REPORT

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Guidelines for owner reimbursement costs under the plant pest deed

Prepared for

Plant Health Australia

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Executive summary

The main objective in providing Owner Reimbursement Costs (ORC) is to provide incentives for growers to report suspicious pests or pathogens[1] under the basic principle of no one being worse off or better off as a result of reporting a suspected exotic pest incursion. A companion objective is to provide social justice to those growers who, through no fault of their own, are seriously affected by a Response Plan to eradicate an exotic pest.

As a general guideline, Owner Reimbursement Costs should be equal to the previous or pre-Response Plan value of the assets in question less the current or post Response Plan value of the damaged assets, plus the response costs incurred by the owner. Where the assets are destroyed, the post Response Plan value will, of course, be zero. Thus,

Owner Reimbursement Costs = (Previous asset value – Damaged asset value) + Response costs

In general, the time of valuation should be as close as possible to the time of destruction of the Crop or imposition of a quarantine order. However there are circumstances where more practical options are available, particularly for immature annual Crops, or short rotation Crops.

The challenge in establishing guidelines is in determining appropriate values of assets, especially in situations where there are no established markets. The concept applied is, at the time of Crop destruction where the Crop is immature or it is a perennial Crop, what price would an owner and a person wishing to lease the Crop/land agree on under normal circumstances. This is equal to the discounted net present value of the income/cost stream that can be earned from taking on the lease and continuing the same line of production. For annual broad-acre Crops, the conceptual lease time would be from the time of Crop destruction until harvest, as there is no need to consider subsequent largely independent

[1] The term 'pests' will be used throughout this report to refer generally to pests and pathogens of plants.

Crops. For perennial Crops the conceptual lease time may spread over several rotations.

Establishing guidelines involves taking into account several factors and finding an acceptable balance between them.

- Guidelines should be consistent with the basic principles.
- They should be relatively simply and easy to understand.
- They should be easy to administer with administration costs kept to a minimum.
- They should be aimed at providing owners with an incentive to report suspected exotic pest incursions — owners should be no better or worse off.
- Yet the costs of providing Owner Reimbursement Costs to owners affected by a Response Plan should not be so high as to frequently make the benefits of eradication less than the costs, and no eradication attempted.

Annual Broad Acre Crops

Based on the general guideline outlined above, the time of valuation should be at the time the Crop is destroyed. This presents no difficulties if the Crop is destroyed shortly before harvest, but there is no effective market value for an immature Crop which is destroyed as part of the Response Plan. Owner Reimbursement Costs could be based on long term average prices and yields, but this would mean that the partners to cost sharing (governments and industry) would take much of the risk in production from the time of Crop destruction to harvest. There would be inequities, for example, if the year turned out to be a drought year and the growers affected by the Response Plan received average yields whereas all other growers in surrounding areas achieved drought yields, and affected growers would undoubtedly also have otherwise achieved drought yields.

Consequently, the approach adopted is to delay Owner Reimbursement Costs until harvest time and base payments on the actual outcomes on prices and yields for the district at that time. The value of the immature Crop destroyed is taken as an estimate of the final Crop value at farm gate less harvesting costs, less any production costs that would normally have been incurred between the time of Crop destruction and harvest. Growers would not normally receive payment for their Crop until harvest anyway so this approach would leave them no better or worse off.

Farm gate value is here defined as the value of produce produced on the farm and sold at first point of "sale"(for example the local silo for grains) less the estimated or actual transport cost and selling costs from farm gate to first point of sale.

Recommendation for Annual Broad Acre Crops

Costs which may be paid as Owner Reimbursement Costs are to be calculated as follows:

ORC = (A – B) + C + D + E – F + G

where:

A = Estimated farm gate value of the Crop(s) destroyed which would otherwise have been harvested, where the timing of valuation is normal harvest time.

= a * y * p

where:

a = area of Crop destroyed

y = estimated yield of the Crop destroyed

$$= \frac{\text{regional average yield in year t} \; * \; \text{Claimant's yield in year t–1}}{\text{regional average yield in year t–1}}$$

Where the whole district is seriously affected by the pest being eradicated and regional yields are clearly distorted, the yield (y) for the determination of Owner Reimbursement Costs paid by the applicable State/Territory will be taken as the regional average for the five years to year t–1.

Yields protected by insurance policies would be protected under this Method of Valuation (to the extent that the Owner is not able to recover under the insurance policy) and any insurance premiums are not to form part of Owner Reimbursement Costs.

p = estimated farm gate price (local silo cash price less transport costs between farm gate and silo) at the time of harvest. Specifically, the average price for the two calendar months over which the bulk of regional harvest takes place. Where no cash prices are posted, prices are to be taken as the estimated pool return for the

type and quality of Crop which was destroyed. In the event that an Owner has taken out a forward contract to deliver grain at a specific price, assessment of 'p' is to be based on this contract price rather than the cash silo price. Price is to reflect the quality of product that would otherwise have been delivered. Owners would need to demonstrate quality by way of variety sown and/or recent farm history.

In the event of there being no obvious local delivery point where cash prices are posted, the average district price (based on deliveries to closest end users or port) is to be used as the basis for payment.

B = 'Best practice' harvesting costs plus any other costs normally associated with Crop production between the time of Crop destruction and harvest.

Such costs are to be standardised for the region based on estimates by State/Territory departments of agriculture.

C = Direct costs associated with the Response Plan incurred by the Owner but not normally incurred as a production expense.

D = Replacement value of any capital items destroyed as part of the Response Plan.

E = Loss of profits from fallow land in subsequent years where land is required to be fallowed as part of the Response Plan.

Owner Reimbursement Costs are to be restricted to loss of profits for a maximum of three years. Methods of estimating loss of profits are the same as for the year in which the Crop is destroyed and include deductions for ground preparation and planting costs normally associated with Crop production. Such costs are to be standardised, based on 'best practice' and estimated by State/Territory departments of agriculture. Any payment of Owner Reimbursement Costs by the applicable State or Territory is to be made after harvest in that region each year.

F = Profits that could be earned from the next best alternative enterprise, produced with the same resources, on the land where the Crop is destroyed and permitted by the Response Plan.

Unless the Response Plan requires the land to be fallow, deductions are to be made on the assumption that the Owner chooses the next most profitable enterprise that could be undertaken with existing capital equipment. Gross margins for these alternative enterprises are to be standardised, based on 'best practice' and estimated by State/Territory departments of agriculture. This applies only in the year in which the Crop is destroyed. Where a strict fallow in subsequent years is not required under the Response Plan — that is, any alternative enterprise can be undertaken except production of the Crop concerned in the Response Plan, Owner Reimbursement Costs are not to include the difference in profits for the Crop in question and any alternative enterprise.

G = Value of any stored grain or other produce on-farm destroyed as part of the Response Plan. The value is to be in-silo value based on local market values less transport and handling costs at the time of destruction of the stored grain.

Where a Crop has to be destroyed shortly after planting and there is a reasonable opportunity to plant an alternative Crop, the Owner may choose to be reimbursed for the costs of destroying the Affected Crop and planting the alternative Crop. Otherwise, the above formula will apply.

with such costs and values being determined in accordance with guidelines issued by Plant Health Australia as set out in Schedule 17.

Annual Short Rotation Crops (Vegetables/Strawberries/Nursery Seedling Producers/Nursery Wholesale)

These Crops include vegetables, strawberries and nursery seedlings. While in some cases an annual Crop is produced, a general characteristic of these Crops is that several 'harvests' are made during the growing season and growers will organise their business to have a constant turnover. A lettuce grower, for example, will have Crops at different stages to produce commercial quantities of fresh produce at regular intervals.

The basic principles and formula for Owner Reimbursement Costs applying to annual broadacre Crops should also apply in this case, even though harvests are made at different intervals throughout the growing season rather than at the end.

Recommendations

Costs which may be paid as Owner Reimbursement Costs are to be calculated as follows:

ORC = (A – B) + C + D + E – F + G

where:

A = Estimated farm gate value of the Crop(s) destroyed.

= a * y * p

where

a = area of Crop destroyed

y = yield

or a and y might refer to number of units expected to be sold, such as a number of punnets of seedlings.

The yield estimate is to take into account the type of Crop destroyed. Strawberries, for example, have a high yield in the first year, but a much lower yield in the second year.

p = farm gate price

= either:

- the average market price for the season in the region or marketplace where normal sales take place; or
- where there are signed contracts with the price stipulated on the contract, the contract price

less any transport or selling costs.

B = Harvesting costs plus any other costs normally associated with Crop production between the time of Crop destruction and selling or harvesting. This is to include normal treatment or packaging and handling costs on farm for some harvested produce (for example washing or dipping of products).

C = Direct costs associated with the Response Plan incurred by the Owner but not normally incurred as a production expense — including cleaning of equipment or glasshouses etc.

D = Replacement value of any capital items destroyed as part of the Response Plan.

E = Loss of profits from a Response Plan requirement to fallow land or keep glasshouses empty.

These ORC are only available where the Response Plan requires a fallow period that exceeds ten weeks and are to be restricted to loss of profits for a maximum of three years. Profits are to be based on standardised gross margins data from State/Territory departments of agriculture, based on 'best practice'. However, in some cases, for example where glasshouses are involved, profit estimates may need to be based on documentation of profits from previous years.

F = Profits that could be earned from the next best alternative enterprise, produced with the same resources, on the land where the Crop is destroyed and permitted by the Response Plan — as determined in accordance with the definition of 'F' in clause 4.4.11.

G = Value of any stored produce on farm destroyed as a directive of the Response Plan — as for annual broadacre Crops.

with such costs and values being determined in accordance with guidelines issued by Plant Health Australia as set out in Schedule 17.

Perennial Trees/Vine Crops/Nut Crops/Nursery Bare Root Stock Production/Large Bare Rooted Plants

This category of plants includes all commercial fruit trees such as citrus and stone fruits, pome fruits, nut trees, all vine Crops, longer-term nursery bare root stock production and large bare rooted nursery plants including trees.

Orchard tree Crops

All these Crops have in common a normal rotation cycle which is more than one year. For example, apples generally have a rotation cycle of around 25 years with a first Crop at around two to three years and first commercial Crop at around year seven.

When a Response Plan involves the destruction of an orchard or vineyard, the normal rotation cycle is interrupted. Tree replacement is brought on sooner, sometimes with a fallow period to control the pest. Apart from reimbursement for destruction of the fruit in the year the orchard is

destroyed as part of a Response Plan, the issue is how growers should be reimbursed for destruction of the trees. Reimbursement is for loss in value of the orchard/land asset. Conceptually, the orchard's value is equal to the sum of the discounted stream of net profits which could in future be earned from the orchard/land — including account taken of future tree replacements. This is the price a person wanting to lease the orchard under normal conditions would agree to pay the owner to lease the asset.

If growers are reimbursed for the full cost of pulling out the trees and replanting them, then some will be better off depending on how old the orchard or vineyard is. If it is at or near the end of its rotation then, in effect, governments and industry would be paying for the removal and replanting costs when under normal circumstances, the owner would meet these costs anyway. The owner would be much better off.

Two methods have been examined that address this issue.

The first method is to apply a 'depreciation' factor to all costs associated with a change in the rotation — tree removal, replanting costs and the period of lost income when trees are immature. Thus, if the orchard had only just reached commercial production and had to be destroyed, the full costs of replanting the orchard would be included plus any lost income during the immature period. However, if the orchard, when destroyed, was in the year when it would have been destroyed and replaced under normal circumstances, then costs of replacement would not be included in Owner Reimbursement Costs. A straight-line depreciation schedule would be applied between these two extremes.

The second method is where replacement payments would be based on the difference between the sums of two discounted net profit/cost streams. One stream would be the normal rotation cycle over several cycles — three cycles are suggested. The other stream would be the new set rotation cycles caused by the Response Plan. All tree replacement costs would be brought forward in the discounting procedure.

The Second method is perhaps the more theoretically correct of the two, but Owner Reimbursement Costs are somewhat sensitive, in some cases to the length of time over which discounting takes place. This may be a source of uncertainty for many Crops. The calculations are quite straightforward but the method is likely to be harder for growers to understand. For this reason it may be better to adopt method one. In both cases, information will be needed on a standard rotation pattern for each Crop. This could be agreed upon by industry associations for purposes of calculating Owner Reimbursement Costs.

For some nut tree Crops, vines and also pears, the rotations are very long, in some cases approaching 100 years. Method one could still be applied. It would mean, however, that for most commercial vineyards which have relatively recently been planted, owners would receive virtually full replanting costs.

Recommendations

Costs which may be paid as Owner Reimbursement Costs are to be calculated as follows:

ORC = (A – B) + C + D + E + F + G + H + I

where

A = Loss of profit from the current Crop destroyed.

= a * y * p

where

a = area of tree Crop destroyed

y = expected yield based on Owners' past records, taking into account any biennial bearing patterns. In particular, Owners claiming above average yields (and prices) must produce auditable records of above average returns in previous years to justify additional amounts in Owner Reimbursement Costs.

If the Owner has no records, the regional average for that Crop is to be used.

p = market price at farm gate at harvest time

B = Harvesting costs based on 'best practice' as estimated by State/Territory departments of agriculture, plus any other costs (such as watering or pruning costs) normally associated with Crop production between the time of tree destruction and harvest.

C = Direct costs associated with the Response Plan incurred by the Owner but not normally incurred as a production expense.

D = Replacement value of any capital items destroyed as part of the Response Plan.

E = Loss of net profits for any fallow period required by a Response Plan.

Net profit is to be standardised based on regional gross margins calculations for the Crop in question by State/Territory departments of agriculture.

F = Tree destruction costs 'depreciated' depending on the age of the orchard in relation to a standardised period of rotation for the tree Crop in question.

Depreciation is to be based on a straight line method between full cost reimbursement at the beginning of commercial production of the rotation and the end of the rotation.

G = 'Depreciated' tree replanting costs as for tree destruction costs.

H = 'Depreciated' loss of profit during the non-bearing period of immature trees.

I = Value of any stored produce on farm destroyed as a directive of the Response Plan including seed or nuts — as for annual broadacre Crops.

If there is an opportunity following the Response Plan for modernising or upgrading the orchard — for example, closer tree plantings, more expensive varieties, or trellis plantings, the level of Owner Reimbursement Costs is to be related strictly to replacing the asset that was there. If an Owner wants to introduce more technology or better infrastructure, for example, the Owner must cover any additional costs.

with such costs and values being determined in accordance with guidelines issued by Plant Health Australia as set out in Schedule 17.

Broad Acre Perennial Crops

This group of plants includes sugar cane, bananas and other such Crops. Owner Reimbursement Costs can be calculated in exactly the same way as for orchard trees. Generally, the broadacre perennial Crops have a shorter rotation cycle, but the principles are the same.

Recommendations

Costs which may be paid as Owner Reimbursement Costs are to be calculated as follows:

ORC = A + B + C + D + E + F + G

where

A = Value of the Crop destroyed

= a * y * p

where

a = Area of Crop destroyed.

y = Yield which depends on the type of Crop destroyed — for sugar, for example, whether it is a plant Crop or ratoon Crop as yields vary from year to year. For this reason, yield *y* is to be based on distinct average yields for the type of Crop destroyed — for example, ratoon or plant Crop.

p = Market price of the product.

= The average regional market price over the previous 12 months valued at farm gate.

B = Any costs of Crop destruction 'depreciated' in the same way as for perennial tree Crops.

C = Any other costs incurred by the Owner as a direct result of the Response Plan and not normally incurred as a production cost.

D = 'Depreciated' Crop replanting costs as for perennial tree Crops.

E = Loss of net profit from compulsory fallow, where fallow would not normally be part of the rotation cycle. Net profit to be standardised and based on regional gross margin estimates by State/Territory departments of agriculture averaged over the rotation cycle. A maximum of three years fallow is to be included.

F = Replacement value of any capital items destroyed as part of the Response Plan.

G = Value of any stored produce on farm destroyed as a directive if the Response Plan — as for annual broadacre Crops.

with such costs and values being determined in accordance with guidelines issued by Plant Health Australia as set out in Schedule 17.

Nursery Root Stock Production and Nursery Large Rooted Plants

For these enterprises, the returns to the owner accrue when the root stock or trees are sold and, in most cases, they can be sold at any stage past an initial juvenile stage. There is no annual production as in the case of orchard trees. Also in most cases, there will be a market value for the trees at nearly all stages. Hence, Owner Reimbursement Costs should be based on the market value of the trees or root stock less any production costs.

Recommendations

Costs which may be paid as Owner Reimbursement Costs are to be calculated as follows:

ORC = A + B + C + D

where:

A = Market value or estimated market value of the plants at the time of their destruction.

B = Direct costs associated with the Response Plan incurred by the Owner but not normally incurred as a production expense. This includes tree destruction costs.

C = Replacement value of any capital items destroyed as part of the Response Plan.

D = Any stocks on hand which are destroyed due to the Response Plan.

with such costs and values being determined in accordance with guidelines issued by Plant Health Australia as set out in Schedule 17.

Nurseries, Retail

A characteristic of these enterprises is that they have a constant turnover of stock. However, Owner Reimbursement Costs relate to the value of assets destroyed, not consequential income losses.

For retail nurseries, stock should be valued at market value. The concept underlying value of stock relates to an auction being otherwise held on the nursery site at the time of destruction of the nursery stock. The market value would most equate to the wholesale price of the stock. If retail prices were taken, deductions would have to be made for selling costs — labour, advertising, etc.

Recommendations

Costs which may be paid as Owner Reimbursement Costs are to be calculated as follows:

ORC = A + B + C

where:

A = Wholesale market value of stock destroyed, valued at the time of destruction

B = Any costs above normal operating costs incurred by the Owner as part of the Response Plan.

C = Replacement costs for any capital items destroyed.

with such costs and values being determined in accordance with the guidelines issued by Plant Health Australia as set out in Schedule 17.

Bees, Hives, Honey and Associated Products

The beekeeping industry has several sectors. The most common is that sector which uses normal hives to produce honey, bees wax and several other minor products. Specially adapted hives are used by some producers to produce pollen in addition to honey. A third sector derives income by providing pollination services for orchardists. Other specialist beekeepers produce queen bees, while others maintain nucleus hives.

Owner Reimbursement Costs following an exotic pest incursion necessitating destruction of hives should be based on the value of the asset destroyed. That is, the value of the hive plus queen bee plus colony. Owner Reimbursement Costs would therefore amount to replacement value for the particular colony destroyed. There are recognised market values for these.

Where beekeepers lose income, for example, because they can no longer provide pollinating services to orchardists, Owner Reimbursement Costs

should not include this loss of income as it is a consequential income loss. To the extent that this may cause particular hardship to some beekeepers, other welfare or adjustment programs may be considered. But the principles of underlying Owner Reimbursement Costs under the plant deed, based on change in asset values, should not be compromised.

Owner Reimbursement Costs would not include loss of product (say honey) value as a result of contamination resulting from a Response Plan action for another industry. For example, if a Response Plan for apples involved spraying trees with insecticide and as a result pollen became contaminated and rendered the honey produced unsaleable, beekeepers would not receive Owner Reimbursement Costs. There are several reasons for this. First, this is a consequential income loss. Second, in this example, beekeepers would not be contributing to the overall costs of the Response Plan relating to apples. And third, in most cases, there would be considerable uncertainty and dispute about the source of any contamination of the honey.

Recommendations

Bees and their hives are defined as included under Crops. However for the avoidance of doubt, costs which may be paid as Owner Reimbursement Costs to the owners of bees and their hives are to be calculated as follows:

ORC = A + B + C + D + E + F + G

where:

A = Value of the particular hive destroyed.

B = Value of the queen bee destroyed.

C = Value for the bee colony component.

D = Replacement value for any other capital items destroyed.

E = Any other costs incurred by the beekeeper as a direct result of the Response Plan and not normally incurred.

F = Value of any honey stocks destroyed.

G = the loss of the estimated Farm Gate Value of products foregone, less beehive operating costs, resulting from a requirement under a Response Plan that for a specified period bees be quarantined in, or excluded from, a specified area, if applicable.

with such costs and values being determined in accordance with guidelines issued by Plant Health Australia as set out in Schedule 17.

Properties with multiple enterprises

Many properties have multiple enterprises and cases may arise where properties are placed under quarantine, which may prevent any produce leaving the property. This may necessitate produce being destroyed on the property even though it is not directly attacked by the exotic pest that is being eradicated. But this other produce may act as a transmission agent for the pest. The question is, should grower Owner Reimbursement Costs be made for the produce not directly affected by the pest but made unsaleable as a direct result of the quarantine order?

Recommendation

In the case of multiple enterprises, produce not directly affected by the pest being eradicated but which is rendered valueless, say, because it is a perishable commodity that cannot be sold because of quarantine restrictions should be eligible for Owner Reimbursement Costs. The principle underlying the amount of Owner Reimbursement Costs should be the same as for produce which is susceptible to the pest and must be destroyed as part of the eradication program.

1 Introduction

In 2001, Plant Health Australia (PHA) published a discussion paper on funding and owner reimbursement costs for the emergency eradication of exotic plant pests.

Since then, PHA has been involved in developing an Emergency Plant Pest Response Agreement (EPPRA), whereby governments and plant industries will share the costs involved in the management and eradication of emergency plant pest incursions. An outstanding issue in finalising cost sharing arrangements is the determination of guidelines for the financial reimbursement to owners, of the costs they incur as a direct result of a Response Plan being implemented to eradicate emergency plant pest incursion.

This report explores the issues surrounding Owner Reimbursement Costs and makes recommendations for guidelines on payments. Key issues and principles and an overall framework are discussed first. This lays the foundation for a common approach to Owner Reimbursement Costs across the different plant industries, based on sound economic and social justice principles. However the guidelines developed also take into consideration several other important issues, including practical ways of dealing with particular situations, as well as administration costs.

Particular categories of plant industries are then considered in turn. The guidelines developed for each adhere to the general framework but the unique characteristics of each category are taken into account in the final recommendations.

The ideas presented in this report have been developed after detailed consultation with and with the help of the nominated industry representatives listed at Appendix 1. Their assistance is acknowledged and greatly appreciated.

2 *Key issues, principles and a general framework*

The objective

Under current arrangements, the Australian government and state governments share the costs of eradicating exotic plant pests. No Owner Reimbursement Costs is paid to owners of Crops or property which are destroyed as a result of a Response Plan being implemented. This provides no incentives to owners to report an incursion because of the fear of incurring substantial financial hardship. But the longer an incursion goes unreported, the greater the costs of eradication to the industries concerned and the nation. In many cases, delays in implementing a Response Plan can result in the failure of eradication attempts and the pest becoming established. This can inflict considerable perpetual hardship on the industries concerned.

A key feature of the EPPRA is the reimbursement of costs incurred by owners whose property is destroyed, or value of assets significantly reduced, as a direct consequence of the Response Plan to eradicate the pest. Under the general agreed principle of owners being no worse off or better off, this should eliminate any incentives not to immediately report incursions. This is the main objective of including reimbursement provisions in the EPPRA. In addition, the aim is to provide natural justice to those directly affected. An owner whose Crop is destroyed as part of a Response Plan should not have to bear an undue proportion of the costs of eradication in the interests of the whole industry.

Issues

The key issue is the appropriate level of reimbursement of additional costs and losses to individuals whose Crops or property is destroyed or adversely affected as a direct result of a Response Plan being implemented. There will seldom be a situation where every individual affected will be reimbursed so that he or she is *exactly* no better off or worse off although

this is the objective. If individuals are significantly under reimbursed, this could undermine the confidence of producers generally and provide incentives not to report incursions in the future. If, however, there is over reimbursement, particularly in difficult industry situations, incentives could be established for some perverse behaviour — some producers under stress may take actions to introduce the pest onto their property just to get the generous Owner Reimbursement Costs. Isolated cases such as this were reported in Britain during the campaign to eradicate foot and mouth disease in that country.

There are other adverse consequences of setting Owner Reimbursement Costs on the side of generosity. Consideration also needs to be given to the capacity of industries, particularly some small plant industries, to raise the levies necessary for those industries to meet their obligations under the cost sharing arrangements. Some of the smaller industries have expressed particular concerns in this regard.

Another adverse consequence is that inflated reimburse payments will affect the benefit/cost calculations which are a necessary part of the decision making process on whether or not an attempt should be made to eradicate the pest. As noted above the objective of Owner Reimbursement Costs is to enhance the process of eradicating exotic pests, but if these payments are too generous, the costs of eradication will be inflated and exceed the benefits, making it less likely that an eradication attempt will be made. Thus many exotic pests could become established which might otherwise have been eradicated.

Over generous Owner Reimbursement Costs are also a concern for governments which, in many cases will be paying a substantial proportion of the costs of eradication. They will wish to avoid any notion that such payments are disguised subsidies or welfare payments or that governments are picking up the risk factors that are a normal part of business activity.

Owner reimbursement costs under the Australian Constitution

In determining owner reimbursement costs for affected landowners it is instructive to consider the principles of compensation which apply in the case of compulsory acquisition of property by the Australian government (box 2.1).

2.1 Compulsory acquisition and compensation

Section 52 (xxxi) of the Australian Constitution allows the Australian Government to make laws to acquire the property of States or persons *"on just terms"*. This has been interpreted by the Australia High Court as providing a "constitutional guarantee of just terms" (Clunies-Ross v Australian Government (1984) 155 CLR 193) when the Australian Government takes property and on this basis it is a constitutional necessity for the Australian Government to pay due compensation when they take property.

The Department of Finance and Administration outlines the specific factors that are considered in assessing compensation to be provided after compulsory acquisition, which include:

- the market value of the property acquired;
- special value to the owner
- if only part of the property is acquired – whether the value of the remainder is reduced;
- disturbance costs – losses and reasonable expenses directly resulting from the acquisition, for example, removal expenses and resettlement costs; and
- reasonable legal or professional costs – such as to help the property owner understand the acquisition procedures or to provide documents required by the Commonwealth.

The constitutional requirement for the Australian Government to pay just compensation when they take property does not extend to instances when the Government interferes with property rights but does not take effective ownership. Subsequently, there is no constitutional requirement for the Australian Government to pay compensation with regards to Crop losses under a Response Plan.

However, given that the Australian Government, State governments and industries have decided to provide Owner Reimbursement Costs under the cost sharing agreement, the rules associated with compensation in the instance of compulsory acquisition are an appropriate guide, though need not be applied to the letter.

Several points are clearly evident from a consideration of the above compensation rules and could be incorporated into guidelines for Owner Reimbursement Costs under the EPPRA:

- Owner Reimbursement Costs to landowners should be consistent with 'on just terms'. PHA members have generally agreed with the principle that Owner Reimbursement Costs should make those affected no better or worse-off as a direct result of the actions taken under a Response Plan;
- market values should be used wherever possible to determine appropriate Owner Reimbursement Costs. Where this is not possible, estimates should be made based on the concept of market values; and
- Owner Reimbursement Costs should not extend to consequential income losses.

Owner Reimbursement Costs under the Emergency Animal Disease Response Plan (AUSVETPLAN)

The guidelines for Owner Reimbursement Costs for the owner of livestock and property destroyed under the Emergency Animal Disease (EAD) Response Plan are clearly outlined in the Valuation and Compensation Manual. This document outlines the principles of the approach, being;

- rapid and equitable payment;
- valuation procedures that do not unnecessarily delay destruction and other eradication procedures;
- clear identification of issues that may impinge on valuation procedures; and
- the need for valuers to be aware of their role and responsibilities.

It is important that owners not be made worse off under the plan to ensure that owners have an incentive to report potential outbreaks, and to ensure equity. Because of this, the EAD Response Plan requires that owners be reimbursed the total market value of all destroyed livestock and property.

Under the Response Plan, an accredited valuer determines the market value of the destroyed livestock at the time of destruction. This necessitates a 'Register of Valuers' and the setting of rules concerning the payment and training of valuers. In a recent review of the AUSVETPLAN Valuation and Compensation Manual it was suggested that the current reliance on valuers might be a weakness of the current approach. This may be true due to inconsistency between different valuers, uncertainty about the conclusion of valuers, a potential shortage of valuers and the potential for sudden changes in the value of livestock. Because of these reasons it may be preferable to consider a situation where national agreed livestock value standards are used, considering an average value over recent years.

As the current animal reimbursement scheme requires payment equal to the market value of the livestock, it does not consider any consequential loses (as these losses are implicit in the market value of the livestock). In addition, no reimbursement is offered to offset the potential impact of any requirement to leave land unused. Animals that die from causes other than EAD, or property not intended for decontamination that is inadvertently damaged, are explicitly excluded from the calculations.

Following a valuation by an accredited valuer, if there is agreement between the owner, the valuer and the department, the owner is paid according to the valuation. If either the owner or the department disagrees with the valuation they may dispute the valuation with a three-person

arbitration panel appointed by the minister. In addition, the owner has the option of applying to have his reimbursement 'topped-up' when s/he re-stocks if the value of the livestock has increased since the initial valuation.

Principles

The following principles should underlie the guidelines for Owner Reimbursement Costs under the EPPRA.

- Owners whose property, Crops or goods are destroyed or significantly devalued as a direct result of a Response Plan should receive Owner Reimbursement Costs for the loss in value such that they are no better off or worse off.
- Valuations should be based on fair market value.
- Owner Reimbursement Costs should relate to the direct consequences of the Response Plan and should not include consequential income losses.
- Where owners incur costs as part of the Response Plan that are additional to their normal operations, those costs should be included in Owner Reimbursement Costs.

General framework

A general model for Owner Reimbursement Costs is that they should be equal to the previous or pre-Response Plan value of the assets in question less the current or immediately post Response Plan value of the damaged assets, plus the response costs incurred by the owner.

Owner Reimbursement Costs = (Previous asset value – Damaged asset value) + Response costs

This general framework applies to all types of Crops and in all situations, including perennial Crops, annual Crops, short rotation Crops, nurseries and beehives. It achieves the goal of ensuring that owners are made no better or worse off due to the Response Plan. This accords with the principles of Owner Reimbursement Costs as outlined above, and it also ensures that there is no incentive to hide the existence of a Crop pest. In addition, Owner Reimbursement Costs do not include consequential loss of income even though the concept of future income streams is used to estimate asset value.

In keeping with the principles, the following should not be included in reimbursement payment calculations:

- future profit from Crops and land which amount to double-counting. If, for example, a Crop is destroyed but some other short rotation Crop can be immediately planted on the same land, the profits from the short rotation Crop would need to be deducted from Owner Reimbursement Costs base on loss of the first Crop ;
- the cost of insuring against potential Crop damage because this is a normal cost; and
- costs incurred in complying with the Response Plan which would have been incurred anyway as part of normal business.

Determining asset value

To determine the appropriate reimbursement payment it is necessary to determine the asset value of land and Crop before the Response Plan, and the asset value of the land and Crop after the Response Plan. The appropriate asset value is the 'fair market value' at the time of destruction, which is the price that a fair minded buyer and a fair minded seller in open competition would agree to exchange ownership of the asset.

The best way to determine a fair market value is to simply observe the outcome of an active market. However, this is not a viable option for something that is not regularly traded, such as short-term leasing rights for half-grown Crops. Consequently, it is necessary to estimate a fair market value using alternative methods.

In economic terms the asset value is equal to the discounted present value of the net income stream that can be earned from ownership of the asset. Future benefits are discounted by an appropriate interest rate to make them comparable with present values. This is because of the time value of money (a dollar today is more valuable than a dollar in the future). So expected future benefits are discounted by the appropriate discount rate (usually 5 per cent in recent years) and the sum of these values is the discounted net present value. From an economic perspective, an investor would be willing to purchase an asset at any price below the net present value of the future returns of that asset, and a seller would be willing to sell an asset at any price above the net present value. The estimated fair market value is equal to the discounted net present value of the future net benefits from the asset.

Some simple examples illustrate the principle concept being applied here.

An annual Crop destroyed just before harvest

In the simplest case, an annual broad-acre Crop (such as wheat) is destroyed shortly before harvest. In this instance, there is no impact on future production. The only year that matters is the year in which the Crop was destroyed. Also there is no change in land value.

As the value of the Crop after it is destroyed is zero, the change in the value of the Crop is equal exactly to the expected returns from that Crop in that one year. This is equal to the gross returns from sale of the Crop, valued at farm gate, less harvesting costs. In this case it is assumed that there is no risk of Crop damage before actual harvest. It is not appropriate to deduct the previous costs of production because they are now sunk costs.

An immature Crop

If, as part of the Response Plan, the wheat Crop is destroyed three months after planting, what should the level of Owner Reimbursement Costs be? In this case there is no market for such an immature Crop. The concept to apply, however, is one where a person would lease the land in question from the owner for the period until after harvest. The lease price is the value of the Crop asset at that stage. That is, before the Response Plan. The value after the Response Plan is zero, as the Crop is destroyed and no alternative Crops are permitted to be grown. The lease price or asset value of the Crop at the time of destruction could be estimated as the final gross returns from the sale of the wheat Crop, at farm gate, less harvest costs, less any other costs that would normally be incurred between the time of Crop destruction and harvest, less an allowance for risk. The person leasing the Crop would factor into his or her offer price for the lease the chance of final yield or prices being lower than normally expected.

From the perspective of Owner Reimbursement Costs under the cost sharing arrangements, a difficulty is in estimating the risk factor. A way around this is for the parties concerned to agree to delay Owner Reimbursement Costs until the normal time of harvest when regional yields and prices are know with certainty. If this practical approach is taken, no risk factor need be applied.

An alternative Crop is permitted

If, under the Response Plan, the immature wheat Crop must be destroyed soon after planting, but a barley Crop can immediately be planted, the same concepts can be applied. In this case, the asset value of Crop/land

before the Response Plan remains the same but the asset value after the plan is enhanced by the expected value of profits from planting a barley Crop on the same land. Here, profits from the barley Crop will take into account all production costs associated with planting, growing and harvesting the barley Crop and the risks of barley prices or yields being lower than expected.

In this case, there may be other practical considerations that should be taken into account. These are discussed in the next chapter.

Fallow land

Suppose under the Response Plan not only does the immature wheat Crop need to be destroyed, but the land has to lie fallow for one year. In this case the concept to apply is one where the lessee would otherwise take on the lease of the land for the current season plus the following season. The amount he or she would pay for the lease (at time of destruction of the Crop) would be as for the immature Crop case above plus the expected profit to be earned from a wheat Crop the following year, including the risks involved. The present value of these sums would be the value of the Crop/land asset at the time of destruction of the first wheat Crop – before the Response Plan. The asset value after the Response Plan would be zero, since the first wheat Crop is destroyed and nothing can be grown on the fallow land. One could argue that the act of fallowing the land improves the soil and hence the asset value but in the context of response payments, trying to take this into account is probably an unnecessary complication. But a related issue is how to take into account, if at all, the likelihood that the landowner would have fallowed the land in the second year anyway. In principle Owner Reimbursement Costs should not be made for the Crop loss in the second year if the owner did intend to fallow the land, but the practical issue is how to prove that the landowner would have fallowed the land in the second year. These issues are considered later.

Perennial Crops

Consider the case where a perennial Crop, say oranges, normally has a rotation of 20 years, with a three year period of non-bearing trees after first planting. If as a result of a Response Plan all trees in the orchard have to be destroyed during the tenth year of the rotation, the issue is what should be the amount of Owner Reimbursement Costs. Any costs incurred by the orchard owner that would not normally be included as a production cost somewhere in the rotation would be included in Owner Reimbursement

Costs, but of particular concern here is the approach to valuing the change in asset value as a direct result of the Response Plan.

Again, the appropriate concept is to consider a person wanting to lease the orchard at the tenth year. What lease price would be settled on? The value of the orchard, or right of the lessee to continue growing oranges over many rotations is the discounted net present value of the income/cost stream that can be generated from continuing to grow oranges. This value can be thought of as the value of the asset (orchard) prior to the Response Plan. This value would take into account the costs that would be incurred in year 20 when the existing orchard would have to be scrubbed out and a new one planted. It would also take into account the three years after year 20 when the new young trees are non-bearing — and so on for subsequent rotations.

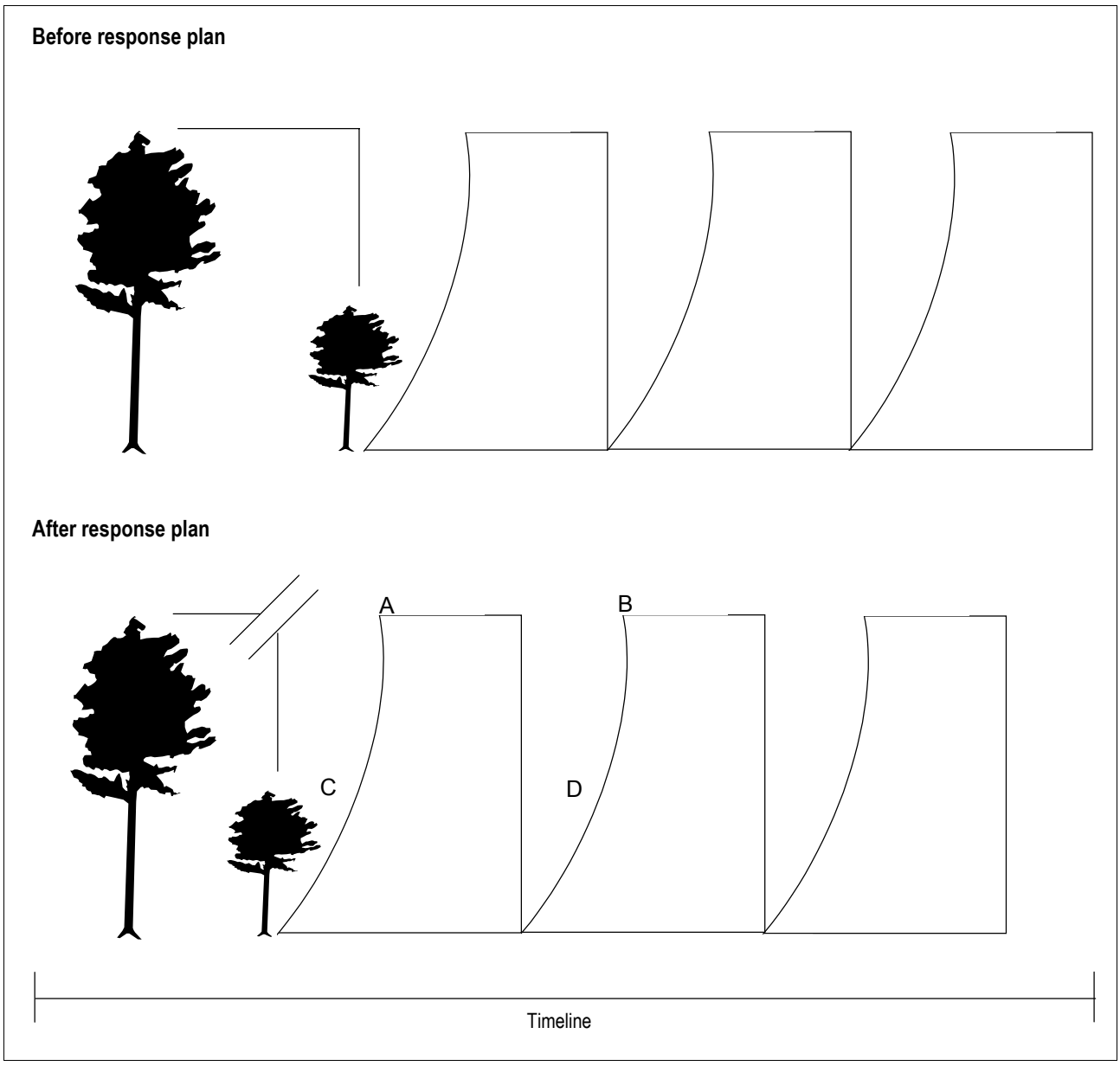
Under the Response Plan, in this example, the orchard is destroyed at year ten, and assume that there must be one year of fallow before the young orange trees can be replanted. In effect, the sequence of rotation has been shifted forward and there is one additional year where no income is generated. Costs associated with removal of trees and replanting have been shifted forward by about ten years.

Some will argue that the amount of Owner Reimbursement Costs should be the sum of the cost of tree removal, the cost of replanting and the income lost from the Crop at the time of implementing the Response Plan (that is year ten Crop when the trees were destroyed) plus the income lost while the young trees are growing to maturity. The effect of this, however, would be to leave the owner better off. One round of costs of orchard replacement would be paid for entirely by the cost sharing arrangement (government and industry). In addition, between years 20 and 23, when normally the orchard would not be producing income, because of immature trees, the owner following the Response Plan would have trees in their prime, producing income.

Based on the principles developed earlier, the appropriate Owner Reimbursement Costs should be the difference between the discounted net present value of two income/cost streams, one being the income/cost stream which would normally occur over several rotations, and the other being that after the Response Plan. The present value in this case is taken at the point when the Response Plan is implemented. Chart 2.1 shows how the sequence of rotations is changed by the Response Plan.

This general approach can be applied in concept to any perennial Crop, irrespective of the length of Crop rotation.

2.1 **Life cycle of perennial Crops**



Market valuation when the market collapses

Karnal bunt is a disease of wheat that adversely affects production but more importantly, if introduced into Australia, would have a serious adverse effect on wheat prices. Several major wheat markets would immediately impose bans on wheat imports from Australia, and wheat prices in Australia would likely fall to very low levels. This raises a conceptual issue of what price of wheat should be used for reimbursement payment purposes — the price prior to or after the incursion or some other standard price.

Some may argue that the average pre-incursion price should be used in line with equity or 'fairness' considerations or to help those most affected. But there are other important consequences. If those whose Crops are destroyed receive Owner Reimbursement Costs based on normal prices, it will mean other wheat farmers will only receive the depressed price for their wheat in that year. Not only will this be seen as favourable treatment for the few whose Crops are destroyed under the Response Plan but may also lead to perverse behaviour by a small minority who may actively seek to get the disease in their Crops so that they can claim the much higher Owner Reimbursement Costs. Cases such as this were reported in the United Kingdom during the foot and mouth disease crisis in that country. The outcome would be the complete opposite to the intended outcome of providing Owner Reimbursement Costs in the first place. There would be incentives established to spread rather than contain the disease.

The animal industries face a similar dilemma and in a review of the Emergency Animal Disease Response Agreement consideration is being given to what price should be used to value stock destroyed in situations where there is a market collapse. It is suggested that a schedule of standard valuations be compulsorily used. These would be determined by a panel of valuers and would generally be above the prevailing collapsed market prices. The issue is somewhat less critical for the animal Agreement because there is a second payment at the time of restocking – equal to the difference between the restocking price and the first payment. The first initial payment affects mainly a grower's cash flow, albeit at a critical time.

Taking all considerations into account, at least for annual or short rotation Crops, there is some justification for using going market prices irrespective of whether the market is depressed or not. This approach would not favour those whose Crops are destroyed over other growers who would receive the depressed market prices.

However there is also a case for special treatment for some perennial Crops when, as discussed above, long time periods are used in the calculations for Owner Reimbursement Costs. A judgement would need to be made on when it is reasonable to expect the market to return to normal.

Properties with multiple enterprises under quarantine

Many properties have multiple enterprises and cases have arisen in the past where such properties have been placed under quarantine because of an exotic disease outbreak affecting one Crop. The effect of the quarantine order under the Response Plan may be to prevent any produce leaving the

property, whether susceptible to the exotic pest or not. Produce not affected by the pest may nevertheless be transmission agents for the exotic disease.

Where non-susceptible produce is rendered valueless, say, because it is a perishable commodity that cannot be sold because of quarantine restrictions, there is a change in the asset value of the commodity and the reimbursement principles discussed above should apply in the same way as if the produce was susceptible to the exotic pest being eradicated.

In other cases, the non-susceptible commodity may not be rendered valueless and may in fact increase in value. Take the case of a nursery grower who produces garden variety deciduous trees for sale at different ages as well as small shrubs. If the incursion related to a small shrub variety, but the whole property was placed under quarantine, the owner may not be permitted to sell any trees and susceptible small shrubs may have to be destroyed. But the trees will keep growing and after, say, a two-year quarantine period will be worth more. Clearly no Owner Reimbursement Costs should be made for the trees other than any costs of treating the trees, but the issue is whether their increase in value should be deducted from the total Owner Reimbursement Costs to the grower.

In principle, as the trees increase in value, a deduction should be made but practical considerations may suggest that Owner Reimbursement Costs cannot be negative. If each component of a reimbursement claim is considered on its merits in isolation, it is difficult to see where a quarantine order would make a grower better off.

3 *Annual broadacre and Annual short rotation Crops (Vegetables/Strawberries/Nursery Seedling Producers/Nursery Wholesale)*

This and subsequent chapters build on the general principles and framework outlined in the previous chapter and discuss options for arriving at Owner Reimbursement Costs that are consistent with the principles but approach asset valuation and other issues in a practical manner. Examples are given to illustrate the alternative approaches.

Annual broadacre Crops

Producers are reimbursed for the loss in Crop asset value as a direct result of the Response Plan. This implies a loss in asset value of Crop/land combined since one cannot be separated from the other. At the time of Crop destruction assuming no other Crops can be grown in that season, the appropriate value is the price a person leasing the Crop/land would pay to the owner under conditions which would prevail if the Crop were not to be destroyed. That person (lessee) would then take on all risks and reap the rewards of final harvest. He or she would factor perceived risks into their lease offer price.

If in the subsequent year, a fallow is involved in the Response Plan, then the appropriate reimbursement payment can be thought of as the lease price (at the time of Crop destruction) that would, under normal circumstances, be paid to the owner for the time to harvest of the current Crop and the subsequent Crop.

In this case, the lease price would be the profits that could be earned from the current Crop, and the lessee planting and harvesting the subsequent Crop.

Guidelines for annual broadacre Crops

Guidelines for determining Owner Reimbursement Costs (ORC) in the case of grains are suggested as follows.

Prices

Prices would be based on those offered by marketing boards or companies (for example, AWB, ABB) at the local silo for the type and grade of grain involved in the Response Plan, less any transport costs between paddock and local silo. That is, prices would need to be at farm gate. Marketing boards or companies post cash prices at local silos for most types and grades of grain. Otherwise local merchant prices could be used. The average price for the two calendar months over which the bulk of the regional harvest takes place could be taken.

The AWB at harvest time provides a series of payment options to growers who sell their grain through the national pools. Owner Reimbursement Costs could be based on the cash price on offer for the type and grade of grain involved. In the case of rice, however, the pooling system means growers receive progressive payments over about 18 months. Owner Reimbursement Costs for rice could likewise incorporate progressive payments as if the grower had sold his rice to the central buying agency.

If there are special circumstances, owners would have to produce evidence of consistently higher than posted local silo prices received over the last few years, or documentation of other special circumstances relating to prices. For example, some growers may be able to produce evidence of particular contract prices.

In the event of there being no obvious local delivery point where cash prices are posted, the average district price (based on deliveries to closest end users or port) is to be used as the basis for payment.

Yields

Estimated yields would be tied to local district yields but also to the owner's past history with grain yields.

Where the whole district is seriously affected by the pest being eradicated and regional yields are clearly distorted, the yield (y) for the determination of Owner Reimbursement Costs paid by the applicable State/Territory will be taken as the regional average for the five years to year t–1.

Yields protected by insurance policies would be protected under this Method of Valuation (to the extent that the Owner is not able to recover under the insurance policy) and any insurance premiums are not to form part of Owner Reimbursement Costs.

Harvest costs

Harvest costs and any treatment or other production costs between the time of Crop destruction and harvest would be deducted. Estimates of these could be based on the owners personal records or 'best practice' estimates by the local department of agriculture. The latter is preferred.

Response plan costs

Any costs incurred by the grower which were additional to normal operating costs and were necessary for the eradication effort would be added to the Owner Reimbursement Costs.

Incorporating risk

Estimating the risk factor is difficult and would require access to historical records over many years at the local level. What is required is an estimate of the probability of getting yields and prices lower than expected at the time of Crop destruction. An example is given under Method 2 below.

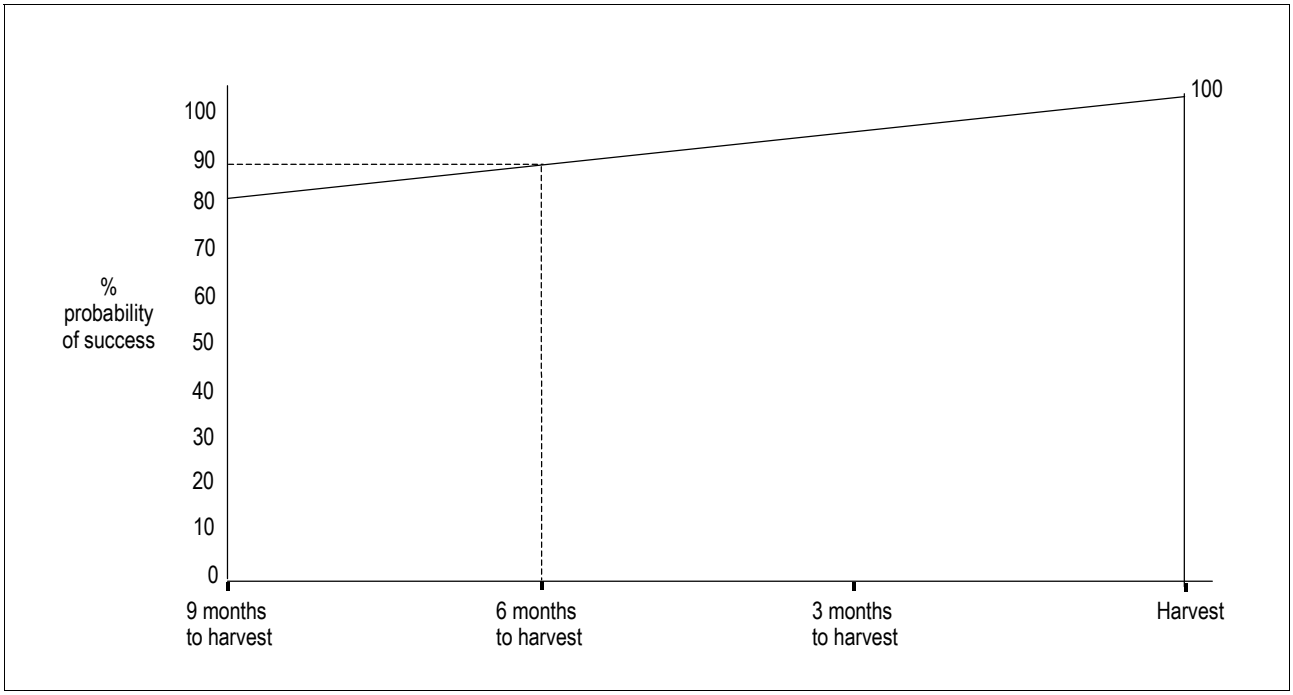
Probability of successful harvest

There are many reasons that a Crop may not be brought to successful harvest. After a Crop has been planted there is a non-zero probability that flood, drought, hail, pests, fire etc may destroy the Crop or severely reduce yields.

The closer a Crop is to harvest then the lower is the risk that the Crop will be destroyed before harvest. Therefore, as time goes by, the probability of a successful harvest increases. A hypothetical relationship between time to harvest and the probability of a successful harvest is shown in chart 3.1.

As shown, six months before the harvest there is a 90 per cent probability that the harvest will be successful. The probability of success steadily increases until it is effectively 100 per cent immediately preceding the harvest. The expected revenue from any Crop is equal to the product of the potential yield, the Crop price and the probability of success.

3.1 **Hypothetical probability of a successful harvest**



Where the Crop is destroyed shortly before harvest, the owner would be reimbursed for the value of the Crop destroyed based on local results of yield and price prevailing for that season. These estimates would be from official sources (AWB or agriculture departments), adjusted to the person's own circumstances on documented evidence as noted above or standard estimates by departments of agriculture. No risk factor would be involved in this case.

Where the Crop is destroyed shortly after planting and the opportunity remains to plant an alternative Crop, a practical and simple approach would be to base Owner Reimbursement Costs on the cost of replanting an alternative Crop, where this is allowed under the Response Plan. Otherwise the approach would be to treat the Crop as an immature Crop (see below). Producers may be given the choice. The risk factor is largest in this case of Crop destruction soon after harvest.

Planting of alternative Crops

To avoid double counting, where the land on which the Crop is destroyed is allowed to be used for other purposes during the same growing season (grazing, potato production etc), the net profits derived from such enterprises in the current season would be deducted from Owner Reimbursement Costs .

Where the Crop destroyed cannot be grown on the same land the following year, but there is no requirement to fallow the land - the land can be used for other purposes (for example, growing another Crop or some other use of the owner's choice), no Owner Reimbursement Costs would be payable for the second year. In many cases alternative Crops would be grown anyway as part of the normal farming rotation management system .

Immature Crops

For otherwise immature Crops, two methods for dealing with Owner Reimbursement Costs are suggested. These are discussed below.

Method 1: Delayed Owner Reimbursement Costs–expost

If the Crop is destroyed, say, 3 months before harvest, Owner Reimbursement Costs under this method would be delayed until harvest time when the owner's production and the price he would otherwise have received can be accurately estimated from regional outcomes. This means that governments and industry and the owner share the risks: if the region experienced a drought year, Owner Reimbursement Costs would be applicable to that drought year. Similarly, for a good year. The owner would be no better or worse off than if his Crop had been harvested under normal circumstances. The owner would normally receive payment after harvest anyway. Also, much of the guess-work in estimation, including of any risk factor, would be avoided. A hypothetical example is presented in box 3.2

No risk factor is applied because of the ex-post nature of the reimbursement. The grower is, in effect, being reimbursed what he would have got had the Crop reached maturity, and Owner Reimbursement Costs would be made after harvest. Also in this example no additional Response Plan costs are incurred.

If government agencies found it more convenient to provide some 'up front' payment at the time of Crop destruction to facilitate grower cooperation a, say, 25 per cent down payment could be made at the time of signing agreements just before the Crop is destroyed. This would be a matter for agencies to decide.

This approach is not inconsistent with the 'animal model'. In that, producers are reimbursed for the market value at time of destruction but a second 'top up' payment can be made if costs of replacement animals are higher when quarantine restrictions are lifted.

3.2 **A hypothetical situation illustrating Method 1**

- An exotic pest is found in a wheat Crop in southern New South Wales at the end of July (three months since planting).
- Assume that the Crop is normally planted in early May and harvested at the end of December.
- The Crop and several surrounding ones are immediately destroyed as part of the Response Plan.

Ex-post valuation calculations

The grower would receive Owner Reimbursement Costs at the time of normal harvest payment.

Component	***Detail***
Area	area of Crop destroyed (100 hectares)
Yield	$\frac{\text{regional average yield in year t} \ * \ \text{Claimant's yield in year t–1}}{\text{regional average yield in year t–1}}$
	= 1.95/1.80 x 2.1 = 2.275 tonnes/hectare
Price in paddock	(local silo price for type of wheat grown by owner) less (estimated transport and harvesting costs)
	= $156/tonne (for NSW) – $5 (local transport) – $10 (harvest costs)
	= $141/tonne
Reimbursement	=area x yield x price
	= 100 x 2.275 x 141 = $32 077

Insurance costs and hedging

If a grower had previously taken out insurance against drought or hail damage to hedge against low yields, then Owner Reimbursement Costs would be based on the protected yields rather than the regional drought or hail-affected yield if these events occurred in the district. Where a grower had not taken out insurance, Owner Reimbursement Costs would be based on the drought or hail-affected regional yields. Thus, this approach would not destroy the incentives for producers to carry insurance.

Where growers had hedged against prices, the hedging contract should still cover them against low regional prices.

Advantages

- The grower receives reimbursement at about the same time he would otherwise have received his returns from harvest.

- Controversial estimation methods especially for the risk factor are avoided. All parameters are known with near certainty.
- Governments benefit by delays in payments.
- The approach is not inconsistent with 'top up' payments in the animal model where delays in payment until restocking mean payments based on known parameters.

Disadvantages

- This method could be seen as consequential income loss. But the principle of reimbursement for asset loss is not changed. The method of estimation is based on delayed payment and greater certainty in parameters.

Method 2: Owner Reimbursement Costs based on valuation of immature Crops

This method requires estimation of the value of the immature Crop at the time it is destroyed. In this example this is assumed to be midway through the growing season. Details are given in box 3.3.

In this example the risk factor has only been applied to yield. In a similar way, it could also be applied to price but this would mean identifying years in which local prices were at very low levels and then estimating the probability of low price years. A complication is that for many Crops local prices and yields mostly reflect outcomes in regions or states, and low yields often correspond with high prices and vice versa. This complicates estimation of the risk factor, and leaves any method of estimation open to challenge. Also, data series over long historical periods is necessary to estimate probabilities, and such data series are not always available.

For these reasons, method 1 is recommended as a more practical approach.

Stored grain

Where stored grain on properties has to be destroyed as part of the Response Plan, owners would receive Owner Reimbursement Costs for the in-farm silo value of the stored grain at the time of destruction. This would be equal to local silo or market prices of the grain at that time less any transport/handing cost estimates from farm silo to local silo.

3.3 **Owner Reimbursement Costs based on valuation of immature Crops**

Parameter definition

Parameter	***Description***
Area of Crop destroyed	100 hectares
Time of Crop destruction	Midway through growing season
Crop type	Wheat
Wheat price	Estimated pool return average of last three years plus AWB estimate for current year, averaged
Wheat yield	Documented evidence of grower's wheat yield for last four non-drought years: or regional averages for that type of wheat if no documentation
Harvest costs	As estimated by regional Department of Agriculture or estimates by grower
Costs from mid-season (Crop destruction to preharvest)	Nil in this case: otherwise as documented by grower on basis of last year's records where such costs are standard best practice
Risk factor	0.5 of probability of achieving drought year yield (because Crop destruction is at midseason)

Estimated parameters

Parameter	***Detail***	***Unit***	***Estimate***
Wheat price (APW – fob)	2003 (est)	$/tonne	206.00
	2002	$/tonne	241.00
	2001	$/tonne	220.00
	2000	$/tonne	200.00
	Average	$/tonne	216.75
Adjustment to farm gate price		$/tonne	50.00
Farm gate price		$/tonne	166.75
Harvest costs		$/tonne	30.00
Value of Crop standing before harvest		$/tonne	136.75
Average yield (average of last 4 non-drought years)		tonnes/hectare	1.85
Average drought yield		percentage of normal yield (%)	70.00
Probability of drought	5 drought years out of 20 years	per cent	25.00
Adjustment for risk factor	=1.85 – (0.3 x 1.85 x 0.25) =1.85 – 0.139	tonnes/hectare	1.71
Owner Reimbursement Costs	=yield x price x area =1.71 x 136.75 x 100	**$**	**23 384**

Total Owner Reimbursement Costs

Total Owner Reimbursement Costs would then be:

ORC = [estimated yield per hectare x area of Crop destroyed x estimated price (farm gate)] – harvest costs – any other production

costs between the time of Crop destruction and harvest + any Response Plan costs incurred by the grower + replacement value of any capital items destroyed as part of the Response Plan + loss of profit from any compulsory fallow — any profits earned from other enterprises on the same land for year one only + value of any produce stored on farm but destroyed as a direct result of the Response Plan.

Other annual broadacre Crops

Most if not all annual Crops can be treated in a similar way. In some cases (for example, rice and cotton), there may be more production costs such as watering costs and Crop maintenance costs between Crop destruction and harvest which would need to be estimated and deducted from farm gate return estimates. These additional costs could be estimated from the owner's past records or, preferably, they could be based on standard industry 'best practice' estimates.

In the cotton industry, many growers sell their Crop using a variety of hedging or forward selling methods. Where forward contract prices have been used, these prices could be taken for reimbursement payment purposes. On the basis of Method 1 the appropriate price is the net farm gate price that the grower would have received in that season in the absence of the Response Plan. This will mostly be the contract price. The hedging transaction would not be affected.

Annual short rotation Crops (vegetables/strawberries/nursery seedling producers/nursery wholesale)

These include Crops such as potatoes, brassicas, tomatoes , lettuce and so on and include nursery seedlings. Growing seasons are quite variable. Potatoes have a growing period of between 4–10 months while brassicas can be grown for around 12 weeks over summer or 30 weeks over winter. In general, however, all these Crops have relatively short growing seasons and, in principle, can be treated in exactly the same way as annual broadacre Crops. Method 1 discussed above would be even more applicable to these short rotation Crops.

In most cases, growers produce a range of Crops. If an incursion relates to one particular Crop, it is most likely that one or more of the other Crops will become involved in the Response Plan and Owner Reimbursement Costs will often have to include not only the susceptible Crop, but others as

well. For example, suppose a property is quarantined because of a potato virus incursion, where the virus can be transmitted in soil on vehicles, cartons etc. The Response Plan will undoubtedly require the destruction of the potato Crop, but if, in addition, the property is quarantined for 4 months, other Crops will be rendered unmarketable, and will need to be dug in. Alternatively, solonaceous weeds which can carry the potato virus may be present in the other Crops, necessitating their destruction as well as the destruction of the potato Crop. In both these cases, destruction of the other Crops is a direct result of the Response Plan and the owner will be entitled to Owner Reimbursement Costs.

The guidelines for these Crops should be the same as for annual broadacre Crops, with method 1 being recommended.

Where short rotation Crops are 'rolled over' to produce a continuous supply, average seasonal prices can be used, but otherwise the Owner Reimbursement Costs should be as for annual broadacre Crops.

4 Perennial Trees/Vine Crops/Nut Crops/Nursery Bare Root Stock Production/Large Bare Rooted Plants

Perennial Crops such as citrus, grapes, nuts and pome fruits, and broadacre perennial Crops such as sugar and bananas introduce a complication in the determination of appropriate Owner Reimbursement Costs where a Crop is destroyed following an exotic incursion. The main challenge is placing a value on the asset being destroyed, such as an orchard. This is more complex than in the case of annual Crops.

The main component of Owner Reimbursement Costs is for the reduction in the asset value of the Crop resulting from its destruction under the Response Plan, not for consequential lost income. The asset value in these cases is approximated by the stream of income derived from the Crop and land. For example, a citrus orchard has an economic life of around 20 years. The question is how to value the reduction in the asset value if an orchard is destroyed at a given time in its bearing cycle.

Two methods for valuing Owner Reimbursement Costs are considered.

Method 1: Reimbursement for short-term losses

Under this method, Owner Reimbursement Costs would comprise the following.

- Loss in value of the Crop being destroyed net of harvesting costs and any other costs normally incurred between the time of destruction of the Crop and normal harvest.
- Costs incurred by the owner in destroying the orchard trees and any other costs incurred as a direct result of the Response Plan which are not normal production costs. The costs of tree destruction would be 'depreciated' (see below).

- Replacement costs for any capital items destroyed.
- Costs of replanting the orchard, these being 'depreciated' according to the stage of the orchard in its productive life cycle. For example, where the orchard being destroyed has only recently been planted, full replanting costs would be included. If, however, the orchard being destroyed was at or near the end of its life cycle — on a standard best practice basis — replanting costs would be at or near zero. A straight line depreciation method is used to determine actual Owner Reimbursement Costs for replanting between these two extremes. The reason for this is that growers with orchards near the end of their productive life would be much better off it they were given full replanting costs.
- Loss of profits from the orchard destroyed during any required fallow period and during the time the trees are immature and non-bearing. Owner Reimbursement Costs for lost income during the immature phase of the orchard could also be depreciated in the same way as for replanting costs — for the same reasons. For example, if the orchard was destroyed half way through its standard life cycle then reimbursement would be paid for half of the lost profits during the immature phase.

Method 2: Difference between the discounted net present value of profit streams before and after destruction

This method was described in chapter 2 and takes into account the change in profit streams over at least three life cycles of the orchard or plantation.

Under both methods, other components of Owner Reimbursement Costs would include payments for loss of capital items destroyed as part of the Response Plan. If a particular shed, for example, needed to be destroyed, the owner would receive Owner Reimbursement Costs for the replacement value of the shed.

In order to illustrate the two methods for valuing reimbursement for perennial Crops, four examples are presented below. These are:

- citrus orchard
- vineyard
- sugar Crop
- banana Crop.

The last two are broadacre perennial Crops, but the principles are the same.

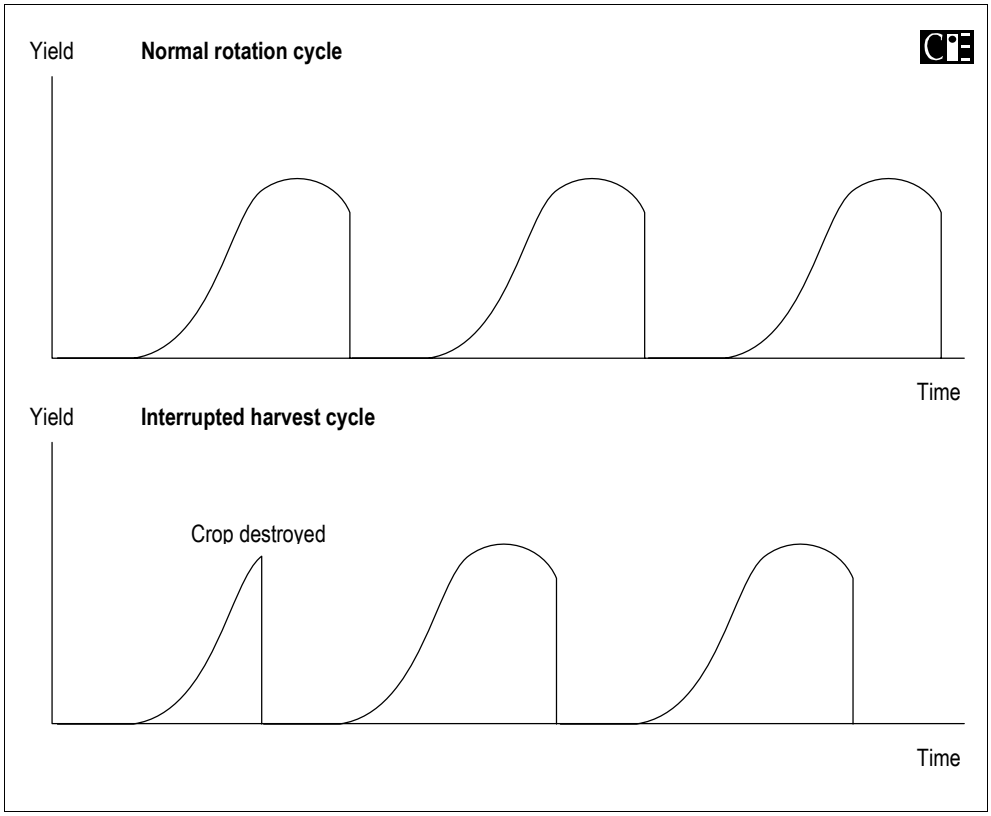
Citrus orchard

Suppose there is a citrus orchard, which for simplicity sake has a bearing Crop of trees in their 10th year of a 20-year bearing rotation. Citrus canker breaks out in the orchard and all the trees are destroyed. The main characteristics of the orchard are:

- the orchard is 100 hectares
- the price received for oranges is $201 per tonne (PC 2002)
- the cost of production is $182 per tonne (PC 2002)
- the average yield is 28.5 tonnes per hectare (PC 2002)
- replanting costs are $2000 per hectare
- destruction costs amount to $100 per hectare.

Chart 4.1 shows how the destruction of the orchard changes the rotation cycle. Essentially, method 2 for estimating reimbursement involves determining the discounted net present value of the profit stream in each case. Reimbursement then becomes the difference between the two net present values.

4.1 **Impact of Crop destruction on harvest cycles — citrus**



4.2 **Gross margins before and after destruction**

Year	*Normal harvest cycle gross margins*	*Interrupted harvest cycle gross margins*
	$/ha	$/ha
1	541	-100
2	541	0
3	541	-2 000
4	541	0
5	541	0
6	541	0
7	541	0
8	541	541
9	541	541
10	541	541
11	541	541
12	-2 000[a]	541
13	0	541
14	0	541
15	0	541
16	0	541
17	541	541
Etc.	Etc.	Etc.

[a] Costs incurred but no revenue.

Source: CIE calculations.

Table 4.2 shows the gross margins per hectare both before and after the destruction.

Under the interrupted rotation cycle it is assumed that trees are destroyed in year one and, following the destruction, the land must remain fallow for one year. In this example, it is assumed that the trees are destroyed at the beginning of the annual production cycle, so the loss incurred by the grower is just the gross margin for that Crop. Grubbing costs are incurred in year 1 along with the loss of Crop. If destruction occurred later in the season, reimbursement would be calculated as gross returns per hectare less harvesting costs and any other costs not yet incurred. Following planting, it takes 4 years for the trees to bear fruit, following which the orchard is assumed to achieve full average yield.

Method 1: loss of value of current Crop plus 'depreciated' replanting costs

Under method 1, reimbursement would be paid for the following elements:

- loss of current Crop as a result of the destruction — since the destruction is assumed to take place early in the season reimbursement is for the gross margin for that year, which amounts to $541 per hectare;
- 'depreciated' destruction costs above amounting to $50 per hectare;
- loss of Crop profits in the fallow year of $541 per hectare;

- depreciated replanting costs of $1000 per hectare; and
- loss of Crop while new trees are immature — this component would be depreciated in the same way as for replanting costs (in the example, this component would amount to (4 x $541) / 2 = $1082).

Thus, the total reimbursement payment in this example would be:

$541 + $50 + $541 + $1000 + $1082 = $3214

Using a 100-hectare orchard as an example, this would result in Owner Reimbursement Costs of $321 400.

Method 2: Difference between discounted income streams

Reimbursement is calculated starting year 1, the time of destruction. If the time period over which the difference in profit streams is considered is short, over payment could result since replanting costs would have been incurred anyway in year 11. However, even taking a period past year 11 does not ensure an appropriate payment. In fact, the reimbursement value fluctuates around an equilibrium point. This value approaches the equilibrium point as the evaluation period is extended. This is illustrated in table 4.3.

4.3 **Reimbursement calculations over different time periods — citrus**

Year valued	*Net present value original cycle*	*Net present value interrupted cycle*	*Difference — reimbursement*
	$'000	$'000	$'000
11	472	-39	511
20	468	217	251
30	626	267	358
40	645	352	293
75	759	443	306

Source: CIE calculations.

All the values presented above use a discount rate of 5 per cent. In this example, the longest time period considered is 75 years. In theory this could be extended to any number of years, however values further out are discounted heavily. The value of the reimbursement over 75 years is $306 000. After 40 years, the reimbursement figure has stabilised close to the longer-term figure.

There has been some suggestion that reimbursement should be calculated up to the end of the original rotation. In this example, this corresponds to year 11. Valuing reimbursement at this point results in gross overpayment to the grower. Reimbursement would be $511 000 as opposed to the long-

term value of $306 000. This is due to the grower being reimbursed for replanting costs and non-bearing trees due to the destruction without taking into account the fact that this would have occurred anyway later in the original harvest cycle. Reimbursement in this case should only be for the impact of bringing forward replanting and non-bearing costs.

Destroying Crops at different times in the cycle

The most important component in determining the Owner Reimbursement Costs due for a perennial Crop is the point at which the Crop is destroyed. To illustrate this, the citrus orchard example presented above is considered with varying destruction times. In each case, both method 1 and method 2 are considered. The results are presented in table 4.4.

4.4 Impact of destroying Crops at different stages

Year of destruction	*Method 1 — partial immature Crop payments*	*Method 2*
	$'000	$'000
5	428	396
10	321	326
15	215	206

Source: CIE calculations.

Once again, the two methods yield similar results. The time of destruction impacts considerably on the Owner Reimbursement Costs under both methods. Under method 1, the reimbursement due ranges from $215 000 (where the Crop is destroyed late in the cycle) to $428 000 (when the Crop is destroyed early in the cycle). Owner Reimbursement Costs under method 2 range from $208 000 to $396 000. Both methods take into account the effect of bringing forward replanting versus simply reimbursing for the full impact of replanting and non-bearing trees.

Nuts

Many nut tree Crops have long rotation periods but in principle they are very similar to other Crops with long rotations including pears and vine Crops. Hence, the same formula would apply to nut tree Crops as applies to other perennial tree Crops.

Sugar

Sugar Crops represent an interesting case for consideration due to the rotation process, which differs from other perennial Crops. Sugar Crops have a plant Crop, which is the Crop immediately after planting and around four ratoon Crops that follow the plant Crop. In general, the returns are highest from a plant Crop and steadily diminish for each subsequent ratoon Crop. There are two methods for valuing reimbursement for sugar that are considered here:

- reimbursement for loss of value of current Crops and depreciated replanting costs; and
- difference between discounted income streams.

In this case, reimbursement for loss of income during an immature phase does not arise.

Method 1: loss of value of current Crop plus 'depreciated' replanting costs

A practical method of estimating Owner Reimbursement Costs, as suggested by industry representatives, would be based on:

- reimbursement for loss of current Crop value net of harvesting or other production costs which would otherwise have been incurred; plus
- replanting costs discounted according to the stage of the cycle. Assuming a plant Crop plus four ratoon Crops as the standard cycle, there would be no payment of replanting if the fourth ratoon Crop was destroyed. However, full estimated replanting costs would be paid if a plant Crop was destroyed. A straight line depreciation schedule would be applied between these two end points for the remaining ratoon Crops.

In this example, it is assumed that there is not a compulsory fallow period. This simplifies the presentation.

Some basic parameters

Table 4.5 presents parameters to be used in this assessment.

4.5 **Gross margins data for sugar cane in the Burdekin Region**

	Plant Crop	*Ratoon 1*	*Ratoon 2*	*Ratoon 3*	*Ratoon 4*
	$/ha	$/ha	$/ha	$/ha	$/ha
Returns from sugar cane sales	4200	3600	3300	3000	2700
Harvest costs	742	636	583	530	500
Planting costs	687				
All other variable costs	866	1070	1070	1125	1050

Source: Queensland Department of Primary Industry.

If there were an incursion midway through the second ratoon Crop, necessitating total destruction and plough-out of the Crop, Owner Reimbursement Costs would be estimated as follows:

- loss of profits on second ratoon Crop, equal to the gross return from that Crop at farm gate, less harvesting costs, less any normal production costs that would have occurred between the time of Crop destruction and harvest (in this case, the Crop is likely to be in the 'out of hand' stage) = $3300 – 583 = $2717 per hectare;
- plus discounted planting costs = $343 per hectare (discounted on straight line basis from $687 per hectare for the plant Crop); and
- plus any costs incurred by the owner which were necessary parts of the Response Plan and additional to normal production costs, say, $70 per hectare.

Total Owner Reimbursement Costs would therefore be $3130 per hectare.

Comments

In this example, all of the production costs except harvesting costs were assumed to have occurred before the order was given under the Response Plan to destroy the Crop. These costs could amount to $1000 or more per hectare.

If replanting costs were not discounted according to which Crop was being destroyed (plant or ratoon Crop), total Owner Reimbursement Costs would increase to $3474 per hectare. This would be an overpayment because of the undue higher replanting costs.

Fallow land

If there is a requirement to fallow the land for a year, the reimbursement payment for the fallow period would be equivalent to the gross margin that could have been earned (based on past or regional records) for the

subsequent ratoon Crop. In this case, this would be the gross margin pertaining to the third ratoon Crop (about $1345 per hectare).

Hence the total Owner Reimbursement Costs in this case of one year of fallow would be $3130 + $1345 = $4475 per hectare.

Risk

To be consistent with annual Crops, some risk factor may have to be applied to the estimated gross margin especially for the third ratoon — to take account of a possible price or yield collapse. This would not be easily assessed for sugar. A more practical method would be to make Owner Reimbursement Costs at the times payments for Crops would normally be received.

Method 2: Difference between discounted income streams

This method is perhaps a more accurate reflection of what Owner Reimbursement Costs should be — loss in asset value of the Crop/land, but it is somewhat more complicated.

In this example, we assume that the Response Plan demands destruction of a second ratoon Crop. This changes the sequence of rotation in this block. The concept being applied is, at the time of Crop destruction, what would a lessee pay for the lease on the block? It would be the discounted net present value of the net income stream that could be generated from farming the block.

Owner Reimbursement Costs would then be the difference between the discounted net present value of each stream — the normal stream and that where the rotation cycle has been interrupted because of destruction of the Crop under the Response Plan.

Table 4.6 shows the different sequences.

Following this approach, the difference in the net present value of the gross margins over a period of 50 years is around $3 634 per hectare discounted at 5 per cent. Table 4.7 highlights this.

Owner Reimbursement Costs change only marginally after 20 years or around four rotations.

4.6 **Gross margins under normal and Response Plan rotation sequences**

Year	*Normal sequence*	*Normal sequence gross margin*	*Sequence interrupted by Response Plan*	*Response Plan sequence gross margin*
1	Plant Crop	1905	Plant Crop	1905
2	Ratoon 1	1894	Ratoon 1	1894
3	Ratoon 2	1647	Ratoon 2 DESTROYED	-1070[a]
4	Ratoon 3	1400	Fallow	0
5	Ratoon 4	1200	Plant Crop	1905
6	Plant Crop	1905	Ratoon 1	1894
7	Ratoon 1	1894	Ratoon 2	1647
8	Ratoon 2	1647	Ratoon 3	1400
9	Ratoon 3	1400	Ratoon 4	1200
10	Ratoon 4	1200	Plant Crop	1905
etc.	etc.	etc.	etc.	etc.

[a] Costs incurred but no revenue.

Source: CIE calculations.

4.7 **Owner Reimbursement Costs over different time periods — sugar**

Year valued	*Reimbursement payment*
Years	$
10	1 580
20	3 541
30	3 588
40	3 616
50	3 634

Source: CIE calculations.

Comparison of methods

For sugar, method 1, based on depreciated replacement costs, gives a higher level of Owner Reimbursement Costs than method 2, based on the difference in discounted net present value between before and after net profit streams. This is largely because of the shorter rotation period for sugar compared with citrus and the effects of discounting.

Bananas

Banana Crops have the following general characteristics:

- following planting, it is around 12 months to maturity;
- on average, plants bear fruit for four years; and
- following the end of a cycle, the land is left fallow for a period of 12 months.

The parameters used in the example to follow are:

- yield of 21 tonnes per hectare (ABS 2001);
- production costs of $923 per tonne (Tony Heidrich, pers. comm., 2 December 2003);
  - production costs of $923 x 21 = $19 385 per hectare
- planting costs of $11000 per hectare (Tony Heidrich, pers. comm., 2 December 2003); and
- producer price of $1231 per tonne (ABGC 2003)
  - producer price of $1231 x 21 = $25 846 per hectare

Using the parameters shown above, the gross margin in this example amounts to $6462 per hectare. Here, we assume that a banana plantation in the second bearing year of a rotation is destroyed under the Response Plan following an incursion. Table 4.8 shows the gross margin sequences before and after the destruction.

4.8 **Gross margins under normal and Response Plan rotation sequences**

Year	*Normal sequence*	*Normal sequence gross margin*	*Sequence interrupted by Response Plan*	*Response plan sequence gross margin*
1	Plant Crop	-11 000	Plant Crop	-11 000
2	Bearing year 1	6 462	Bearing year 1	6 462
3	Bearing year 2	6 462	DESTROYED	0
4	Bearing Year 3	6 462	Fallow	0
5	Bearing year 4	6 462	Plant Crop	-11 000
6	Fallow	0	Bearing year 1	6 462
7	Plant Crop	-11 000	Bearing year 2	6 462
8	Bearing year 1	6 462	Bearing Year 3	6 462
9	Bearing year 2	6 462	Bearing year 4	6 462
10	Bearing Year 3	6 462	Fallow	0
11	Bearing year 4	6 462	Plant Crop	-11 000
12	Fallow	0	Bearing year 1	6 462
etc.	etc.	etc.	etc.	etc.

[a] Assumes 20 per cent of normal production costs are incurred but no revenue generated.

Source: CIE calculations.

Method 1: loss of value of current Crop plus 'depreciated' replanting costs

Under method 1, reimbursement would be paid for the following elements:

- loss of profit on the current Crop — here we assume that the Crop is destroyed at the start of the season, so the loss incurred in year 3 is equivalent to the gross margin of $6462 per hectare;
- the loss of profit on the fallow year Crop of $6462 per hectare;
- 'depreciated' destruction costs of $100 per hectare; and

- depreciated replanting costs of $5500 per hectare

Reimbursement for loss of Crop in the fallow year is questionable since bananas have a fallow year in any normal rotation. However, it could be argued that bringing the fallow year forward would have some impact on the grower. Including reimbursement for the fallow year, the total payment is equal to:

$6462 + $6462 + $100 + $5500 = $18 524 per hectare.

Excluding reimbursement for the fallow year, the total payment would be:

$6462 + $100 + $5500 = $12 062 per hectare.

Another option is to include payment for the fallow year Crop, but to depreciate it depending on what stage the Crop was out, similar to the citrus example. With the banana Crop destroyed in year 3 in this example, depreciated reimbursement payment for would be equivalent to $3231 per hectare. Thus, total payments would be $15 293 per hectare in this case.

Method 2: Difference between discounted income streams

This method presents a more accurate reflection of the loss in asset value resulting from the Crop destruction under the Response Plans. Using the gross margins outlined in table 4.8, net present values are calculated over various periods of time before and after the incursion. The results are presented in table 4.9.

4.9 Reimbursement calculations over different time periods — bananas

Time period	*Net present value original cycle*	*Net present value interrupted cycle*	*Difference — reimbursement*
Years	$/ha	$/ha	$/ha
10	28 276	7 425	20 851
20	38 611	24 784	13 827
30	37 421	31 229	6 192
40	50 425	34 365	16 060
50	52 817	38 381	14 435
75	55 941	41 074	14 867

Source: CIE calculations.

Similar to the citrus example, the difference in income streams fluctuates in the short term before stabilising over a longer period of time. It is interesting to note here that the reimbursement payment calculated over three rotations and in the very long term — 75 years — is fairly close to the figure calculated using method 1, particularly where the depreciated cost of bringing the fallow year forward — $15 293 per hectare for method 1

against $14 867 per hectare under method 2. The apparent anomaly with a 30 year rotation is largely because of the 'lumpiness' of the costs and returns.

Grapes/vineyards

Determining appropriate reimbursement for a destroyed wine grapevine is more complex than the other examples in this chapter. The complication arises due to the length of the life of a grapevine — in some cases as high as 150 years. Returns from old vines can be significantly higher than from younger vines. For example, grapes harvested off a 100-year-old vine would be expected to attract a significant price premium over grapes from 10-year-old vines depending, of course, on the variety and reputation of the vineyard.

Typically, larger enterprises have higher yields and lower returns from their grapes while smaller boutique style wineries have lower yields and higher returns. Larger irrigated vineyards tend to replace their vines, typically after around 40 years, while higher end wineries tend to build their reputation on distinct wine made from high quality fruit off old vines.

There may be cases with exceptional circumstances that arise in the wine industry such as when a vineyard with extremely old vines is destroyed. There could be consideration given to some alternative means of calculating fair Owner Reimbursement Costs in these cases.

The parameters to be used in this example are:

- yield of 15 tonnes per hectare
- average price of $1000 per tonne — or $15 000 per hectare
- cost of production of $5000 per hectare
- planting/establishment costs of $20 000 per hectare
- destruction costs of $5000 per hectare
- average length of rotation is 40 years.

In this example, the vineyard suffers an incursion 10 years after planting. The vines are destroyed at the start of the season, following which the land must remain fallow for 1 year. It is assumed that following planting the first fruit is picked after 3 years at a capacity of 20 per cent, which increases to 100 per cent after six years. Once again, the two methods described earlier are used to value the reimbursement payment.

Method 1: loss of value of current Crop plus 'depreciated' replanting costs

Under method 1, Owner Reimbursement Costs comprise the following elements.

- Loss of profit on the current Crop, equal to the gross margin on the Crop of $10 000 per hectare.
- Loss of profit in the fallow year of $10 000 per hectare.
- Depreciated loss of profit in non-bearing years — in this case, this could be restricted to the non-bearing years or also include the period where the vines operate at less than full capacity. This could range from $22 500 per hectare without including the period of less than full capacity to $32 250 if these costs are included. These figures are three quarters of the full amount since the vines are destroyed 10 years into a 40 year cycle.
- Depreciated destruction costs of $3750 per hectare.
- Depreciated replanting costs of $15 000 per hectare.

Thus, the total reimbursement due under this method is:

$10 000 + $10 000 + $3750 + $22 500 + $15 000 = $61 250 per hectare or $71 000 per hectare if the costs of lower yields following replanting are included.

Method 2: Difference between discounted income streams

Because of the high number of years in the typical rotation of a grapevine, it is important to evaluate the reimbursement over a significant time period under method 2. In this example, the vines are destroyed in year 10 out of a normal rotation period of 40 years. This means that a period of at least 40 years must be considered in order to capture one rotation of the regular Crop. Table 4.10 presents the results for this example under method 2.

The results under method 2 are similar to those found using method 1. Over a period of 75 years, the reimbursement payment due is $71 440 per hectare, whilst the figure calculated under method 1 was $71 000 per hectare.

4.10 **Reimbursement calculations over different time periods — bananas**

Time period	*Net present value original cycle*	*Net present value interrupted cycle*	*Difference — reimbursement*
Years	$/ha	$/ha	$/ha
20	134 622	56 022	78 599
40	167 797	102 991	64 805
60	185 499	114 058	71 440
75	191 055	119 615	71 440

Source: CIE calculations.

5 *The nursery sector*

The nursery sector is undoubtedly the most complex of all the plant industries. There are several categories of business enterprise and any one business may engage in a variety of categories. The following categories make up the nursery sector.

- Retail nursery businesses:
  - these have in stock a wide variety of perennials and annuals and frequently have other facets to their businesses, such as retail shop fronts and landscaping. Frequent turnover of stock is a key to business success.
- Wholesaling businesses:
  - frequently these businesses specialise in fewer lines but turnover much larger volumes, supplying retail nursery businesses or orchardists and commercial growers;
  - some may be specialist seedling producers growing seedlings from seed, while others may be specialist bare root stock producers – deciduous roses, fruit trees, or ornamental trees;
  - some businesses will specialise in the production of large rooted plants, usually sold in 25 to 45 litre tubs or bags while others may specialise in ornamentals such as palms or other indoor plants; and
  - most wholesaling businesses will engage in *growing* seedlings or other plants.
- Specialist root stock producers:
  - these businesses specialise in producing disease and pest resistant root stocks. On to these will be grafted genetically desired cuttings.
- Cut flower sector:
  - these growers produce cut flowers for the wholesale or retail markets or other special outlets.
- Specialist growers of parent lines of genetic stock.

Some of these categories fit neatly into the other plant categories considered, but others differ from other plant industries when considering guidelines for Owner Reimbursement Costs:

- the retail category relies on turnover of stock rather than growing stock, and
- breeders rely on parent lines with unique genetic characteristics developed over many years. Such lines are difficult to value if they have to be destroyed.

For the sake of convenience, the different categories of the nursery sector are considered in this chapter eventhough some categories have been considered earlier. The complexity of most nursery businesses will necessitate a component approach to estimating Owner Reimbursement Costs in situations where the business is quarantined and some or all stock has to be destroyed.

Annual short rotation plants

Take the example of a wholesaler producing seedlings from seed in punnets for sale to retail nurseries, commercial vegetable growers or landscape gardeners, councils etc.

If there is an exotic disease incursion affecting one variety of seedling, necessitating the whole business be placed under quarantine, the following guidelines for Owner Reimbursement Costs are recommended:

- Owner Reimbursement Costs will apply to stock on hand but can also include payments for 'fallow' of glasshouses where under the Response Plan glasshouses cannot be used for a certain time;
- valuation of stock assets should be based on final sale price from the owners records less estimated production and selling costs involved. Owner Reimbursement Costs therefore relates to the net value of stock at time of destruction or when the business is placed under quarantine;
- where, because of quarantine restrictions stock, not susceptible to the disease, are rendered unsaleable, Owner Reimbursement Costs should apply as if they were destroyed. Their value is destroyed as a direct result of the Response Plan.

In this case, a significant proportion of business profits will depend on turnover of stock during the season. But as Owner Reimbursement Costs relates only to loss of asset value, not future consequential income loss, the owner whose business is placed under quarantine will generally be worse off because of loss of future income. However, where an asset such as a

glasshouse is not allowed to be used for a time under the Response Plan, this can be treated in the same way as fallow land. The loss of profit from use of the glass house should be included in Owner Reimbursement Costs.

A different problem applies to retail nurseries, where business profit relies even more heavily on turnover and there is no asset such as a glasshouse involved. Loss of future income is loss of consequential income. There is no solution to this problem without violating the basic principle of no owner reimbursement costs for consequential income loss. The only alternative may be for assistance to be provided through some other government welfare or adjustment programs.

Perennial nursery stock

Suppose a grower who grows large deciduous ornamental trees up to four or five years old is placed under quarantine for two years, and some but not all varieties have to be destroyed. Normally, trees will be sold at any stage depending on demand. Generally, a one year old tree will sell for less than an older tree. In this case, there is a recognised market for trees of any age and at the time of destruction, the valuation of trees should present no real difficulties to a professional valuer. The grower/wholesaler would be compensated for the value of the trees at the time of their destruction. Similarly, if a retail nursery had in stock, trees of different ages, the owner would receive Owner Reimbursement Costs according to their age at the time of destruction.

Where trees are not destroyed, but cannot be sold for two years because of the quarantine, at the end of the quarantine period they will be two years older and worth more. Should the increase in value — less production costs — be deducted from final Owner Reimbursement Costs? While, in theory, there may be an argument for clawing back some payment for this increased value, in practice, given that the owner's cash flow is seriously disrupted, it is suggested that no Owner Reimbursement Costs be made to the owner for the trees in question, which are not destroyed, but that there be no clawback for the increased value.

Special parent lines

The destruction of parent breeding lines of plants as part of a Response Plan is in many ways similar to the destruction of special stud animals in the animal sector.

The value of these lines is in their genetic make up relative to market demand for the final products. The value of the breeding stock where the breeder is on the verge of producing a 'blue rose' for example, would be extremely high, where as the value of parent stock producing common varieties of plants may have little special value.

In the event of destruction of these lines as a result of a Response Plan, it is suggested that expert valuers be used to value the stock preferably before destruction. Better still, where the lines are especially valuable, special measures could be taken to place them in quarantine or otherwise salvage the genetic material. Special arrangements should be made for Owner Reimbursement Costs under these circumstances. It would not be appropriate to apply general guidelines for valuation for purposes of Owner Reimbursement Costs in these cases. However, special valuing arrangements should be worked out with experts and the industry association at an early stage so that all parties are aware of where they stand before an incursion strikes.

6 *Bees, hives, honey and associated products*

Beekeeping is a unique primary industry. There are around 673 000 registered hives in Australian and an unknown number of unregistered hives. (Gibbs and Muirhead 1998). Major products of the industry are honey and beeswax but specialist segments of the industry produce queen bees and package bees including for export. Minor products produced include pollen, royal jelly, propolis and bee venom. In addition to the production of products, the industry provides a lucrative pollination service to horticultural and agricultural industries.

A unique characteristic of this industry is that its basic resources — nectar and pollen — are rarely owned by the beekeeper. These resources are mainly supplied by public lands with beekeepers having access to these lands.

Industry sectors include the following.

- Honey and wax producers:
  - this is the main component of the industry, with production of honey at around 33 000 tonnes per annum. The queen bee is usually replaced in a hive every 18 months, with half the queen bees required being met from within the commercial operation. Some beekeepers in this sector also derive income from providing pollination services. Most commercial beekeepers are under contract to supply the few major honey packers.
- Queen and package bee producers:
  - specialist growers supply queen bees to commercial operators for the other half of their queen bee requirements. These growers also supply queen bees and package bees (queens plus bees) for export.
- Honey packers and exporters:
  - this sector of the industry deals with packing and sales of honey and related products to domestic and overseas markets.

Exotic disease threats to the beekeeping industry are many but the worst is the Varroa mite (*V. jacobsoni*) which is carried on the Asian honey, *Apis cerana* and the European bee *Apis mellifara*. These are present, to the immediate north of Australia. *Apis mellifera* also carries the Asian mite *Tropilaelaps clareae* as well as the tracheal mite *Acarapis Woodii*. The latter is also carried by *V. jacobsonia*. These are very serious pests of honey bees. In the event of an incursion, it is likely that many hives would have to be destroyed as part of a Response Plan. The issue is, what Owner Reimbursement Costs should be made to beekeepers where hives are destroyed.

Bees also come in under the AUSVETPLAN where guidelines suggest that hives should be separated into at least five different categories:

- normal production hives
- pollen production hives
- pollination hives
- queen production hives
- nucleus hives.

Values for each of these could differ depending on the time of year and breed. Pollen production hives, for example, will have special bee filters which collect pollen from the bees.

Under AUSVETPLAN, owner reimbursement costs is based on the value of the hives as a structure plus the value of the queen bee which is only around $8. Obviously there must be complete consistency between the AUSVETPLAN and the plant industries EPPRA. It is understood that valuation arrangements for the former are being reviewed.

In keeping with the principles outlined throughout this paper, the value of a producing hive should reflect the value of the income which can be generated from it. Yet if destroyed, the hive can be readily replaced and a queen bee incorporated. There is also a recognised market for hives as structures and queen bees, but once a queen bee is incorporated, it takes time to build up a productive colony. In general, a hive as a structure, a hive plus queen bee and a productive hive colony ascend in value.

If productive hives are destroyed, beekeepers should receive as Owner Reimbursement Costs the market value of such hives at the time of destruction. Beekeeping experts could be consulted on hive values.

A key issue from the plant industries perspective is where bees could be a source of transmitting diseases in orchards and beekeepers are banned

from providing polination services. This would be a loss of consequential income by the beekeeper and hence would not be eligible.

In summary, it is recommended that in the event of hives having to be destroyed, Owner Reimbursement Costs should be based on the value of the hive plus colony because this is what has been destroyed. Market value should be used as the basis of valuing the hive plus colony, depending on what type of hive is destroyed.

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Appendix

A List of persons consulted

Plant industry members

Name	*Position*	*Organisation*
Mr Jock Krietals	Executive Director	Grains Council of Australia
Mr Euan Laird	Chief Executive Officer	AUSVEG
Mr Richard de Vos	Chief Executive Officer	Nursery and Garden Industry Association
Mr Greg McPhee	Industry Development Manager	Summerfruit Australia
Ms Judith Damiani	Executive Director	Australian Citrus Growers' Inc.
Mr Bernie Milford	Senior Manager Policy — Industry Development	CANEGROWERS
Mr Stephen Ware	Executive Director	Australian Honey Bee Industry Council
Mr Matthew Linnegar	Executive Director	Ricegrowers' Association of Australia
Mr Allan Williams	Executive Officer	Australian Cotton Growers' Research Council
Mr Tony Battaglene	Director, International and Regulatory Affairs	Winemakers' Federation of Australia
Mr Tony Heidrich	Chief Executive Director	Australian Banana Growers' Council
Mr Andrew Heap	General Manager	Australian Macadamia Society Ltd

Government representatives

Name	*Position*	*Organisation*
Mr Dean Merrilees	General Manager, Animal & Plant Health Policy	Department of Agriculture, Fisheries and Forestry
Mr Peter Bailey	Director, Quality Assurance	Department of Primary Industries, Victoria
Mr Chris Adriaansen	A/g General Manager (Plant Health)	Queensland Department of Primary Industries