



Australian Government

Department of Agriculture, Fisheries and Forestry

Economic Advice For Decision Making In Biosecurity: A View From An End-User's Perspective



**Mike Cole: Office of the Chief Plant Protection Officer
Biosecurity Services Group/DAFF**

Roles of Economic Advice in Biosecurity Decision Making/Resource Allocation

- **Overall Risk Return Framework**
 - What is the best investment of resources?
- **Pest Incursion Response Decision Making**
- **Preparedness Across the Biosecurity Continuum**
 - Pre-Border
 - Border
 - Post Border
- **Risk Analysis**



End Users

Who?

- **Government**

Agency heads/senior management, advisers, program managers for quarantine, response and preparedness activities

- **Industry**

Industry body heads-industry body program managers/advisers

Interests?

- Strategic Directions
- Program Funding Decisions
- Program Development, Implementation and Monitoring

Backgrounds?

- Range of skills, interests and backgrounds leaning towards agriculture production and biological science backgrounds and less in economics
- Range in the need for interaction and understanding of methodologies
 - Different packaging, communication and adoption strategies



Characteristics of Advice For Decision Making

- **Appropriate/Fit For Purpose**
 - Does it answer the question asked (interaction between economists and end-users to craft the right question)
 - Is it packaged appropriately for consideration/adoption
- **Transparent**
 - Stakeholders can understand how a decision was made
 - are the methods acceptable?
- **Accurate**
 - has made the best use of information in an often sparse/low information environment
- **An understanding of the level of uncertainty**
 - limitations of the advice and the risks of acting on the advice
- **Timely**
 - emergency responses/Can we have the advice yesterday???
- **Inclusive**
 - Does or how does it address diverse stakeholders and competing views and interests



Response Decision Making

- **Initiation of a National IncurSION Response-Is it Cost Beneficial?-Technically Feasible?**
 - Emergency Plant Pest Deed- Plant Health Australia
 - Inter-governmental Agreement* (pests not covered by other deeds)
 - National Significance Criteria
 - Business
 - People (health, amenity, infrastructure),
 - Environment
- **What type of response? Eradication, Containment, Management, Nil**



Response Decision Making

- **Beneficiary Analysis- Who should be involved and contribute?**

Categorisation/PHA identification of industry and non-industry benefits and beneficiaries for level and allocation of cost sharing

Public-Private Good (What businesses? How Much)

- **Monitoring/Evaluation-Is the response still appropriate?**

Refinement of original CBA as response progresses



Measuring/Characterising Impacts

- **Market Valuation To Define Impacts:**
 - Production Loss
 - Trade Loss,
 - Business Costs
- **Non-Market Valuation To Define Impacts??:**
 - Ecosystem services
 - Biodiversity
 - Land Use
 - Cultural Impacts
 - Public Amenity
 - Etc.



Key Areas of Advice/Input In Decision Making

Appropriate Integration

- Economics
- Biology/Ecology
- Operations
- Sociology- community engagement

“Define the market values of loss of production and other more measurable impacts and make a broader statement alluding to various other impacts and say that the analysis is an under estimate?”

Tools/Approaches

Ecosystems Services/New Jersey Model
Choice Modelling/Willingness to Pay
“Bio-economics”-invasion-spread-impacts
?



Response Decision Examples

European House borer (Perth) \$13Million

cross-sector beneficiaries/industries, infrastructure impacts, containment vs eradication

Red Imported Fire Ant (Brisbane)\$202 Million

human health, amenity, biodiversity, indirect-production, containment vs eradication

Electric Ant (Cairns) \$7 Million

biodiversity (world heritage area), amenity



Response Decision Examples

4 Tropical Weeds (Far North Queensland)\$2.4 Million

Biodiveristy (world heritage area)/ Environmental Services-water, Cross-sector production horticulture/pastures

Siam weed (Far North Queensland)\$ 5 million

Biodiversity/Environmental Services, Cross-sector industry impacts horticulture/pastures, containment vs eradication



Resource Allocation for Biosecurity

- Many potential pests and pathways and finite resources
- Preparedness Activities and Investments by Federal, State/Territory Governments and Industry –Risk Return
 - prioritisation of pests to target response activities (pre-border)
 - response plans, surveillance targets, diagnostic tests
 - R&D offshore management/mitigation
 - quarantine activities (border)
 - appropriate surveillance and diagnostics (border/post border)



Types of Preparedness Investments

- Industry Biosecurity Planning Targets, Emergency Plant Pest Lists/Plant Health Deed- Plant Health Australia
- Agricultural RDC's and Industry Biosecurity R&D programs
 - breeding programs, management technique studies
- Diagnostic tests and capacity (Governments/Industry)
- Targeted surveillance programs general and specific (Governments/Industry) early warning survey targets
- Targeted border quarantine activities and increase or decrease in intervention for specific pests and pathways
- Etc.



Resource Allocation In Biosecurity

Prioritisation

- Integration of biological, operational, sociological and economic input
 - potential of entry, establishment, spread
 - potential impacts in Australia
 - production loss, management costs, environment, human
 - effectiveness of interventions and activities
- Transparent and justifiable way to narrow the range of potential pests and mitigation measures to focus limited resources on (Lists?)



Approaches To Prioritisation-Pest Targets and Mitigation

- Deliberative Multi-Criteria Evaluation/Citizen Jury: ACERA, CRC NPB, CSIRO Entomology
- Multi-Criteria Analysis: environmental pest list for Environmental Biosecurity Committee- ACERA/DEWHA/ DAFF-BRS
- Integrated Approach to Characterization of Consequences of pest incursions taking into account likelihood of entry, establishment, feasibility and cost effectiveness of alternatives: DAFF/ACERA
- Structured Decision Making: ACERA/DAFF
- Other ??



Approaches Prioritisation-Surveillance

Surveillance

- Portfolio Theory to analyse the allocation of surveillance resources between general and specific surveillance for Red Imported Fire Ant Detection in the Brisbane area: ACERA, Univ. Massey NZ.
- Surveillance optimisation, integration of spread modelling to economic analysis to determine optimum levels of papaya fruit fly trapping in Australia (case study): ANU
- Search theory/Economics for optimum weed surveillance: ACERA. Uni. New England



Risk Assessment

Valuing non- production impacts from the introduction of a pest appropriately to set and justify trade and quarantine policy-DAFF/BA

International Plant Protection Convention

- Standard: Pest Risk Analysis for quarantine pests including analysis of environmental risks



Directions-from an end-user's view

- **Integration**
 - Integrated approach to decision making involving economics, social science as well as biological and operational experts connected to end-users/decision making early with an increased emphasis on non-market valuing.
- **Adoption**
 - A need to develop and involve end-users in appropriate development and packaging of tools/methods for better application.
- **Capacity**
 - Development and maintenance of national capacity for economic input into various biosecurity related aims and activities. A practitioner's network, central focus/center, others?

