

Dr John Radcliffe AM, FTSE

February 28 2013

Mr Stephen Palethorpe
Committee Secretary
Senate Standing Committee on Rural and Regional Affairs and Transport
PO Box 6100,
Parliament House
Canberra ACT 2600

Dear Mr Palethorpe,

Public Hearing Friday, 08 February 2013
Questions Taken on Notice – Eminent Scientists Group

I refer to the invitation from the Committee to review the paper by Peace, C. (2013) *Advice on the risk estimation used by DAFF Biosecurity as part of the Import Risk Analysis process* (Client Report CR0127 Australian Senate Rural and Regional Affairs and Transport Committee) Wellington NZ : Risk Management Ltd. I should like to offer some comments following consultation with my colleagues who are members of the DAFF Eminent Scientists Group.

Essentially, Mr Peace appears to recognise the quality of scientific rigour provided by DAFF Biosecurity in undertaking Import Risk Analyses, an observation supported by and we hope contributed towards by the Eminent Scientists Group. However, Peace discusses changes that could be made to present analytical practices. We are unpersuaded that significant improvements would arise in consequence, but the Committee may wish to seek further advice on these alternative analytical techniques, perhaps from the Australian Centre of Excellence for Risk Analysis (ACERA) based at the University of Melbourne as these matters are outside the skills for which we were appointed to the Eminent Scientists Group. However, Mr Peace does make some helpful operational suggestions which we have supported. We further discuss various specific issues as follows:

Language

Mr Peace, as author, correctly points out in the paper the variations in meanings and definitions between treaties, agreements and standards. Much of the debate revolving around the use of Import Risk Analyses is of an etymological nature. Peace is careful to define the terms that he uses. The Committee may wish to explore whether more consistent and better-understood terms could be identified for use in Import Risk Analyses (IRAs) by DAFF Biosecurity to minimise what Peace refers to as “idiosyncratic interpretation” on page 18.

These issues are largely a matter of risk communication and may not materially alter the scientific outcome of the analysis.

Risk

We note that Peace comments that “risk is the likelihood of the consequences on an event”, but we note that the statement appear not to be tacitly correct in that it discounts the likelihood of an event occurring in the first place. We are not convinced that DAFF’s definition “risk being the likelihood of an event occurring” is wrong. An event may well occur (“a food product passes undetected through the barrier”), but it may or may not prove to have quarantine consequence (“the importer ate most of it and destroyed the remainder”).

We note from the Risk Management Ltd website that Mr Peace over the period 2007-2012 represented Massey University on the joint standards committee under Standards Australia and Standards New Zealand that wrote AS/NZS 4360: 2004 *Risk Management* (now replaced by AS/NZS ISO 31000) and worked on risk-related standards and handbooks aligned with the international standard. The author, in a table on page 9 of his advice, summarises a comparison between AS/NZS ISO 31000:2009, WTO Sanitary and Phytosanitary measures, FAO Codex Alimentarius, the Terrestrial Animal Health Code and the International Plant Protection Convention. It is noted that steps specifically identified in the ISO document are in some cases only implicit in the other document. However, it would be our view that the explicit steps listed by the ISO document have been addressed in each of the IRAs that have been referred to the Eminent Scientists Group (ESG).

Quantitative Risk Estimates and Scientific Uncertainty

Reference is made on page 10 to a quotation from the UK Health and Safety Executive’s publication *Quantified risk assessment: its input to decision making*, reviewing 16 case studies of quantified risk assessment, that

“...the numerical element must be viewed with great caution and treated as only one parameter in an essentially judgement exercise”.

We support that view. Peace suggests in his advice (page 14) that records may show a specified type of event has a known frequency but matrix designers are unaware of it. That may be true for the example he gives on page 28 - dust (*e.g.* flour mill) explosions, of which there have been many and for the many other risk areas where Mr Peace has particular training and experience such as Occupational Health and Safety, Fire, Air Pollution etc.

However, in the context of analysing biosecurity risks from a proposed import, it should be recalled that the analysis has to resolve matters of scientific uncertainty in terms of the potential biological impact of a new species on agricultural practices or the natural environment, if any. When identifying the risks (hazards) that could eventuate from the introduction of new biological products at the border, the “level of risk”, the probability of occurrence, and the consequences will rarely have any prior measured estimations available in the Australian environment being addressed for the purposes of establishing an Appropriate Level of Protection for Australia (ALOP) that is defensible internationally. Indeed, the thresholds for use in the matrix should be defined *a priori* before beginning the assessment to guarantee a transparent process. Judgements have to be made on the basis of the experience of the participating individuals – in essence using an “expert systems” approach to the topic. Those doing the estimations must be free of any conflicts of interests, in terms of benefitting from the judgements to be made and the existing process is designed for that purpose. As the author points out, stakeholders evaluating the outcome of the IRA

being evaluated will analyse the level of risk differently in terms of the types of consequences that might follow depending on their personal interests.

Analytical quality and communication

We note the author's page 12 statement, which we support, advising that "...it is likely DAFF import risk analyses are providing the 'best available information' for the nature of import risks". DAFF Biosecurity appears to communicate effectively to stakeholders of its intention to undertake an IRA when petitioned to do so by another national authority on behalf of a potential importer. It makes available the draft IRA for comment by anyone interested, and this process is quite transparent. From the experience of the ESG, the comprehensive nature of DAFF's science in identifying risks has been impressive, albeit sometimes slow. The ESG's task has been to review the adequacy of the science responding to issues raised by stakeholders in considering deficiencies or suggested amendments to draft IRAs. There have been very few occasions where we have been able to criticise the science or identify omissions of science in the IRAs we have examined. However, we have found quite a few examples where Biosecurity Australia could have better expressed scientific responses to issues being raised by respondents to a circulated draft, and we have identified those examples to the Director of Agriculture, Fisheries and Forestry. However, any improved scientific expression would not have materially affected the conclusions of the IRA, though it may have improved understanding. We have suggested on several occasions that in the interests of transparency, these responses should be reviewed and made publicly available.

Collateral damage

Mr Peace also comments that he was asked whether import risk analyses are adequately addressing risks for species or crops other than the subject of the import risk analysis, but felt unable to respond as it was outside his competence. Our experience is that other vectors and alternative host species are considered by DAFF within the science that is available. The review of science is quite exhaustive during the initial phase of the analysis, but where Australian native species are relevant, the amount of scientific information on which to make judgment is often limited. This may raise the issue of adopting the "precautionary principle". In developing IRAs, use must be made of the best science available at the time of the analysis, but DAFF is not expected to initiate major research programs in consequence of developing an IRA. Scientific knowledge often further evolves over time and significant new findings can lead to a subsequent revision of import policy. The proposals in the draft Biosecurity Bill should enhance science engagement by officers in the environment and health areas.

Use of matrices and alternative instruments

We observe that Peace in seeking to discuss the use of matrices, hypothesises an example that assumes (page 17) that there is a negligible risk of foot and mouth disease entering Australia but that there is a high likelihood that extreme consequences would follow if it did. This is an unfortunate illustration as a report, commissioned by DAFF from Mr Ken Matthews AO, released in November 2011, indicated that large gaps remain in Australia's capacity to prevent an incursion, or respond effectively should the disease reach Australia's shores. We understand that these gaps are being or have been addressed through the Standing Council on Primary Industries.

The paper includes considerable theoretical discussion about qualitative risk matrices. From our experience, we are not persuaded that a five point scale has any great advantage over a six point scale. We are comforted by Peace's comment "...having re-read the four IRA reports and been impressed with the qualitative analyses and their summary risk evaluations...".

Peace quotes on page 13 a paper discussing use of risk matrices by Cox L (2008) *Risk Analysis* 28 (2) 497-512, which is available on the web at <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2008.01030.x/full> . Cox notes that
"...categorizing severity may require inherently subjective judgments (e.g., reflecting the rater's personal degree of risk aversion, if severity is modelled as a random variable) and/or arbitrary decisions about how far to aggregate multiple small and frequent events into fewer and less frequent but more severe events."

The quality of judgment may well be enhanced by a good understanding of the science that underlies the judgment to be made. Cox goes on to say

"...risk matrices do not necessarily support good risk management decisions and effective allocations of limited management attention and resources. Yet, the use of risk matrices is too widespread (and convenient) to make cessation of use an attractive option. Therefore, research is urgently needed to better characterize conditions under which they are most likely to be helpful or harmful in risk management decision making (e.g., when frequencies and severities are positively or negatively correlated, respectively) and that develops methods for designing them to maximize potential decision benefits and limit potential harm from using them."

This leads into a set of mathematical issues upon which my colleagues and I on the Eminent Scientists Group do not feel able to venture given that the Group was established as experts in other aspects of science to review scientific responses to the IRAs. However, we note that Cox does not suggest alternative instruments for the purpose.

While preparing our response to one of the IRAs that were referred to the ESG, we became aware that Biosecurity Australia had scope to make greater use of expertise available, and that there are a number of areas where Australian Centre of Excellence for Risk Analysis (ACERA) based at the University of Melbourne could assist. We noted that it was established specifically for this purpose and receives funding from DAFF to research methodology for biosecurity risk analysis and could be asked more explicitly by DAFF to provide advice, including any effect of qualitative versus quantitative risk analysis on the consequences and methodology of sampling and on the forms of and use of matrices.

However, we understand that some work has been done in this area for ACERA by Dr Simon Barry of CSIRO Mathematics, Informatics and Statistics, in a detailed discussion paper entitled "Putting the quantitative into qualitative Import Risk Assessments". This is available at http://www.acera.unimelb.edu.au/materials/endorsed/0705b_final-report.pdf . The paper finishes by saying

"In conclusion, the key issue to consider is what are the quantities that are being estimated at each step and how the questions can be framed to aid assessors in providing a well framed and interpretable response.....The discussion in the previous sections has demonstrated that it is possible to construct a compound assessment using the components typically considered in a qualitative assessment that is logically based, interpretable and all components are clearly defined. It needs no more data

than a qualitative assessment as it simply requires the analyst to express what they are thinking in a coherent framework.”

We suggest that the Senate Standing Committee on Rural and Regional Affairs and Transport may wish to seek advice from ACERA on these issues.

Similarly, the ESG does not feel able to comment on whether the additional suggestions by Peace to use “event tree analysis” and “bow tie analysis” would add a higher degree of rigour to the individual pest risk assessments that underpin an IRA and ACERA’s advice could be sought on their merits.

The ESG has also commented in one of its IRA responses that we see an advantage in having a suitable independent party (such as ACERA) review the range of models used in the IRA process by our major trading parties. We understand that some work in this area has been done by ACERA (refer http://www.acera.unimelb.edu.au/materials/endorsed/0709_final-report.pdf) but this could be extended further to other trading partners and might well be useful in advancing Australia’s opportunities to export.

Risk Analysis Checklist

Mr Peace advises

“While we have been impressed with the scientific information in three import risk analyses, a detailed review of these is outside our terms of reference. The narrative reports describe the nature of each risk and for the basis for any determination of the level of risk”.

Mr Peace goes on to suggest a risk analysis checklist (pp25-26) and that DAFF officials may wish to develop it further. We would support this as a constructive suggestion.

Revision of Import Risk Analysis Handbook

It is also suggested that the Import Risk Analysis Handbook should be revised to reflect full details of techniques available to DAFF risk analysts and any underlying data or research validating those techniques. It is also observed that

“The current Import Risk Analysis Handbook does not mention, let alone describe the use of the DAFF risk estimation matrix.”

This is correct, but the matrix is well described in the introduction to each IRA as is made clear in Appendix 2 – “Method of pest risk analysis”. In so far as the Handbook will need to be revised as a result of whatever Biosecurity legislation emerges from the current considerations, the suggestion to revise the Import Risk Analysis Handbook is also supported.

I hope these comments and discussions regarding Mr Peace’s paper will be of assistance to the Committee

Yours sincerely



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CHAIR, EMINENT SCIENTISTS GROUP