Chapter Title: Quarantine reform: Australia’s recent experience
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Book Title: The Economics of Quarantine and the SPS Agreement
Book Editor(s): Kym Anderson, Cheryl McRae, David Wilson
Published by: University of Adelaide Press. (2001)
Stable URL: https://www.jstor.org/stable/10.20851/j.ctt1t304rx.19

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Quarantine reform: Australia's recent experience

CAROLYN TANNER*

Three years after the Australian government announced major changes to Australia's quarantine system, quarantine-related issues continue to elicit strong interest from the media, some industries and foreign governments, and quarantine remains high on the policy agenda. It is therefore time to ask: what have been the major outcomes of reforming the Australian quarantine system and what now are the key issues from an economic perspective?

This chapter addresses these questions by first briefly reviewing the background to and major tenets of the report of the Australian Quarantine Review Committee (Nairn et al. 1996) which formed the basis for the government's fundamental reforms to the quarantine system announced in August 1997 (DPIE 1997). The chapter examines the broad outcomes resulting from the government's reforms before focusing on the key issues of managed risk (in particular, import risk analysis) and the continuum of quarantine (that is, expanding the scope of quarantine to include pre-border, border and post-border activities that assist in achieving the quarantine objective). Finally some comments are made about the performance of quarantine delivery and the goal of quarantine from an economic perspective.

* The author wishes to thank Mal Nairn, Andrew Inglis, Mike Nunn and Warren Vant for helpful comments and Mark Kethro, Warren Vant and Neil McWaters for assistance with the tables.
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Australian quarantine reform

The efficacy of the Australian Quarantine and Inspection Service (AQIS) — the organisation responsible for the development of Australia's quarantine policy and programs — was called into question in the early 1990s by the entry into Australia of a succession of exotic pests and diseases that attracted wide media attention\(^1\). Concern about the adequacy of Australia's quarantine system was exacerbated by a highly politicised and public debate concerning the entry conditions for a number of products on which AQIS and industry representatives were unable to reach common ground for deciding issues on their scientific merit. As Nairn et al. (1996, p.3) observed, the debate was 'resource-intensive and time-consuming' and led to 'community concern about Australia's quarantine services'.

Coincident with the controversy concerning the Australian quarantine system, major developments were occurring in world trade and other areas relating to quarantine, including:

- the conclusion of the Uruguay Round, which opened up trade opportunities and enhanced exporters' expectations with respect to market access;

- the negotiation of the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement), which defined the rights and obligations of Members of the World Trade Organization (WTO) with respect to the development and implementation of quarantine controls;

- the increasing use of the 'clean, green' reputation by food exporting nations such as Australia, partly in response to increased consumer concern for food safety;

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\(^1\) With the restructuring of Agriculture, Fisheries and Forestry — Australia (AFFA) which occurred in mid-2000, these activities have been relocated in the Market Access and Biosecurity group of AFFA, but the same staff are involved. To avoid confusion and for consistency with the Handbook, staff conducting IRAs will be referred to as AQIS staff throughout this chapter.
• rapid increases in the volume of world trade and international passenger movements (in the order of 10 per cent per year); and

• significant scientific advances in surveillance and identification techniques for animal and plant pests and diseases (Nairn et al. 1996, pp 3–4).

In response to mounting criticism of the Australian quarantine system from primary producer groups, the scientific community and the general public, the then government set up an independent review of Australia's plant and animal quarantine policies and procedures in December 1995, chaired by Professor Malcolm Nairn. Following a general election in March 1996, the review was endorsed by the Coalition Government and the Review Committee's report was presented to the new Minister for Primary Industries and Energy (the Hon. John Anderson MP) in November 1996.

The report - *Australian Quarantine: A Shared Responsibility* - proposed fundamental changes to the culture of the quarantine service and the way quarantine policies are developed and put into effect. Central to the Nairn Review's recommendations was the need to develop a 'partnership approach' that embraced industry, governments and the wider community. The basic tenets of the Nairn Review can be summarised as follows:

• development of a partnership approach to quarantine policies and programs involving the whole Australian community - the general public, industry and governments;

• establishment of a statutory authority to develop national quarantine policy and ensure national delivery of quarantine services;

• establishment of a more balanced approach to animal and plant health and quarantine by providing additional inputs for plant health and quarantine;

• development of a more formally structured process for conducting risk analyses to provide a scientifically based foundation for a policy of manageable risk;
acknowledgment of the importance of quarantine to the natural environment;

• expansion of the scope of quarantine by recognising the importance of activities in all three elements of quarantine - pre-border, border and post-border - as a continuum; and

• enhancement of the focus on pre-border and post-border activities of the continuum of quarantine in the achievement of Australia's quarantine goal (Nairn et al. 1996, pp. 11–12).

In its response (DPIE 1997), the government accepted the basic principles and recommendations of the Nairn Review — with the exception of the recommendations to set up a statutory authority to be responsible for quarantine policy and programs, and to establish a key centre for quarantine-related risk analysis — and provided funding in the order of A$76 million over a four-year period.²

Key outcomes

In its response to the Nairn Review, the government stressed the importance of Australia's quarantine system for potential agricultural exports and the need for 'a credible quarantine policy that is consistent with international rules and standards' (DPIE 1997, p. 8). The government emphasised the need to 'accept the international rules with which we expect our trading partners to comply' and to base quarantine decisions 'on the weight of scientific evidence and judgement' (DPIE 1997, p. 8). In providing additional funds to enhance the quarantine system, the government placed particular emphasis on increasing community awareness, applying the principle of 'manageable risk' (based on science) to quarantine decisions, protection of Australia's unique environment and recognition of the continuum of quarantine (that is, quarantine needs to be seen as a continuum of pre-border, border and post-border measures). Greater emphasis was also to be given to improved consultation in import risk analysis, increased monitoring

² The government's response was a joint response to the Nairn Review and to the National Task Force on Imported Fish and Fish Products (DPIE 1996).
for pests and diseases, and enhanced national preparedness and response capacity (especially for plants and aquatic animals).³

In providing significant funding for quarantine - at a time of overall budgetary stringency - the government demonstrated its commitment to maintaining a strong quarantine system (Tanner and Nunn 1998). Consistent with the government's endorsement of the underlying rationale of the Nairn Review of a 'shared responsibility', two-thirds of the funding has been provided by government, with the remainder being contributed by industry through the application of AQIS's existing full cost-recovery policy.

The Government's endorsement of the partnership approach established a framework for a change in the culture of quarantine that recognises that quarantine is not the sole responsibility of government but that all members of the community as well as industry and governments need to be involved. Overall, the reforms that have been made to the Australian quarantine system have led to greater transparency, which is consistent with Australia's international obligations and trade objectives as a major agricultural exporter and leader of the Cairns Group. At the same time, the quarantine system has been strengthened and its focus extended beyond the border. Strengthening the pre-border and post-border elements of the continuum of quarantine is particularly important in managing the quarantine threats inherent in increasing volumes of trade and numbers of tourists (Tanner and Nunn 1998).

In its response to the Nairn Review, the government indicated that it had been guided by 'seven key quarantine themes':

- managed risk (based on science);
- a continuum of quarantine;
- community responsibility;
- consultative decision-making;

³ For the allocation of additional funds to major functional areas, see DPIE (1997, p. 10).
• external input to quarantine policy;
• enhanced capacity in plant quarantine protection and policy; and
• delivering quarantine objectives (DPIE 1997, p. 9).

The seven quarantine themes set out above are clearly inter-related and have led to a suite of reforms. Arguably, the first two are of greater significance and will be discussed in more detail.

**Managed risk**

At the time of the Nairn Review, import risk analysis (IRA) was a highly controversial issue, and addressed in many submissions. Despite the changes that have been made to the IRA process, Australia's quarantine risk analyses continue to attract criticism from Australia's major trading partners, some domestic stakeholders — particularly those whose economic interests are affected by the IRAs — and the media. In addition to the scrutiny of the WTO Panels, the IRAs carried out by the then AQIS for uncooked Pacific salmon products have been the subject of a recent Senate Committee inquiry (Senate 2000).  

Each of Australia's quadrilateral partners has expressed concerns about Australia's quarantine regime — for example, New Zealand with respect to apples, Canada with respect to salmonids and pigmeat, and the United States with respect to chicken meat, pigmeat, salmonids and table grapes — as have the ASEAN countries, notably Thailand (on durian and chicken meat) and the Philippines (on tropical fruits). The European Union (EU) has long held and expressed concerns about Australia's quarantine policies as they affect EU plant and animal exports. It is well recognised in international trade circles that such concerns about Australia's quarantine policies can have an adverse impact on market access for Australian export products, as recent events in the Philippines

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4 It should be noted that the 1996 IRA on salmon was undertaken prior to the new IRA process being implemented and the 1999 IRA was conducted under an accelerated procedure due to time constraints arising from the WTO proceedings.
clearly demonstrated. Recently, Australia's quarantine goals have also come under scrutiny by economists (see, for example, James and Anderson (1998) and Rodriguez et al. (2000) - the particular issues raised by economists are addressed in the next section).

The Nairn Review endorsed the government's 'managed risk' approach to quarantine. This is the only appropriate approach in view of the increasing levels of international trade and tourism and the finite resources available to AQIS to prevent establishment of pests and diseases. There is also the constant threat of pests and diseases entering through 'the natural movement of wildlife, such as migratory birds, or [being] borne long distances on wind or sea currents' (Nairn et al. 1996, p. 21). The community therefore needs to accept a pragmatic approach to quarantine that is consistent with increasing trade and tourism and the threat of disease and pathogen entry through natural pathways.

The Nairn Review identified a number of fundamental principles that should apply to import risk analysis, similar to those that apply in other disciplines such as food safety (ANZFA 1996) and environmental sciences (Norton, Beer and Dovers 1996). In summary, risk analysis should be:

- conducted in a consultative framework;
- based on science and politically independent;
- transparent and open;
- consistent with other government policy and Australia's international obligations;
- harmonised to take account of international standards, guidelines and recommendations; and
- subject to appeal on process (Nairn et al. 1996, pp. 89–90).

These six principles were endorsed in the government's response and incorporated into the new IRA process that came into effect in 1997 (DPIE 1997 p. 21). The major differences between the new IRA processes and the previous practice adopted by AQIS is in the
'duration, timing and consultative requirement, and the provision for an appeal mechanism' (Tanner and Nunn, 1998 p. 450). *The AQIS Import Risk Analysis Process Handbook*, which was published in August 1998, sets out — for stakeholders and other interested parties — the process that Biosecurity Australia follows in conducting an IRA. As shown in Table 13.1, many of the import requests received by Biosecurity Australia can be addressed relatively quickly without the need for a formal IRA process. Those requests that involve significant variations in established policy require an IRA to be carried out. For the period 1993/94 to 1999/2000, 174 plant and animal quarantine decisions were made in

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<tr>
<td><strong>Plant</strong></td>
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<tr>
<td>Reviews</td>
</tr>
<tr>
<td>IRAs(^a)</td>
</tr>
<tr>
<td><strong>Animal</strong></td>
</tr>
<tr>
<td>Reviews</td>
</tr>
<tr>
<td>IRAs(^a)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>Reviews</td>
</tr>
<tr>
<td>IRAs</td>
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</tbody>
</table>

\(^a\) Caution should be used in comparing activity before and after the new IRA process (which was introduced in September 1997). The new process is more extensive, thorough, consultative, transparent and significantly more resource intensive. Before the new process, all the animal quarantine decisions followed a period of stakeholder consultation while for plant issues a large percentage (50%) were based on pre-existing policy and required minimal consultation. Those included above as 'IRAs' are ones that involved new policy and more extensive analysis than those counted as reviews.

Source: Biosecurity Australia.
response to requests to import products or material not previously permitted. Of these decisions, more than half could be dealt with using the less formal review process, whilst the remainder - some 82 decisions - involved more complex issues, requiring a full IRA. Although caution needs to be exercised in comparing data before and after the introduction of the new IRA process, Table 13.1 indicates that the proportion of requests being addressed via IRAs has increased. This is largely a function of the increased funding of risk analysis that has allowed a greater number of IRAs to be undertaken simultaneously.

An IRA may be conducted on a 'routine' or 'non-routine' basis, depending on the complexity of the issues involved, but either way there is opportunity for extensive consultation with stakeholders who may lodge appeals if not satisfied that the process — as set out in the AQIS Handbook — has been followed. Routine IRAs are handled 'in-house' by Biosecurity Australia, with scientists and other experts both within Biosecurity Australia and outside being consulted, as required. More complex proposals (non-routine risk analyses) involve the establishment of an expert panel (called a risk analysis panel or RAP) to conduct the IRA. Staff of Biosecurity Australia's Plant and Animal Quarantine Policy Branches are responsible for assigning priorities to import requests, conducting IRAs, developing risk management options and making recommendations to the Director of Quarantine as to which option meets Australia's appropriate level of protection (ALOP) or level of manageable risk in the least trade-restrictive way. These staff are also responsible for arranging stakeholder consultations and the negotiation of the final import protocol with the exporting country's relevant agency.

The process is designed to ensure that the risks of entry, establishment and spread of pests and diseases, and their potential

5 With the restructuring of Agriculture, Fisheries and Forestry — Australia (AFFA) which occurred in mid-2000, these activities have been relocated in the Market Access and Biosecurity group of AFFA, but the same staff are involved. To avoid confusion and for consistency with the Handbook, staff conducting IRAs will be referred to as AQIS staff throughout this chapter.
impacts are fully evaluated. Imports are only permitted where such risks can be managed in a way that is consistent with Australia's very conservative approach to quarantine risk management. The ALOP is essentially Australia's quarantine goal and the import decisions and quarantine protocols are the means of achieving that goal. The concept of ALOP is discussed in detail above in Chapters 6 to 10 of this volume. Suffice to say here that Australia's ALOP is not quantified (nor is any other country's). Despite being relatively straightforward in concept, ALOP is not easy to define and is often not well understood by stakeholders. Consistency in the application of the concept is 'achieved by reference to existing Australian policies and procedures, by reference to relevant international standards, guidelines and recommendations, and through the contribution of experienced risk analysts' (Tanner and Nunn 1998, p.451). The additional funding for risk analysis provided by the government has allowed additional scientific staff to be hired by AQIS and outside expertise to be contracted, as appropriate.

The transparency of the overall process has increased since the publication of the Handbook. In addition, Biosecurity Australia maintains public files for all IRAs (accessible to all parties), a register of stakeholders is established for each IRA, and registered stakeholders receive progress reports on the IRAs. As of mid-2000, 26 IRAs had been completed under the new procedures that were implemented in 1997. A further 46 IRAs are in process and over 150 requests for import market access — some dating from the early 1990s — await consideration.

As discussed in AQIS (1999a), while Australia's ALOP is illustrated by the body of quarantine decisions, inevitably 'outliers' will occur. This is particularly the case with older decisions or in cases where new scientific evidence has emerged or new technologies have been developed. Review of such decisions is an on-going process.

Biosecurity Australia is developing a publication on the technical guidelines used in undertaking an IRA and developing risk management procedures to complement the Handbook and to make the overall process more transparent. The method of analysis used by Biosecurity Australia is based on the international standards produced by the Office International des Epizooties (OIE) and the International Plant Protection Convention (IPPC) and are consistent with the requirements of the SPS Agreement.
Experience with the new IRA process suggests that the majority of IRAs — particularly those involving products that do not compete directly with Australian industry or provide new genetic material — are not controversial. Criticism of AQIS and the new IRA process has often come from industries that perceive their economic interests are threatened by entry of competing product from overseas if quarantine restrictions were lessened or removed. Of the IRAs completed under the new process, the IRAs on table grapes and durians have been particularly contentious. Since the right to appeal was introduced, there have been appeals in 12 IRAs, with the stakeholder concerns ranging from the priority accorded the IRA and the composition of the Risk Analysis Panel to criticisms of the risk analysis itself (see Table 13.2 for details of appeals and their outcome). Major criticisms by stakeholders include claims that the then AQIS:

- failed to attach sufficient weight to scientific evidence submitted by domestic industry (or judgements of their nominated experts);
- lacked sufficient scientific basis for the conclusions reached;
- failed to explain adequately how it reached its conclusions both about the assessment of risk and the efficacy of the proposed risk management procedures for reducing the risk;
- was not sufficiently conservative in interpreting the ALOP; and
- did not consult widely enough when the routine process was used.

The two Import Risk Analysis Appeal Panels that considered the appeals on durians and table grapes each concluded that the then AQIS did not fail to consider significant bodies of relevant scientific evidence but that AQIS had failed to provide sufficient transparency in respect to certain technical matters. Notwithstanding these criticisms, the process exhibits a higher degree of transparency and stakeholder involvement, compared with the earlier process used by the then AQIS and the IRAs conducted by major trading partners. Notwithstanding, there is still room for greater understanding by stakeholders of the underlying principles of the IRA process and the
international framework within which Australia operates, greater transparency in the risk analysis itself and more consultation with stakeholders in the early stages.

Overall, the changes that have been made to the IRA process, together with additional funding, have enhanced the technical capacity of Biosecurity Australia to undertake IRAs and ensured that the six fundamental principles of risk analysis are met. The process is clearly structured, transparent and consultative. It is common practice to involve outside experts in both routine and non-routine IRAs, thus ensuring a strong scientific and technical basis for risk analysis and quarantine decisions. While continuing to maintain a very conservative quarantine policy, recent decisions clearly indicate that Biosecurity Australia is implementing a managed risk approach (based on science), consistent with Australia's international obligations. In commenting on the effectiveness of Australia's quarantine protocols, Gascoine et al. (2000, p. 177) note that Australia's import protocols '… are among the most stringent in the world' and that 'no pest or disease incursions have been attributed to import decisions by the then AQIS'.

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8 See AQIS (1999b) for a list of pest and disease incursions since 1997 and likely source of introduction.
Table 13.2: Summary of appeals received in Australia

<table>
<thead>
<tr>
<th>Subject of IRA</th>
<th>Basis of Appeal/s</th>
<th>Appeal/s Considered by</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prawns and prawn products</td>
<td>• RAP membership • Consultation process</td>
<td>Director of Animal and Plant Quarantine (Director APC)</td>
<td>Dismissed</td>
</tr>
<tr>
<td>Bulk maize from the United States</td>
<td>• Priority accorded to the IRA</td>
<td>Director APC</td>
<td>Dismissed: not an appealable matter</td>
</tr>
<tr>
<td>Psittacines</td>
<td>• RAP membership</td>
<td>Director APC</td>
<td>Dismissed</td>
</tr>
<tr>
<td>Non-viable salmonid products</td>
<td>• Timetable • RAP membership • Scope</td>
<td>-</td>
<td>Encompassed into a broader accelerated IRA</td>
</tr>
<tr>
<td>Live and novel veterinary vaccines</td>
<td>• Inconsistency in the final conditions</td>
<td>-</td>
<td>Inconsistency addressed and appeal withdrawn</td>
</tr>
<tr>
<td>Non-viable bivalve molluscs</td>
<td>• RAP membership</td>
<td>Director APC</td>
<td>Dismissed</td>
</tr>
<tr>
<td>Hatching eggs of domestic ducks</td>
<td>• No details provided</td>
<td>-</td>
<td>Withdrawn</td>
</tr>
<tr>
<td>Edible eggs and egg products</td>
<td>• Scope • Timetable • RAP membership</td>
<td>Director APC</td>
<td>Dismissed</td>
</tr>
<tr>
<td>Fresh durian fruit from Thailand</td>
<td>• Transparency of the process • Risk analysis failed to consider a significant body of relevant scientific or technical information</td>
<td>Import Risk Analysis Appeals Panel (IRAAP)</td>
<td>Upheld on transparency on the basis that AQIS had failed to fully explain four technical issues</td>
</tr>
<tr>
<td>Table grapes from California, United States</td>
<td>• Transparency of the process • Risk analysis failed to consider a significant body of relevant scientific or technical information</td>
<td>IRAAP</td>
<td>Upheld on transparency on the basis that AQIS had failed to fully explain two technical issues</td>
</tr>
<tr>
<td>Uncooked chicken meat</td>
<td>• RAP membership • Scope • Timetable • Approach</td>
<td>Director APC</td>
<td>Dismissed</td>
</tr>
<tr>
<td>Camelids from Chile and Peru</td>
<td>• ALOP</td>
<td>IRAAP</td>
<td>Not an appealable matter</td>
</tr>
</tbody>
</table>

Source: AFFA
Continuum of quarantine

Putting into effect the concept of a continuum of quarantine — involving pre-border measures to reduce the threat of entry, well-targeted border controls and post-border measures such as monitoring and surveillance to detect incursions at an early stage, backed up by emergency response plans to contain, control or eradicate pests and diseases when incursions occur — is one of the major outcomes of the quarantine reform. Although border activities continue to be central to the quarantine system, greater emphasis is now placed on pre-border and post-border activities than was the case in the past.

Pre-border measures

Pre-border measures are essentially a means of managing the quarantine risks off-shore. Measures include the identification, surveillance and monitoring of quarantine threats off-shore and managing these risks through co-operative programs of training, research and education; pre-clearance of goods off-shore; and promotion of quarantine awareness among Australian and overseas travelling and trading communities. Major initiatives include accrediting fumigation treatment providers, establishing timber certification standards for Canada and the United States, and extensive awareness promotions in the travel industry and with national Olympic committees in the period leading up to the Olympic Games in Sydney. The Northern Australia Quarantine Strategy (NAQS) has achieved considerable success in looking for and identifying threats in Papua New Guinea and Indonesia.

The government has endorsed the expansion of pre-clearance activities as part of the pre-border phase of importation. Pre-border activities, which are monitored at the border, include pre-cleared fruit and vegetables from a number of countries including New Zealand and Japan, pre-cleared military and agricultural equipment, and inspection of athletes' personal effects and equipment before their return to Australia (used for the Olympic Games in Atlanta and the Commonwealth Games in Malaysia). Since Australian troops were deployed in East Timor, Biosecurity Australia staff have
been stationed in East Timor and additional staff have been stationed in Darwin to mitigate the threat posed by the frequent movement of personnel and equipment between East Timor and Australia.

Border measures
The implementation of the government's response to the Nairn Review has seen the deployment of additional staff and other resources aimed at improving border integrity. The focus of the Nairn Review's recommendations was that there should be better targeting of border activities to focus on paths identified as involving high risk of pest and disease incursion. As a result there has been significant data collection and analysis in a number of areas (including air passengers, air couriers and international mail exchanges, and external container inspections) to assist in risk profiling. In addition, performance indicators have been identified and a number of border activities have been reviewed and documented to achieve national consistency and to ensure appropriate risk management. A priority area for border programs is to continue to work with industry towards co-regulatory arrangements that are designed to outsource low-risk quarantine functions to industry, thus freeing AQIS resources to concentrate on higher risk areas.

Post-border measures
Effective monitoring and surveillance for pests and diseases are essential if Australia is to fulfil its international obligations under the SPS Agreement. Article 6.3 requires countries to establish scientifically that they are free from pests and diseases, rather than simply claiming such freedom. The Nairn Review identified deficiencies in the post-border area of quarantine, particularly in relation to plants and aquatic animals. The establishment of the position of Chief Plant Protection Officer (analogous to the Chief Veterinary Officer) and of Plant Health Australia (analogous to Animal Health Australia) has enhanced Australia's plant health infrastructure and ability to respond to disease incursions. Aquatic animal health capacity has been increased through the appointment of experts to a special Fish Health Unit in AFFA (and additional
experts to Biosecurity Australia to carry out IRAs). An emergency response plan - AQUAPLAN - has been developed for aquatic animals along the lines of the AUSVETPLAN which has proved very effective for livestock diseases. The benefits of regular monitoring and early detection of pests and diseases were clearly demonstrated by the detection and subsequent eradication of black-striped mussels in Darwin harbour in 1998. This pest has the potential to impose significant costs on shipping through the fouling of hulls.

Notwithstanding the improvements made in the post-border area as a result of the additional funding following the Nairn Review, the 1999 Australian National Audit Office report - Managing Pest and Disease Emergencies - identified the need to further enhance emergency planning for and response to animal and plant pest and disease incursions. Under a new program, the government will allocate $22.3 million over the next four years to enhance Australia's emergency management capacity for animal (including aquatic animals) and plant diseases and pest emergencies and secure a national approach to animal and plant health infrastructure.

**Economic considerations**

**Performance of quarantine delivery**

A key question in any analysis of Australia's quarantine reforms is how effective and efficient have the reforms been in achieving their goal? The goal of Australia's quarantine policy (the ALOP) is clearly articulated in Recommendations 1 and 2 of Nairn et al. (1996):

- that the vision for quarantine be 'that Australia will maintain its relative freedom from unwanted pests and diseases while fulfilling national and international obligations in a responsible manner'; and

- that the goal of national quarantine should be to prevent the establishment and spread within Australia of exotic pests and diseases that are deemed to have a significant
deleterious effect on humans, animals, plants or the natural environment.

Australia's ALOP - which can best be described as 'very conservative' (AQIS 1999a) - is achieved through a managed risk approach to quarantine.

As previously indicated, analysis of incursion data shows that there has been no increase in the rate of pest and disease incursions since the time of the Nairn Review and - more importantly - no increase in the rate of establishment (AQIS 1999b). Of the 19 incursions reported to the National Office of Animal and Plant Health in the period 1997 to 1999, 10 have been eradicated (or are in the process of being eradicated), three were of no economic significance, one is controlled by normal management procedures, two are still being evaluated, and three have established, for which management programs are in progress. This result has been achieved at a time of increases in the number of international visitors, aircraft movements and entry of vessels, and the amount of international mail and cargo entering the country. Enhancement of pre-border and post-border quarantine, together with increased use of risk profiling to target resources in areas of highest risk in all parts of the quarantine continuum have contributed to the improved effectiveness and efficiency of the system. Greater quarantine awareness and the development of a partnership approach with industry (involving co-regulatory arrangements) have contributed to the improved performance of the quarantine system.

A good example of how risk profiling and better targeting of resources can improve effectiveness and efficiency of the system is the international mail program. More than 160 million articles of mail enter Australia each year, many containing items of high-risk quarantine concern such as foodstuffs, plant material, seeds and animal products. The increased funding provided to the international mail program has been used for extra staff and detector dogs and the introduction of scanning equipment. In conjunction with the Australian Customs Service, AQIS has refined its approach to targeting mail items of quarantine concern. The number of high-risk items seized has increased as has the number of
seizures per officer and the number of seizures compared with the number of items of quarantine interest referred for closer examination (AQIS 1999c).

Consistency in the application of quarantine protocols is an important aspect of performance from a National Competition Policy perspective and one that attracted considerable comment at the time of the Nairn Review. The differences in the delivery of quarantine services reported by the Nairn Review were an inevitable outcome of the changes that have occurred in quarantine delivery nationally. Before 1994, all Commonwealth quarantine services were delivered under agency arrangements by State quarantine services, on behalf of the Commonwealth. In October 1994, a meeting of the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) resolved to transfer delivery of quarantine services to the Commonwealth. However, failure by the Ministers from Northern Territory, Western Australia and Tasmania to agree to such a transfer has resulted in a situation where AQIS officers perform Commonwealth quarantine services in most States while State officers appointed as Quarantine Officers by the Commonwealth perform the border functions in Northern Territory, Western Australia and Tasmania (Nairn et al. 1996, p. 121).

Differences in delivery of quarantine services between States have the potential to be anti-competitive and to encourage the undesirable practice of 'port shopping'. AQIS has expended considerable effort in developing a nationally consistent quarantine service through documenting various procedures, increased staff training, introduction of performance indicators and regular program reviews. Although the 'mix' of service delivery persists, differences in service delivery no longer appear to be a major issue for stakeholders.

Regular oversight of AQIS and now Biosecurity Australia's performance is undertaken by the Quarantine and Exports Advisory Council (QEAC) which was established as part of the government's response to the Nairn Review. Its terms of reference include, inter alia, to oversee the implementation of the Nairn Review and Fish
Task Force Reports, to provide advice on AQIS's program delivery and to help AQIS to evaluate its performance. The regular reports that have been made to QEAC during its three years of operation demonstrate improved levels of effectiveness and efficiency, supported by the use of performance indicators and regular surveys of client satisfaction. Overall, the reforms to the quarantine service have led to a better allocation of resources through the use of risk profiling and targeting resources to areas of highest quarantine risk.

The goal of quarantine

As already indicated, Australia's goal of quarantine (ALOP) is set at a 'very conservative' level that is consistent with Australia's trade profile as a major exporter of agricultural products and the trade benefits that flow from maintaining Australia's relative freedom from pests and diseases. Under the SPS Agreement, it is up to the Member Countries of the WTO to determine their appropriate level of sanitary and phytosanitary protection. To achieve this level of protection, Member States can apply quarantine measures that protect against potential pests and diseases provided such measures are:

- based on a sound scientifically based assessment procedure;
- not more trade-restrictive than necessary to achieve the desired level of protection; and
- non-discriminatory.

The methods currently used by Biosecurity Australia for undertaking IRAs and determining quarantine protocols are consistent with the SPS Agreement.

Not surprisingly, if the ALOP is changed, the range of products that can be imported — and the associated trade flows — will change. This has been demonstrated by a recent ABARE study by Heaney, Rodriguez and Abdalla (1999), who use an iso-risk approach developed by Bigsby and Whyte (1999) to define the boundary between commodities with acceptable risks and those with unacceptable risks. Heaney et al. (1999) show that for the six commodities studied (apples, bananas, chicken, pilchards, salmon
and wheat), none would be imported at a very conservative ALOP (of $700 per year) except for chicken meat from the United States. If the ALOP is raised to $24.5 million per year, imports of pilchards and bananas, as well as chicken meat from the United States, would be permitted. At an ALOP of $33 million per year, all of the case-study commodities would have unrestricted access.

One might expect that the debate would now be focused on quantifying the ALOP for Australia but — at least amongst economists — the debate seems to have shifted to whether the current approach used by Biosecurity Australia, which is clearly consistent with the SPS Agreement, should be replaced by a cost/benefit approach to quarantine policy (James and Anderson 1998; Rodriguez et al. 2000). From a purely economic perspective, a cost/benefit approach is preferable because it allows all the costs and benefits associated with the import decision to be considered. The Biosecurity Australia approach, which is focused on scientifically based risk analysis, considers only the following economic factors:

- the potential damage (in terms of loss of production or sales in the event of entry, establishment or spread of the pest or disease);
- the costs of control or eradication of an outbreak, and the costs of programs to manage such responses;
- the costs of the loss of markets either nationally or internationally; and
- the relative cost effectiveness of alternative approaches to limiting risks (Gascoine et al. 2000).

The Biosecurity Australia approach excludes from any analysis important trade-related benefits resulting from consumers gaining access to imported product at competitive prices and agricultural producers obtaining access to superior genetic material. The

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9 See Rodriguez et al. (2000) for a discussion of the various costs and benefits associated with a quarantine decision.
omission of these benefits may lead to a sub-optimal outcome for society as a whole.

Although a cost/benefit approach to quarantine decision-making has considerable appeal to economists, some fundamental factors need to be taken into account, including:

- Is a cost/benefit approach compatible with the SPS Agreement?
- Is further change in quarantine decision-making desirable at this stage, given the relatively recent introduction of the SPS Agreement and the recent reforms to the Australian quarantine system?
- Are the data available to undertake cost/benefit analyses of quarantine decisions?
- Will the greater complexity of cost/benefit analyses lead to a higher level of disputation and more appeals to the WTO? and
- Will developing countries, in particular, have the resources to implement such an approach?

The question of compatibility with the SPS Agreement is something that will probably have to be tested legally before a definitive answer is possible. Certainly there are those such as Roberts (1998) who argue that there is scope to include welfare impacts on consumers within 'relevant economic factors' (Article 5.3 of the SPS Agreement). However, the inclusion of benefits to consumers is likely to lead to violation of the consistency requirement. Article 5.5 ensures that Members apply measures consistently to different commodities that pose a similar risk of introducing the same diseases. Where different commodities pose similar risks, allowing imports of one commodity (based on higher net benefits from imports), while banning the other, would contravene the SPS consistency provision. Violation of this provision was one of the key issues in the WTO Australia – Salmon case. Whilst renegotiation of the SPS Agreement to accommodate cost/benefit analysis is always an option, it would not seem prudent to do so at this time as some countries may wish to weaken the current provisions.
Much of the wording of the SPS Agreement is fairly general and imprecise but its meaning is being clarified through the legal dispute settlement process. The SPS Agreement is still relatively new and many countries are still coming to grips with the changes necessary to make their quarantine decision-making processes consistent with the agreement. Although minor changes to the way quarantine decisions are made in Australia are likely to occur—indeed, some changes will be required by the recent restructuring of AFFA—major changes to the framework would be undesirable while the recently introduced reforms are still settling down.

The idea of applying cost/benefit analysis to quarantine, while gaining support in recent years, is not particularly new. Hinchy and Fisher (1991) argued very persuasively for the use of cost/benefit analysis in quarantine almost a decade ago. The desirability of applying cost/benefit analysis to quarantine decision-making to justify the allocation of resources to the quarantine services was clear to the Nairn Review. However, the approach proved infeasible due to data limitations. One suspects that little has changed in the intervening period. Many developing countries are finding it difficult to undertake the necessary scientific and technical analysis to meet the current requirements of the SPS Agreement and to comply with quarantine protocols. Any change to the current SPS Agreement that increases its complexity would disadvantage developing countries in particular and is likely to lead to an increase in trade disputes.

From a trade perspective, the application of the current SPS rules is leading to greater market access and increased trade. Market access for Australian animal, plant and food products has been opened up or maintained in no less than 640 cases since 1993/94. In 1998/99, 44 new markets were opened and over 100 existing markets were protected from market disruption or closure. On the import side, the number of products for which entry is permitted is increasing. The additional resources allocated to risk analysis through the government's reforms have increased the number of IRAs being

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10 See Pauwelyn (1999) for an excellent discussion of how the first three SPS disputes have clarified the SPS Agreement.
conducted simultaneously but a backlog of requests still exists, creating some trade tensions.

**Conclusion**

The reforms that have been made to the Australian quarantine system have improved the effectiveness and efficiency of quarantine delivery. This has been achieved through increased use of risk profiling to target resources to areas of highest risk and greater focus on pre-border and post-border activities. Fundamental to the changes to the quarantine system has been the development of a partnership approach between the general public, industry and governments. This is being developed through initiatives to increase quarantine awareness, enhanced consultation and the development of co-regulatory agreements with industry.

Despite the changes that have been made to the risk analysis process to make it more transparent, consultative, structured and independent, to ensure it is based on sound science and to make the process appealable, IRAs continue to attract controversy. While there is scope for further enhancing the transparency of the risk analysis itself and the amount of consultation involved, the greatest deficiency at present appears to be the lack of clarity of the ALOP and the level at which it is set. Economists have a role in contributing to this debate. The current very conservative level effectively takes no account of the significant trade-related benefits that result from importation of many products. Shifting to a higher - but still conservative - ALOP would be tantamount to recognition of those benefits. Cost/benefit analysis has a useful role to play in quantifying those benefits to ensure a more informed debate on the level at which Australia sets its ALOP.

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