Submission to the Senate Standing Committee on Rural and Regional Affairs and Transport Inquiry into the Import Risk Analysis on Apples from New Zealand

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Introduction

My submission to the Senate committee concerns the process of managing quarantine risk to Australia and my overall comments are as pertinent to the inquiries into pig meat and banana importation as they are to apples. My principal argument is that risk assessment should be undertaken as an actuarial process, with costs and rewards attributed appropriately, and that the cost of quarantine breach should be borne by the market not the State as is currently the case.

The most recent risk analysis, *Revised draft IRA Report Importation of Apples from New Zealand* February 2004 is the latest in a series of assessments dating back to 1996. This delay could be seen as delaying tactics to avoid both importation of apples and censure by the WTO, a failure to deliver the benefits of cheaper New Zealand apples to the Australian consumer or simply as following due process. The indecision has involved some of the finest scientists with knowledge of the quarantine risks and has probably cost millions of dollars in consultation time by both Biosecurity Australia and the Senate. I suggest that actuarial risk assessment, in combination with a cost-benefit analysis to allocate costs appropriately between producers, their insurers and importing governments, could manage disputes over quarantine more effectively than existing mechanisms. At the very least costs

and benefits of importing apples could be presented in an actuarial framework as the basis for a decision by regulators.

My submission is in two parts: a summary of where I see shortcomings in the existing assessment and a discussion of an alternative means of managing quarantine risk.

Shortcomings of the current assessment

Having read all previous assessments I can say that the current draft assessment if superior in both its scope and content and explains with clearly the major issues as they relate to the mechanics of risk assessment and the characteristics of the pests and the industry. On first reading, however, there are three main areas where I think there could be improvements. If time permits I am intending to make further detailed comments on individual risk assessments direct to BioSecurity Australia.

Risk assessments

I think it would be useful to express the annual probability of a quarantine breach as both a proportion and its inverse, the frequency, on years, with which Australia might be expected to deal with a breach of quarantine. For instance, based on the midpoints of the uniform probability distributions, incursions would be likely to occur at the following frequencies:

Likelihood	Frequency with which incursion likely to occur	Range
High	14 months	Certain - 17 months
Moderate	2 years	17 months - 3.3 years
Low	5.7 years	3.3 years - 20 years
Very Low	39 years	20 years – 1 thousand years
Extremely Low	2 thousand years	1 thousand years – 1.67 million years
Negligible	2 million years	1.67 million years - never

To me this expression of risk is easier to understand. I also find it a little alarming that government policy will allow in products with a Very Low likelihood of carrying pests given that, based on the probabilities tabulated, there is a50% chance of a quarantine breach every 20-40 years. Given that it has taken 40 years to eradicate an outbreak of European Canker in four Tasmanian orchards and cost $2.5 million to eradicate fireblight after its discovery on two plants in Melbourne Botanic Gardens, this seems a high level of risk to accept, a level of risk that is less apparent when expressed as 0.0255.

Use of the qualitative terms to describe risk also has the potential to be misleading. Apart from being against the recommendations of the last Senate Inquiry into the draft IRA, it is also value-laden. Very Low to trade negotiators operating within election cycles can have a very different connotation to an orchardist planning for decades, or conservation groups hoping to keep Australia pest free for centuries. The use of the qualitative terms also hides variation in expert opinion that could be expressed in terms of range or standard deviation so there is no measure of certainty of the assessment.

Equally unscientific are unsupported statements used to justify low estimates of risk. As one example among many, on p138 it states that ‘nurseries with host plants of *Nectria* would not be located close to landfill sites to which urban wholesaler waste goes’. While this may indeed be true, I would be surprised if there were not nurseries and waste dumps in close proximity somewhere in Australia. It may be useful to set planning regulations so that they are not allowed to be in close proximity but simply to state that they would not be seems like wishful thinking. Even where supporting evidence is provided, as for importation step 3, p 129, the conclusions do not seem to match the discussion; it would

seem brave to go from 'mummified fruit is *unlikely* to occur in export orchards' to a conclusion that infection of fruit with canker under such circumstances would occur, on average, once every 2 million years, especially when 'picked fruit can be contaminated in rainy or windy weather' and the orchards are in New Zealand.

Consequences

Attempts to estimate the consequences of quarantine breach for any of the pests are, at best fragmentary and are often misleading. If it is to be argued that the risk assessment is just that, the probability of entry under various scenarios, no attempt should be made to explore the consequences of quarantine breach. However this would seem to make it difficult to assess the level of quarantine risk with respect to section 5D(a)(ii) of the *Quarantine Act 1908: the probability of the disease or pest causing harm to human beings, animals, plants, other aspects of the environment, or economic activities*. In particular I think the analyses of the indirect economic and ecological consequences are inadequate and reflect the absence of either an ecologist or an economist on the technical panel.

For example, for fire blight, a range of economic studies are quoted uncritically for different parts of Australia with no attempt to explain or resolve differences or explore the veracity of different claims. For instance, on page 118 alone, Bhati and Rees (1996) estimated the annual loss at $125 million whereas a year later it can be calculated that the annual loss will be $165 million (Oliver *et al.* 1997). Roberts (1991) estimated that the loss to the apple industry under a worst case scenario would be 20%, a loss of 30% can be calculated from the figures quotes for Oliver *et al.* (1997) and the Queensland Fruit and Vegetable Growers estimate the loss would be 20.9 million out of 35 million or 60% (Street 1996, QFVG 2000). All of these figures require manipulation, however, and the only picture that emerges is that a quarantine breach will cost a great deal to the Australian apple and pear industry, possibly making it uncompetitive, but that the actual figures are irrelevant because there is such a small chance of it entering. Unlike some pests, no analysis of the economic impacts of fire blight are provided in Part B of the IRA, for reasons I could not discern. I think it would be most useful to have such an analysis.

Beyond these direct economic effects, the assessment is even more sparse. Summaries of indirect economic effects are presented for different regions with no attempt at a national

overview and most of the possible effects on human health or the environment are summarily dismissed. With native leafrollers the potential damage is rated as B with three unquantified statements about possible effect, but no analysis of what they mean. There is an assumption that both native leafroller or New Zealand flower thrip a. will be detected in Australian vegetation while it is still possible to eradicate it and b. that it will be possible to eradicate it by chemical or biological means without having consequences for Australian leafrollers. This seems to indicate a high level of naivety about the workings of natural systems and the probability of, and resources for, control once it enters the natural system, even if its effects are considerable. The New Zealand flower thrip is known to affect 225 species of plant in 78 families so it would seem remarkable that, should it become established, it would not spread widely. This assessment seems to assume that, since its probability of arrival is low, the consequences need not be fully explored.

With fire blight the absence of any ecological analysis may be a serious oversight should the disease arrive. While there appear to be no native members of the subfamily Maloideae in Australia, a fact not mentioned by the IRA which does not distinguish between exotic and native species, there are many native bird species, such a lorikeets, that routinely feed in orchards and have the potential to spread the disease rapidly throughout south-east Australia. An immediate control measure, once fireblight or a number of other diseases arrive, might have to be netting of infected orchards since no other technique is effective, adding considerably to control costs.

Mitigation procedures

There is an assumption in the procedures proposed for the reduction in risk of fire blight introduction that the New Zealand Ministry of Agriculture, Forestry and Fisheries will undertake all quarantine procedures, and it the thoroughness of these procedures that are the principle protection against transfer of the disease since, if they fail, the risk level becomes unacceptable. While I have no doubt the New Zealand inspection officers will do the work assiduously, I am concerned this raises a precedent and that there are rewards but no consequences for the exporting country to be responsible for inspection quality. As proposed the in-country quarantine and inspection procedures place a substantial burden on New Zealand fruit growers and the New Zealand government if apples are to be exported to Australia. If, however, disease managed to breach quarantine, the restrictions on trade

could no longer be justified, the need for inspections would be removed, the Australian industry would be less able to compete and the size and profitability of the New Zealand industry would increase. The only disincentives to relaxing the quality of inspections appear to be professionalism and conscience, which may be severely strained by the potential monetary gains to the industry and the country.

Alternative procedures

Costs incurred through importation of a potential pest organism

Economic analysis is an important part of the international standards for phytosanitary methods (IPSM) nos. 2 and 11 in assessment of risk, though, in practice, the economic impact appears to be assessed less rigorously than the probability of quarantine breach, as would appear to have happened in this case. As part of the economic analysis it is worth noting that importation incurs costs associated with quarantine from the moment an application is made. These costs occurs as follows:

- On application:
  - Risk assessment and negotiation transaction costs. These are assumed to be a one-off procedure and be negligible compared to the benefits from free trade should it be approved. In fact there is a substantial allocation from government dedicated to risk assessment and negotiation, sometimes continuing for decades, as appears to be happening with apples. This includes negotiations with other trading partners to ensure that permission to import from a country affected with an invasive organism does not lead to a restriction in exports to other trading partners. Most of these costs are borne by the importing government, although the exporting government may need to undertake extra research should their initial application fail, as happened with New Zealand apples after 1998. Fortunately with apples the size of the industry and of the Australian economy is large enough to allow this investment in the quarantine assessment – presumably there are smaller economies where

- On approval to import:

- Monitoring costs. If risks are deemed to be manageable and imports are permitted then investment in monitoring needs to rise within the importing country because the risk of inadvertent importation of a pest has increased. This will be an ongoing imposition on local producers, although monitoring effort is likely to decline the longer importation occurs without outbreaks of new disease. Monitoring within the exporting nation by the importing nation may also be necessary. This latter cost may be borne by exporters under supervision from the importing nation to ensure the monitoring is conducted diligently (although this safeguard does not appear to be proposed for New Zealand apples where all costs, and diligence, is being passed to MAFF)..
- Transaction costs associated with authorisation of approval for control measures should the disease arrive, particularly if such control measures are not already approved. With fire blight this will include the costs of spraying streptomycin, a problematic solution that is not currently approved in Australia. It is worth noting that the absence of an approved control measure in Australia may delay control should the disease become established in Australia, and hence it is more likely to get out of control. It may be worth ensuring control procedures are in place before apples are allowed in.
- Indirect social impacts resulting from a reduction in local producer profitability. These are assumed to be short-term as uncompetitive producers are forced out of the market and into other occupations. The increase in consumer benefits from the cheap apples could ostensibly be used to compensate producers by way of rural adjustment packages and other forms of compensation. It should be noted that losses to local producers cannot be considered a reason to refuse trade under WTO rules; by traditional economic logic, producer losses associated with increased competition are generally considered to be merely pecuniary, involving no misallocation of resources or inefficiency. Any welfare losses are simply a function of markets clearing, which is, by definition, welfare optimizing.

♦ On quarantine breach:
  - Direct costs.
    - Compensation for localised removal of infected crops and restrictions on trade to third, uninfected countries.

- Eradication costs. The costs of eradicating a disease are initially borne by the producers within the importing country, further reducing their capacity to compete with the imports. Often these costs are then passed on to the government of the importing country, through compensation to affected growers, increased costs of survey and monitoring and higher administrative transaction costs. Some environmental costs will also have economic consequences as likely disease hosts are eliminated. Together these may reduce the benefits to both consumers and producers in the importing country resulting in a net loss to the importing country until elimination has been achieved.
- Control costs. In the event that attempts at eradication fail, ongoing costs of management of the invasive organism will place further pressure on the competitive capacity of the importing nation's industry, further increasing the probability of net loss.

- Indirect costs
  - Social impacts, as more producers are rendered unprofitable. Restrictions on movement may also affect tourism and internal trade.
  - Environmental costs. Environmental effects of quarantine breach can often be diffuse and have extended lag times before they have a bearing on economic systems, at which time they can be catastrophic. Exotic organisms often have an extended period when they are ignored as a threat and investment in control is made only when eradication is all but impossible. While there are no established methods of environmental valuation, it is argued elsewhere that the true cost of environmental loss should be the cost of restoring the environment to its previous state. In the apple IRA the costs of environmental restoration are mentioned but with no mention of the costs of implementing that restoration, which are likely to be huge. For the purpose of assessing costs, therefore, the objective of any control action should be eradication.

Costs and benefits interact over time (Figure 1). Social benefit, the trade benefits to the importing economy from cheaper imported goods, is likely to increase rapidly then plateau as the market reaches saturation. Initial transaction costs are likely to be high, their size being related to potential economic impact of quarantine breach, eradication costs and the probability of quarantine breach. The pattern will be similar for social impact, with negative effects on producers being correlated with the price and volume of imports, and

thus with the size of consumer benefits. Both transaction and social impact costs should decline rapidly as import systems are bedded down and social readjustment occurs, assuming money saved by buying cheaper imported goods will be used to compensate producers or be invested in economic activities that will benefit local producers and associated industries that are rendered uneconomic by the increased competition.

There is likely to be an interaction between monitoring expenses and eradication costs. Monitoring costs will initially be high as a result of uncertainty over risks and increased vigilance in response to a novel threat. If no quarantine breach occurs, investment in monitoring is likely to trend downwards with time since introduction as people become less vigilant, thus reducing the probability of early detection, although there are likely to be occasional short-term increases in response, for example, to climatic fluctuations that temporarily increase the likely prevalence of disease in the exporting country. Eradication costs, however, are likely to be lower the sooner a breach is detected. It therefore follows that, in the early days of importing, when monitoring is particularly vigilant, eradication costs will probably be lower than later when local producers are more relaxed about threats. There is thus a good chance that, at any one time, the summed costs could exceed the trade benefits should there be a quarantine breach even if there are net benefits if such a breach does not occur. This would represent a potential unfunded liability from importation (Figure 2).

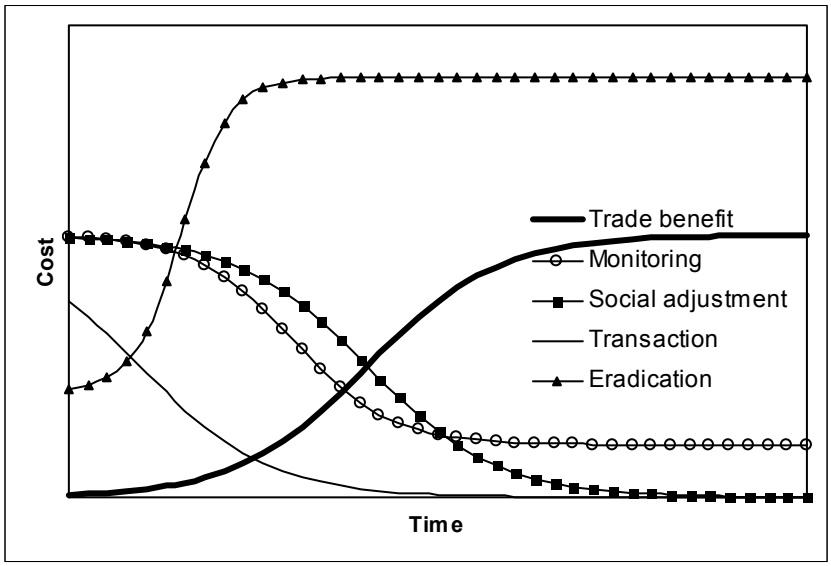

Figure 1. Potential trends in benefits and costs of imports where there is a risk of quarantine breach.

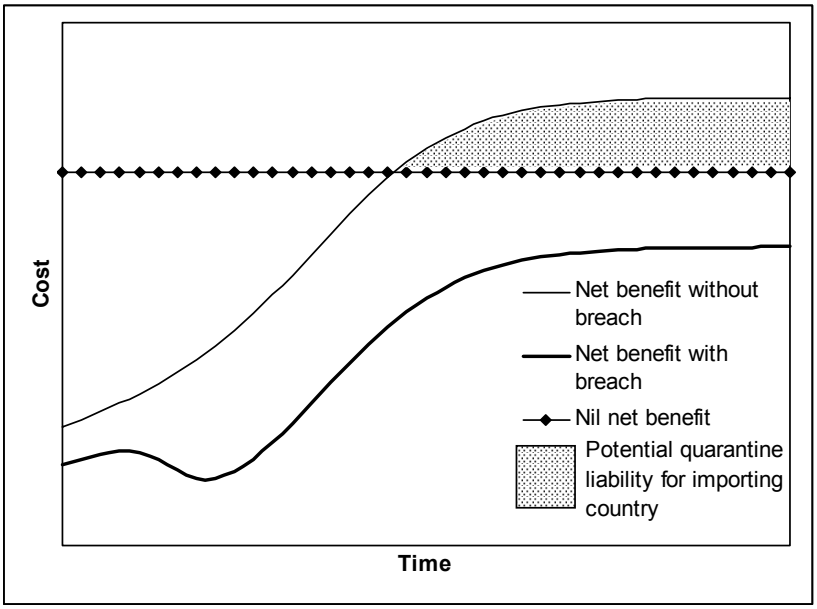

Figure 2. Net benefit to importing country with and without a quarantine breach from newly imported goods, based on Figure 1.

Existing governance of existing quarantine risk management

It is an explicit objective of the WTO is to promote free trade. Although the final arbiter of trade disputes relating to quarantine, the WTO nevertheless fosters an unimpeded flow of goods between countries and, despite the clarity of its rules and professionalism of its dispute resolution panellists, it is inevitable that, if there are errors, they are likely to be towards accepting lower risk levels. In fact the IPPC standards 2 and 11 governing WTO quarantine restrictions state that such restrictions must be kept to a minimum level. In most cases the only means of determining that minimum level will be to have a quarantine breach. If there is a precautionary principle applied, it tends towards minimising risk to free trade not minimising breaches of quarantine. Similarly the SPS agreement states that phytosanitary measures 'are not more trade-restrictive than required to achieve the appropriate level of sanitary or phytosanitary protection'[1].

In contrast it may be in the interests of importing nations to assess risks as being higher than they actually are. Since, under the WTO SPS Agreement, a country retains sovereignty over the level of risk that it may deem acceptable, there is ample evidence that the assessing agency will be under pressure to be cautious, especially if the agency assessing risk is an arm of a democratic government whose voting public will be able to

[1] SPS Agreement Paragraph 6 of Article 5. http://www.wto.org/english/tratop_e/sps_e/spsagr_e.htm

influence elected members to intervene in favour of local producers. The WTO decision on apple imports to Japan would suggest regulator capture of this nature has happened in the case of the Japanese Ministry of Agriculture, Fisheries and Forests[2]. It could be argued that the current Senate inquiry is evidence of a similar process occurring in Australia.

Regardless of the direction of the built-in error tendency, the risk assessment bodies have no direct responsibilities for the consequences of their assessment, be they the WTO or a national organisation. There are no rewards if there are no breaches of quarantine since the status quo pertains. If there is a breach and there are negative effects of trade, the WTO has no capacity to pay compensation and, in the case of a national quarantine organisation, a risk assessment that was followed by a quarantine breach would probably be rewarded with more resources to improve forecasting. In the case of neither decision-making body would there be personal consequences for those making the assessment. One public submission on an earlier draft Australian IRA on the import of apples from New Zealand suggested bluntly that 'It would bring BA [Biodiversity Australia] into reality if the budgets for fire blight eradication are drawn from the same budget for hiring those responsible for the decision, and as a result they would automatically lose their jobs'[3]. Although the Risk Assessment Panel considered this comment beyond their jurisdiction, it must remain a consideration for broader government.

Finally, both Australian law[4] and the WTO SPS Agreement[5] assume there is a small risk, even if it is 'negligible'. So, even when negligible, the law of probability makes it inevitable that quarantine will be breached in a very small number of instances. Therefore the more imports that arrive, and the longer the period over which they arrive, the greater the likelihood that a breach will occur. The current IRA deals in terms of annual risk. In reality risk should be managed in a way that assumes imports will flow for decades.

Potential for use of insurance

While there are few consequences of quarantine breach to government-funded agencies, and hence little direct incentive to ensure import risk assessments are correct, accurate risk assessment is the business of insurance companies, particularly in a competitive market.

[2] WTO accessed 15 July 2003 Japan – measures affecting the importation of apples. WT/DS245/R http://www.wto.org/english/tratop_e/dispu_e/245r_e.doc
[3] Agriculture Fisheries and Forestry – Australia (July 2002) Importation of Apples from New Zealand Scientific Review Paper July 2002.http://www.affa.gov.au
[4] Section 5D of the Australian *Quarantine Act 1908* and Section 70 of the *Quarantine Proclamation 1998*
[5] SPS Agreement Paragraph 3 of Article 5.

An insurance company that assesses risk at too low a level will set premiums that will not cover claim outlays, one that is too conservative about risk will be priced out of the market by competitors. Use of the market to assess risk can thus lead to both more accurate estimates of probability and independence from agencies subject to external political pressures. It would also mean that the costs associated with quarantine breaches occurring despite 'negligible' risk should be covered.

Under an insurance system negotiations would occur between insurance companies and potential exporters on the phytosanitary protective measures necessary to reduce risk to a level where premiums are sufficiently low to make trade profitable. If premiums cannot be reduced to that level then importing countries may be less likely to find the risk acceptable in a formal risk assessment process, and would have the basis to argue for a ban on importation before the WTO. However if the level of risk, as determined by market forces, is low enough to enable profitable trade it should also become acceptable to importing governments. The process should also be sufficiently transparent to satisfy the exporting country that a fair process had been followed.

Importantly insurance should attempt to cover the costs of eradication not control since, once an invasive organism becomes established and ongoing control is needed, quarantine restrictions can no longer be justified under the WTO SPS rules. By the time this occurs, however, the insurer would have expended the full amount available up to the predetermined maximum considered to be a reasonable estimate of the amount needed for eradication. In fact exhaustion of these funds could be seen as the point at which attempts to eradicate had failed.

The risk management could take one of two forms, or a combination of the two.

The first could be a single initial bond payment lodged with the government of the importing nation and accessed in the event of a quarantine breach. Bonds, however, tie up substantial amounts of capital and may not reflect accurately the level of risk as it evolves over time.

The second approach is to rely entirely on insurance to cover the extra costs in the event of a quarantine breach. Annual insurance premiums are likely to be low compared to the initial payment of a fixed bond since cost is moderated by risk probability, but can deliver far more in the event there is a breach. Insurance is particularly attractive because of its flexibility. For instance premiums can reflect the many factors that influence quarantine risk, such as measures taken by the exporter to reduce it, as well as changing knowledge of risk as empirical data is obtained through time.

The combination of bond and insurance provide benefits from both systems. A small bond would protect the importing government and the insurer against breaches of faith by the exporter, and ensure the availability of resources at call to undertake breach management, but the bulk of breach management funds would come from insurance.

Empirical data will be critical to ensure that the cost of insurance is not used as a *de facto* trade barrier. This would be the case if the insurance has to cover the entire cost of eradication. In fact the insurance would only be used to cover the gap between the potential costs of eradication and the point at which eradication costs exceed social welfare benefits, the quarantine liability of Figure 2. To calculate this will require not only the assessment of the risks but accurate figures and modelling of net trade benefits, effectively an empirical measure of the benefits of GATT as it relates to the traded commodity[6]. Some models of apple importation into Japan suggest that the risks are so low that, even with a fire blight outbreak, the Japanese economy would benefit[7]. If the insurer considered that this was likely to be the case, there would be a low probability that the insurer would need to outlay funds in the event of a quarantine breach, which would be reflected in minimal premiums. If, however, the insurer considered that the importing government could prove that the costs of eradication exceeded trade benefits, premiums could be high, possibly to the extent that trade would be unprofitable.

In this way the costs of risk management would be shared fairly among potential beneficiaries. Currently, when a government grants a licence to a foreign exporter, it is effectively accepting responsibility for all risk management relating to quarantine. Thus the exporter, while creating the hazard, accepts no responsibility for the risk. Using insurance, however, the importing government would grant a license to trade on condition that the exporter, through the exporter's insurer, accepted an appropriate share of the risk. In fact collaborative insurance arrangements involving accredited producers and importers are being developed in the Netherlands for quarantine pests of glasshouse crops[8] suggesting that the allocation of costs can be organised by industry partners without government intervention.

Insurance that covers only the potential contingent liability would seem to fall within Article XX(b) of the GATT:

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[6] These allocations could also be used to determine the responsibilities for greenhouse gas emissions under the Kyoto agreement that are a consequence of trade, and which are directly correlated with any increase in trade.

[7] Calvin, L. and Krissoff, B. (1998) Technical barriers to trade: a case study of phytosanitary barriers and U.S.-Japanese apple trade. *Journal of Agricultural and Resource Economics* 23: 351-366.

[8] Roozen, N.J.M. and Cevat, H.N. (1999) Dutch quarantine strategies applied to glasshouse pests. Organisation Européenne et Méditerranéene pour la Protection des Plantes 29: 37-39.

Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures necessary to protect human, animal or plant life or health[9].

While Article 13 of the WTO SPS agreement states:

"members shall ensure that they rely on the services of non-governmental entities for implementing sanitary and phytosanitary measures only if these entities comply with the provisions of this Agreement"[10],

there is nothing in the agreement with which the implementation of a quarantine insurance scheme would contravene.

Risks from an actuarial approach

The first risk of using insurance to manage quarantine risks is that an importing government whose regulators had been captured by producers could use insurance as a trade barrier by over-estimating the costs of eradication, thus forcing up premiums. While this replaces the need for accurate estimation of quarantine risk with the need to make a reasonable estimate of eradication costs, there is usually more information on disease control and eradication costs by virtue of the disease already being known in the exporting country. Nevertheless a judicial process may be necessary should the importing government and the insurer not be able to agree on a liability maximum that genuinely reflects the possible costs of eradication.

The second risk is that quarantine insurance would act as a Trojan horse for infected produce. For instance insurance companies could assess the risks not only of quarantine breach but also of a successful claim by the importing government or producers. Thus they may be inclined to set lower, more attractive premiums, and accept a higher level of risk than might have been acceptable to the importing government. To counter this it will be necessary to have a single insurer for all imports of goods likely to carry the target disease so that, should there be a breach, only one insurer will be accountable, maintaining a

[9] WTO accessed. 27 July 2003. THE WTO…in brief….http://www.wto.org/english/thewto_e/whatis_e/inbrief_e/inbr00_e.htm
[10] SPS Agreement Paragraph 3 of Article 13.

competitive market for insurance by selecting this insurer through a tender process. The insurer will then have to assess the risk of a breach occurring that is not sourced from the commodity being imported, removing the possibility for dispute about the source of the breach. It will also be important that any legislation covering this form of risk management be explicit about the nature of the responsibilities.

There is also a danger of vexatious introductions. Currently there is a greater danger of such introductions occurring from agents of the exporter, breaching quarantine so that areas that were disease-free can be shown to be infected and so are no longer protected by the SPS agreement. This incentive will exist for as long as trade is prevented. Once trade is occurring there may then be some incentive for producers in the importing country to breach quarantine deliberately to raise premiums in the future so that imports become uneconomic. However the consequences of this are likely to be far worse than having competition or else there would not be the concern about quarantine in the first place. Also there would be a risk that insurance funds would be exhausted before eradication attempts succeeded and trade restrictions lifted entirely.

This illustrates a fourth risk, which is that insurance companies would not have the capital to cover eradication following a breach. It is unlikely that insurance companies would bud for a tender that involved unlimited liability so there is a reasonable chance that liability limits would be met before eradication had been achieved. A vexatious introduction from producers in the exporting country would thus remove the impediment of insurance and still manage to establish the disease in the importing country. This is another problem that would need to be managed by the insurance company, assessing the risk of such introductions occurring, and reducing their probability of occurring still further by setting the initial bond payment at an appropriate level.

Finally there is a possibility that no insurance company will be found that is willing to write the business. This is analogous to the situation in the Netherlands where government intervention was necessary to insure crops against pest damage, although the subsequent entities rapidly established profitable business with high producer uptake[11]. If the case of quarantine insurance the failure to find an insurer could be construed as sufficient argument for refusing imports because, if the risks are considered too uncertain for a commercial insurance company to contemplate what is possibly highly profitable new

[11] Doornbos, G. (2001) Perspectives for risk management in Dutch agriculture. www.lto.nl/themas/brussel/archief/speeches/ speechPerspectiveforriskmanegment.htm 29 August 2003.

business, how can the potential exporter argue before the WTO that the risks are negligible.

The alternative is for the WTO or the exporting government to create its own insurance fund with the object of providing greater security for importing governments. While this means there will not be the competitive commercial incentive to assess risks accurately, it does mean that the costs of quarantine breach will be borne directly by the economies that benefit most from the trade or, in the case of the WTO, the organisation that makes the final decision on whether quarantine is being used to restrict trade. An insurance fund run by the WTO could be used to manage a whole suite of situations where it is thought that the SPS agreement is being used to restrict trade[12].

At the very least I believe it would be worthwhile using an insurance framework to inform the government on the costs and benefits of introducing apples from New Zealand. A crude calculation using figures and probabilities derived from the current IRA are described below for fireblight.

Case study using Australian fire blight quarantine

To calculate an insurance premium that might be paid on apples there needs to be an assessment of the probability of quarantine breach and the costs of eradication.

- Unrestricted access Low[13]: midpoint probability: 0.175[14] (equivalent to chance infections once every 6 years)
- Restricted access after quarantine procedures (apples sourced from uninfected orchards, treated with chlorine and cold-stored) Very Low[15]: midpoint probability 0.0225[16] (equivalent to chance infections once every 44 years)

Costs of eradication: assume minimum eradication cost is that needed after two plants with the disease discovered in Melbourne Botanic Gardens: $2.8 million[17]

[12] The Export Finance Insurance Corporation provides a similar single desk insurance is available for exports in Australia.
[13] Revised Draft IRA report Part A p 124
[14] Revised Draft IRA report Part A p 48
[15] Revised Draft IRA report Part A p 476
[16] Revised Draft IRA report Part A p 48
[17] Revised Draft IRA report Part A p 120

Raw potential annual premium to cover the cost of eradication if the disease is detected immediately is thus:

- unrestricted access: 2.8 million x 0.175/year $490,000/year
- with full phytosanitary measures: 2.8 million x 0.0225 = $63,000/year

However the eradication cost was low because the outbreak in Melbourne was detected early. Other countries have not been so fortunate and, although stringent phytosanitary measures have kept spread to a slow rate, eradication is more difficult[18]. Therefore, while snnual monitoring in Australia would probably cost less than this intensive reactive survey after the Melbourne outbreak, any savings would be offset by the monitoring needed to ensure phytosanitary procedures are maintained in New Zealand and broader monitoring for the disease across Australia. Thus, to be able to detect outbreaks early and thus keep eradication costs low, let us assume $2.8 million needs to be invested in monitoring each year.

Transaction costs of risk analysis and administrative fees would add considerably to the initial premium, possibly another $1 million. This might be the equivalent of the bond levied to promote compliance.

Thus total outlays per year for insurance (raw premium plus monitoring costs) would thus be about $3.3 million per year, with a bond of $1 million. By implication the Australian government would carry $3.3 million in risk that fire blight would be introduced should it grant a licence to import.

For Japan it has been estimated that, even allowing for reduced producer welfare, there would need to be a yield loss of 30% from fire blight to remove the benefits from trade[19]. Taking this figure at face value, and making, for the purpose of this argument, the assumption that the trade benefits to Australia would be proportional to those calculated to pertain to Japan, it is assumed that losses resulting from the inadvertent introduction of fire blight following trade in New Zealand apples would have to exceed 30% of the value of the Australian industry. The loss value of 37.5% calculated to occur if the disease became

[18] López, M. M., Llop, P., Donat, V., Peñalver, J., Rico, A., Ortiz, A., Murillo, J., Llorente, I., Badosa, E. and E. Montesinos. (2002) Chronicle of a disease foretold (that advances slowly): the 2001 Spanish situation. Acta Horticulturae 590: pp.35-38.

[19] Calvin, L. and Krissoff, B. (1998) Technical barriers to trade: a case study of phytosanitary barriers and U.S.-Japanese apple trade. *Journal of Agricultural and Resource Economics* 23: 351-366.

widespread in all Australian growing areas[20] is 7.5% higher than the potential benefits (ignoring, for the sake of this argument, costs to beekeepers and environmental costs). Thus about 20% of the risk costs would be borne by the exporters, about $670,000/year in premiums, with the remaining $2.6 million by the Australian government.

If New Zealand were to capture 20% of the Australian market, as predicted[21], this represents a gross value of about $26 million[22], so insurance would constitute about 13% of the total value of the trade of which the exporters would pay 2.5%. While more sophisticated modelling and examination of the assumptions will be needed, the size of this figure does suggest that insurance is not necessarily an impediment to trade while managing the risk more effectively and more equitably than do current arrangements.

Conclusions

Using insurance to mange quarantine risk may facilitate resolution of trade disputes where it is being asserted that sanitary and phytosanitary measures are being used to inhibit free trade. Such insurance has the potential to attribute costs appropriately and cover contingent liabilities resulting from accepting risks inherent in trade in commodities carrying a risk of disease. It also provides for better governance and more accountable risk management than existing government-led systems.

[20] Bhati, U.N. and Rees, C. (1996) Fire blight, a cost analysis of importing apples from New Zealand. *In* Roberts, W. (1998) Final risk analysis of the New Zealand request of the access of apples (*Malus pumila* Miller var. *domestica* Schneider) into Australia. Australian Quarantine and Inspection Service, Canberra.
[21] Revised Draft IRA report Part A p.55
[22] Calculated from price/tonne in Queensland (Revised Draft IRA report Part A p118) and likely import levels (p55)