Use of economics in pest and disease management

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SPS Committee workshop

October 2009

(version: RJ Ivess MFAT 30 Oct 2009)

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Objectives

Demonstrate New Zealand's system for allocating resources for pest and disease management for:

- **Established pests**
- **Potential pests**

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New Zealand and International Quarantine

New Zealand:

- **Is an Island country**
- **Bottom right hand corner of the world**
  - **Recently settled**
  - **Isolated (1,500 km to our nearest neighbour)**
  - **Few points of entry – all managed**
  - **Still free from many major pests (e.g. FMD, BSE, fruit flies)**
- **Quarantine is real and treated very seriously!**

The Problem

Pests and diseases could have significant impacts on human, animal and plant health, jobs and the environment

But - Will they have these impacts?

If so,

- **How can these impacts be mitigated?**
- **What will it cost to mitigate them?**
- **Will it be worth it?**

The New Zealand Experience

In NZ - we use cost benefit analysis to ascertain the merits of taking action against both established and potential pests and diseases.

This work weighs up:

- **the benefits of taking action (i.e. the reduction in impact of the pest of disease) versus,**
- **the costs of the mitigations (e.g. pesticides, movement controls, off-shore treatments)**

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Problems encountered (past)

- **We were determining resource allocations based on stakeholder concerns (encouraged that behaviour!), and sometimes intervening when it was not actually worth it**
- **We were also leaping to popular solutions before identifying the problem and all possible remedies**
- **Ministers felt they were being required to fund every intervention for every possible biosecurity risk and were starting to make ad hoc "no" decisions**
- **Risk: inefficient and ineffective decisions worth millions of dollars**

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The solution

Developed a "decision-making framework"

A set of principles and a process to apply to our decision making across the organisation

1 The Process

Simple:

i) Identify the problem
ii) Define your objectives (what you want to achieve)
iii) Ascertain and consider the options
iv) Consult
v) Make the decisions
vi) Implement
vii) monitor

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The solution

2 Principles

5 key areas

i) Outcomes over prescription
ii) Irreversibility
iii) Uncertainty
iv) Risk management
v) Net benefit

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The solution - Principles

i) Outcomes over prescription

- Outcome-based rules (e.g. prevention of entry, eradication, control) should be favoured over prescriptive rules
- Outcome based requirements provide great opportunity for innovation e.g. fruit flies- PFA, cold treatment, fumigation, irradiation, VHT, …
- A key assumption - outcomes are measurable (if they are not then some level of prescription may be necessary)

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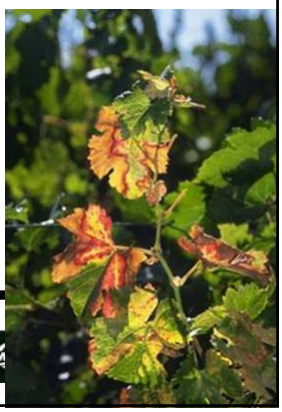
The solution - Principles

ii) Irreversibility

Where the impacts of not intervening are likely to be irreversible, there is a stronger case for intervention even when the benefits only marginally outweigh costs (often to take advantage of the window of opportunity)

For example, when a pest/disease is so contageous/difficult to control once it establishes, the case for taking border action is stronger, all other things being equal



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The solution - Principles

iii) Uncertainty

Decisions should focus on:

- **What reasonable steps can be taken at the time based on the best information available at the time, while maintaining future options where appropriate**
- **Further information - should be collected to assess whether the decision was correct or whether it should be amended.**

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The solution - Principles

iv) Risk management

Risks should be managed by those best placed to do so, whether it be the:

- **Producer (e.g. off-shore - production treatments, e.g. PFA)**
- **Exporter (post harvest/pre-export treatments, e.g. cold treatment, fumigation)**
- **Government - importing country (e.g. border control – treatment, destruction, re-shipment)**

Those who have the strongest incentives, or skills or access to the right tools should manage the risks identified

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The solution - Principles

iv) Net benefit

Decisions should aim to improve overall economic, environmental, social welfare

To do this – have to assess the costs of taking action (e.g. imposing measures) as well as the benefits

In effect, the benefits of taking action should outweigh the costs of taking that action

Established pests

Problem definition

- **Is "easier" - You know what pest you are dealing with and have seen the impacts**

Questions are :

- **What can you do about it ? (Usually there is some experience to draw on)**
- **What will it cost?**
- **How much should be spent?**
- **Or should you just "live with it"? (e.g. ongoing commercial control in fruit production)**

E.g. Southern Saltmarsh mosquito

New Zealand had detected a "new to NZ" species of mosquito capable of carrying the Ross River virus in several parts of NZ's coastal environment

A cost benefit analysis was undertaken to assess the net benefits of continuing the control programme

Benefits included: health benefits and "reduction in nuisance from mosquito"

Costs included direct costs (spraying the affected areas) and movement controls (e.g. on soil not being shifted out from the areas)

E.g. Southern Saltmarsh mosquito

"Scenario analysis" was undertaken to assess the relative merits of:

- **i) "do nothing",**
- **ii) "containment only" and**
- **iii) "try to eradicate options"**

Each option was assessed by a technical group for its likelihood of success

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E.g. Southern Saltmarsh mosquito

Ministers were then presented with a cost benefit analysis assessing the relative merits/costs of;

ii) "containment" and

iii) "attempt eradication" against the

i) "do nothing" option using the following equation:

$$\frac{\text{benefits of the option (\$) x likelihood of success (\%)}}{\text{costs of that option (\$)}}$$

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E.g. Southern Saltmarsh mosquito

Despite prior concerns (the Govt had already spent $70 million to date and the chances of "attempting eradication" were only assessed at 50%), the Govt chose the eradication option as it had the highest assessed net benefit compared to the alternatives…

The programme is continuing and the number of infected sites is steadily reducing….

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Potential pests

Problem definition

Is more complex

We don't know for certain (albeit we've got a pretty good idea):

- **What pests will actually arrive - particularly for "new trade"**
- **Whether the pests would indeed establish**
- **What the longer term impact would be if they did**

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Potential pests

<u>But</u> we do know the costs of most mitigation options e.g. fumigation, heat treatment, post harvest dips etc

Hence it's a <u>challenge</u> around balancing:

- **unknown and future benefits (of not having pest impacts) with**
- **known and more immediate costs (e.g. of import controls)**

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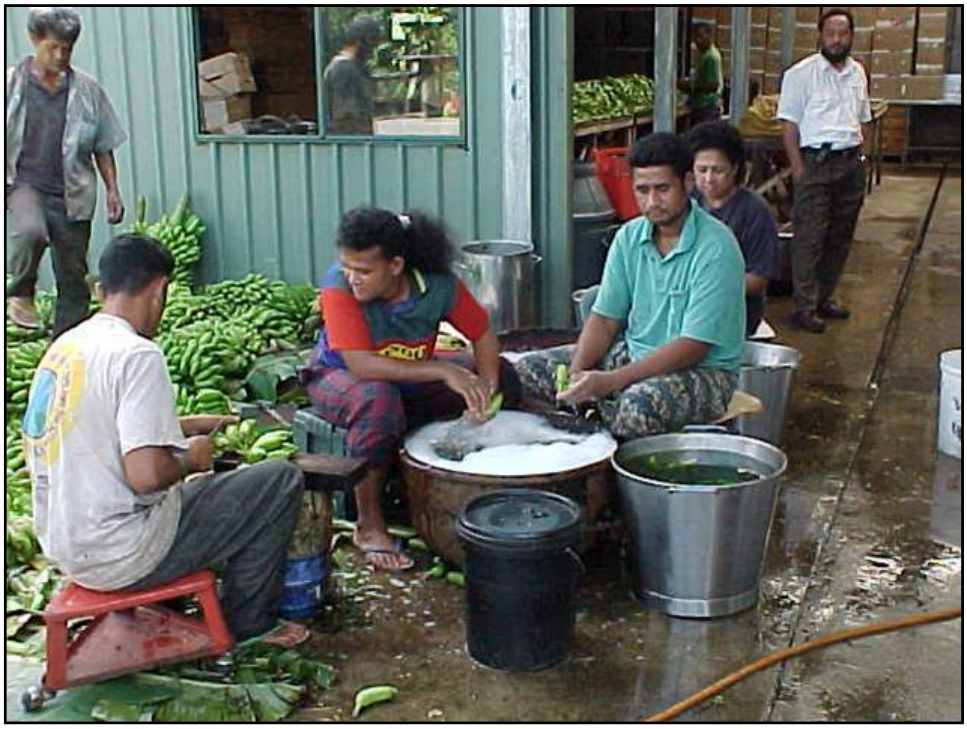

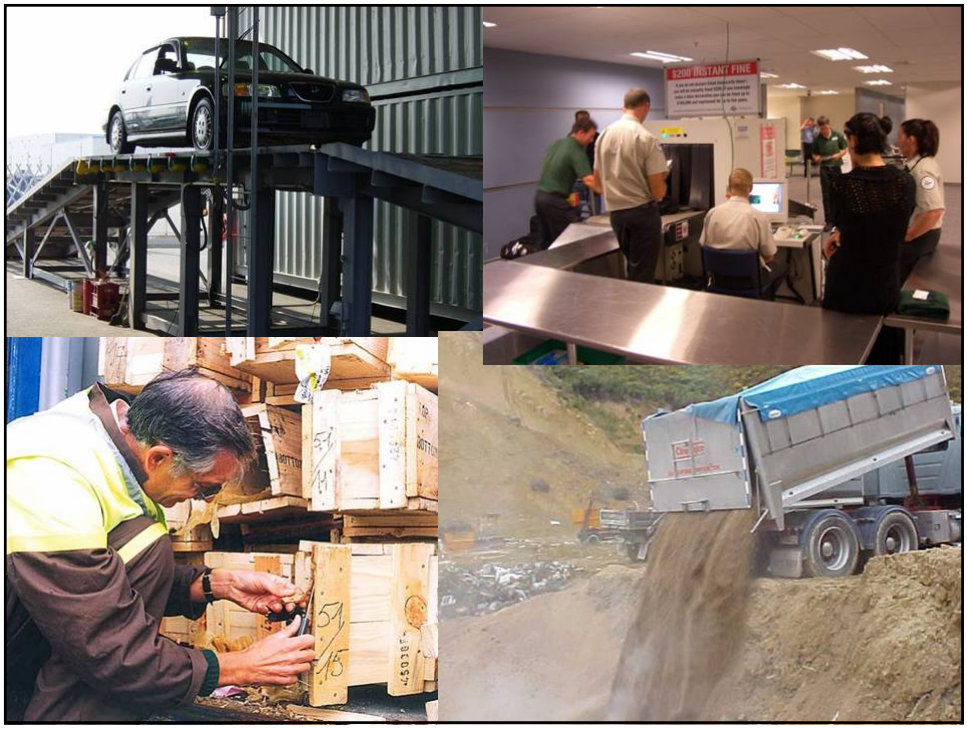
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