till the produce is cooled after harvesting?
  - What is the mode of transport from paddock to packing shed?
- 2) - Do they wash the produce down with water or apply ice to reduce field heat before cooling?
- 3) - Do they stack produce loosely to allow adequate ventilation?
- 4) - How do they maintain the right humidity in the store room? (e.g. Thermfresh; apply moisture manually)
- 5) - At what temperature do they keep produce at?
  - Any temperature recorder?
  - Check if produce is cooled enough.
- 6) - Do they transfer produce into the store room immediately after cooling?
- 7) - Observe cartons packed 1-2 days after.

#### **Packing**

- 1) - How is produce tipped from the bins or field boxes? By hand or mechanically? Does that result in skin abrasions?
- 2) - How is the hygiene condition in the packing house overall: specific areas such as sorting table, dip tank (if any), packing lines etc.?
- 3) - Is there a clear separation zone for receipt and cleaning of harvested produce and a zone for grading and packing of clean produce?
 

Is the latter zone fully enclosed and supplied with external filtered air to maintain a slight positive pressure to prevent entry of air borne infectious material and potential insect carriers?
- 4) - Is the packing room air-conditioned?
- 5) - Any trimming involved?
- 6) - Do they discard everything suffering from bruises, splits, cracks and soft patches?
- 7) - Do they wash produce (with/without chlorinated water) as soon as possible after harvest?
- 8) - How much produce (by weight or by size) do they put in each container?
  - Do they maintain consistent quality in different containers?
  - Do they overfill cartons?
- 9) - Does the packer conduct any follow-up check to make sure produce been packed properly?

- 10) - Do they employ any particular batch coding system to identify different lots of produce?
  - How do they label the produce?
- 11) - Any rough handling involved?
- 12) - Do they blend all growers' supplies together during packing? Or do they keep a particular grower as a separate supplier?

### Storage

- 1) - How is the hygiene condition for the store room overall; specific areas such as wall; floor; evaporative fan etc.?
- 2) - Do they stack produce on pallets in the store room on four sides to allow adequate air flow?
- 3) - Do they stack produce in parallel to the air flow? (not in front of the evaporator)

### Transport

Have they committed the following abuses?

- 1) - Loading produce packages first, then piling hard lines (or general freight) on top and crushing the produce.
- 2) - Walking over packages during loading/unloading, crushing the produce and weakening cartons.
- 3) - Dropping and throwing packages during loading/unloading. This causes bruises and splits which will subsequently rot.
- 4) - Pulling ropes tight against packages and breaking them. Wooden slats or right-angle corner support should be inserted under ropes.
- 5) - Pulling tarpaulins tight over loads of hot produce. This interferes with ventilation and causes overheating and harmful modification to the atmosphere.
- 6) - Leaving produce unattended at ambient temperature in the shed and upon arrival at the terminal markets.
- 7) - Loading produce tightly. This blocks the air passages in the transit unit.

### Observe the following

- 1) - Time how long does it take to fill a transit unit.
- 2) - What is the time gap between finished loading and the start of the journey?
  - Do they turn on the refrigerated unit immediately after finish loading?
  - Do they load produce onto pre-cooled trucks?

## APPENDIX 8: CASE STUDIES FOR THE TRANSPORT OPERATION

### Part 1: Questions to the Transporter

#### Background

- 1) How long have you worked for this organisation? Are you an owner/driver?
- 2) How many people generally work here?
- 3) Do you earn by a piece rate system i.e. calculate earning by the number of loads you deliver?

#### Loading

- 4) What are the procedures for loading produce for delivery?

##### Objective:

- A flow diagram for loading produce for delivery
- Who owns the transport facility?
- Who loads produce onto trucks?
- What are the instructions given by the grower/packer to the order pickers in this process?  
e.g. Stabilisation of a load (on a per pallet basis) by strapping; corner stays and straps; tension netting or glueing; Loading produce in a pattern that allow air circulation throughout the transit unit (i.e. produce should be loaded tightly and braced in position in order to achieve maximum payloads and stability); Putting soft items on heavy items
- How long does it take normally to fill a truck?
- Is cooling on when truck stopped?
- Do they leave the unloaded produce exposing to the sun?
- Any rough handling involved? If yes, what do they do about it?
- Any mixed loads involved? Do they keep incompatible produce together?
- Any extra measures are adopted for interstate/exported crops?

- 5) What sort of transport facilities do you employ for delivery? (both local and interstate)

##### Objective:

- Whether it has refrigerated unit (turn on all the time/ only in summer)
- At what temperature do they hold produce at?
- any record keeping for produce temperature
- How do they maintain the right humidity during transit?
- Try to quantify the time and the number of stops involved for delivery
- How often is the vehicle serviced?
- Do they think they have a problem in transporting produce? If yes, what do they do about it?
- Does the grower/packer always cool produce to the desired temperature before delivery?
- Is the truck equipped with a front return air bulkhead (i.e. an air delivery chute) to carry air to the rear of the truck?
- Besides fresh produce, do they normally deliver any other items (give e.g.) on the same trip?

- 6) How frequent do they stop for interstate journey?

##### Objective:

- Number of stops; stop for how long?

- 7) What are the responsibilities for transport operator in delivery?

##### Objective:

- Who is responsible for checking temperature, hygiene condition of containers? Any record keeping?
- Who is responsible for switching on the refrigerated unit of the truck after finish loading?
- Has the client i.e. grower/packer specified particular requirements e.g. palletisation of loads; temperature management; thermostat setting; maintain adequate air circulation; loading/unloading procedures etc. ?

- How often and when do they check the temperature recorder?

8) Upon arrival of stocks at final destinations, do you observe any problems involved in receiving by the operator at the other end? How do you communicate this with your clients?

*Objective:*

- Try to find out the problems involved by receiving staff

*e.g. rough handling by unskilled staff; leaving produce in ambient environment; unhygienic practice in storage and preparation areas etc.*

- Do the deliverer see this as a responsibility to raise the issue to the grower/packer?

## **Part 2: Things to Observe**

Have they committed the following abuses?

- 1) - Loading produce packages first, then piling hard lines (or general freight) on top and crushing the produce.
- 2) - Walking over packages during loading/unloading, crushing the produce and weakening cartons.
- 3) - Dropping and throwing packages during loading/unloading. This causes bruises and splits which will subsequently rot.
- 4) - Pulling ropes tight against packages and breaking them. Wooden slats or right-angle corner support should be inserted under ropes.
- 5) - Pulling tarpaulins tight over loads of hot produce. This interferes with ventilation and causes overheating and harmful modification to the atmosphere.
- 6) - Leaving produce unattended at ambient temperature in the shed and upon arrival at the terminal markets.
- 7) - Loading produce tightly. This blocks the air passages in the transit unit.

### **Observe the following:**

- 1) - Time how long does it take to fill a transit unit.
- 2) - What is the time gap between finished loading and the start of the journey?
  - Do they turn on the refrigerated unit immediately after finish loading?
  - Do they load produce into pre-cooled trucks?

## APPENDIX 9: CASE STUDIES FOR MERCHANDISING OPERATION

### Part 1: Questions to the Manager

#### Background

1) How many people generally work here? (both permanent & casual)

*Objective:*

- *What are their jobs?*

2) How many growers you serve for in the East Gippsland region?

3) What are the major outlets for these crops?

*Objective:*

- *To confirm the structure of the handling chain*

- *Ask them to name the participants involved (for follow-up purpose)*

- *What are their major clientele?*

- *Do they have a regular list of suppliers & customers to work with?*

4) How many lines do you normally carry? Do you specialise in any particular crop?

*Objective:*

- *Try to find out the degree of specialisation in any particular crops*

- *Any preference for buyers to choose a particular agent on the basis of specialisation produce knowledge involved*

#### Sourcing supplies

5) How do you source your main crops for local customers?

*Objective:*

- *To see if there is any preference on the existing channel of sourcing main crops to customers and its rationale*

- *On what basis do they choose a supplier? e.g. consistent quality; quantity; established brand*

- *Is there any contractual arrangement between them?*

- *Is it a common practice for them to inform growers about the final destinations (i.e. retail outlets) for their produce?*

- *How many suppliers do they use to fill up an order?*

6) What about the practice for overseas market?

*Objective:*

- *Same as Q5.*

- *How often they personally meet overseas buyers?*

#### Unloading

7) Who is responsible for unloading when stocks arrive at the market?

*Objective:*

- *Is the unloading agent employed by the grower or the agent?*

- *Does that person provide service to various parties?*

- *Are they responsible to check the condition of produce upon arrival?*

- *Do they see this as a responsibility to raise any problem issue to the grower or agent?*

## 8) What are the procedures for unloading produce in the market?

*Objective:*

- A flow diagram for unloading produce
- What are the instructions given by the grower/agent to the unloading agent in this process?  
e.g. Handle produce with care; unload produce as soon as possible upon arrival and transfer them to the cool room
- How long does it take normally to unload a truck?
- What is their opinion about the produce condition? e.g. produce is loaded tightly and hence air passage in the truck is blocked; putting hard lines on top of soft items; partly frozen loads; cooked produce; pulling ropes tight against packages
- Are all produce transferred to the agent's stand for presentation for sale? Or do they transfer most of them directly to the cool room?

**Incoming produce inspection**

## 9) How is quality of produce assessed upon arrival in your premises?

*Objective:*

- What are the procedures for incoming produce inspection? e.g. checking produce temperature; defects/foreign matter; bruising; damage to the box; consistency of quality etc.
- How much produce do they reject prior to presenting for sale? What are the reasons for rejection?
- What are the procedures for rejecting poor quality produce?
- How would you rate/score (out of 10) the quality of produce you have to work with? (Both in general and for the grower who is involved in the case study)
- Do they advise the grower when the produce should be harvested?  
If yes, what are the criteria in assessing the quality of crops in the field (i.e. maturity determination; stalk length/ colour/ compactness of produce; diameter of the head/ disease symptoms/ foreign matter/ damage etc.)

**Presenting for sale**

## 10) How is produce presented for sale?

*Objective:*

- Are samples of produce presented for sale?
- How do they set the price for a particular lot of produce? Do they normally give growers the price before receiving the stocks?
- Do they blend all growers' supplies together? Or do they keep a particular grower as a separate supplier?

## 11) Have you got a list of major customers to work with? What are the major outlets for these customers?

*Objective:*

- Number of years in business with these customers
- How do they arrange sale with these major customers?
- Are purchases usually made in advance before the stocks are delivered?
- Have they specified any particular requirement for the produce? Are there any discussion amongst growers, agents and customers on product specification? If yes, what are they?
- Do their customers recognise certain brands and choose that as major supplier?
- Have you ever engaged in any promotional campaign with these customers? Give e.g.
- How often do they visit the major outlets of these customers?
- Have they got strong link with chain stores and food service sector? Is there any contractual arrangement between the agent & his customers?
- Will produce be re-packed for certain purposes by them or their customers?

## 12) What about the clientele who buy produce off the stand?

*Objective:*

- Who are these customers who usually buy produce off the stand? Are they usually the same each month?

- Will produce be re-packed by customers for certain purposes?
- What are the major criteria of these customers in choosing produce from their stand? (e.g. price; quality; quantity; brand awareness etc.)

13) What % of your major lines did you export last season? What are they?

Objective:

- What are the channels for exporting?
- Do they usually inform growers beforehand and then plan accordingly?
- What, if any, extra measures were adopted at time of packing for exported crops?

14) How do customers feel about the quality of your produce? How do you get feedback from customers? What do you do with these information?

Objective:

- How often do they communicate with their supplier/customer? What issues do they usually discuss about?
- How often do they visit major supplier and customers?
- Are there any formal feedback mechanism e.g. in-house market research channelling information back to them? Do they just rely on complaints?
- Do they convey both positive and negative feedback to growers? Give e.g.
- Who set quality standard for produce? Is this flexible? Have they ever had any discussion with their suppliers/ customers on product specification?
- Do they set (especially for direct sales) any growing program for growers? What are they? (e.g. sourcing seed/ seedling supplies; advice when to harvest etc.)
- Do they employ any particular batch coding system to identify different lots of produce? Have their growers provided enough information on labels?

15) What do you see as the major responsibilities for agent/ broker?

Objective:

- Do they consider themselves as agent; broker or merchants?
- Is there a clear demarcation between these functions? What are the differences between the functions of these operators?
- A link between grower and customer
- Convey feedback of market information and quality concerns
- Assist in promotion

### **Re-packing**

(For agents who re-pack produce)

16) What are the purposes for re-packing produce?

Objective:

- A flow diagram for packing each crop
- What are instructions given by the manager in assessing the quality of the crops in the shed (i.e. stalk length/ colour/ diameter of the head /disease symptoms/ foreign matter/ damage etc.)?
- What are the criteria for grading?
- Do they discard everything suffering from bruises, splits, cracks and soft patches?
- Any trimming involved?
- Do they wash produce (with /without chlorinated water ) as soon as possible after harvest?
- How often do they clean the shed?
- Is temperature comfortable in the shed?
- How much produce (by weight or by size) do they put in each container? Do they overfill the cartons?
- Does the manager conduct any follow-up check to make sure produce been packed properly?
- Do they employ any particular batch coding system to identify different lots of produce? How do they label the produce?
- Any rough handling involved? If yes, what do they do about it?
- Do they blend all growers' supplies together during packing? Or do they keep a particular grower as a separate supplier?

- Is produce re-cooled after packing? At what temperature do they store produce at?

17) How many people (including manager) are employed for packing? Are they permanent or casual staff?

*Objective:*

- To see whether the operation is labour intensive or not.
- Do they think training is necessary for their staff on packing?
- Are those casuals employed regularly?
- Who is in charge of the packing process?

### Storage facilities

18) What happen to the produce which is not sold during trading hours?

*Objective:*

- Do they transfer produce as soon as possible to the cool room?
- Are they more concerned to clear the stock at the time rather than selling the best quality produce to customers?

19) What sort of storage facilities do you employ for your produce? Do you find the facilities adequate enough to store all the produce during peak season?

*Objective:*

- How long do they normally keep the produce in the store room? Does it vary over the year (i.e. summer & winter)?
- At what temperature do they keep produce at?
- How do they monitor temperature in store room?
- How do they maintain the right humidity in the store room? e.g. Thermfresh; apply moisture manually
- Do they transfer the produce into the store room immediately after unloading?
- Do they store compatible lines together?
- Where does excess produce if storage facility is fully occupied?

20) How do you stack produce in the store room?

*Objective:*

- Do they stack produce on pallets in the store room with space on four sides to allow adequate air flow?
- Do they stack produce in parallel to the air flow? (not in front of the evaporator)
- How often do they clean the store room?

### Transport

21) What are the procedures for loading produce for delivery?

*Objective:*

- A flow diagram for loading produce for delivery
- Who owns the transport facility?
- Who loads produce onto trucks?
- What are the instructions given by the agent to the order pickers in this process?  
e.g. Stabilisation of a load (on a per pallet basis) by strapping; corner stays and straps; tension netting or glueing; Loading produce in a pattern that allow air circulation throughout the transit unit (i.e. produce should be loaded tightly and braced in position in order to achieve maximum payloads and stability); Putting soft items on heavy items
- How long does it take normally to fill a truck?
- Is cooling on when truck stopped?
- Do they leave the unloaded produce exposing to the sun?
- Any rough handling involved? If yes, what do they do about it?
- Any mixed loads involved? Do they keep incompatible produce together?
- Any extra measures are adopted for interstate/exported crops?

- Do they deliver produce direct from farm to major customers in order to avoid double handling?
- Any extra measures adopted for exported crops?

22) What sort of transport facilities do you /your deliverer employ for delivery? (both local and interstate)

Objective:

- Whether it has refrigerated unit (turn on all the time/ only in summer)
- At what temperature do they hold produce at?
- any record keeping for produce temperature
- How do they maintain the right humidity during transit?
- Try to quantify the time and the number of stops involved for delivery
- How often is the vehicle serviced?
- Do they think they have a problem in transporting produce? If yes, what do they do about it?
- Is the truck equipped with a front return air bulkhead (i.e. an air delivery chute) to carry air to the rear of the truck?

23) What are the responsibilities for transport operator in delivery?

Objective:

- Who is responsible for checking temperature, hygiene condition of containers? Any record keeping?
- Who is responsible for switching on the refrigerated unit of the truck after finish loading?
- Has the client i.e. grower/packer/agent specified particular requirements e.g. palletisation of loads; temperature management; thermostat setting; maintain adequate air circulation; loading/unloading procedures etc. ?

24) Upon arrival of stocks at final destinations. do your deliverer observe any problems involved in receiving by the operator at the other end? How do your deliverer communicate this with you?

Objective:

- Try to find out the problems involved by receiving staff  
e.g. rough handling by unskilled staff; leaving produce in ambient environment; unhygienic practice in storage and preparation areas etc.
- Do the deliverer see this as a responsibility to raise the issue to the agent?

### **Part 3: Things to Observe**

#### **Storage**

- 1) - How is the hygiene condition for the store room overall: specific areas such as wall; floor; evaporative fan etc.?
- 2) - Do they stack produce on pallets in the store room on four sides to allow adequate air flow?
- 3) - Do they stack produce in parallel to the air flow? (not in front of the evaporator)

#### **Unloading & Transport**

Have they committed the following abuses?

- 1) - Loading produce packages first. then piling hard lines (or general freight) on top and crushing the produce.
- 2) - Walking over packages during loading/unloading. crushing the produce and weakening cartons.
- 3) - Dropping and throwing packages during loading/unloading. This causes bruises and splits which will subsequently rot.
- 4) - Pulling ropes tight against packages and breaking them. Wooden slats or right-angle corner support should be inserted under ropes.

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- 5) - Pulling tarpaulins tight over loads of hot produce. This interferes with ventilation and causes overheating and harmful modification to the atmosphere.
  - 6) - Leaving produce unattended at ambient temperature in the shed and upon arrival at the terminal markets.
  - 7) - Loading produce tightly. This blocks the air passages in the transit unit.

**Observe the following:**

- 1) - Time how long does it take to fill a transit unit.
- 2) - What is the time gap between finished loading and the start of the journey?
  - Do they turn on the refrigerated unit immediately after finish loading?
- 3) - Do they load produce into pre-cooled trucks?