Good Industry-Good Investments

A Report to MAF Policy

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EXECUTIVE SUMMARY

- The Commodity Levy process for land-based industries is administered by the Ministry of Agriculture and Forestry (MAF). As well as fulfilling the Ministry's formal role in the Commodity Levy process, MAF staff assists industries to develop proposals that will comply with the Commodity Levies Act (1990). To facilitate this role MAF has commissioned a study, to be carried out during 2009 that would:

    i. provide a framework for understanding the issues that are important in evaluating the impacts of industry-good investments

    ii. identify the types of industry-good investments regarded by levy-payers and representatives of levy-funded organisations as generating the greatest benefits for their industries

    iii. identify any changes to the CLA process that would enable more cost-effective implementation of the CLA framework

- Ten land-based industries were selected that currently operate 23 Levy Orders for inclusion in the study. The study involved a review of literature dealing with the evaluation of the benefits for industry-good activities; interviews of industry leadership and focus groups of levy-payers to elicit information on and views about current planning and evaluation processes; and the development of a framework to facilitate more effective planning and selection of industry-good investments. The industries included:

    i. The arable industry

    ii. The avocado industry

    iii. The dairy industry

    iv. The meat and wool industry

    v. The passionfruit industry

    vi. The pipfruit industry

    vii. The Satsuma mandarin industry

    viii. The summerfruit industry

    ix. The tamarillo industry

    x. The vegetable industry (Horticulture New Zealand levy-payers)

- The industries were selected to reflect the diversity of the industries operating Commodity Levy Orders. The selected industries varied in the size and, therefore, scale of levy-funding; homogeneity of product covered by the levy; experience with the levy; range of activities undertaken with levy funding; and structure of the industry organisations.

- The research involved:

    i. a review of the literature relating to the evaluation of the benefits of industry-good investments

ii. interviews with industry leaders from the industries included in the study about their experience with industry-good investment planning and evaluation in New Zealand. The meetings were held with the Chairman and CEO of the organisations wherever possible

iii. focus group meetings with levy-payers from all the selected industries to examine their knowledge of the levy process and of industry-good investment decision-making, as well as their views on good investments

- The outcomes of the three stages of the research included:

  i. description of:
     - the relationships between financial cost-benefit processes and the practical issues that industries face in making industry-good investment decisions
     - the types of frameworks that might be used in cost-benefit analysis
     - the industry circumstances that would make such decision making complex

  ii. identification of a series of questions that industry organisations need to ask and answer in planning and reviewing their investment planning processes

- The literature review found that there is no single analytical approach that can be used across all investment types to guide those making industry-good investment decisions.

  It examined the internationally accepted rationale for the use of levies to fund industry-good investments and found a wide range of methods had been used for evaluating the costs and benefits of such investments. Their suitability for planning levy-funded investments has been discussed, and the limitations of their use in evaluating particular types of levy-funded investments identified. While partial equilibrium analysis is the approach often used to estimate the total benefits to producers and consumers, identifying the underlying shifts in market supply and demand as a result of different types of investment may require understanding of farm systems, extensive market research or sophisticated risk analysis techniques. Such work is extremely costly and it is usually applied to completed investments, rather than as an ex-ante guide to investment selection.

- The researchers compiled a summary of the expenditure on different major types of industry-good investments from the annual financial reports of the selected industries. They found, however, that the considerable variability in reporting frameworks, and differences in the manner in which industries categorise expenditures meant that the information obtained from this exercise was of limited value. It was concluded that:

  i. Accountability would be improved by moving to a reporting framework that attributes all expenditures, including overheads, to major categories of industry-good activity, or to a reporting framework based on outcomes

- Information on the nature of planning in the industries, their processes for priority setting and the evaluation of industry investments was obtained from industry leaders. The interviews identified the range of practice that exists in the industry. Although most industries have processes in place for consultation and decision-making, there is no consistency in their approaches to the evaluation of investments and little formal investment evaluation.

- The leaders of the selected industries had few suggestions for change to the process of establishing Commodity Levy Orders. They acknowledged that this involves a great deal of work that is particularly burdensome for small industries, where the loss of a single staff member can represent a complete loss of institutional knowledge about the process. In one case only was the process considered to be unnecessarily difficult. The most significant issue raised by leaders was the difficulty of involving growers in the consultation process despite considerable effort and expense on the part of the organisation. Attendance at "road-shows" was frequently reported to be extremely poor. The majority of industry leaders interviewed expressed doubts over the value of formal cost-benefit analysis as a means of demonstrating the benefits of the Commodity Levy, and discussed the difficulties faced in undertaking such analysis. A number however, believe that this analysis is required of them.

- The discussions with industry leaders identified two areas in which MAF could improve the process by:

  i. Advising industries to adopt an industry planning strategy and to evaluate industry-good investments in terms of the extent to which they contribute to the achievement of those outcomes, as described in this report. Documentation of the plan and the investment evaluation process should be accepted as evidence that the requirements of the Commodity Levies Act with respect to demonstrating the benefits of levy-funded investments

  ii. Providing advice on consultation strategies that will be more cost-effective and less demanding of under-resourced industries.

- Despite the opportunities for involvement, most levy-payers expressed confidence in the ability of industry leaders to make such decisions, and had little or no involvement themselves. In general levy-payers were satisfied with the extent to which industry organisations account for their use of levy funds. There is considerable variation in the way in which levy-payers communicate with their industry organisations and make use of the information they supply, Not surprisingly, levy-payers prefer activities that have clearly-identified short-term benefits. Although they appreciate the need for some longer-term investments, there is less certainty about the costs and benefits of these.

- The study concluded that cost-benefit studies of the types of industry-good investments undertaken by land-based industries are very data intensive, extremely complex and costly, and have seldom been used as a method of project selection. While they have potential to contribute to long-term evaluations, they are usually conducted on completion of an investment and offer little guidance to industries in their annual investment planning. In light of this review it is concluded that:

  i. Cost-benefit analysis of the industry investment decisions may be useful, but should not be required as a means to demonstrate that good industry-good investment decisions have been made

- It is recommended that in order to improve investment decision making industries adopt an industry planning process that involves:

  i. Identification of strategic priorities for the medium term that can be expressed in measurable terms and that are able to be influenced by industry activity

  ii. Involvement of the industry in setting priorities

  iii. Understanding the production and market environments in which the industry operates and particularly the manner in which investments will affect farm and market outcomes

  iv. Identification of the investments required to achieve those objectives

  v. Evaluation of investment proposals in terms of their ability to contribute to desired outcomes

  vi. Understanding of both the wider issues affecting investments and the pathways to achievement of outcomes via proposed investments

- Checklists that set out a general pathway from the selection of desired industry outcomes to the selection of the investment portfolio that will best achieve those outcomes have been created. Much of this approach is derived from existing industry practice. Although the size and complexity of the industry has a profound effect on the investment opportunities and the resources available for planning and monitoring, the framework has been developed to deal with these differences, and to be of use to all industries.

SECTION 1
INTRODUCTION

1.1 Background

The Commodity Levies Act 1990 (CLA) was implemented to provide a mechanism for primary industries to levy producers in order to fund industry-good activities including:

1. Research relating to the commodity or commodities concerned, or in relation to any matter connected with it (including market research);

2. The development of products derived from the commodity or commodities concerned;

3. The development of markets for the commodity or commodities, or products derived from the commodity or commodities;

4. The promotion (including generic advertising) of the industry concerned, the commodity or commodities, or products derived from the commodity or commodities;

5. The protection or improvement of the health of animals or plants that are, or parts of which are, or from or by which is or are produced or gathered, the commodity or commodities concerned;

6. The development or implementation of plans or programmes of quality assurance (relating or relevant to the commodity or commodities concerned);

7. Education, information, promotion, or training, (relating or relevant to the commodity or commodities concerned);

8. Day to day administration of the organisation's activities (not being the administration, direct or indirect, of any commercial or trading activity undertaken by the organisation or on its behalf); and

9. Any other purpose the Minister thinks fit.

The CLA has been widely adopted by land-based industries in New Zealand and there are presently 27 Commodity Levy Orders in force, 23 of which apply to land-based industries. A number of industries are now operating under their third levy orders and only four of the industries that have operated under Commodity Levies in the past no longer do so. These are the bee, berryfruit, blueberry and deer industries.

The Commodity Levy process for land-based industries is administered by the Ministry of Agriculture and Forestry (MAF). MAF's formal role in the process is firstly to assess the levy order application submitted by an industry to the Minister of Agriculture against the CLA and to advise the Minister whether the application complies. Once the Minister has agreed to make the order, MAF staff work with the Parliamentary Council Office to ensure that the Levy Order reflects the proposal submitted by industry. Informally, however, MAF's role begins much earlier in the process as staff assist industries to develop proposals

that will comply with the CLA, to avoid the unecessary cost of a second referendum if non-compliance issues are discovered once the proposal is formally submitted to the Minister.

In 1999 MAF commissioned the Agribusiness and Economics Research Unit (AERU) to undertake an extensive investigation of industry views on the making and operation of Commodity Levy Orders, to assist MAF in identifing improvements to procedures for administering the CLA and to assist Government decision-making on possible changes to the legislation. In 2008 a second study was commisioned with the following objectives:

- To provide a framework for understanding the issues that are important in evaluating the impacts of industry-good investments
- To identify the types of industry-good investments regarded by levy-payers and representatives of levy-funded organisations as generating the greatest benefits for their industries
- To identify any changes to the CLA process that would enable more cost-effective implementation of the CLA framework

The research was required by MAF in order to provide information to assist levying organisations, particularly those sectors considering implementing a commodity levy for the first time, in making sound investment decisions. The results of the research will support MAF's own work in the area of industry performance by providing information on the outcomes of industry funding decisions from the perspective of industry participants. It will also provide background information for any review of the CLA to be conducted in future.

The outputs of the research were to include a review of the types of industry-good investment that can be undertaken using Commodity Levy funding and the key factors involved in evaluating the benefits and costs of the main activities; a report on the way in which industry leaders and levy-payers determine the relative values of differing investments; and a review of the Levy Order process and changes desired in this by industry organisations.

1.2 The Study Methodology

In the first stage of the research a review of literature relating to the evaluation of the benefits of industry-good activities was conducted. This information was used in designing the formats for focus groups and industry organisation interviews, and in formulating the approach to investment evaluation described in Section 6 of this report.

In consultation with MAF staff a sample of ten land-based industries was selected for analysis. They were selected to encompass the range of industry sizes, structures and experience with the levy process and included:

- The arable industry
- The avocado industry
- The dairy industry
- The meat and wool industry
- The passionfruit industry

- The pipfruit industry
- The Satsuma mandarin industry
- The summerfruit industry
- The tamarillo industry
- The vegetable industry (Horticulture New Zealand levy-payers)

Six focus groups, some comprising participants in a single industry and others multi-industry groupings, were held in various locations. They included:

- Meat and wool focus group held at Hororata in Canterbury
- Vegetable focus group held in Christchurch
- Pipfruit and summerfruit focus group held in Napier
- Avocado, passionfruit and Satsuma focus group held in Tauranga
- Arable focus group held in Ashburton
- Dairy focus group held in Dunsandel, Canterbury

It was originally planned to hold the dairy focus group in the Waikato but efforts to put together this group failed and a Mid-Canterbury location was used instead. Although twelve vegetable growers agreed to attend the Christchurch meeting, a fine day after a prolonged period of bad weather resulted in a number tendering last minute apologies, and only five attended. Two additional growers were interviewed later.

At the focus groups, members were asked about their awareness of levy rates and expenditure areas; their views on investment areas and specific projects within those areas; and their involvement in the investment planning process.

Personal interviews were held with the leadership of all ten industries. For six of these both the CEO and the Chairperson or his deputy was present, although in three cases the Chairperson joined the meeting via conference call. In one case (N.Z. Passionfruit Growers' Association) the Chairperson also fulfils the executive role, in two (Avocado Growers Association and Horticulture New Zealand) only the executive officer was available, and the Director of Farm Services, who has the major responsibility for levy activities, was the interviewee for Meat and Wool New Zealand Ltd. The interviewees were questioned in detail about their processes for selection of industry-good activities and the frameworks within which that selection is made; the extent of alignment of annual investment decisions with any strategic plan; and the process for reviewing the benefits accruing to the industry from past and future investments.

1.3 Organisation of the Report

The industries included in this study and the activities in which they engage are described in Section 2, while Section 3 reviews a range of industry-good investments and approaches to their evaluation. The views of industry leaders and levy-payers are summarised in Section 4. The issues that should be considered in evaluating industry-good activities, and the realities which affect the extent to which this is possible are discussed in Section 5, and the proposed framework for evaluating future investments is presented in Section 6.

SECTION 2
OVERVIEW OF INDUSTRIES AND INVESTMENTS

2.1 Land-based Industry Commodity Levy Orders

There are twenty three Commodity Levies in force in land-based industries, which include:

Dairy Sector Levy

- The Milksolids Levy 2009

Meat and Wool Sector Levies

- The Meat Levy 2004
- The Wool Levy 2004

Arable Sector Levies:

- The Arable Commodities Levy 2006
- The Maize Levy 2006
- The Non-proprietary and Uncertified Herbage Seed Levy 2009
- The Wheat grain Levy 2008

The Egg Levy 2004

Horticultural Sector Levy:

- The Asparagus Levy 2007
- The Avocado Levy 2007
- The Blackcurrant Levy 2007
- The Feijoa Levy 2008
- The Nashi Asian Pear Levy 2006
- The Navel Orange Levy 2006
- The Passionfruit Levy 2008
- The Pipfruit Levy 2008
- The Satsuma Mandarin Levy 2008
- The Summerfruit Levy 2008
- The Tamarillo Levy 2003
- The Vegetable and Fruit Levy 2007
- The Winegrapes Levy 2004
- The Wine (Grape Wine) Levy 2005
- The Wine (Non-grape Wine) Levy2008

There are very marked differences amongst the industries in terms of size, homogeneity of product covered by the levy, experience with the levy, and structure of the industry organisation. Industries range in size from the dairy industry with annual exports valued at approximately $10 billion, to the passionfruit industry with annual exports of $0.6 million dollars.

Some industry organisations have considerable experience with the Levy Order process and the same professional staff members have been involved in three levy orders. In others,

although there have been two or three levy orders, staff changes have led to a loss of institutional knowledge that may be particularly difficult in small organisations where most or all of the work will be undertaken by a single Executive Officer.

Levies may be charged at a single rate across all production by the sector ,or different levy rates may apply to different products covered by one Levy Order (Arable Commodities, Summerfruit, Horticulture New Zealand, Wool) or to products with different final destinations (Avocado, Summerfruit) such as export, local market or processing. The extent to which pooled funding is allocated specifically to the individual products on which it is collected varies by industry. In addition, the extent to which farm-gate or inter farm-gate sales impact on the proportion of levy actually collected depends on the nature of the industry. The orchard fruit and arable sectors are most affected by non-payment issues of this type.

The structure and resources of industry organisations vary according to size of industry and whether there are umbrella structures in place. DairyNZ has approximately 200 staff in its employ (involved in both funding and provision of services), strong linkages with other industry players and the ability to source external advisors and analysts when required. At the other extreme, Passionfruit New Zealand is operated on a voluntary basis only as it has no funding with which to pay an executive officer or other staff. While the individual vegetable industries are not large, the umbrella structure under which they have always operated (Horticulture New Zealand and previously the New Zealand Vegetable and Potato Growers Federation) provides access to a much more professional structure than would otherwise be likely.

Individual industries may be permitted under their Levy Orders to use levy funds to carry out a single activity plus administration (e.g. the Wheat grain Levy may be used only for crop insurance), a limited range of activities (e.g. research and education in the case of the Arable Commodities Levy) or the full range of activities permitted under the CLA, even though they may not be undertaking all of these.

Many levy-payers pay more than one levy. Two levies may be imposed on a single product (fruit industries pay both their product levy and the Vegetables and Fruit Levy; wheat growers pay the Arable Commodities Levy and the Wheat grain Levy) or they may produce more than one type of leviable product.

2.2 The Selected Industries

The industries included in the study were selected to represent the range described in the previous section. Where more than one levy was paid by levy-payers in a focus group, the discussion was centred on those most closely related to the industry grouping selected, but some discussion of other levies did occur in most groups. In total four large industries (value of production in excess of $250 million per annum); three medium industries (value of production $50 to $250 million per annum) and three small industries (value of production less than $50 million per annum) were selected. Table 1 summarises the characteristics of the industries selected. They included industries that had made one, two and three Levy Orders, although Meat and Wool New Zealand Ltd, the only industry organisation still operating under its first order, has considerable professional expertise at its disposal.

Table 1
Characteristics of Selected Industries

Large Industries	Size ($2008)	Institutional Experience with CLA	Levy Structure	Permitted activities
Dairy	• $10.4 billion exports	• 2 levy orders • Considerable professional expertise although no cumulative experience with CLA	• Single rate	Most of the activities listed under the CLA with the exception of: • Quality Assurance • Market Development • Product promotion
Meat and Wool	• $5.5 billion meat exports • $0.6 billion wool exports	• 1 levy order • Considerable professional expertise • Previous experience with other levies	• Meat – rate differs for different types of livestock • Wool – differing rates for different wool products	Broad general listing under the CLA although the nature of activities such as R & D, market development and extension are further defined Additional activities: • Trade Policy • Industry services • Representation of farmers
Vegetable	$524 million exports	• 3 levy orders • Considerable institutional experience with CLA	• Differing rates for different product groups • Flat rate for Horticulture New Zealand core	Broad general listing under the CLA with the addition of: • Advocacy
Pipfruit	$360 million exports	• 2 levy orders • Professional expertise although no cumulative experience with CLA	• Single rate	Broad general listing under the CLA with the addition of: Advocacy.

Medium Industries	Size ($2007) (note year change from previous page)	Institutional Experience with CLA	Levy Structure	Permitted activities
Arable	$146 million exports	• 3 levy orders • Considerable institutional experience with CLA	• Multiple rates possible. • Actual rates constant for most commodities • Levy take pooled across commodities	• Research and Development • Extension • Education
Avocado	• $28.5 million exports • $15.1 million domestic	• 2 levy orders • Professional expertise although no cumulative experience with CLA	• Differential rates across differing market destinations	Broad general listing under the CLA
Summerfruit	• $17.3 million exports • $57.0 million domestic	• 2 levy orders • Considerable institutional experience with CLA	• Differential rates across differing market destinations • Differential rates across different products • Levy take pooled across commodities	• Determined by the Association after consultation with growers therefore constrained only by Act.

Small Industries	Size ($2007)	Institutional Experience with CLA	Levy Structure	Permitted activities
Passionfruit	• $0.6 million exports	• 2 levy orders • No institutional experience with CLA • Voluntary basis only	• Single rate	Determined by the Association after consultation with growers at AGM therefore constrained only by Act.
Satsuma mandarin	• $3.6 million exports	• 2 levy orders • Institutional experience with CLA	• Single rate	Broad general listing under the CLA with the addition of: • Advocacy
Tamarillo	• $0.7 million exports • $1.4 million domestic	• 2 levy orders • No institutional experience with CLA	• Single rate	Broad general listing under the CLA with the addition of: • Advocacy

Sources: Fresh Facts 2007
Situation and Outlook for New Zealand Agriculture and Forestry 2008
Commodity Levy Orders –Various
Industry spokespersons

2.3 Levels of Investment in Industry-Good Activities

Comparison of the relative expenditures of the selected industries in the main investment areas is difficult. The reporting framework varies between industries and even within industries from year to year and in some cases the end of the financial year has changed recently. The reporting frameworks of both DairyNZ and the Horticulture New Zealand core are not comparable with other industries since the frameworks they use are outcome rather than input-based. DairyNZ has defined four main work platforms that each include a wide range of research and technology transfer, biosecurity, industry advocacy and promotion and administration activities. Most of Horticulture New Zealand's core activities are associated with national advocacy for the fruit and vegetable industries, as well as providing support to the product groups, developing industry strategies in a range of areas and publishing industry information. While income and expenditure is reported for individual product groups, and is disaggregated to some degree, the structure and funding arrangements of the industry mean that even this is not directly comparable with other industries.

Although most industries report expenditure under similar functional categories, there is undoubtedly variation in the way in which different industries classify expenditure and in the extent to which a single reporting category, such as education, captures the full costs associated with that activity. For example, the salaries of staff involved in educational activities are more likely to be allocated to overheads or administration than to those activities, and educational activities may be embedded in research expenditures. Activities such as industry advocacy are not generally separately reported. While industry annual reports all meet legal requirements in terms of financial accounting, they do not provide a meaningful picture to analysts, and more importantly to industry stakeholders, of relative expenditures in different investment categories. Accountability would be improved by moving to a reporting framework that attributes all expenditures, including overheads, to major categories of industry-good activity, or to a framework based on outcomes.

The data reported in Table 2 on expenditure by category in the selected industries with the exceptions of DairyNZ and Horticulture New Zealand is a mix of information assembled from annual reports, and that obtained directly from industries. The data in Table 2 are indicative only of the investments made by industry organisations. For some industries, where there is considerable between-year variability, the range over a specified period is provided. This variability is particularly evident in the smaller fruit industries where a single Sustainable Farming Fund project has a major impact on income and expenditure.

Some organisations, like the Foundation for Arable Research, have specified budget targets with respect to expenditure that are constant over several years. However, even for medium sized industries, the proportions of expenditure in different categories usually vary markedly between years as major projects are adopted and completed.

There is little consistency in the expenditure patterns of the selected industries except that for smaller industries research is the major investment area and expenditure on promotion is often low or non-existent. However, expenditure such as website development and maintenance, which has been allocated to education in Table 2, often involves at least an element of industry promotion. Industry advocacy on an individual industry basis is generally undertaken only by large industries, while Horticulture New Zealand acts in this role for most of the fruit and vegetable industries.

Table 2
Expenditure Allocations of Selected Industries
(percentage of total expenditure)

	Levy as % of income	Research & devt.	Industry liaison	Promotion/ Market Access /QA	Ed/tech trans/comm	Admin	Trade Policy	Other
Arable – policy decision FAR	57-75	70			20	11		
Avocado – from 2007-08 levy application budget	31-60	28		45	7	20		
Meat (3 years' annual reports)		28	25		10	10	10	10[1]
Wool (3 years' annual reports)		45			43	9	3	
Passionfruit (2 years, annual reports)	22-25	89		2	4	5		
Pipfruit Industry -2008 reallocation by PNZI	75-84	59	6	4	15	17		
Satsuma Industry (3 years' annual reports)	34-65	67	1		21	11		
Summerfruit Industry (3 years' annual reports)	65-70	37		21	12	30		
Tamarillo Industry (3 years' annual reports)	39-100	53		10	10	28		

Notes: [1] Sundry payables for both meat and wool

SECTION 3
INDUSTRY-GOOD ACTIVITIES AND THEIR EVALUATION

The overview of the Commodity Levy programmes described in Section 2 shows the broad industry-good investment areas in which the selected industries are involved. While there are many common elements in the investment portfolios of New Zealand land-based industries, the emphasis on different activities varies widely, and the scope of the activities may be limited by Levy Orders and by the nature of the industries themselves.

The economic arguments for, and approaches taken to evaluation of, the most common areas of investment are described in this section. Reference to some of the extensive literature relating to industry-good policies and investments in other countries that has developed internationally is included.

3.1 Research and Development

The most common economic rationale for Government support of agricultural research (or support for industry levies that fund that research) is expressed as "Market Failure", which is most simply reasoned as:

> "Investments that are in the industry-good but would not be undertaken by producers as individuals"

Although there are more sophisticated economic arguments associated with rivalry and excludability for outputs such as research, the issue is fundamentally associated with the difficulty of establishing and maintaining property rights or ownership for research outputs, and the reduction in transactions cost that can be achieved by their common rather than individual production. These arguments have led to government support of agricultural research, and the establishment of levy programmes to fund research in most developed agricultural economies. Greer and Zwart (1999) reviewed experience with levy-funded industry-good activities in a number of countries.

At the industry-level the degree of support for different types of research can be influenced by a number of factors. These include the ease with which research outcomes can be incorporated into the farming system; the extent to which privatisation of research benefits is likely to occur; the time horizon of research benefits; and levy-payer perceptions of market and social issues. Examples of these differences include:

- *Disease and pest control:* The impacts and risks associated with, pests and diseases are clearly understood and accepted by most producers. Consequently, research that will reduce the costs of control, or achieve better control, is usually well-supported and often accounts for a high proportion of research funding, particularly in smaller industries. Research outputs in this area are typically easy to adopt and result in short-term increases in producer-returns.
- N*ew genetic material/ product development:* This type of research typically requires medium to long-term investment, and rates of adoption may be relatively slow if existing farming systems must be changed significantly. However, the development of Plant Variety Rights (PVR) and other systems that allocate property rights over

genetic material has created opportunities for individuals, for groups of growers, to capture the benefits from private ownership of unique genetic material and thus make private investments in this area more attractive. This is further enhanced by the increased sophistication of consumer markets and supply chains, which create opportunities for growers to compete with each other (i.e.: there is not a perfectly elastic demand at the firm level) and some New Zealand industries are reducing levy-funded support in this area.

- *Extension activity/management systems:* These areas often attract significantly less industry funding than others, although it is widely acknowledged that they are extremely important in ensuring that best practice is adopted across an industry. Low levels of extension funding may reflect lack of recognition of the co-dependency of particular research and extension investments. Research into management system changes often appear to be less attractive to levy-payers then, for example, the adoption of new cultivars or pest control products since their rates of adoption are often slower. This may reflect the fact that more fundamental changes in practice are required for the adoption of new management systems.
- *Environmental research*: An increasing proportion of research funding is directed towards addressing the environmental externalities associated with agriculture, and the development of practices associated with the amelioration of their impacts. Such research may be viewed by levy-payers as a threat in terms of costs that may be imposed on industries as a result of research findings, or as paving the way to future market opportunities for product differentiation. Its benefits are not usually realisable in the short-term and a range of value-judgements about the nature and extent of the impacts, responsibility for the problem, and distribution of benefits may influence levy-payers' attitudes to investment in this area.

There is extensive literature describing studies that have evaluated the economic impacts of research investments, which include a range of techniques and approaches. The selection of approach is influenced largely by the level of aggregation and the research question posed. Perhaps one of the earliest and most comprehensive reviews was that of Norton and Davis (1981) who described a wide range of formal and informal approaches to analysis, and made the clear distinction between ex-ante and ex- post evaluations of research benefits. These distinctions and approaches remain in wide-spread use today and can be broadly grouped into three categories.

The aggregate approach: Many of the original studies and more recent reviews have focused on the long-term benefits of government-funded research by seeking to establish the linkages between research funding levels and shifts in agricultural productivity. Fuglie and Heisey (2007) provide a brief summary of the results from a number of such studies, and compare the aggregate approach with more focused studies that are based on particular research projects or specific industries, and which are of more relevance to the current study.

The partial equilibrium approach: The work of Alston *et al* 1995 provides an overview of an alternative approach that has been widely used to evaluate the impacts of different types of research activity by evaluating the impacts of individual research projects on the supply or demand relationships for specific products in the market place. This approach makes it possible to evaluate the impacts of the research on the market equilibrium, and thus estimate social benefits for producers and consumers. It takes account of the spill-over benefits that

research provides for consumers, which is the basis for the provision of government support for co-funding agricultural research. More extensive equilibrium models can involve interactions with other product markets, and with producers and consumers in other countries through trade.

The partial equilibrium approach has proved to be extremely flexible and has been widely used to analyse a range of issues related to research funding for agriculture. As well as applied studies of particular industries and actual investments, it can be used to enhance understanding of the broad parameters and factors that influence the effectiveness of investments. An example of this was a comparison of the impacts of investments in research and in promotional activities on the Australian beef industry. The results were consistent with other studies in showing that investments in on-farm research provided greater benefits for producers than off-farm research or domestic promotional activity (Zhao et al 2003).

Sergio and Hayes (2008) developed a theoretical model of research in a trade environment that they used to evaluate the implications of the changing intellectual property rights (IPR) environment in agriculture. This model demonstrates the complexity of the impacts of research where there are spill-over impacts caused by the international transfer of technology in a trade environment, and where the protection of intellectual property is incomplete. The results of the study suggest that producers may not always benefit from the growth in privatisation of the ownership of IPR.

An analysis of the distribution of benefits from levy-funded research by Alston, Freebairn and James (2004) is of direct relevance to the current study. They modelled the policy in Australia, under which government funding matches industry levies to fund research and promotion, and concluded that the distribution of national and producer benefits depends on the specific nature of the research activity, and the market conditions for the industry concerned. This conclusion is broadly supportive of the New Zealand Government approach of contributing targeted support for research, rather an un-tagged contribution to research funding.

The partial equilibrium approach described by the studies cited above can be used for both ex-ante or ex-post evaluation of general classes of research activity, but is dependent on estimates of the impacts that the research would be expected to have on the fundamental supply and demand relationships in the industry. Typically this relies on expert judgments or assumptions about the nature of the shifts in supply and demand relationships, which may not be easily related to the biological or cost-saving impacts of the research outcomes themselves. Such estimates are normally beyond the expertise of the scientists directly involved in the research, but there is a growing number of economists and analysts with experience in evaluating the economic impacts of research.

The approach does appear to be useful in providing a preliminary analysis of the expected impacts of research and also of a wide range of other industry investments that are likely to change the supply or demand conditions for the product concerned. Such models could include the trade-offs between activities as diverse as promotion, information and food safety, and market access. There are also obvious uses in environments where there are complex market conditions or spill-over costs or benefits that involve other groups affected by the investment. However, estimation, rather than measurement of some key parameters will be required.

The farm-level approach: A third important approach to evaluating the costs and benefits of industry-good research is the assessment of the costs and benefits at the farm level, and relies on modelling and understanding the role of the research, and the impact that it has on the typical farm system and subsequent returns to individual producers. This approach is well described by Pannell (1999) who identifies the set of on-farm changes that are usually the outcome of research and associated extension activity: They include:

- Improved Technology
  i. New enterprises
  ii. Increased production
  iii. Decreased production costs
  iv. Increased product quality
  v. Reduced risk
- Information
  i. More rapid adoption and/or higher levels of adoption of existing technology
  ii. Better management systems
  iii. Reduced risk

These are the major factors affecting the economic performance of farm businesses that are likely to result in changes in farm productivity and profitability. An improved understanding of the farming system makes it possible to identify the components that are most influential on productivity, and is, consequently, critical in developing research programmes or in extension planning.

The farm-level approach provides considerably clearer guidance to industry organisations on the specific research plans and priorities that will benefit levy-payers most than the other approaches described. Analysis of this type would also provide information about the supply and shifts that would result from the research, which could subsequently be used in the partial equilibrium analysis described above.

At a more general level, a recent review by Gray (2008) describes the growth and development of agricultural research in North America in the past decade and discusses the continually changing research environment, and the challenges that have faced industry groups and publicly funded research. For example, although the growth in biotechnology and bio-energy offers huge opportunities to agricultural economies which produce non-traditional products, there are challenges for agricultural research in the increasing importance of the ownership of intellectual property derived from research activity. He noted the increasing development of incentives for private firms to invest in research, and to protect their discoveries. This activity has also increased in public institutions, including universities and publicly funded research centres. The same issues had earlier been identified in a theoretical study by Moscini and Lapan (1997) who observed that the changing IPR environment would change input pricing structures, which would lead to over-estimates of the benefits of research and development activity.

The increasing sophistication of the research environment has led to an growing focus on evaluation and priority setting for publicly funded research. An example of this is the range of topics that were discussed at a recent workshop on the assessment of benefits from agricultural research (Farm Foundation 2008). This workshop considered international experience and presented a wider range of evaluation tools than is more frequently used in

non-agricultural than agricultural environments. Review of the workshop outputs highlights the need for continual evolution and evaluation of the methodology and priorities for evaluating industry-good research activities.

3.2 Promotional Activity

Internationally it is common for governments to support producer-driven promotional activity at the industry level. The economic rationale for this support is one of market failure associated with the size of farm businesses and the homogeneity of the agricultural products that they produce.

In some countries there are government subsidies for this activity, but in almost all cases there is at least some element of producer-funding, usually through a levy collection process. Although the details of the schemes vary considerably by country there are some common elements in all of these schemes and there has been a substantial body of research into the evaluation of the effectiveness of such generic promotional activity.

There are some parallels in the evaluation of promotional and research activities, as has previously been noted, but there are also substantial differences in the specific impacts of these investments. Many promotional programmes are focused on generic marketing activity associated with a broad category of product, possibly only in a particular state or region within a country. The emphasis is usually on increasing the consumption of the generic input across a range of consumer products, and through a range of distribution channels. The programmes themselves can vary widely and make use of a full range of marketing activities including sophisticated advertising, brand development and technical support for trading activity.

The situation is more complex in a traded environment, and in countries such as Australia and New Zealand there is usually separation between the promotional activities in export and domestic markets, although there may be interaction between the different programmes implemented in different countries. In some situations there are joint programmes where importers are required to contribute to the generic promotion of products in the importing country. The argument for this is generally that any promotional activity supporting domestic consumption will benefit both importers and domestic growers of that product. These situations provide a complex environment in which to analyse the benefits and costs of promotional activity.

There have been many approaches and techniques applied to the analysis of specific promotional programmes in order to gauge the market reaction to such expenditures. Many of these are the same techniques used to evaluate any advertising or promotional programme, while others address the more specific aspects of generic promotional programmes. They include the development of complex econometric models, a wide-range of methodologies for examining consumer preferences and, in recent years, such techniques as analysing electronic data from supermarket check-outs. The National Institute for Commodity Promotion Research and Evaluation (NICPRE) based at Cornell University, undertakes work associated with the commodity check-off programmes supported by the United States Department of Agriculture, and has employed a wide range of these techniques. Its work provides a useful overview of some of the techniques and approaches which have been used in evaluating generic promotion. Typically, studies involve a tracking of promotional expenditures and

any associated changes in per capita consumption of the relevant product. The data obtained from approaches such as these can then be used in estimating the shifts in demand associated with promotional activities, in order to estimate their benefits using a partial equilibrium framework.

A stream of literature has developed that parallels the literature dealing with the ex-ante evaluation of benefits from research activity. Wohlgenant (1993) has reported an evaluation of the distribution of gains from research and promotional activity for the US beef and pork industries. This analysis used a partial equilibrium model to demonstrate that when research and promotional activities resulted in equivalent impacts on supply and demand curves producers benefit more from the research activities. More recent studies of this type have shown that these outcomes are sensitive to the assumptions about the impacts of the promotional activity on the demand for the product. Never-the-less, Wohlgenant's approach has been used to evaluate a range of different and complex situations.

A particularly useful study is that of Zhao et al (2003) which investigated the distribution of benefits associated with both research and development and promotional activity in the Australian beef industry. An equilibrium displacement model was used to evaluate the impacts of these investments on the different types of producers involved in the industry, and on companies involved in the marketing and processing of both domestic and export market grain-fed and grass-fed beef. The impacts of research investments at different levels in the industry are also investigated.

This model facilitated evaluation of a complex industry environment and provided some interesting insights into the returns from a range of different investment activities. Although the results are not necessarily relevant to New Zealand, the analysis showed that domestic promotional activity and domestic market research generated lower returns for growers than a wide range of on-farm research activities. Export market promotion, however, was more profitable than on-farm research in general, while the investments in research activities associated with the production of weaner calves were shown to generate the highest returns of all.

Information on the returns to other groups, including domestic and export market consumers, and market intermediaries such as marketing and processing companies, is also provided by the model. While the specific outcomes may not be relevant to other industries, or to the New Zealand environment, it is a useful framework for considering the nature of the interactions and responses of the different parties in distribution channels. The results it generated explained the rationale behind, and provide justification for, co-funding by other parties and for Government support for these industry-good activities, by showing that their benefits are not limited to producers.

A major shortcoming of this and similar studies is that while they evaluate the impacts of equivalent research and promotional outcomes, they do not take into account the cost-effectiveness of generating those benefits. Investments in both research and promotional activity can be subject to considerable uncertainty, and there is no guarantee that equivalent investments will generate the same levels of aggregate benefits. These studies do, however, provide considerable insight into the distribution of investment benefits and, consequently, have implications for the relative levels of funding support from growers and other players in the distribution channels that may be appropriate.

A recent theoretical study by Norman, Pepall and Richards (2008) provided interesting insights into the trade-off between generic promotion and the marketing activities carried out by individual firms in the industry. The study used a theoretical model to demonstrate that at critical levels of concentration (or numbers of firms in the industry) there are incentives for individual firms to promote their own products but a reduced rationale for generic promotion. This may be intuitively obvious, but is likely to become increasingly important in marketing environments where individual producers are more closely aligned with supply chains or distribution channels, than with wider industry-good activities.

This brief review of the framework for evaluating benefits from industry-funded promotional activities suggests that there is a wide range of approaches to analysis, including both ex-post and ex-ante techniques, which can provide insight and understanding of the likely impacts and distribution of benefits from promotion. An extensive body of international research has demonstrated the social benefits that have been generated by industry-funded promotion. These findings are supported by the high level of industry and government support for this activity. The distribution of those benefits is perhaps less clear, although there are methodological approaches to exploring distributional issues.

3.3 Market Access, Bio-security and Food Safety

Historically the New Zealand animal industries have allocated a great deal of funding to the management of particular pests that pose market access threats to the exports of our beef, dairy and venison products. The most significant of these costs are associated with controlling the possum population and managing the Bovine Tuberculosis status of our cattle and deer populations by means of a strategy that is implemented by the Animal Health Board and jointly funded by industries and regional and national government. Other industries face equivalent industry-wide problems where market access is influenced by the actual or perceived pest, disease and health status of the products exported. In horticultural industries spray residues or pest contamination pose equivalent threats, although the management of the risk at the farm level is more directly controlled by individual growers. In such situations industry or government often assumes responsibility for monitoring outcomes and managing the spread of pests.

Conversely, the bio-security status of importing countries clearly creates strong incentives for New Zealand to maintain stringent bio-security standards on imported products, in order to prevent the introduction of new pests and diseases that may have adverse impacts on New Zealand's land-based industries. The maintenance of these standards is primarily funded by Government.

Food safety issues are of increasing importance in food markets around the world. This has led to increasingly complex systems of government and private sector involvement in ensuring the quality of food products and the integrity of the production systems involved in producing those products. In most countries these efforts have been concentrated on domestic food production and consumption, but in exporting countries like New Zealand and Australia the importance of food exports means that both government and industry groups have an export market focus in this area. Exporting countries must contend with the food standards established by all trading partners, since failure to comply with such standards could lead to the imposition of trade bans with adverse economic consequences for both industry and the national economy.

In the areas of both biosecurity and food safety the actions of individual growers, and their ability to manage the incursions of particular pests, diseases or contaminants, can impose risks (e.g. trade sanctions) for all growers of that product. The expected cost of a complete trade ban on exports would be very large for any grower reliant on exports, although the probability of that outcome may be small. For the individual grower there are real on-going costs associated with managing the risk, which include relevant pest controls and quality assurance measures.

While in principle, the activities required to maintain both food safety and biosecurity standards could be undertaken at the individual farm level, the "free rider" problem and the externalities associated with individual actions often lead to industry and government involvement in monitoring and management of the risks. The majority of the industry costs in this area are related to monitoring activities and the establishment of industry standards for products or management practice. Additional activities involve the resolution of trade access problems related to breaches and other industry responsibilities associated with trade access or food safety.

In evaluating the cost-effectiveness of investments in these areas the use of sophisticated risk analysis techniques is required to investigate a number of factors which are extremely difficult to quantify. These factors include assessment of the likelihood of bio-security incursions and the risks of opportunistic behaviour of business operators. The costs of monitoring export and quality standards can usually be measured, although estimating the costs of breaches or breakdowns in systems may be more difficult.

The roles of government, private interests and industry bodies have become increasingly complex in recent years. The changing food-safety environment in major trading partners and the level of co-regulation has been reviewed in a recent study by Garcia Martinez et al. (2007). This study reviews developments in North America and Europe and the growing range of government and industry partnerships that are involved in food standards. Although the approaches differ considerably between countries, in general the role of retailer-driven supply chains and producer-based farm assurance schemes creates new challenges and opportunities.

Another development has been the growing importance of traceability schemes that change the information environment in food supply chains. Hobbs (2004) describes the differing roles of traceability systems in modern food systems. She distinguishes between reactive traceability systems that enable ex-post cost reduction by identifying the source of any breach of standards or regulations, and those which result in a reduction in information costs for consumers. The former create the opportunity to allocate responsibilities and liabilities and will, to some extent, substitute for any collective responsibility at an industry level, while the latter establish standards and methods of accountability that are credible to consumers. Studies by Fulponi (2005) and Banterle and Stranieri (2008) describe the growth and economic impacts of voluntary traceability and food standards in international markets.

Increasing change in this area will make it difficult for industry bodies to assess which investments in quality assurance and traceability systems are appropriate at the industry level, and to what extent growers or supply chains will be responsible for the more sophisticated developments in this area.

It is recognized that traceability will, to some extent, substitute for the need for collective responsibility for food safety and associated market access risks. Similarly the increasing growth in private supply chains, frequently managed by food retailers with their own traceability and supply chain management systems, may further reduce the incentives for industry level involvement in the management of food safety investments.

Where issues are unable to be controlled by individual growers or others involved in the marketing channel, for example bio-security threats, there is likely to be continued strong support for industry or government investment in control activities and risk management.

3.4 Other Investment Areas

There are a number of types of investment that are commonly made at the industry-level to support the activities of levy-payers, which might loosely be called communications. These overlap to some degree with the investment areas described previously, but also involve specific types of support that allow the industry participants to conduct their individual businesses more profitably.

The rationale for conducting these communication activities at an industry level rather than individually is that joint provision significantly reduces duplication in transaction costs, and the compulsory levy ensures that there are no "free-riders" on privately funded communication activities.

Specific aspects of industry communication include education/training, the provision of information to members, and advocacy on behalf of the industry.

3.4.1 Education/Training

Formal educational opportunities in the agricultural and horticultural industries are usually provided jointly with the Ministry of Education. Most industry bodies support an Industry Training Organisation (ITO), usually by means of contribution to the specification of learning needs, and in some cases by means of a direct financial contribution to the ITO aligned with their industries.

ITO training is usually undertaken by employees rather than levy-payers, on the basis that the provision of a well-trained workforce is of benefit to the industry as a whole. The rationale for Government contribution is that the benefits are vested in the individual trainee and there are risks that they may not remain in the industry. The distribution of benefits and the difficulties in measuring the impacts of the training make it particularly difficult to evaluate the benefits and costs of such support. It is reasonable to assume however, that industry participants will be more likely to fully fund training that has short-term benefits and develops skills that are specific to the industry.

3.4.2 Information provision

Almost all industry organisations are involved in the provision of information to members through a full range of communication mechanisms. Increasingly this has involved electronic as well as hard-copy information and often includes field days and meetings to disseminate information, and to facilitate two way communication that reflects the growers' role as stakeholders and voters in the industry organisation.

A major investment area is the provision of information on research outcomes and the extension activity necessary to enhance the adoption and appropriate implementation of those outcomes. The costs and benefits associated with this activity should correctly be included in the evaluation of the research project itself, since estimation of the benefits of research usually include some assumptions about level of uptake and implementation at the farm level. Some industries employ individuals with direct responsibility to work with growers over a broad range of extension and communication-related activities, which can create difficulties in allocating their costs amongst the range of activities with which they are associated.

Many industry organisations also provide market information collated from external sources or collected specifically to meet the needs of levy-payers. These activities clearly benefit decision-making at the farm level and in some cases may be the only source of such information. Firms and organisations within or related to an industry may be prepared to trust an industry organisation to collate and analyse information that at the individual firm level is commercially sensitive, but which at the aggregate level is of considerable value to industry participants.

Industry organisations also provide information to members on the levy process itself – changes in rates, purposes, the range of activities undertaken and the benefits of these. Although many industry participants may place little value on this activity it is a legislative requirement of industry bodies.

3.4.3 Advocacy

Many industry organisations also define a set of activities associated with advocacy or lobbying. The area is not well defined but it is normally understood to include the monitoring of all potential legislation or policy changes that could impact on the industry, and making appropriate representation to protect the interests of the members of that industry with respect to these.

Activities of this type are common in a wide range of industries, even where there is no compulsorily acquired funding for them. They are well recognised by growers but are not often reported as a specific area of investment. Their inclusion in the range of levy-funded activities may be justified on the basis of the potential transactions costs savings and financial benefits of the protection that is provided.

There is likely to be considerable overlap in the provision and costing of communications investments as well as measurement difficulties in evaluating the benefits of activities. These may accrue over long periods with substantial variation in the extent to which they are realised by individual industry members – a difficulty associated with firm-level measurement of many specific investments.

The fact that, internationally, most industry groups employ levy funding in communication investments indicates that the individual participants in those industries must value these activities, although they may be particularly hard to quantify. The assurance of positive net benefits probably comes from the fact that they are usually relatively low cost, and provide a wide spectrum of possible benefits to levy-payers.

3.5 Summary of Investment Areas

The review of the major areas of levy-funded investment has found an internationally accepted rationale for levy-funding of industry-good investments. Evidence that benefits can accrue from such investments can be found both in the research literature and in the wide political acceptance of industry levies in many countries.

Unfortunately much of this evidence is from evaluations of past investments and is unlikely to provide clear guidance to the industry leaders who must make these decisions on an on-going basis.

Partial equilibrium analysis may be used to evaluate the impacts of research, promotional and market access expenditures. However the techniques required to determine the changes in supply and demand relationships associated with different types of investment differ.

Evaluation of research investments that result in changes in practices employed at the farm level require sound understanding, not only of farming systems and the factors that affect productivity and profitability, but also of the impacts on these of changes in, for example, the intellectual property rights environment.

The evaluation of the benefits of promotional activities requires investigation of the impacts of those activities on consumer demand using a range of market research tools, while market access, biosecurity and food safety investment analysis will involve the use of sophisticated risk assessment methodologies.

While similar techniques to those used for other types of investment could be employed to evaluate the group of investments collectively termed in this section "communication investments", it is concluded that the difficulties of disaggregating the impacts of these from each other, and from other types of investments, means that formal evaluation of their benefits is rarely practical to undertake.

The review has demonstrated that there is no single analytical approach that can be used across all investment types to guide those making industry-good investment decisions.

SECTION 4
THE VIEWS OF INDUSTRY LEADERS AND LEVY-PAYERS

4.1 Views of Industry Leadership

4.1.1 Strategic planning

The level of strategic planning that is undertaken by industry organisations in the land-based industries included in the study ranges from no strategic planning at all to the preparation and regular review and updating of complex detailed plans that establish the basis for investment decision-making. In general, the level of planning reflects the size of and resources available to the industry.

All four of the large industry organisations included have, or are completing, strategic plans that establish medium-term industry priorities, and they evaluate investments against strategic priorities. These plans are annually reviewed and broader industry consultation has been important in setting strategic priorities. The two largest, dairy and meat and wool, which have large numbers of professional staff and extensive advisory resources have separate teams, often including broader industry representation, to assist in assessing investments under different strategic areas. In the others, this separation does not occur to the same extent. The two new industry organisations in this group, DairyNZ and Horticulture New Zealand have succeeded earlier structures, and although the strategic planning process is yet to be completed strategic priorities have been clearly articulated. These industries have sufficient resources to continue to invest to meet strategic priorities and to address new and important issues that arise in the short term.

Although Horticulture New Zealand is in the process of developing an industry strategic plan and has clearly articulated priorities with respect to core activities, the individual vegetable product groups are variable in the extent to which they undertake planning activities. Only the Potato Product Group operates a formal plan covering a period longer than one year, although those groups that undertake industry promotion activities using levy funds do set five-year strategic directions for this work.

The medium-sized industries also have strategic plans but the sophistication of the processes around development of these, and their relative importance in annual investment decision making, varies between the three industries. The New Zealand Avocado Growers Association's newly established strategic plan and priorities, consultation process, strategic teams, and the extent to which the plan governs investment decisions, are very similar to the two largest industries. The Foundation for Arable Research has a strategic plan developed by the Board, which it regards as an in-house working document, the preparation of which does not involve outside consultation, and which it not publicly available. It should be noted that unlike other organisations FAR's role in the arable industry is exclusively that of coordinating and providing research and development and technology transfer with no elements of broader industry representation or responsibility. Summerfruit New Zealand operates from a strategic plan that establishes industry priorities for a four to five year period. Developed by the Board and Executive Officer, the strategic planning process does not involve formal consultation but broader consultation in the industry is on-going. Where a

major new area of industry priority arises (e.g. climate change) external funding is sought in order to scope the issue thoroughly to facilitate its incorporation into the strategic plan.

Strategic plans do not exist in any of the small industries selected. The passionfruit and tamarillo industry interviewees expressed the view that their industries have no longer-term views and simply survive from year to year using whatever funds are available from levies and external sources to address the issues that are most pressing at the time, or selecting the best projects put forward by providers. Although the Satsuma Product Group of Citrus Growers New Zealand does not have an industry strategy, believing that longer-term issues are addressed by Horticulture New Zealand in the wider context, it was clear that the organisation does make longer-term strategic decisions on behalf of the industry with respect to appropriate investments, e.g. the decision to support private firms in cultivar development work rather than funding this work directly.

4.1.2 Annual priority setting process

In the large and medium industries, the annual priority setting and work planning processes involve multiple stages and a range of players. The reports of interviews with industry leadership in Appendix 2 include descriptions of the annual planning processes of each of the industries. In this section, the considerable variations in the extent to which industry organisations involve external participants in annual priority setting and work planning are discussed.

There is considerable variability in the approaches taken to this process. At one extreme there is heavy reliance on continuing discussions with industry on all issues to inform what is essentially in-house development of annual investment priorities by staff and management. At the other extreme is a highly devolved process where committees comprising industry organisation management and governance and other industry participants formulate priorities and plans for final approval by the Board, and there is a range of approaches between these. This appears to reflect, to some extent, the nature of the investments to be made as well as the direct involvement of stakeholders with the organisation.

In some industries annual investment planning is very explicitly linked to the strategic priorities (e.g. DairyNZ and Horticulture New Zealand), while in others this process is less formal.

Horticulture New Zealand's primary role as an umbrella organisation is to address issues which impact on a range of related industries at a high level rather than selection of projects to solve farm-level issues. The staff develops an annual plan of advocacy and liaison activities to address priorities for approval by the Board. There is no formal involvement of advisory groups or research committees established for this purpose, but the regional groups and product groups are given the opportunity to review and comment on the plan, and all members of the industry organisation are invited by email to submit input to this process. Regular two-way communication with product groups and growers informs staff about industry priorities and concerns.

At the other extreme, the largest part of the role of the Foundation for Arable Research is to undertake and disseminate the results of research that deals with specific on-farm problems on behalf of arable growers. Its stakeholders have a very direct relationship with the

organisation and its activities. FAR's Board as a whole is not involved in the formulation of annual plans and priorities, although individual Board members are members of the Strategic Research Committee which is responsible for planning longer-term research in areas such as the environmental and new product research. This committee involves Board and staff members, growers, research providers and Environment Canterbury. Production research is planned by grower Arable Research Groups and the final plans are formulated by staff for Board approval.

In the meat and wool, dairy, avocado and pipfruit industries priorities are developed by staff and the extent to which user-advisory groups and external reference groups are used in this process varies. DairyNZ employs a highly consultative approach to strategic priority development, and then relies heavily on the regular industry contact and experience of the investment leaders in the development of annual plans, while Meat and Wool New Zealand Ltd staff is advised by user-advisory groups throughout the annual process. The Research Consultative Committee of Pipfruit New Zealand is specifically charged with liaising with industry to develop ideas about annual investment activities and Reference Groups in the Avocado industry provide advice to the organisation and collect, collate and analyse the views of the wider industry.

The annual planning process in the small industries is undertaken in a much more "stand-alone" manner, although to some extent the decision is pre-empted if the industry is involved in a multi-year project that is not yet complete. The investments selected are not generally related to strategic objectives, but are usually intended to provide solutions to the most immediate pressing issues facing industry participants. The selection of individual projects often depends on the extent to which co-funding will be available because, for these industries, even a small research or promotion project is likely to require far more funding than the levy provides. The approaches taken by the three small industries included in the study differed widely.

The Satsuma Product Group is part of a wider umbrella group, New Zealand Citrus Growers and does employ a formal system of investment planning although this is not linked to an industry plan. A research committee that comprises external industry participants and the organisation's Research Manager is responsible for project selection and reports directly to the product group. Each project is reviewed in the light of previous work, expected outcomes, cost-effectiveness and impact on growers by the two groups. In the passionfruit industry investment decisions are taken by the industry as a whole at the AGM while in the Tamarillo industry the Board alone makes the decision without particular industry consultation although feedback is received on plans made.

4.1.3 Evaluation of investment activities

The extent to which industry organisations undertake any formal evaluation of the investment projects undertaken differs widely. Most consider that formal cost-benefit analysis, ex-ante or ex-post, lacks the ability to fully capture the impacts of the types of investment undertaken by organisations in the land-based sectors, in which the systemic effects of any change can be far-reaching and complex. Several interviewees spoke of the difficulty of identifying the impacts of a single project when the industry is continually subject to the effects of market, climate and regulatory change as well as, in larger industries, the impacts of multiple industry-led initiatives. Growers' distrust and lack of understanding of the results of cost-benefit analysis was also discussed by several interviewees.

DairyNZ and Meat and Wool New Zealand Ltd, which have made the greatest use of formal ex-post cost-benefit analysis of research projects, and to a lesser extent ex-ante analysis, are looking to refine the "ready-reckoner" approach they generally use to ex-ante evaluation. The wealth of data collected by these industries over many years will be used to design farm systems models that will enable staff to examine the impacts, adoption and risks associated with new projects in a farm systems context. Neither of the other large industry organisations, Pipfruit New Zealand and Horticulture New Zealand, uses formal ex-post evaluation processes, although both organisations do review the results of their investment activities.

There is little use of formal quantitative investment evaluation amongst medium-sized industries, and considerable variation in the extent to which formal review processes are used to examine the impacts of projects. This ranges from a regularly instituted formal review process to ensuring that projects meet the outcomes specified in agreements between provider and industry organisation. The small industries are not involved in ex-post evaluation. Satsuma industry representatives are actively opposed to any requirement for ex-post evaluation because they believe qualitative ex-ante evaluation of the type described in Section 4.1.2 is of much greater benefit to the industry.

4.1.4 The levy order process

Industry leadership in general had little to say about the process of taking out a levy order and very few suggestions for improvement. This was in sharp contrast to their attitudes ten years ago when the last research into the process of taking out a Commodity Levy Order was undertaken, when many issues of concern were identified. Most were very positive about the assistance provided by MAF staff. A few problems were identified during these discussions although in most cases solutions were neither expected nor required.

Volume of work involved: Even in medium and large industries a number of industry spokespeople did consider that the Commodity Levy process is onerous, particularly where it is undertaken by a single person which was the case in both the pipfruit and summerfruit industries. However, only one of the interviewees felt that any parts of the process were unnecessarily burdensome. Rather, most appeared to feel that the privilege of operating a Commodity Levy did warrant the rigorous renewal process in place.

For smaller industries such as the tamarillo and passionfruit industries, where there are few resources, little institutional knowledge and comparatively little information even on the scope of the industry, it remains a very difficult task, although the interviewees from these industries did not identify any aspects of the process in which change was required.

Loss of institutional knowledge: Now that the majority of industries have applied for levy orders several times they are able to use previous orders as guides, changing only those areas where operational difficulties have been encountered such as being unable to undertake an activity endorsed by the industry because it was precluded by the purposes spelt out in the Order, or finding that the basis of calculation of the levy rate led to unacceptable variability in the budget. However, although large industries are able to compensate for loss of institutional knowledge resulting from changes in staffing with the breadth of professional expertise in the organisation; this is a much greater problem in less-well resourced industries. There is, however, recognition that help may be available from other industry organisations that have sought legal advice on, or found solutions to, similar issues.

Variability in demonstration of benefits: The Commodity Levies Act (1990) requires that "overall, the benefits to the persons who will be primarily responsible for paying the levy of the spending for the purposes specified in the order of the amount of levy likely to be raised will outweigh the disadvantages to them of the imposition, collection, and payment of the levy on the commodity". The notes provided by MAF to assist industries state that they should "provide detailed cost-benefit analysis of key spending areas". Some industries are interpreting this to mean that they should provide at least some quantitative economic analysis and are doing so, although most industry organisations have significant doubts about the validity of cost-benefit analysis for a range of reasons. There is considerable inconsistency in the way in which industry organisations interpret this requirement.

Consultation: The consultation process is an expensive and onerous component of the Levy Order process for many industries. Many spoke of poor attendance at "roadshow" meetings and of poor voter turn-out for the referendum. One interviewee considered that meticulous recording of the consultation process is the "key to getting it right" but another considered that if the industry consults regularly on a range of issues and makes sure that the levy is a regular topic of discussion it is possible to demonstrate adequate consultation without incurring very high costs. Again there is inconsistency in industry understanding of what would constitute appropriate consultation.

Levy duration. Industries may elect to renew their levy order after five years or to take out a new order, in which case the Order holds for an additional year. Because industries do not consider that there is any difference in the work required for renewal and reapplication they generally opt for the six-yearly process. There was some discussion round the fact that the process could be made less demanding for those renewing an existing order, where the industry had shown on-going commitment to the levy, but there was no consensus about this. Overall, however, the only potential for improving the process that emerged from this discussion appeared to be in:

- advising industries to adopt an industry planning strategy and to evaluate industry-good investments in terms of the extent to which they contribute to the achievement of strategy. Documentation of the plan and the investment evaluation process should be accepted as evidence that the requirements of the Commodity Levies Act with respect to demonstrating the benefits of levy-funded investments

- providing advice on consultation strategies that will be more cost-effective and less demanding on under-resourced industries

4.2 The Views of Levy-payers

4.2.1 Knowledge of levies paid

While all focus group participants were aware that they paid commodity levies and most noticed regular levy deductions from product payments, awareness of actual or maximum levy rates differed between focus groups. Generally participants from smaller industries who feel a sense of engagement with their industry organisations are more aware of levy rates and likely to raise issues pertaining to the levy such as non-payment by groups within the industry (gate and inter-farm sales) than those from large industries such as dairy and meat and wool.

There was, however little awareness in any of the groups about the total levy take or the budgets of industry organisations except that dairy levy-payers were aware that their levy generates a "huge" pool and passionfruit growers spoke of the seriousness of the constraints imposed by a small budget.

4.2.2 Awareness of levy-funded activities

Most of the growers who attended focus groups were aware that information on the investment areas funded by their levies is made available to them, but few had accessed it. While some of participants were very knowledgeable about levy activities, in most of the groups discussion about these arose from the prior knowledge of a small number of participants only, and only a very small number had ever participated at any level in the priority setting or project identification process. For many, research and development was the only activity that they could recall without prompting and most were able to recall specific research and development projects that were of particular benefit to them.

Best informed were the arable and passionfruit growers. The Foundation for Arable Research is geographically adjacent to most of the arable industry. Its work is very visible and it is very inclusive in its reporting and planning processes. Levy-payers appear to have a very strong stake in its activities. The small passionfruit industry is still at a very collegial stage; it has made comparatively few investments and decisions are made on a consensus basis. In other industries which are large (the dairy and meat and wool industries) or diversified with respect to product and geographic location (those linked to Horticulture New Zealand) there is considerably less awareness on the whole of industry activities, and a greater reliance on elected representatives and professional staff to deal with these issues, leaving growers to concentrate on their own business operations.

4.2.3 Good industry-good activities

The industry-good investment area most strongly supported by group participants was research and development, while industry administration costs were viewed with suspicion on principle by members of three groups. Addressing short-term issues behind the farm gate was seen as the major priority by most groups. Overall, it was felt that growers lack the knowledge and information to evaluate specific investments and that they must rely on industry organisations to invest levy funds wisely.

Where participants expressed views on the general nature of "good" investments they reflected the views of arable group members who agreed that good investments "are those that make a direct contribution to the bottom line *[of the farm]*" or of the vegetable group that "*[good investments]* are those which are grower driven". One member of the dairy group stated that good investments would address the two major issues of profitability and sustainability – the first two of the platforms identified by DairyNZ – and other members of the group concurred.

Attitudes to expenditure on promotion as an industry-good differed, but often reflected the extent to which the industry is associated with a clearly identifiable processing sector. Only in the meat and wool group was there discussion of the fact that spending money in the export sector may bring larger returns to levy-payers than addressing production issues. This group, and the pipfruit/summerfruit group, stressed the value of, and necessity for, on-going investment in market access.

Investment in relevant appropriate education, and the strategic importance of this for the dairy sector was discussed at some length by dairy group members. There was dissatisfaction with the ITO system and the lack of opportunity for improving the skills of the rapidly changing workforce in this industry.

For many of the group participants there was some awareness that environmental issues are of increasing importance, but in the arable and dairy groups, where most of the discussion of these issues occurred, investment in this area was considered to be important to maintain the farmer's right to farm, rather than in terms of environmental protection to protect market requirements. Not unexpectedly, this area was of most importance to the dairy group who felt that both the industry organisation and regional and central government should be working to change public perceptions and reduce costs of compliance with environmental regulations.

An aspect debated by two groups was the ownership of intellectual property. They discussed the fact that changes in the structure and management of science provision in New Zealand resulted in the sale by Government of intellectual property that had been developed using farmers' funds, and that under the present structure management tools that have been funded at least in part by industry are being sold back to farmers. This was an issue that industry organisations should, they believed, consider in investment planning.

4.2.4 Communication between industry and industry organisations

Members of most groups were aware of the efforts made by industry organisations to communicate with them, but many do not use the opportunities available to them. Communication between growers and the Foundation for Arable Research is not only widely used by its levy-payers, but also was spoken of as a model by members of both the vegetable and meat and wool groups. Material from FAR is timely and much of it is practical advice on issues affecting growers at the time it is dispatched. In addition, for Canterbury growers, field days and trials are local and apply to their local production environment.

Both meat and wool and dairy producers feel besieged by information from a range of sources and rely more heavily on sources outside their industry organisation, primarily farming magazines, for information about issues affecting their industries, although they acknowledge that information in these may be based on the results of industry organisation activities.

Overall, group participants agreed that industry organisations face what several referred to as "grower apathy" in this area, particularly when things are going smoothly, and apart from some discussion on whether revamping and re-instigation of discussion groups may be timely in some industries, and of how these could be made relevant and appealing, had few suggestions for changes in the communication process.

The only suggestion from levy-payers that industry organisations should do more to demonstrate their accountability to levy-payers came from wool growers who felt that they could see little benefit from the large amount of money paid each year in wool levies. They were, perhaps, particularly sensitive to this issue since the new levy proposal had just been released and the wool industry has been experiencing poor returns for many years.

SECTION 5
ISSUES IN EVALUATING INDUSTRY-GOOD INVESTMENTS

There is considerable variability in the processes used by industry organisations to evaluate and select industry-good investments, as Section 4 shows. There is a similar level of variability in the extent to which industry participants are aware of the investment activities carried out with the levy funds they contribute. This is probably not surprising, given the diversity of the selected industries with respect to industry size, direct involvement of participants with the industry organisation, level of investment experience and other characteristics. The review of literature dealing with industry-good investment activities and their evaluation has shown that there is a wide range of alternative models and frameworks that might be used to evaluate particular types of investments.

The Commodity Levies Act (1990) establishes the responsibility of the industry organisation to invest levy funds to generate benefits for levy-payers, and it is commonly assumed by both industry leaders and levy-payers that investments should be made to maximise those benefits. Although it can be shown that many industry-good investments undertaken using producer funds have implications for other groups, both in the industry concerned and in society, the responsibility of the levying industry organisation is to those directly involved in levy payment. The evaluation framework they employ must, primarily, reflect this. This is, perhaps, in contrast with equivalent policies in other countries where there may be substantial direct contribution by government to the funds available to producer organisations.

In Section 5.1 a brief review of the important elements of an evaluation framework is provided and the realities of using such a framework in the current environment are discussed. In this section reference is made to financial cost-benefit analysis as an accepted tool for evaluating investment decisions and although the framework is not described in any detail here, the document prepared by the New Zealand Treasury (2005) provides an excellent overview and discussion of the methodology and its uses.

Traditional financial cost-benefit analysis provides an analytical framework that is widely used in selecting between alternative financial investments that can have very different characteristics, such as the timing of costs and benefits, levels of risk, and size of investment required. The main requirement for a traditional financial cost-benefit analysis is that the benefits and costs are measured in financial terms rather than in terms of social or physical impacts. There is a range of broader evaluation frameworks incorporating financial cost-benefit analysis that also take into account social or other external costs and benefits. As noted above, there is a common understanding amongst Government, industry leaders and levy-payers that financial benefit for levy-payers, at least in aggregate, is the most important criterion for investment decisions.

Examination of the evaluation framework may be undertaken in two stages. The first of these is the measurement of the financial outcomes of an individual investment, and the second, which could be termed the “portfolio problem”, is comparison of the financial implications of a range of alternative investments.

5.1 Evaluating the Impacts of an Individual Investment

Any investment evaluation requires a clear understanding of the pattern of expenditures and expected returns from the investment. This can be a very difficult task for the types of investments that are involved in industry-good activities, and the difficulty of identifying benefits for individual members is one of the reasons why the investments are not undertaken by individual producers, or in a voluntary collaborative arrangement.

Investments such as research and promotion can have benefits that are difficult to measure and may be distributed over a long period. These issues can be handled in an analytical framework if there are some measures of the nature of the risks, or the likelihood that a particular outcome will occur in a particular time period.

Such evaluations of industry investments are undertaken, and there are established methodologies and analytical frameworks that make it possible to deal with uncertainty and still provide quantitative measures of returns. This process can be expensive and complicated and is usually undertaken using external expertise. It is most commonly used in the analysis of expensive research programmes where there may be considerable investment over long periods of time.

When evaluating a research investment the common areas of uncertainty and issues that must be addressed in order to provide a detailed evaluation are as follows:

- *Achievement of research goals:* Research proposals usually identify a set of expected outcomes and may include a preliminary analysis of the level of expected benefits. There is, of course, considerable uncertainty about whether the outcomes will be achieved, especially in the case of longer-term or more visionary projects. The timing of the benefits for levy-payers and the likelihood of success also depends on the rate and extent of adoption, which are both largely outside the control of the researchers.

- *Adoption level and rate:* It is well understood that there are significant differences in the extent to which individual farmers adopt new technology. While it appears obvious that innovations which incur low on-farm costs and have considerable potential benefits will be most readily undertaken, this is not always the case, and it is necessary to understand the factors that affect farmer attitudes to particular technologies. The rate of adoption and risk of non-adoption is influenced by the investments in extension and communication activities that are made in conjunction with the research investment. It can be argued that investments in extension should be part of the research investment, but this does not necessarily occur since scientists who develop research proposals may not be responsible for the extension outcomes.

- *Impacts of research investments on the product market:* Large-scale projects may have an impact on the total level of production, or the nature of the product itself, which will influence the market supply and demand for the product. For example, technologies that substantially lower costs can increase marginal production from existing growers in an industry, or attract new entrants to an industry, thus increasing supply. Technologies which change the nature of the final product, such as new varieties or enhanced product characteristics, may have an impact on the demand for, and price of that product. Increasingly there are examples of farm-level practices that are not viewed favourably by

consumers, which may have future implications for market access or consumer perceptions of those products.

These risks are particularly hard to quantify but can be modelled through an understanding of the products concerned, and the markets for those products. In considering the nature of the risks involved it is not surprising that existing growers or levy-payers have a preference for supporting research projects that demonstrate clear short-term benefits, and for developing technologies that are easy to adopt. Research projects may be less favoured if there is a long delay before benefits are realised; a long period over which benefits are realised; a need for investment in learning or expensive technologies; or risks associated with outcomes or market impacts.

The sources of risk associated with research and other common forms of industry investment are shown schematically in Figure 1. While the nature of the investments and the fundamental risks associated with them can be very different, there are common links through the market reaction and subsequent income impacts at the farm level.

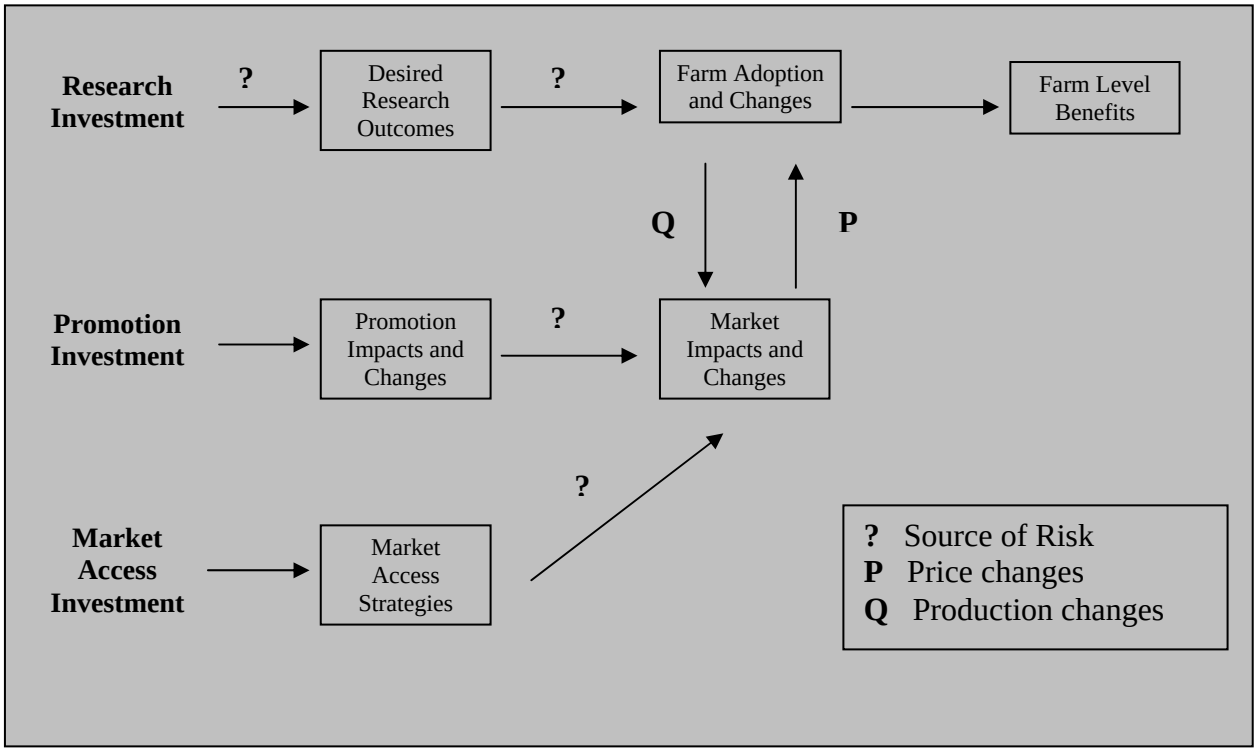

Figure 1
Uncertainty in Benefit Analysis

The set of risks facing investments in promotional activities differ from those associated with research. Promotional investments are obviously vulnerable to the effectiveness of the particular programme, as well as to the dynamics of the market place. In contrast to an industrial environment where the output of a firm can be carefully controlled, the obvious risk associated with generic or industry-wide promotional activity in the land-based sectors is that any increase in demand and prices is likely to lead to an uncontrolled increase in production. This will limit the benefits for individual producers or levy-payers. Awareness

of these issues has led to considerable change in the targeting and focus of generic industry-wide promotion programmes. For example, promotional programmes are often used strategically when production is expected to increase, in order to minimise any fall in price by increasing demand.

Investments in areas such as market access or lobbying on industry issues face another set of risks. While the probability of the occurrence of an adverse situation, such as the closure of a market, may be low the costs of that event can be very high. Sophisticated analytical techniques for risk assessment have been developed to deal with the quantification and evaluation of these particular types of risks. It is not surprising that investments in market access or advocacy are often supported by levy-payers. The on-going costs for monitoring of market access issues are often relatively small in comparison to those of research and promotional activities, and it is easy to see that the potential benefits are very high. However, other activities to minimize market access risks, such as the eradication of a pest, may be much more costly, which makes the investment decision-making process more complex.

Evaluating the distribution of benefits and costs for any investment is theoretically possible, but in order to do so the sources of benefits, their timing, and the nature of the risks involved must be understood. The approach to their evaluation often involves multiple stages. The discussion above has highlighted the complexities of the responses that must be understood in order to quantify or analyse the impact of any individual investment. The discussion in Section three has also shown that there is a range of research and analytical approaches that can be used in such analysis and that the appropriate approach will vary with the nature of the investment.

Figure 2 depicts the relationship between the analytical approaches used to evaluate investments and different types of industry-good investment. It shows the common element in the analysis to be partial equilibrium evaluation of the impacts on consumers and producers. The literature review, however, showed that the most complex task in evaluating these investments is the determination of their impacts on total industry supply or demand relationships that is required for the partial equilibrium analysis.

In practice, the research reviewed shows that, in almost all cases, this detailed work can only be conducted after the investments have been made, and it is not usually used as a guide to future investment decisions.

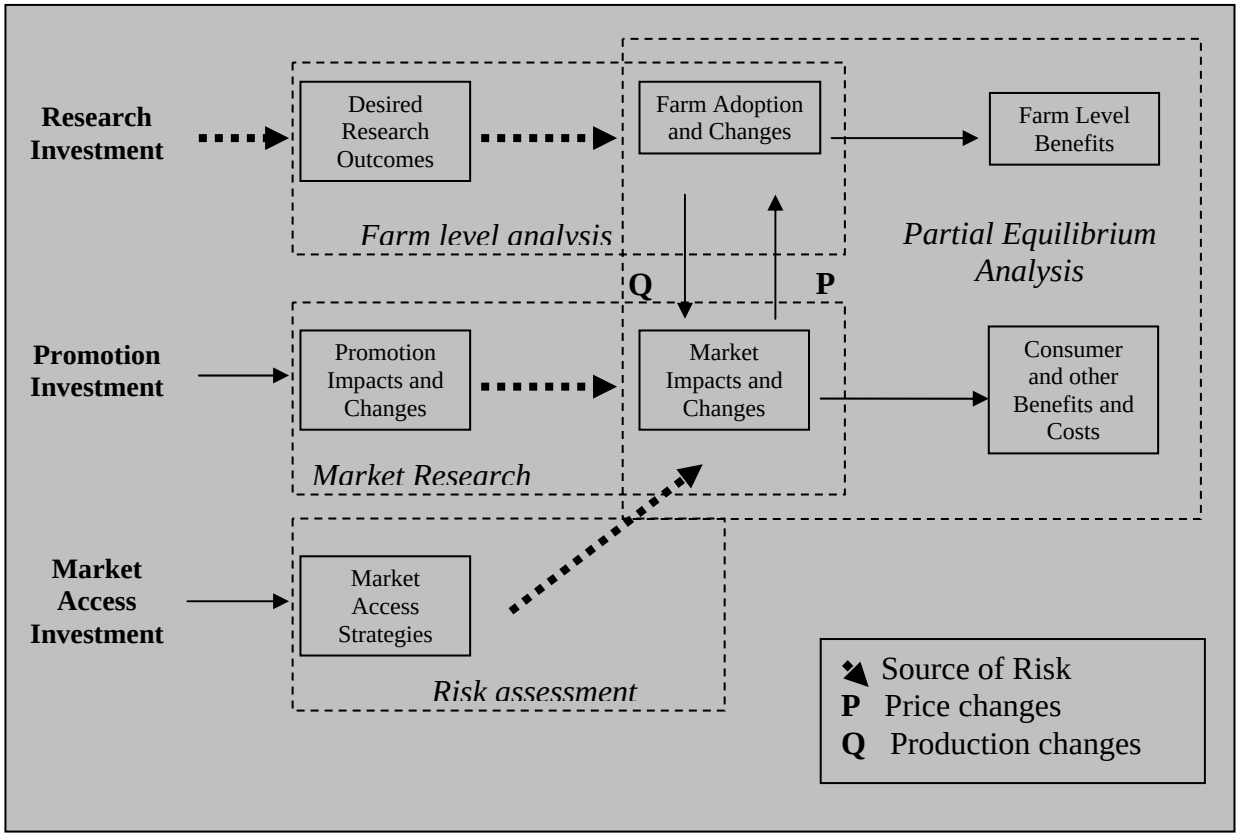

Figure 2
Analytical Approaches to Evaluating Investments

5.2 The Portfolio Problem – Selecting from Competing Investments

Organisations operating under the CLA have budgets that are strongly influenced to a high degree by production levels and returns for the industry in any particular year. Industry leaders and levy-payers in the industries reviewed discussed the complexity of annual planning, and of maintaining consistency of expenditure when the levy take depends on prices and/or volumes of production that are highly variable. The CLA itself limits industry organisations' ability to build up reserves between years to overcome some of the variability. These factors create a difficult decision-making environment.

In addition to the problem of annual variation in budgets, the organisations face the problem of allocating a finite budget to competing investments. In traditional financial cost-benefit analysis the returns on competing projects would be compared, and those which showed the greatest rate of return would be selected in descending order of profitability until the budget was fully allocated. Specific measures such as the net present value, the internal rate of return or other related criteria are used as a part of this process.

In the real world, and particularly in the land-based industries, such a simplified process is not always appropriate because of the uncertainty and lack of information about many critical factors. In addition, it may not always be appropriate to evaluate the contribution of a total portfolio or set of decisions by summing the estimated returns from the individual components, because of the inter-relationships and dependencies between them. Some of

these issues and their relationship to Commodity Levy investment decisions are discussed in more detail below:

Appropriate time horizon: In traditional financial cost-benefit analysis the discount rate is a key tool used to compare competing and very different projects in which costs and benefits occur over time periods of varying length. Selection of a high discount rate implies a preference for projects which produce returns in the short-run rather than the long-term, while a low discount rate will improve the relative rankings of projects that produce longer-term returns.

It is recognised that individuals and businesses can have quite different time preferences that affect their rankings of equivalent projects. The difficulty for an industry organisation is that the decision-makers are required to represent the range of individuals who make up the stakeholders in that organisation. The views of industry members will be influenced by their personal financial circumstances, their ages, and personal financial goals. This places a responsibility on the industry leaders to develop a representative view on such matters through industry consultation and sound judgement.

Examples of projects to which individual industry participants have differing attitudes have arisen in industry discussions. These include investments in areas such as environmental protection and the development of greenhouse gas strategies, which are widely accepted as being important issues for land-based industries, but which are perceived as being high-risk in terms of their likelihood of success and as benefiting future generations more than current levy-payers.

Investment decisions in these areas have been dealt with in different ways in individual industries, but the need to make critical decisions has focused attention on the differences between long and short-term investments. Industry leaders have used a range of arguments to justify environmental investments, some of which have placed more emphasis on short-term threats to current levy-payers than on longer-term market benefits or wider social benefits. The increasing importance of issues of this type in the wider economy will mean that even more decisions of this nature will be faced in the future. However, the growing importance of supply chains driven by consumers with an awareness of the longer-term issues may make the benefits of these investments more apparent to individual levy-payers.

Differing business types: The businesses in an industry are not homogeneous but can vary considerably in their size, location, and the particular mix of products produced. This means that the level of benefits accruing from any particular investment is likely to vary between individual producers.

The most obvious examples are those organisations that represent producers of different products such as the summerfruit or arable industries. There are also a number of industries in New Zealand that operate in geographic areas with significantly different production environments, slightly different products and, consequently, have different research and promotional needs. In other industries production units vary widely in scale, ranging from large corporate entities to large numbers of life-style farmers and part-time producers.

These differences increase the complexity of the decision-making environment for industry leaders. Most industry leaders are aware of such issues and some industries have developed a

system of representation at the regional or sub-product level. This allows a broad range of input and feedback during the decision-making process, reflecting the disparate circumstances of producers. While formal allocation of funding based on the proportions contributed by levy-payers on different products or from different regions is rare, the majority of industry leaders dealing with wide diversity do attempt to select projects with wide applicability, or check that there is some equity in investment selection. This does mean that investment selection will involve some political element and is not a straightforward formula-driven process.

The formation of Horticulture New Zealand as an umbrella organisation is a specific response to dealing with issues that affect of a number of different industry groups. In this case there is a separation of investments between those designed to achieve solutions to shared problems, and the product-specific investments that are managed by smaller groups through product group structures.

Some industries have also developed smaller-scale, more flexible funds that allow sub groups within the industry to identify, and have input into, particular research programmes that address their interests. These measures, which have been adopted to overcome issues relating to the differing business types within industries, generally appear to have been successful as there is little dissention over these issues amongst focus group participants.

Size of projects: The range in size of the organisations represented in this study highlights another common problem in selecting projects. In theory, in financial cost-benefit analysis, the ranking of investment projects should be independent of the size of the investment required. However, in some cases it is recognised that the preferred project to address a particular issue would require a very large proportion of the funding available to the industry organisation. There are a number of examples in the smallest industries where investment in a single multi-year project, despite success in acquiring co-funding, absorbs all investment funding and completely removes the ability of the industry to react to unexpected urgent issues that arise. These circumstances are a reality of the linkage between industry size and the opportunities for growth and investment. The Sustainable Farming Fund is extremely important in assisting smaller industries to invest for growth, and the constraints they face would be even greater if they were required to deal directly with the larger research funding organisations and compete directly with better resourced industries. The availability of opportunities for small industries to take advantage of umbrella structures that enable them to share the costs of dealing with common issues may make a significant contribution to their survival and growth.

Interdependence between projects: Investment opportunities in land-based industries are seldom completely independent, as there are direct and indirect linkages between projects within individual investment areas, and also across the wider investment categories. Simple decision-making using financial cost-benefit analysis techniques assumes either that projects can be treated as individual investment decisions, or that they are funded and evaluated jointly. There is a wide range of examples of these linkages that should be accounted for in industry-good investment decisions. The most common example is the linkage between research and extension investments. In addition, as one focus group discussed, the results of research projects that result in farm-level cost reductions and/or increases in returns may also have significant implications for market access. Linkages between investments and the wider implications of the outcomes may not be attributed directly to the scientific outputs of a

funded research project, but they may have significant implications for adoption rates and impacts on the total benefits accruing to levy-payers.

Careful planning of the order in which related investments are undertaken may significantly increase overall returns. Benefits can arise from carefully considering linkages between expenditure proposals, and even more importantly through strategic planning of the links between proposals that could interact to meet larger and longer-term outcomes. The identification of such opportunities requires leadership, strategic planning and active consultation, rather than simple responses to the perceived needs of individuals or interest groups in the industry.

Co-funding and leveraging opportunities: The review has highlighted the increasing importance of co-funding for industry investments. The government has actively encouraged collaboration across industries, and has provided opportunities, such as the Sustainable Farming Fund, which allow industry organisations to leverage their own contributions (in cash and kind) to attract public sector funding. The theoretical analysis shows that the spill-over benefits to groups other than levy-payers justify this public sector co-funding. The establishment of umbrella organisations and decisions by smaller industries to join forces with larger ones, such as the recent decision by the nashi (Asian pear) industry to join Pipfruit New Zealand, facilitates such collaboration. There are also collaborative agreements between large industries to collectively address issues such as greenhouse gas emissions that affect them all. The complication from an investment analysis viewpoint is that these arrangements mean that the priorities for other groups become important in industry decision-making. It is important that the setting of industry priorities and investment selection are not distorted by opportunities to collaborate, but that the collaborations contribute to achieving outcomes desired by the industry.

5.3 Summary of the Issues

In this section the relationship between the financial cost-benefit analysis process and the practical issues that industries face in using formal techniques of this type to guide industry-good decisions have been discussed. Financial cost-benefit analysis approaches have been used in the larger industries to evaluate the impacts and returns from individual research projects, but has been applied largely to existing or completed projects, and any sophisticated analyses have involved considerable information and analytical resources. These analyses have been used mainly to fulfil the obligations of the Levy Order renewal process to ensure ongoing levy funding, rather than as a part of the annual investment allocation process.

Ex-post analysis of the impacts of these investments may be important to ensure continuing Government and levy-payer support for the investment of industry and public funds in the industry-good. However, the review and discussion presented here has shown that analysis of the full impacts of industry-good investments is usually more complex than the analyses that have been undertaken by land-based industries in New Zealand to date. This is not surprising given the complexity of the issues addressed and resources required to do so, such analysis would certainly be outside of the scope of individual smaller industries

Even the international research has relied on analyses that use partial frameworks or aggregate level analysis that do not provide a quantitative framework for evaluating competing investment proposals of this type. For these reasons it is concluded that such

frameworks are not appropriate to guide the investment decision making that is required in all industries on an annual basis.

In recent years the larger industries in New Zealand have relied largely on consultation and input from professional staff and selected external or industry advisors to select projects and programmes within larger funding areas that have relatively stable total funding allocations. The major focus is on decisions within categories, such as research, with minor changes only across the major categories. There is, however, agreement in those industries that improved planning of aggregate investment strategies and more careful evaluation of the desired outcomes improves the decision-making process.

SECTION 6
A PLANNING FRAMEWORK FOR MAKING GOOD INDUSTRY-GOOD DECISIONS

The review of international and local experiences of industry-good investment evaluation has shown that it is not feasible, either theoretically or practically, for New Zealand land-based industries to use a single analytical process or procedure to provide clear guidance on which industry-good investments will generate the greatest benefits for levy-payers.

However, the research has identified some guidelines for the improvement of industry-good investment decision-making that involve the clear identification of benefits sought by the industry and of the pathways by which those benefits are most likely to be realised. During the discussions held with industry leaders several acknowledged that better investment decisions can be made only through more careful planning and scrutiny of investment proposals and opportunities. Many of the ideas presented and discussed in this section of the report have been derived from existing industry practice.

The following discussion outlines and explains an industry planning framework that will provide guidance for better investment decision-making. This planning framework that clearly identifies priority investment areas, and clarifies the information and support required when considering investment proposals.

In order to be of use to the wide range of land-based industries the framework that has been developed includes practices and procedures that work, or may be expected to work for most industries. The size and complexity of an industry has a profound effect on the investment opportunities that are open to it and on the resources available for planning and monitoring. This framework has been designed to be used in a simple descriptive fashion by small industries or to incorporate the more complex planning processes and investment decisions of large ones. The framework is summarised in the form of checklists in Tables 3 and 4.

6.1 The Industry Plan

For consistently good investment decision-making, an industry will require a clearly articulated plan that sets out priorities and provides guidance to assist in decision-making, usually over the medium-term (perhaps 3 to 5years). The plan is usually reviewed and updated annually so that it reflects changes in industry circumstance and continues to cover the medium-term for the industry. The nature and sophistication of these plans will differ between industries reflecting the industry differences discussed previously.

The processes by which that plan might be developed, or who might be involved in its development, are outside the brief for this study but it is expected that such a process would be managed by elected industry leaders who are responsible to levy-payers and to the Government under the Commodity Levies Act (1990). There are a number of strategic planning models and frameworks readily available to industry organisations that could provide valuable assistance in this exercise. The details of the process and the consultation involved are probably not as important as the key components of the plan, including its scope and the statements it makes about desired industry change.

The purpose of the plan is to provide guidance on, and clarify the nature of, the investments that will provide the greatest benefits for the medium term. The most important component of the planning process is the identification of a set of industry changes (outcomes) that can be influenced by industry investments, and which are most likely to benefit levy-payers. These desired outcomes should be measurable and expressed in quantitative terms, and have clearly identified time-frames for the achievement of change.

For example, an industry outcome might state that the industry expects to negotiate market access for a particular market within a specified number of years, or that average yield for a crop would increase by five percent over a five year period. Alternatively an industry might seek to create a new set of quality assurance standards for the industry within three years. These are examples of measurable outcomes that have defined time horizons for their achievement. They also provide clear signals to levy-payers about the outcomes and benefits they might expect to see from investments in this area.

Agreement on the industry outcomes sought requires consultation and discussion within the industry in order to ensure that decision makers understand current management practices within the industry, industry views on the constraints associated with potential changes, and any concerns industry participants have about them. Those participating in the discussions should be advised of the potential benefits of proposed changes and of any trade-offs between alternative outcomes so they can participate fully in the consultation process.

Another important component of the industry planning process is the understanding of farm business structures and their relationship with other industry players, since this will determine the impacts of different investments on industry outcomes. While it may not be possible to model farm and market behaviour formally in order to quantify these impacts in all industries, it is important for all key participants to have an understanding of the pathways or mechanisms that will eventually result in benefits to levy-payers and other participants.

Discussion of desired outcomes should also identify priority areas of investment required to meet these outcomes. These should also be identified as part of the planning process and will involve articulation of a level of detail below the general outcomes. Their definition should provide a guide to the types of change at the farm and industry level that would bring about the desired outcomes. For example, the planning process might identify that crop yields could best be developed by improving management practices with existing technologies, or by investing in improvement in genetic material.

Investment priorities for particular outcomes or benefits may not, in many cases, align with a single functional area of expenditure such as research, extension, or market access. Meeting the desired outcomes will probably require a mix of functional activities and possibly a combination of projects. This format has been adopted by the dairy industry over recent years and has provided a useful framework for reporting and accounting for the full cost of achieving outcomes.

Industry leaders might also consider whether there are differences in the way in which regional or industry sub-groups are likely to be affected by such proposals and the implications of this. Where there is an obvious alignment of interest within and across industry groupings, opportunities for co-funding or collaboration should be explored.

While many of the industries included in the study do undertake some strategic planning activity, it has not always been clear how this process contributes to the investment decision-making process. It can be argued that the test of a good strategic plan is the ability of that plan to guide critical decisions on priorities and to allocate scarce resources.

An industry organisation developing an industry plan and allocating investment resources needs to ask and answer a number of questions about the industry. Table 3 is a checklist of the questions industry organisations need to address in relation to the industry strategic planning process. These questions can be answered without detailed analysis or, if resources permit, some or all of them can be subjected to such analysis. The nature of the questions is independent of the size and complexity of the industry involved, although approaches to considering the issues may vary widely. Many industries, particularly larger ones, have strategies and processes that answer these and more questions, but there are new industries and others that have not considered these issues.

Table 3
Checklist of Questions to Facilitate Industry Planning

Does the industry have a strategic plan with a time horizon longer than one year?
Although short-term planning is essential for budgeting and financial control, it does not address longer-term changes in industry circumstances or the potential developments such as better marketing and improved technologies that may be required. The following questions should be answered when formulating or reviewing industry plans.

What is the planning horizon?
Many of the issues facing land-based industries are medium or long-term in nature and the terms of many investments are likely to be greater than one year. It is common for strategic plans to have a medium-term perspective of three to five years and to be regularly reviewed and updated.

What are the desired changes to be achieved within the planning horizon?
It is important to understand where the industry wants be in the future and to identify the main changes that the industry desires in order to improve the position of its stakeholders.

Which of these changes can be influenced by industry investment activity and therefore be described as "outcomes" in the industry plan?
It is essential that the defined outcomes are those on which industry investments will have an impact, rather than those beyond industry control such as exchange rates, climate and some consumer attitudes.

Can these outcomes be described in measurable terms and what are the measures?
It is important to be specific about the components of the farm or market systems in which change is desired and the extent to which these are to be changed. Outcomes need to be defined in measurable terms that provide targets against which to assess performance.

Do the industry leaders/managers understand the change environment and the priority areas of investment for achieving the outcomes?
An understanding of the farming systems and market environment of the industry will enable identification of the most cost-effective investment options for achieving the desired outcomes. e.g.: Can increases in production best be achieved through cultivar development or changes in management practices? Such questions require review of both the potential level of change and the costs of achieving it.

(cont.)

Have levy-payers had input to the process of identifying desirable outcomes?
Consultation is essential to this process in order to understand the implications for, and impacts of, change across the industry. It will also identify any conflicts or special interests that are important.

6.2 Investment Decision-making

The industry reviews have described the annual processes used in different industries to allocate funds to specific investment areas. New investment decisions, particularly in smaller industries, are constrained by the extent to which the industry is committed to on-going projects. They are complicated by the uncertainty of income associated with the industry's vulnerability to changes in markets, weather and other short-term factors. Notwithstanding these issues, the majority of industries do allocate funds each year to initiate new projects, and are able to review funding to existing projects in the light of new priorities.

The proposed planning process, and identification of the outcomes sought and the priority investment areas for their achievement will provide guidance for investment decision-making in the medium-term. It is clear that individual levy-payers do not expect to be involved in the detail of reviewing proposals or assessing benefits, but most expect to have the opportunity to consult on the planning and priority setting process.

Identifying clear priorities will provide an opportunity to streamline the decision-making process and develop more reasoned arguments when ranking investment proposals. This, in turn, should facilitate the development of a transparent decision-making process and may enable industry organisations to consider a wider range of options for sourcing and managing investment proposals. For example, rather than commissioning a single research provider to prepare a proposal to generate an outcome, industries may elect to involve different providers in the different investment areas required to achieve that outcome. This more targeted commissioning of investments may be a more effective approach to achieving outcomes and addressing constraints to industry development.

The theoretical discussion in earlier sections has shown that it is difficult to provide meaningful, quantitative, ex-ante cost-benefit analyses for investment proposals in the agricultural industry. However, it is not unreasonable to expect that proposals will be guided by strategic priorities and will not be funded unless the manner in which they will contribute to the achievement of the industry outcomes sought has been demonstrated. This is often the most difficult and uncertain area in industry-good investment decision-making.

Some industries may consider it to be more appropriate for industry organisation investment leaders (or external advisors) to develop very specific briefs for investment activities that are expected to contribute in a predetermined manner to the achievement of industry outcomes (e.g. DairyNZ). Industries with fewer resources may require providers to develop an understanding of the outcomes required and demonstrate clearly the manner in which the proposals they submit will contribute to these. Providers should also define the way in which they will interact with other investment providers in, for example, the technology adaptation phase that may be required between the research and extension phases of investments that lead to changes in on-farm practices.

In fact, elements of this outcome-driven approach can be seen in some long-standing industry investments such as the Meat and Wool New Zealand Ltd Monitor Farm Programme and in

the farmer-driven initiatives that have been important in some industries in recent years. Its adoption at the industry-level is more recent and not yet widespread. Levy-payers' strong support for projects that generate clear short-term benefits at the farm level, such as pest and disease control projects and management practices that address specific immediate problems also reflects a desire to achieve particular outcomes via industry-good investment.

It is easier to identify and analyse the potential outcomes of short term investments than of wider industry-good investments such as setting and maintaining industry environmental standards, or long-term cultivar development programmes that may involve allocation of property rights. The industry reviews show that while many growers can see some of the potential benefits of this type of investment, they do not wish to understand the uncertainties and flows of longer-term benefits associated with them. While levy-payers may not fully understand or appreciate, these longer-term benefits, such issues should be addressed and debated in establishing the industry priorities and desired outcomes.

For the industry organisation, understanding the pathway to achievement of outcomes and benefits will also highlight the importance and costs of the extension and communication activities that are a necessary part of any research investment. A focus on outcome-driven investment decisions will ensure that these costs are correctly attributed to the outcomes achieved.

The adoption of outcomes that are stated in a measurable way makes it possible to monitor progress towards them, and establishes an appropriate basis for any more formal evaluation of the costs and benefits of past industry-good investments. It is more appropriate to consider the all the financial impacts of attaining specific industry outcomes that are known and understood by industry participants, than to focus on individual and often isolated investment decisions, which may have unidentified interactions with other investment activities. This type of evaluation may well make it possible for industry organisations to demonstrate the success of industry-good investments in a manner that is meaningful and interesting to growers, and to improve their accountability to levy payers.

In planning investments it is essential for industry organisations to understand the role that the wider rural network including private consultants, communications specialists, and trade representatives can play in outcome achievement. As discussed in Section 4, levy-payers are influenced by a wide range of information sources in their technology adoption and formulation of views on industry issues.

The checklist provided in Table 4 is intended as a guide to the type of information to be obtained and questions to be addressed by industry leaders, and others involved in preparing proposals, when making decisions.

Table 4
Checklist of Questions to Guide Investment Planning

Do the priority areas and desired outcomes provide sufficient guidance for identifying good investment proposals?
It is necessary to understand how priority areas for investment will affect profitability on farm and market outcomes

How will you evaluate success?
The industry plans should provide a basis for evaluating investment proposals - if not they may require further refinement.

Does the investment proposal under review directly address industry outcomes?
Proposals must set out clearly the contribution that the proposed work will make to the achievement of desired outcomes. This is an important criterion for proposal evaluation.

Does the proposal explain the how the desired outcomes will be met and the path to benefits for levy payers?
It is important for industry leadership and those submitting proposals to understand how levy payers benefit from the investment and what risks are involved.

How will farm level changes affect markets and returns in the short/long term?
Farm level changes, such as increased production or changes in product quality, can have longer-term impacts on markets that must be accounted for in benefit estimation.

What other groups or industries would be affected by this proposal?
Opportunities for co-funding or collaboration are becoming increasingly important as a means of reducing the costs incurred by a single industry. They may also allow industry involvements in investments too large for them to undertake alone.

Are there any property rights issues that will affect long run benefits/costs*?*
The private ownership of technologies or genetic material can influence the benefits to growers or the costs of implementing technologies. This aspect is becoming increasingly important.

Can the costs and benefits be quantified?
While this is not essential, and may be prohibitively costly in some cases, such analysis can be valuable in selecting between investments to achieve a particular outcome. While such evaluations are more common at the completion of projects they are likely to be of more benefit to industry at the outset. There are several decision criteria available to investment analysts. The most commonly used are:

- *Net Present Value (NPV) which estimates the value today of projects with differing patterns of expenditure and benefit realisation and is the favoured method according to Treasury*
- *Internal Rate of Return (IRR) which is the discount rate at which the NPV is zero and is effectively a "break-even" interest rate. It is potentially useful where there is a lot of uncertainty about the discount rate*
- *Benefit Cost Ratio (BC) which shows the ratio of the NPV of benefits over the NPV of costs. As a rule of thumb, picking the projects with the highest BC ratios can ensure maximum value for money in terms of contributing to outcomes*
- *Payback Period is the period after which the cumulative cashflows exceed zero. Its weakness are that it does not discount cashflows and it ignores costs and benefits beyond the payback period which may be very significant*

(Treasury, 2005)

(cont'd)

Is there experience of the benefits from similar investments in other industries or overseas?
This can provide useful guidance, and such experience is often freely shared.
On completion of the investment project have the results been reviewed in terms of their contribution to outcomes?
Such reviews need not be quantitative but are a valuable part of assessing the effectiveness of the investment planning process, and can be a useful component of feed back to levy-payers and industry leadership.
Can the total costs and benefits of attaining an outcome be quantified and evaluated?
For industries with sufficient resources to do formal analysis of total farm and market benefits associated with the achievement of an outcome, or extension of that analysis to include measures of social and environmental benefits to stakeholders and other groups, could provide a basis for evaluating the decision-making process and the impacts of achieving different types of outcome on the industry good.

6.3 Overview

Figure 3 provides an overview of the framework that has been proposed to assist industry organisations in allocating levy funding for the benefit of levy-payers. It shows the normal separation of responsibility between a governance body, responsible for planning and priority setting, and an executive responsible for specific proposals and delivery.

It is recognised that industries that have implemented Commodity Levies vary considerably in size and scope. While the concepts described above may at first appear too complex and resource-demanding for smaller industries, the approach can be adapted readily for application in industries of differing sizes and levels of investment funds.

The process for developing strategic plans and agreeing priorities in smaller industries may involve considerably fewer people, less detail, and less formal analysis than in large industries where complex strategic planning processes are already employed. It is, however, equally important that the process is conducted by smaller industry organisations and that outcomes, targets and key investment areas are agreed. Participants in smaller and more focused industries often have more personal contact, better communication, and more awareness of industry issues than those involved in larger industries, but this does not substitute for, or remove the need for, some form of medium-term planning.

There may be considerable differences in the degree of analysis of investments between industries, but it is still important that industry leaders are able to explain from an industry perspective the longer term goals of investment activity and the manner in which a particular investment will benefit that industry. Many of the investments in smaller industries will involve a large proportion of the budget in any one year. Consequently, priority setting and the understanding of trade-offs between investment options may be even more critical for them than for larger industries which have more budgetary flexibility.

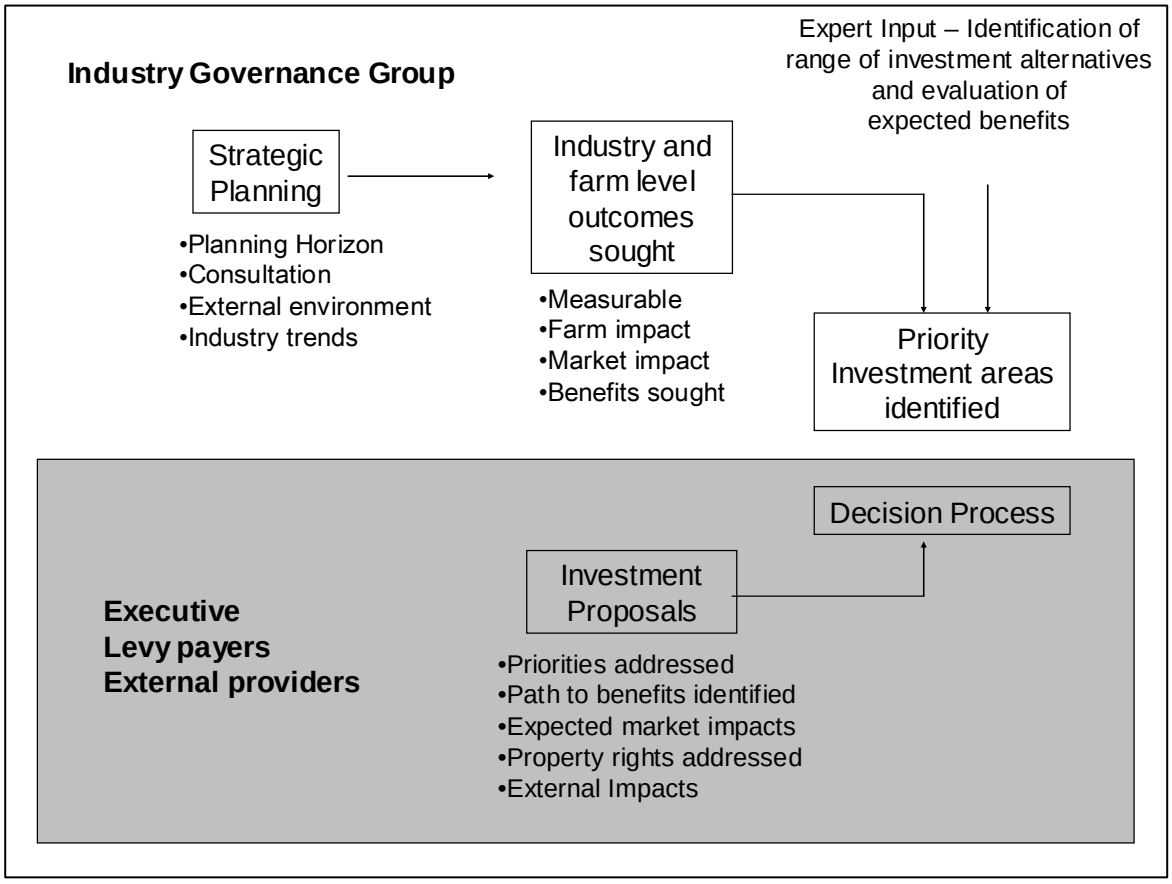

Figure 3
Overview of Investment Decision Framework

6.4 Implications for the Levy Order Review Process

The discussion of investment processes presented above has focused largely on annual decision-making, rather than on the planning associated with the levy review process which is undertaken every five or six years. It seems logical that industries which implement a clear annual planning process, and have clearly articulated industry strategies that are well understood and accepted by industry members, will find the levy renewal process easier.

For this reason it is recommended that:

- documentation of an annual priority setting and consultation process should become an significant component of the levy renewal process and would replace any current requirement for cost-benefit analysis

It can be argued that improved understanding of annual priorities and evolving longer-term industry strategies by levy-payers will make them able to see the reasons for, and advantages of, increasing levy rates, more readily than at present. This would allow industries to make greater use of provisions for changes in levy rates up to the maximum levels set in Levy Orders, and facilitate more gradual adjustments to changes in industry circumstances.

Although the study has shown that most industry organisations are satisfied with their current processes, changes of this type would minimise the additional resources required during the

renewal process, a particular burden for small industries. The costs of meeting any additional planning requirements will depend on the quality and value of processes that are currently in place in the industry.

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APPENDIX 1
Focus Group Reports

[CONFIDENTIAL TO MAF]

APPENDIX 2
Reports of Interviews with Industry Leadership

[CONFIDENTIAL TO MAF]

APPENDIX 3
Summaries of Levy Orders in Selected Industries

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