Current issues in quarantine risk assessment

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Introduction

Previous talks at the AAVAC conferences in Noosa and Echuca have given background on the administrative and technical processes used by Animal Biosecurity (formerly AQIS Animal Quarantine Policy Branch) for Import Risk Analysis (IRA). Recent meetings of the Risk Analysis Panel have shown that the assessment of the impact of an outbreak of exotic disease is one of the more complex parts of the technical process. This talk will attempt to explain in more detail the process followed in assessing the impact of disease, and to gain input from the Association on what the impacts of some particular diseases might be.

Background

As discussed last year, the assessment of consequence is undertaken by identifying a discrete number of animal groups likely to be exposed to exotic disease as a result of the import of the commodity in question (in this case, psittacine birds). Within these exposure groups, a discrete number of likely outbreak scenarios are identified, and estimates are made of the relative likelihood of each of these scenarios. The economic, social and environmental impacts of these various scenarios are then assessed. Combining the individual likelihood and impact assessments leads to an estimate of the overall expected consequences of each scenario.

The following excerpts from Biosecurity Australia's draft "Guidelines for Import Risk Analysis" provide further background to the method.

Criteria for consequence assessment

The SPS Agreement states that:

> Members shall take into account as relevant economic factors: the potential damage in terms of loss of production or sales in the event of entry, establishment or spread of a pest or disease: the costs of control or eradication in the territory of the importing Member: and the relative cost-effectiveness of alternative approaches to limiting risks.

The *OIE Code* expands these 'relevant economic factors' by delineating between the 'direct' and 'indirect' effects of a disease, and providing examples of typical factors that will be relevant to an IRA. The OIE criteria have been expanded, as shown below.

It is important to note that consequence assessments must not extend to a consideration of the benefits or otherwise of trade in a given commodity, nor to the impact of import competition on industries or consumers in the importing country.

Direct impacts

The direct consequences of a disease include those effects that, as the result of the introduction of a new/additional vector, result in increased range or improved transmission:

- Animal or plant life and health, including animal and plant production losses.
- Human life or health
- The environment (see below), including biodiversity, endangered species and the integrity of ecosystems

Indirect impacts

Indirect consequences are the costs resulting from activities associated with the incursion of a disease:

1. New or modified eradication, control, surveillance/monitoring and compensation strategies/programs
2. Domestic trade or industry effects, including changes in consumer demand and effects on other industries supplying inputs to or utilising outputs from directly affected industries
3. International trade effects, including loss of markets, meeting new technical requirements to enter/maintain market, changes in international consumer demand
4. Changes to natural and built environment, including reduced tourism, reduced rural and regional economic viability, 'side effects' of control measures, loss of social amenity

Consequence assessment scenarios

For each exposure group, the impacts of the disease outbreak are assessed for a discrete number of outbreak scenarios, as shown below.

1 Disease does not establish within exposed population/sub-population
2 Disease establishes within exposed population/sub-population, but is identified and eradicated
3 Disease establishes within exposed population/sub-population and spreads to other populations before being eradicated

4 Disease establishes within exposed population/sub-population, spreads to other populations and becomes endemic in Australia

Level of impact

Depending on the size of the outbreak, and the industry or sector involved, the impacts of an exotic disease outbreak may be felt at different levels within the community. These levels are defined below.

Local: an aggregate of households or enterprises - for example, a rural community, a town or a local government area

District: a geographically or geopolitically associated collection of aggregates - generally a recognised section of a state, such as the 'North West Slopes and Plains' or 'Far North Queensland'

Region: a geographically or geopolitically associated collection of districts - generally a state, although there may be exceptions with larger states such as Western Australia

National: Australia-wide

Quantum of impact

At each level, the quantum of impact is described in terms of being 'unlikely to be discernible', of 'minor significance', 'significant' and 'highly significant':

1. An '*unlikely to be discernible*' impact is not usually distinguishable from normal day-to-day variation in the criterion
2. An impact of '*minor significance*' is not expected to threaten economic viability, but would lead to a minor increase in mortality/morbidity or a minor decrease in production. For non-commercial factors, the impact is not expected to threaten the intrinsic 'value' of the criterion - though the value of the criterion would be considered as 'disturbed'. Effects would generally be reversible
3. A '*significant*' impact would threaten economic viability through a moderate increase in mortality/morbidity, or a moderate decrease in production. For non-commercial factors, the intrinsic 'value' of the criterion would be considered as significantly diminished or threatened. Effects may not be reversible
4. A '*highly significant*' impact would threaten economic viability through a large increase in mortality/morbidity, or a large decrease in production. For non-commercial factors, the intrinsic 'value' of the criterion would be considered as severely or irreversibly damaged

Impact Assessment

Despite the existence of the guidelines, members of the RAP had some difficulty with identifying what impacts were attributable to a particular disease outbreak scenario. To assist, we developed the attached table, which listed the types of adverse happenings, and the impacts that could result from them. It is based on the direct and indirect consequence criteria listed above, but is arranged differently, to try to take account of the "triple bottom line" approach being used in some areas of government currently (ie it lists impacts against economic, social and environmental outcomes). By taking this approach, we hoped to ensure that:

1. All potential adverse effects were counted; and
2. No adverse effects were counted twice.

Table 1 Estimation of Economic, Social and Environmental Costs of disease outbreaks

Direct effects

1 Animal production

Effect	Economic Cost	Social cost	Environmental cost
Production and companion animals die	Value of animals & genetic material Cost of treatments	Increased management input Owner stress	
Animals get sick Decrease repro Decrease growth rate Decrease feed conversion ratio Welfare	Value of lost production Increased feed cost Cost of treatment	Increased management input Owner stress	

2 Human health

Effect	Economic Cost	Social cost	Environmental cost
Humans die	Value of human life Cost of treatments	Hospital / health care cost Personal stress for families	
Humans get sick	Cost of treatments	Hospital / health care cost Personal stress for families	

3 Environment

Effect	Economic Cost	Social cost	Environmental cost
Wild animals die	Increased environmental management cost		Loss of biodiversity Loss of endangered species Non-threatened species become endangered
Wild animals get sick	Increased environmental management cost		Decreased reproduction rate may increase pressure on threatened species

Indirect effects

New or modified requirements

1a Costs of eradication

Effect	Economic Cost	Social cost	Environmental cost
Production animals slaughtered as part of eradication campaign Possible need to slaughter wildlife	Value of animals & genetic material Cost of slaughter / disposal • Staff • Infrastructure • Disposal method (fuel cost for burning etc) Loss of product	Owner / Operator stress Family & community disruption Employment effects	Pollution from disposal methods • Air • Water Possible loss of biodiversity

1b Costs of control

Effect	Economic Cost	Social cost	Environmental cost
Movement restrictions	Interference with normal processing / marketing chain for production animals causing loss of existing markets Compliance costs	Decreased amenity "Fear factor"	Possible decreased environmental damage arising from improved control of feral pests Loss of amenity (enjoyment of countryside)
Vaccine / treatment	Cost of vaccines and drugs (for production animals, humans & wildlife	Increased management input	Side effects of chemical treatments for disease vectors

1c Costs of surveillance / monitoring

Effect	Economic Cost	Social cost	Environmental cost
Sampling regime	Increased labour costs of animal handling	Increased management input Stress	Sampling of feral/wild animals
Testing	Transport of samples Laboratory costs	Lab staff stress	

1d Costs of compensation

Effect	Economic Cost	Social cost	Environmental cost
Compensation for slaughtered animals	CAREFUL - NO DOUBLE DIPPING Administration of compensation scheme	Tax increases/levies	

2 Domestic trade / industry effects

Effect	Economic Cost	Social cost	Environmental cost
Changes in consumer demand	Decreased market for products Loss of economic viability Industry restructuring Possible glut on domestic market as a result of decreased exports	Decreased variety of food available Stress Family breakdowns Unemployment (Possible decrease in domestic price for goods)	Possible improvement in biosecurity as a result of required changes decreases health costs in the future?
Effects on other industries	Decreased demand for slaughter / processing / transport etc	Unemployment in related industries	

International trade effects

Effect	Economic Cost	Social cost	Environmental cost
loss of markets	Decreased market for products Loss of economic viability	Stress Family breakdowns Unemployment	
new technical requirements	Costs of meeting requirements Economic viability of export industry	Stress Family breakdowns	
changes in consumer demand	Decreased market for products Loss of economic viability	Stress Family breakdowns Unemployment	

Natural and built environment

Effect	Economic Cost	Social cost	Environmental cost
Reduced tourism	Decreased income in area/ district/ region Economic viability of tourism industry	Stress Family breakdowns Unemployment	Possible improvement?
Reduced rural & regional viability		Stress Family breakdowns Unemployment	
Side effects of control measures	Any not already accounted for?	Any not already accounted for?	Any not already accounted for?
Loss of social amenity	Any not already accounted for?	Any not already accounted for?	Any not already accounted for?

For each disease, and each outbreak scenario, some or all of these effects might be encountered. The table is intended to serve as a memory jogger, while assessing the impacts of individual scenarios.

Comments on the completeness and relevance of the material in the table are welcomed.