

# final report

**Project code:** FLOT.109  
**Prepared by:** ACIL Consulting  
ACIL Consulting  
**Date published:** May 1999  
**ISBN:** 1740364112

**PUBLISHED BY**  
Meat & Livestock Australia Limited  
Locked Bag 991  
NORTH SYDNEY NSW 2059

## **A review of AQIS's March 1999 draft import risk analysis for the import of Bulk Maize from the USA**

**Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.**

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# **A Review of AQIS's March 1999 Draft Import Risk Analysis for the Import of Bulk Maize from the USA**

A Report to Meat and Livestock Australia Limited

May 1999

Prepared by



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## **Executive summary**

In this review for Meat and Livestock Australia, ACIL Consulting Pty Ltd (ACIL) looks at the Draft Import Risk Analysis (Draft IRA) on Bulk Maize from the United States released for comment by the Australian Quarantine Inspection Service (AQIS), in March 1999.

The Draft IRA is AQIS's response to an application by the feedlot industry nearly two years ago to import bulk maize direct to inland sites. Such imports would be used in when droughts caused shortages of local grain. Currently maize and other grains are being imported, but they are required to be processed at seaboard upon landing which imposes heavy quality costs if further transport is undertaken.

Professionally and in legal terms, ACIL finds the Draft IRA to be inadequate. It is in breach of guidelines requiring the thorough consideration of costs and benefits.

From a professional viewpoint, the Draft is unnecessarily impressionistic. In particular:

- its analysis is insufficiently quantitative; and
- the investigation is not structured - on an issue as important and controversial as this, costs and benefits, their probability and their timing need to be systematically and comprehensively assessed.

Instead of undertaking a structured analysis which considers costs and benefits on both side of the equation, AQIS seems to have adopted the same 'zero risk' approach it has adopted on past occasions. In other words, it seems to have presumed that the local grain industries should bear no additional risks, no matter how intermittent or small or manageable, and no matter what the benefits to the rest of the country. Moreover, a great deal of relevant evidence is not considered:

- recent quantitative analysis by the Centre for International Economics has not been examined by AQIS;
- none of the new 'feedgrain security' literature has been cited;
- earlier conclusions reached on transport security by the Bureau of Resource Sciences seem to have been ignored; and
- there is no sign that possible retaliation by the US in regard to Australian exports has been considered, as it should be when import restrictions on any US agricultural products are under investigation.

One reason for these gaps may be that the Technical Working Committees did not have people with sufficient economics expertise or sufficient direct overseas experience with the risks being assessed to do

their jobs. There is a question-mark also over whether stakeholders were given sufficient opportunity to present evidence.

As for matters of detail presented in the Draft, ACIL has not attempted to check every point made by AQIS. However we have found a number of areas where the assessment is unbalanced. In particular, we consider:

- from a biological and economic standpoint, the near-equal emphasis given in the Draft to the possible introduction of new pests and the introduction of pests of the type already here is unbalanced;
- the great emphasis on Karnal bunt as a disease risk is unwarranted;
- the likely quantity and infectiousness of any soil introduced with bulk maize imports has been greatly exaggerated;
- less destructive but likely effective treatment methods involving infra-red and other forms of irradiation are not seriously considered but should have been;
- the lessons of experience by other countries, such as Chile, with imports of US maize have not been considered;
- conflicting interpretations are given by two of the technical working groups of past BRS work on the risk of spillage of grain during transport; and
- unduly heavy emphasis is given in the Draft to the risk posed by witchweed infestation in the United States (seen currently on less than 2000 acres in a quarantined area in two States of the US which *import* maize) and the true situation is inadequately reported.

In view of the Draft's general faults and the specific imbalances listed above, we conclude the Draft does not abide by the rules requiring a full and balanced consideration of the benefits and costs. We recommend that the defects be remedied and in particular that the Draft IRA be recast within a formal framework which recognises and treats consistently the issues concerned with levels of hazard, risk, timing, and economic cost and benefit to different sectors.

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## 1. Context

### 1.1 Subject of this review

This brief review was commissioned by Meat and Livestock Australia Limited (MLA) in April 1999. It is an independent assessment by ACIL Consulting Pty Ltd (ACIL) of the Australian Quarantine and Inspection Service's (AQIS's) "Draft Import Risk Analysis and Proposed Phytosanitary Requirements for the Importation of Bulk Maize [*Zea mays L.*] from the United States of America". The AQIS Draft was released for public comment on 19 March 1999.

The Import Risk Analysis (IRA) for maize reported in the Draft was conducted by AQIS in response to an application on 5 June 1997 by the Australian Lot Feeders Association (ALFA) to import bulk maize grain from the US for processing and use as animal feed in feedlots in Australia. The application sought a protocol for maize whose identity would be preserved. It would come from selected low risk areas in the US and would be transported conventionally to feedlots located in inland Australia.

Already maize is being allowed into Australia for metropolitan processing and bulk grains have been admitted from time to time for processing at seaboard sites for use as feed. The difference in this case is that the request relates to maize that would be processed inland.

The general issue of importation of feed grain and arguments about Australia's bans and tight restrictions on grain imports in particular, has a long history. The issue has been the subject of some science-oriented papers and reports which are cited in the Reference list and Appendix 1 of AQIS's Draft IRA.<sup>1</sup>

It has also been the subject of some consultancy reports with a cost-benefit analysis orientation commissioned by industry which, though public, are not cited in AQIS's Draft IRA.<sup>2</sup>

Finally, and also apparently ignored by AQIS in its IRA, there is also now in the public domain increasing amounts of literature relating to the subject of 'feedgrain security' in Australia. This is relevant to the maize

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<sup>1</sup> Eg. Evans G. *et al* "Quarantine risk associated with the importation of bulk grain — A retrospective analysis", Bureau of Resource Sciences, Canberra, 1996.

<sup>2</sup> Eg. Centre for International Economics (CIE) *Economic costs of an import ban on feed grains*, Report for grain user industries, Canberra, December 1994.

import issue because it relates to possible approaches by which the local grain industry could become a more secure supplier of feedstuffs to Australia's livestock industries. The Grains Council of Australia has been looking into the subject.<sup>3</sup> Also, a group of livestock and grain industries' research and development organisations are coordinating in a program on the matter. In one research project currently being funded by the Grains Research and Development Corporation, the NSW Department of Agriculture (with inputs from the Australian Bureau of Agricultural Resource Economics (ABARE) and the Grains Council) is investigating the implications for growers and feed buyers of developing and growing better-suited feed grains — a project that will involve adaptations of a model developed by ABARE for an earlier project.<sup>4</sup>

The IRA process undertaken by AQIS on this occasion has included technical analyses of the disease risk posed by microscopic pathogens, arthropods and weeds and a discussion of possible risk management strategies. Essentially, the Draft findings were that:

- the identification and enforcement of pest free areas in the US from where imports might come untreated is "unlikely to be achievable" (p. 29)<sup>5</sup>;

and thus that to meet "Australia's appropriate level of protection",

- imports of bulk maize would need to be disinfected and rendered sterile at the port of export in the US (p. 26).

For this, the Draft says:

- "specific [US/Australian] agreements on inspection standards would be needed" (p. 27);
- "an initial pre-clearance visit by an Australian inspector may be required" (p. 27);
- "ship survey standards equivalent to the Australian standard" would need to be included in the protocol for treatment (p. 28); and
- measures would need to be "taken to prevent post-treatment infection, infestation or contamination of the shipment" (p. 30).

The Draft stresses the "integrated approach" required (p. 30) but a general set of conditions are proposed for import (subject to a caveat that "specific conditions for individual shipments may vary depending on the

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<sup>3</sup> See for example: Ryan, TJAustralian Feedgrains: A Strategic Plan Leading the Industry into the 21<sup>st</sup> Century. A Report prepared for the Grains Council of Australia's Feedgrains Strategic Planning Unit, Grains Council of Australia, Canberra, 1997.

<sup>4</sup> Brennan, J, *pers.com* 12 May 1999. ABARE's earlier work is reported in Hafi, A and Andrews N *Regional feed markets in Australia*, Australian Bureau of Agricultural and Resource Economics, Canberra, 1997.

<sup>5</sup> AQIS notes that for a number of reasons it has not addressed this matter in detail. It is a judgement ACIL finds not to be substantiated, as will be indicated.



configuration of sourcing, place of treatment and transport systems used" (p. 30)). In brief, the general conditions (all on pp. 30-33) can be paraphrased as follows:

- the commodity be sourced from northern USA States;
- the permitted grade be US No.2 Grade or better (at least until the equal effectiveness of treatment of lower grades can be shown);
- shipments should be tracked from source (eg rail head) to exit ports in the Pacific Northwest;
- disinfection and sterilisation "to a high degree of confidence" should be undertaken at the export port;
- post-treatment, the grain should be "immediately" reduced to near ambient temperature and not more than 14% moisture (wet basis);
- samples and documentary evidence of treatment should be air-couriered by US authorities to AQIS;
- pre-shipment storage and loading paths to vessel should be clean;
- a phytosanitary certificate should be issued by the US Animal and Plant Health Inspection Service (APHIS);
- the ship should be inspected and certified "substantially free" from previous cargo residues and live insects — and this is a tighter standard than the usual US Federal Government Inspection Service (FGIS) appears to apply; and
- upon arrival at an Australian port, the cargo should be inspected by AQIS prior to discharge to provide a "high degree of confidence" that it is in keeping with the pre-shipment samples.

The general Draft conditions listed above are essentially a modified version of "protocol 1", a quarantine procedure under which feed grains may be imported provided processing occurs immediately, at seaboard. The key difference is that in this case, involving processing at inland feedlots, the Draft conditions include a requirement for disinfecting and sterilising (and extensive official activity) prior to departure from the US.

ACIL believes the Draft conditions are so onerous that they may rule out the economic importation of bulk maize for feed purposes to sites in Australia's grain growing areas from the US, even in times of severe drought.

We have not costed every element of the conditions, but have been told by feedlot industry sources that undertaking the required heat treatment prior to export from the US will both add to costs and reduce the value of the grain when it does arrive. Experience with shipments that were processed at seaboard in Brisbane during the last drought provided evidence of these difficulties. The technical issues are discussed briefly in Box 1.

## Box 1: On-site Processing of "Live" Grain for Feed-Use

Australia's largest commercial feedlots, for cattle, are located in the cereal growing areas of Queensland and New South Wales close to sources of livestock and local grain and to export abattoirs. Most have their own processing plants to mix feeds and prepare grain for optimal use. Processing enhances the energy value of grain. The three main processes applied to grain are reconstitution; steam flaking; and dry rolling.

Reconstitution involves bringing the moisture content of the grain up to about 30 per cent and then sealing it in air tight containers. There is initially sufficient air to start the process of germination, which converts the starches to sugars, but once the air in the container is used, the process stops. The grain is stored for 15 days in the sealed containers and then dried, milled and fed to the cattle within a short time. **Because it depends on kick-starting germination, this process must use whole live grain. Inert heat-treated grain does not work.**

Steam flaking involves steam heating the grain to soften it and gelatinise the starches. The grain is then passed through rollers to flake it. After drying it is fed to cattle.

Dry rolling is the least sophisticated of the three methods and merely involves passing the grain through rollers to crack it. It is a much less effective means of raising digestibility than reconstitution or steam flaking, though its lower capital costs mean it is still sometimes used.

Steam flaking and reconstitution can raise the available energy in maize by up to 10%.

The use of heat-treated inert grain as compared to using the reconstitution or steam flaking processes on live grain has several disadvantages, which adds to the costs of lot feeding. De-vitalisation of the grain involves steam heating to about 95 ° Celsius and then drying. Initially, the grain moisture content falls to about 8 to 9 per cent but over time moisture is absorbed from the atmosphere. After treatment the grain is brittle and easily cracks with handling, a problem likely to be exacerbated if treatment occurs before export. This significantly adds to screenings which impairs palatability (by 2 to 10 per cent). As noted, this grain cannot be used in the reconstitution process and feedlots which use reconstitution could only dry roll the heat treated grain and feed it dry, which involves a quality penalty which causes a 10 to 30 per cent loss of productivity.

*Source: CIE and industry sources.*

Whatever their cost, the proposed conditions are bound to be a matter of concern to the association that made the initial application for importation and any others who may have been contemplating a similar feed sourcing strategy to cope with droughts.

## 1.2 The new rules

Given the nature of the task we were set, ACIL has not cross-checked all the references cited in the Draft IRA, nor sought out all the submissions made in relation to AQIS's Issue Paper of July 1998. Likewise, we have spent only limited time pursuing our own sources in order to verify the technical 'facts' that AQIS's Draft presents. As will be seen, we have investigated a few technical aspects that seemed counter-intuitive and have looked at some others which were not necessarily suspicious, but were relatively easy to check.

Our principal concern has been to assess, not so much the technical 'facts', but rather whether the Commonwealth Government's new guidelines for quarantine, announced in August 1997<sup>6</sup> have been applied as a professional risk analyst should apply them.

Official adoption of the Government's new approach followed a 10-month inquiry by the Nairn Committee into quarantine policy,<sup>7</sup> and extensive consultations thereafter.

One of the pillars of the new approach is the emphasis on, in the Government's words, "whether risk can be managed to an acceptable level".<sup>8</sup> Important to this will be not simply border protection, but rather the balancing of pre-border, border and post-border quarantine systems. In addition, a greater emphasis required by the new rules is to be given to addressing cures as well as preventions, and in particular "the issue of preparedness and response to pest and disease incursions".<sup>9</sup>

Significantly in the present context, while the Government has explained how it has revised the import risk analysis *process*, key details of how the analytical job is to be done have not appeared in policy statements. Changes were made to the consultation requirements.<sup>10</sup> Also, the Government has explicitly accepted that "there is not and never can be a 'no risk' quarantine policy for Australia",<sup>11</sup> consistent with the Nairn Committee's firm statement to that effect. Both were big steps, but provide little in the way of operational guidance.

Conceding that "... both the principles behind [risk analysis] and their application are still not well understood",<sup>12</sup> the Government's 1997 statement did not offer a detailed explanation of how it saw risk analysis being undertaken. It outlined a procedure (supported by a 2-page action chart tracing steps from the application for import through to the final decision and its implementation), but exactly what was to be measured and how different factors were to be weighed were not explained.

Instead, the statement says in an Appendix that the Government accepted

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<sup>6</sup> See in particular: Anderson, Hon. John (Minister for Primary Industries and Energy) *Australian Quarantine — A Shared Responsibility: The Government Response*, Canberra, August 1997 but also 'linked' documents — see later.

<sup>7</sup> Nairn ME, Allen PG, Inglis AR and Tanner C, *Australian Quarantine: A Shared Responsibility*, Department of Primary Industries and Energy, Canberra, October 1996 (released December 1996).

<sup>8</sup> Anderson, *ibid*, p. 10.

<sup>9</sup> *Ibid*, p. 11.

<sup>10</sup> *Ibid*, p. 12.

<sup>11</sup> *Ibid*, p. 16.

<sup>12</sup> *Ibid*, p. 21.

the Nairn Committee's recommendation 35, which among other things, proposed that the quarantine agency develop and circulate a public handbook on its risk analysis process "as a matter of urgency".<sup>13</sup>

The Handbook was produced in 1998. It provides *some* operational guidelines, but still not very many.<sup>14</sup> In a statement with some (qualitative) operational content, reference is made in the Handbook to Australia's "very conservative approach to pest and disease risk which reflects the high value of our agricultural industries and Australia's very favourable animal and plant health status as well as the need to protect Australia's natural fauna."<sup>15</sup> Reference is also made to the application of the World Trade Organisation's (WTO's) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) and the right it gives to Australia to base its quarantine policy on "the management of risk to an acceptably low level". But the Handbook, provides no explicit statements about what should be measured and how factors should be weighed. That is, it contains no guidelines about the standard components of a risk assessment such as probabilities, discount rates, tradeoffs between costs to different groups or similar topics that ought to exercise the minds of business or policy risk analysts 'in the field'. However, the Handbook implies that these topics should be considered because it does include as annexes:

- a copy of the WTO SPS Agreement (which in its preamble and Articles 2, 5 and 10 makes reference to the objective of not needlessly restricting trade);<sup>16</sup> and
- an Office International des Epizooties (OIE) draft animal health code and a set of International Plant Protection Convention (IPPC) Guidelines, both of which contain detailed guidelines of factors, including costs and benefits, to consider in risk assessments<sup>17</sup>.

The Foreword to the Handbook (by AQIS's Executive Director) says processes the Handbook describes will be kept under review and improvements made in the light of experience.

There may be other examples, but one piece of evidence that policy (or at least the international agreements underpinning it) is evolving to become more explicit is contained in a circular issued by AQIS's Animal

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<sup>13</sup> *Ibid*, p. 47.

<sup>14</sup> AQIS, *The AQIS Import Risk Analysis Process Handbook*, Canberra, 1998.

<sup>15</sup> *Ibid*, p11.

<sup>16</sup> *Ibid*, Annex 1, pp 20-33.

<sup>17</sup> *Ibid*, Annex 2, pp 34-59 [see especially Article 1.4.2.3 ('Risk Assessment Steps') p39; Section 2.2.3 ('Potential economic importance') p53; and 3.2 ('Efficacy and Impact of the Options') p56].

Quarantine Branch on 22 April 1999. The circular sets out to clarify "the concept of 'appropriate level of protection' (ALOP), as used in reports of import risk analyses" in response to "enquiries from stakeholders."<sup>18</sup>

Again the operational guidance remains indirect and implicit in the circular. Indeed, rather self-consciously, the fact that the WTO's SPS Agreement does not require a WTO member to make a clear statement of the scientific basis for its ALOP is stressed, and Australia's use of the term "very conservative" is cited in the circular.

However, the circular reaffirms that the WTO SPS obliges each member to see that its risk analysis identifies: the target diseases and their potential biological and economic consequences; the likelihood of their entry, establishment and spread and their potential biological and economic consequences; and the likelihood of their entry, establishment and spread with and without particular SPS measures<sup>19</sup>.

The Handbook's and the recent circular's references to the need to take into account the *economic consequences* of risks can be taken to imply a need to apply to importation and treatment questions a standard assessment of risky alternatives of the type seen in reputable economics and other decision making textbooks. They point to a requirement that AQIS apply a decision framework which is concerned with *probability weighted* benefits and costs. They also point to a requirement that AQIS assess the benefits and costs measured as *differences* between the with and without SPS requirements (as opposed to with and without the introduced pest species) because that is what is relevant as regards the policy instruments that can be practically applied, as distinct from imaginary measures that might in some other world deliver a zero risk result.

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<sup>18</sup> AQIS, "Australia's Appropriate Level of Protection and AQIS's Import Risk Analysis (IRA) Process", *Animal Quarantine Policy Memorandum*, 1999/26, 22 April 1999.

<sup>19</sup> *Ibid* p 4. In the circular, the actual description of these obligations is somewhat longer.

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## 2. General Observations

### 2.1 "Measuring" risks

#### 2.1.1 The three essential components

As a matter of principle, decision making (whether in relation to business strategies or the choice of policy measures) is always, explicitly or implicitly, about the weighing of alternative courses of action in the light of information about the likely pay-offs from them, given estimates of the probabilities of certain events.

There is inevitably some subjectivity in the decision-maker's selection of possible actions, of which events to consider and of what probabilities to assign to them. This 'guess work' may extend to the description of the outcomes associated with events, in money or other terms. However it is also true, without exception, that each of these elements (possible actions, possible events and their probabilities) will be capable of being objectively and quantitatively assessed through investigation to some extent, especially via the application of statistical techniques and the assembly of expert opinion.

That these are the three essential components of the analysis of decision making in the face of uncertainty is universally accepted in the textbooks written about the subject, whether presented from a statistical, economic, engineering or scientific point of view.<sup>20</sup> In the higher reaches of economics and business management, the combination of statistical techniques and decision-making theory has become quite esoteric, but practical applications generally entail the straightforward application of quite simple models. Software packages to aid the assembly of relevant information are readily available.<sup>21</sup>

This does not necessarily mean that a formal and explicit quantitative assessment of all possible actions, events and associated probabilities has to be undertaken in all cases. In circumstances of severe data limitations, such formalism can lead to both over-engineering and a false sense of accuracy. However, it is essential that any less formal tools still respect

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<sup>20</sup> An example of such a textbook in common use as a teaching and practical aid over the last 30 years is Raiffa, Howard, *Decision Analysis* "Introductory Lectures on Choices Under Uncertainty", Addison-Wesley Massachusetts, (Second Printing), 1970.

<sup>21</sup> An example mentioned by the BRS's Mike Nunn in a 1997 article (p. 571) was the "@RISK" package marketed by Palisade Corporation. (See Nunn, M, "Quarantine risk analysis" *Australian Journal of Agricultural and Resource Economics* 41:4, 1997, pp 559-78).

the basic decision framework and not be unduly prone to bias by failing to take adequate account of how risks and outcomes interact to suggest appropriate decisions.

As a general point, for major and contentious decisions the conduct and presentation of a structured approach to the selection of the preferred strategy will add rigour and have transparency and credibility advantages.

### 2.1.2 Examples of applications to quarantine questions

Decision making about quarantine matters is nearly always contentious and often major and can be structured and analysed in the standard textbook way. Many examples of the application of such analysis have been published, for example by the Industries Assistance Commission and the Australian Bureau of Agriculture and Resource Economics.<sup>22</sup>

Applying the standard decision analysis to the bulk maize quarantine question will require some effort. But as the above IAC and ABARE references (and any reputable textbook on the subject) show, it will be straightforward.

Briefly, in choosing the quarantine strategy for a certain grain import that is likely to have the highest pay-off for Australia, it will be relevant to consider the following broad elements, each of which in turn may have several components:

- (1) the probability, timing and costs of harm to Australia through the spread of contaminants that could be brought in with the imports — relative to the outcomes likely under more stringent import requirements or a ban on imports and after taking into account the most cost effective options for responding to the introduction or spread of a contaminant;
- (2) the probability of reductions in exposure to such harm through adopting particular hygiene measures, their extent of reduction and their costs (including both added administrative and handling costs and any downgrading of the quality of the grain);
- (3) the probability, timing and magnitude of the prospective benefits to grain users from having access to the grain in question; and

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<sup>22</sup> See for example:

- Industries Assistance Commission, *Criteria for Economic Evaluation of Quarantine Provisions*, Working Paper, December 1987 (especially Attachment IV: "Assessing the Costs and Benefits of the Change in the Paddy Tolerance for Milled Rice").
- Hendy MD and Fisher BS, *A Cost-Benefit Analysis of Quarantine*, ABARE, Canberra, 1991.
- Hendy M and Low J, *Cost Benefit Analysis of Quarantine Regulations to Prevent the Introduction of Fire Blight into Australia*, ABARE, Canberra, 1990.

- (4) the probability and magnitude of any wider consequences for trade in other products associated with any or all of the above.

In practice, in relation to a proposal to import grains to benefit the livestock industries, one would expect the considerations of timing and probability to almost always favour importation. The benefits to the beef industry from having access to an option to obtain feed grains at lower effective cost are almost immediate and certain. By contrast, the costs associated with possible introduction or spread of a pest will normally be both delayed and less than certain. The availability of strategies for responding to the introduction of the pest, for example through a post-introduction extermination or control program, or through alternative farm management strategies, and the usual presence of some risk of eventual introduction even if these imports are banned, further diminishes the down-side and adds to the attractiveness of the case for allowing imports. Moreover, to see that everybody has the right incentives for care, insurance and indemnity clauses can always be added, so that risk management is done by 'the right person in the right place at the right time' – which, by the way, might not always be AQIS.

Offsetting these considerations will require both that the *potential costs in the event of an introduction* are substantially greater than the anticipated benefits to the beef industry, and that allowing the imports will substantially bring forward the average time to introduction of the pest.

### 2.1.3 CIE's 1997 imported feed grain report

A simple and practical example of what is required for application of the structured approach to the analysis of decision making in relation to item (3) in the above list was provided in a consultancy report for the beef feedlot industry in 1997.<sup>23</sup>

The report estimated the cost impost on the feedlot industry and Australia of requiring inland feedlots to use imported grain devitalised at port of entry rather than allowing them to use imported grain moved in whole, unprocessed form to inland feedlots by sealed truck. Using the prices observed around the time of the 1994-95 drought as an example, the report estimated that the requirement added over \$30 per tonne to lot feeders' feed costs, leading to losses of feedlot sector returns (after allowing for costs 'saved' by not fattening as many animals) of about \$20m over the June 1994 to February 1995 period in today's money.<sup>24</sup>

<sup>23</sup> CIE, *The beef feedlot industry's access to imported feed grains*, a report for the Meat Research Corporation, Canberra, 1997.

<sup>24</sup> Importantly, the figure allows for the fact that when less is produced, somcosts are 'saved' and that it is the lost 'value added', which is the cost to GDP. As with all estimates of the losses implied by increased costs (including disease outbreaks, if that is the harm being considered), measuring the loss of the gross value of output, or turnover will give vastly inflated estimates of the true economic impact.



The estimate did not include longer term losses that might be implied through the diversion of capital investments to alternative enterprises, and so can be regarded as conservative.

The use of historical data relating to stock, processing, etc in this case was supplemented by assumptions about the cost advantage presented by accessing US grain based on the prevailing difference between the world price of US maize and local Australian barley prices.

The price *difference*, which peaked at around \$200 per tonne in 1995,<sup>25</sup> provides the plainest possible statement of why imports of US maize were of interest at the time. There is evidence, also reported in the study, that since the early 1980s, during seasonal downturns here, a significant US/Australian price gap has appeared and that the size of such gaps has steadily widened. That is to say, the returns available to lotfeeders and Australia from exploiting the gap from time to time, already considerable, may be growing.

#### 2.1.4 Quarantine economics

From data cited in the 1997 CIE study, it appears that, quarantine and treatment costs aside, the average price difference between imported US maize and domestic barley delivered to a Darling Downs property would have been around \$50 per tonne.<sup>26</sup> The devitalisation requirement (costing \$12 per tonne to do, and implying a \$23 productivity loss at the feedlot) reduces this advantage to about \$15 per tonne before quarantine charges. This shows how sensitive the economics of importing can be to the quarantine rules in place.

There may be equivalent opportunities in other intensive livestock industries — pork, poultry, or dairy, each of which accounts for a similar percentage of Australia's feedgrain use.

The point is that, in a full and structured risk analysis of the grain importation issue, these opportunities would be set against any estimated gains (after taking into account both probabilities and time lags) to the grains industry and the economy from quarantine restrictions.

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<sup>25</sup> This, which is the difference between the per tonne Australian barley price and the fob Gulf Ports No.2 Grade yellow corn, translates to a price ratio of 3:1. (CIE, *ibid* p. 21).

<sup>26</sup> CIE, *ibid*, Table 3.3, p. 15.

## 2.2 AQIS's approach

### 2.2.1 Little quantification

There are signs that to some extent AQIS has approached its IRA for maize as a structured decision making exercise, but it has evidently attempted little quantification. Moreover, some of the little quantification it has brought to bear is desultory. Finally, as will be discussed under subsequent headings, significant elements of the cost and benefit picture relevant to the quarantine decision from an Australia-wide perspective appear not to have been considered at all.

Table 3.1 on p. 11 of the Draft is an example of analysis containing qualitative assessments of the probability and extent of harmful effects. The 16 pathogens in the Table represent a short-list of potentially significant pests drawn from a much longer list of candidates, by and large also selected on the basis of qualitative evidence. While ACIL queries whether some are as significant as is portrayed, it is clear that, to an extent, a structured approach has been applied.

However, the lack of quantification of key elements of information is a defect and, we would argue, an unnecessary one. In part the problem may stem from the reluctance of the authors to properly sort the decision-making problem into its analytical components and to the use of sometimes ambiguous language which implicitly merges different analytical components. In particular, we note that the term 'risk' (as in the heading of the last column of Table 3 'Overall Risk', for example) is used in a very casual (or 'lay') sense, and a sense which tends to hide the important distinction between possible damage and the probability of that occurring. Commonly and usefully, risk analysts would distinguish between hazards and risks, with risk being interpreted as the probability of an adverse outcome from exposure to a hazard. The combination of the probabilities of different adverse outcomes, and their costs, produces the concept of 'probability-weighted damage' which is apparently what is meant by the term 'risk' at several places in the Draft. There are many other instances too where terms relating to risk are used loosely — ie in a manner that does not reflect much professional insight.

An example of desultory quantification in the Draft is the references to the gross values of particular crops that might become infected by *P. sorghi*, on page 12. Not only is there an unwarranted implication that the entire Australian acreage of these crops is open to attack from this organism if it were a contaminant, but also there is a faulty assumption that the gross figure is an appropriate indicator of the industry or national loss if the crops were to be comprehensively attacked. The approach taken also entails the implicit assumption that the damage would be immediate.

The 'value added' of these grain industries is the national amount at stake, not the turnover. The need to recognise this and to be aware that producing less will simultaneously involve fewer costs, was underlined earlier in a footnote of this review during the discussion of CIE's 1997 report on grain imports. The economic costs are typically even further reduced by allowing for possible substitution into other crops or the use of damage-limiting practices and by the substantial delays likely in both the introduction and maximum spread of any introduced pest.

Besides being a theoretical error, the Draft's use of gross value as a measure of potential damage is biased in favour of a decision to impose severe quarantine requirements. It would, of course, be equally invalid to measure the benefits to feedlots of allowing imports with low quarantine requirements as the gross value of the livestock feedlot industries in Australia — but the bias would be less in this case if value added were used on both sides of the equation because the value added proportion of output is generally bigger for feedlots than for graingrowing.

The antecedent of AQIS's latest Draft conditions for bulk maize importation, "protocol 1" referred to earlier, came into use after the Bureau of Resource Sciences (BRS) undertook a review of grain import risks for AQIS in 1994.<sup>27</sup> The operational risk assessment undertaken by AQIS for maize largely mirrors this earlier work with one important difference — although the BRS's analysis was confined to biological issues, it concluded with the economic insight that:

"Ultimately if a protocol such as that proposed in Protocol 3 is being seriously considered a decision will have to be made which considers the benefits of importing grain versus the risks involved. This decision should take into account the relative risks and benefits to different sectors of the economy."

As we understand it, an analysis along the lines of that proposed by BRS has never been done, or at least not in any publicly documented form. Certainly it has not been done as part of the latest AQIS risk analysis for maize.

The Draft IRA does not consider (or quote earlier work on) the opportunity costs to the livestock sector of restricting imports. Moreover, as noted, the assessment of the implications for local grains industry is incomplete. The reference list in the Draft IRA is narrow. The

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<sup>27</sup> See

- Phillips D, *Pest risk analysis of seed-borne pests of barley, maize and sorghum from the USA, and barley from Canada, Part 1*, Bureau of Resource Sciences, Canberra 1994;
- Phillips D, Roberts W and Chandrashekar M, *Pest risk analysis of seed-borne pests of barley, wheat, maize and sorghum from the USA, and Canada, Part 2*, Bureau of Resource Sciences, Canberra 1994.

impression conveyed is that AQIS believes these wider issues are none of its business.

Interestingly, the BRS's 1996 paper which contained a retrospective analysis of bulk grain import risks commented that:

“... all things considered, and in contrast with AQIS's ranking, we conclude that imported maize from the United States presents an extremely low risk to Australia's grain industries”.<sup>28</sup>

It seems that BRS too has been concerned about AQIS's reluctance to quantify all the relevant components.

### 2.2.2 Over-concern about problems from outside

A general feature of AQIS's Draft which reduces its credibility as a fair statement of the risk situation with maize is its apparent preoccupation with the idea that any contaminant in a shipment from overseas should be looked at in a worst-case disease-risk light. There appears to be little recognition of two points in particular—

- (a) that high risks do not necessarily imply disastrous or even adverse safety outcomes. In part, this notion was addressed by the Nairn Committee, which stressed the idea of risk management as a continuum which extends both within and beyond our national borders, and includes the possibility of handling an outbreak if it did occur. In addition, we see no recognition in the AQIS Draft, even qualitatively, of the scope for individuals privately to respond to increased risks through preventative actions, or through diversification or other insurance strategies. The presumption seems to be that 'AQIS must do it all.'
- (b) that contamination of foreign cargoes with pest species which are already present in Australia cannot realistically be regarded as a problem which is in the same league as contamination by other species. Arguably 'naturalised' pests should not be a preoccupation of AQIS at all, particularly in the absence of any significant phytosanitary restrictions on the movement of grains domestically. Several examples of pathogens and weeds already in Australia that appear to receive unwarranted attention in the Draft IRA could be given. The matter is discussed again in a later section.

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<sup>28</sup> Evans, *op.cit.*, p. 5.

More generally, in its Draft IRA, AQIS does not seem to have kept in perspective the magnitude of the threats being considered here. Granted, introduction of a pest species to a new environment, away from its natural predators or controls, can lead to more severe damage than that historically observed in the species home country. However, in assessing the probability and possible magnitudes that are involved, it needs to be remembered that we are still talking about importing maize from production areas where, with a range of pests in place, maize is produced very productively. Furthermore, these areas overlap with areas producing a range of other grains, including wheat, also very productively. A sober consideration of the risks in this light is required.

### 2.2.3 Under-concern about one outside problem – international trade

Conspicuous by its absence from the IRA is any mention of the potential implications for Australian trade more generally of the stance Australia takes with regard to the importation of maize. The absence of any such discussion is as significant a defect in ACIL's view, as the absence in the Draft of any consideration of the benefits that maize imports would deliver to the intensive livestock industry, and to inland feedlots in particular.

It would seem obvious that the possibility of US trade retaliation in one form or another, should be considered, especially in a situation where Australia's avowed quarantine stand is so plainly anti-trade (or what AQIS and the Government term "very conservative"). The point is a particularly important one in view of the WTO SPS Agreement's requirement that, in instances of lack of information, "the adoption of conservative measures [be] only provisional and ... that if adopted on the basis of gaps in information, member countries 'shall seek to obtain the additional information necessary for a more objective assessment ... within a reasonable period of time'."<sup>29</sup> Australia's very conservative stance is now decades old.

In a similar situation recently, concern about flow-on trade effects were expressed by the Cattle Council when the Commonwealth Government was receiving calls for protection against pork imports from North America. Preparations for the next round of multilateral trade negotiations are already under way. Moreover a number of WTO disputes involving agricultural products which have Australia and the USA on opposite sides are in train.

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<sup>29</sup> Cited in Nunn (1997), *op cit*, p. 567.

Whether there is a significant problem or not in this area cannot be assessed without some investigation, but there is no evidence in AQIS's Draft that it has undertaken any.

#### 2.2.4 Process issues

The Government's announced quarantine policy stresses the importance of due process and the transparency of decision making. The Nairn Committee found that in the past this was not how things had always been done and recommended that attention be paid to making improvements.

The lengthy period over which AQIS's maize investigation has extended (ALFA's application was dated nearly two years ago), and its occurrence following an already lengthy history of investigation (as noted on the first page of this review) might be thought by some to show that the IRA has been deliberative.

However a procedural aspect that is less than satisfactory from a national interest point of view is the make-up of the Working Groups and the Risk Analysis Panel (RAP) itself. Despite the welcome inclusion in the Technical Working Groups' (TWGs') terms of reference of an express requirement that they consider economic costs and benefits, no professional economists, to our knowledge, have been included amongst their members. At the risk of being accused of special pleading, as a firm of professional economists ACIL considers this to be an important defect of the IRA in the context of the supposed emphasis of the new approach on analysis. As Nunn has pointed out,<sup>30</sup> the Nairn Committee anticipated that RAP Working Parties would include a specialist economist from ABARE who, *inter alia*, would chair an Economics Working Party. Our concerns about this matter are strengthened by the evident inadequacy and especially the bias, in the Draft IRA's approach to quantifying costs to which we drew attention under a previous heading (2.2.1).

Another defect of this type is the failure of the Working Group to include, or at least be seen to include, people with direct overseas experience in the matters at hand.

Finally, there are grounds for concern that, despite the length of the process to date, AQIS has made insufficient effort to take account of stakeholder opinions and evidence. We have been told that AQIS has shown no interest in taking up an offer by the (former) Meat Research Corporation to present the results of a study by David Heinrich which it commissioned on maize risks in September 1997.<sup>31</sup> ACIL has seen a

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<sup>30</sup> Nunn *ibid*.

<sup>31</sup> ALFA staff, *pers.com*, 4 May 1999.

'commercial-in-confidence' copy of the Heinrich written report, and believes it contains information which is at odds with some of the Draft IRA's findings about security of transport. AQIS's failure to avail itself of this information may have been material to its conclusions in some areas. It would be interesting to know if this was so, and whether there are other parties who feel they have not been properly heard.

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### 3. Specific Points

#### 3.1 Possible over-emphasis on problems already here

The TWG reports are not consistent in their approach to the identification and segregation of 'major' risks which would be new to this country and those which are already here, albeit usually in limited areas. It is contended that, although a particular pathogen, weed, etc may pose an equal risk to Australian crops, the risk of a particular problem from imported material must be viewed in a different, lesser light when that problem is already evident in Australia.

As an example, in the IRA, Table 5.1, Quarantine pest weed species associated with bulk maize grain imported from the USA, lists 78 species of concern. However, approximately 40 of these are identified as "prohibited" or "prohibited, noxious" with no indication as to whether they are already established in Australia. As these 40 or so include common blackberry and johnson grass (described as being widespread in northern Australia by TWG1), it is difficult to accept that Table 5.1 has any particular relevance to the establishment of an accurate risk profile.

It can also be seen in Table 5.1 that 13 pesticide resistant weeds are identified as being of concern. Given the rush to planting of pesticide tolerant crops in Australia, eg 'Roundup Ready' soybeans, and the not insignificant possibility that pesticide resistance will be conferred on 'local' weeds by that route, the IRA needs to more clearly define to what extent it considers maize imports would constitute an added risk.<sup>32</sup> Our impression is that broad-scale planting of herbicide resistant crops in Australia poses a risk which is overwhelmingly greater than that posed by the possible spillage of a few imported seeds. We think the probability-weighted impact of this group of plants should be reassessed.

#### 3.2 Raising unsubstantiated concerns (particularly about risk to the Australian wheat industry)

The report of Technical Working Group 1 (Disease Risks) raises the possibility of losses of nearly 10% of the value of Australia's wheat industry, ie approximately \$500 million in \$5 billion. This loss appears to be predicated on the introduction of *Tilletia indica*, the cause of Karnal

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<sup>32</sup> The Global Review of Commercialised Transgenic Crops 1998 lists 56 transgenic crops approved in at least one country. Of these 30 are herbicide resistant and 12 of these are corn.



bunt through the admixture of infected wheat with the imported corn or fungal spore contamination of rail cars used to transport bulk maize in the USA.

One problem with this assessment is that any loss of gross returns will not entail a net economic loss to the wheat industry which is proportionate, because reduced output means some costs will not also be borne.

Another, more serious, fault of the assessment however, is that having raised the Karnal bunt outbreak issue, the working group provides no information on the probability of such an event. Specifically, the working group does not:

- examine means by which the probability of such an occurrence might be expected be lessened or eliminated by normal handling practices, eg sieving, air drying;
- indicate that wheat crops in the northern USA appear to be *free* of Karnal bunt;
- note that Australia is already exposed to this 'risk' through the import of maize for processing (both at the seaboard and elsewhere in metropolitan areas); and
- mention that there are other potential sources of contamination which are already being successfully managed, eg imports of US fertilisers.

The Draft IRA, based on the four TWG reports, is much more restrained. It mentions Karnal bunt but not in the same emotive way as the TWG1 report. Further, the IRA acknowledges that wheat crops in the northern USA appear to be free of Karnal bunt.

Given the TWG's unbalanced approach to Karnal bunt and the general, assertive tenor of the language used in the report, at least some concern must be raised as to its objectivity.

### 3.3 Soil

The report of TWG1 (Disease Risks) postulates that, if soil was present in a maize shipment at 0.1%, then a 1,000 tonne shipment of maize would contain one tonne of soil. The mathematics of this postulation is obviously correct but no justification is given for the estimate. Maize is not subject to gross soil contamination during growth or harvesting and it undergoes various cleaning, drying and separation steps which would substantially reduce the amount of soil present. Probably, any soil still present would settle away from the corn during shipment, thus further reducing the possibility of it being a disease vector of any significance.

To check firsthand the particular case of possible contamination of soil in a shipment with *Striga asiatica* (witchweed), on 3 May 1999 ACIL telephoned Dr Robert Eplee Senior Research Scientist, US Department of Agriculture's (USDA's) Raleigh Plant Protection Center. (Eplee is cited

on p.23 of AQIS's Draft IRA). Eplee said the weed's incidence in corn is now confined to 8000 acres in North and South Carolina, only 1000-1500 acres of which is in production and all of this is routinely treated with pre-emergent and then post-emergent herbicide. The weed is no more than 30 cm tall, and well below harvester height and the machinery which strips cobs would clean out small seeds of the Striga type through air blasting. Surveys over 30 years have never recovered Striga seeds from bins or cribs of harvested corn or been able to document a case of Striga movement on corn. An address for detailed records was provided. As regards the 0.1% soil contamination estimate, Eplee thought this was a gross exaggeration given production methods. Finally he pointed out that North and South Carolina do not export corn. Rather, to feed turkeys, chicken broilers and pigs, these States are major importers of corn from elsewhere in the US. Overall, he described the chance of *S. asiatica* being a contaminant of US exports of corn as "presumptively zero". HE said he believed Chile, at least, had come to a similar conclusion and provided contact details in Washington where this could be checked.

It is significant also that the APHIS material referred to on p.8 of AQIS's Draft IRA (which although received by AQIS after the TWGs reporting deadline, was considered by the RAP) both confirms the tiny area to which the US's internal quarantine now applies and makes it clear that the quarantine does not apply to "shucked ear corn" (ie maize grain of the cob).

### 3.4 Treatment methods

Various means of treating imported maize so as to ensure that all risk is eliminated have been advanced in the Draft IRA and the various TWG reports. The IRA has concluded that only three methods have sufficient likelihood of devitalising the maize and eliminating weed and pest problems. These are steam treatment, infra red heat treatment and irradiation. Of these, only steam 'cooking' is considered to be immediately applicable.

Steam treatment would require that the grain be re-dried, a procedure which is known (eg on the basis of experience with treatment of shipments into Brisbane during the last drought) to add substantially to costs and to detract from the worth of the grain. It would have been much more positive if the IRA had provided some detail on overseas experience with alternative, potentially more economic methods, such as irradiation. Additionally, the effect of North America's normal maize drying (usually at 71-73°C) practices on weed and insect viability needs consideration.

## 3.5 Other

### 3.5.1 Lack of 'internationalism'

There is a lack of completeness about the RAP/TWG process inasmuch as it seems to inadequately draw on or examine international experience.

The evidence for this is:

- lack of overseas specialists on the TWGs. An international presence on the RAP and/or the TWGs would have provided a broader perspective. It may be that the members of the four TWGs have, in fact, such experience but this is neither evident nor stated (eg through attachment of curricula vitae to the reports);
- inconsistent approaches by the TWGs to overseas sources, some using and citing them, others not;
- no examination of similar situations in other countries. The US is a major exporter of corn and, it can be assumed that other countries use US maize for a similar purpose to that proposed in Australia. However, no mention is made of any practices that may have been adopted by other countries in considering and coping with the risks identified by the RAP and its TWGs.

As noted in Section 3.3 above, the US researcher we contacted, Dr Eplee, said he believed at least one other country, Chile, had sought quarantine risk details regarding US maize in recent years, and had satisfied itself that purchases from the US could go ahead. There is no evidence in the IRA that potential sources of information of this kind have been pursued by AQIS. Dr Eplee also named Greg Waldon, a scientist now resident in Australia, who had worked with him and could be familiar with the relevant data. There is no evidence that AQIS has availed itself of this contact (or knew about it).

### 3.5.2 Contradictory interpretations by TWGs

There appears to be at least some contradiction in the interpretations placed by TWG1 (Disease Risks) and TWG2 (Weed Risks) in their respective interpretations of material in the Evans *et al* Report, "Quarantine risk associated with the import of bulk grain: a retrospective analysis". TWG1 states that "Evans *et al* (1996) concluded that there was minimal chance of spillage of material during transport within Australia and that any spillages could be readily contained". TWG2 cites Evans *et al* (1996) as saying that the use of stringent controls to prevent spillage of untreated grain during transport was a high-risk strategy. Interestingly, TWG1 disagreed with what it believed Evans *et al* were saying, while TWG2 agreed with their version of Evans *et al*. In this context, we draw attention to a general conclusion reached by Evans *et al* that it considered

AQIS's assessment of the risks at that time to be faulty (see citation in section 1 of this review).

### 3.5.3 Disproportionate concerns (eg about *Striga spp.*)

By comparison with their importance as likely pests in Australia, the emphasis in the Draft on *Striga spp.* (ie witchweed and its relatives) appears overdrawn. By and large the report of the TWG on weed pests is probably of better quality than those of the other TWGs, but our own investigations (already reported in Section 3.3 above) indicate that witchweed in corn in the US is confined now to a tiny area in North and South Carolina (in fact some 1000 to 1500 acres), and more importantly, that the US's own internal quarantine provisions for witchweed do not apply to shucked corn (ie maize grain off the cob).

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## 4. Conclusions

### 4.1 Bottom line

By itself, the Government's August 1997 statement about the new approach to risk analysis contains little operational detail. However, the modern standards of risk analysis, and references in the WTO's SPS Agreement and other international agreements Australia has signed as to the need for such procedures to cover benefits and costs, create an expectation that IRAs conducted by AQIS will now contain structured quantitative analyses of all the key elements relating to the assessment of what, if any, quarantine regulations to apply.

AQIS's March 1999 Draft IRA for bulk maize does not meet that expectation. The report's analysis is unduly impressionistic. Important components are missing from the analysis; the level of quantification is inadequate given the profile of the issue and the national costs and benefits at stake; it is not clear that the working groups have included enough economic expertise; there are signs that consultation with stakeholders has been inadequate; and there are a number of specific areas where AQIS's judgments about the 'facts' must be questioned.

AQIS's bulk maize analysis appears to be based on a 'no risk' presumption of the type AQIS has applied in the past - that is, that the grain industries are so important that no increase in their risks should be entertained — no matter how intermittent or small or manageable, and no matter what the benefits to the rest of the country. The Government's repudiation in 1997 of the no-risk policy approach, and the promise that this would see AQIS weighing the pros and cons of particular quarantine measures, seems to have been ignored.

The absence of quantitative analysis in the AQIS Draft, even in relation to the incomplete range of topics that it does address *qualitatively*, is unnecessary. There is a wealth of information available about probabilities, costs and benefits to all parties, and alternative strategies which AQIS has not drawn upon for its investigation.

### 4.2 Recommendations

In view of the Draft's general faults and the specific imbalances listed in this review, ACIL concludes that the Draft does not abide by the rules requiring a full and balanced consideration of the benefits and costs. We recommend that the defects be remedied and in particular that the Draft IRA be recast within a formal framework which recognises and treats

consistently the issues concerned with levels of hazard, risk, timing, and economic cost and benefit to different sectors.