

**2002 IFA REGIONAL CONFERENCE
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**FERTILIZER, FOOD SAFETY AND THE ENVIRONMENT
AN AUSTRALIAN PERSPECTIVE**

**NICK DREW
FIFA, Australia**

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**“Fertilizer, Food safety and the environment”
"An Australian perspective"**

Paper by Mr. Nick Drew

FIFA - Fertilizer Industry Federation of Australia Inc

I. Summary

There are a number of issues of public concern in the areas of food safety and the environment in Australia that involve the fertilizer industry. Through the Fertilizer Industry Federation of Australia (FIFA) the industry has developed an active involvement in managing these issues and engaging with public debate and the development of public policy.

The issue of heavy metals and the risk they may pose to public health if they enter the food chain in sufficient quantity has received recent media publicity under the heading “Toxic waste sold as fertilizer”.

Eutrophication, particularly in the catchments of the Great Barrier Reef is the issue currently receiving the most public attention in Australia and scientists claim a clear link between fertilizer use and nutrient levels in the waterways of the Great Barrier Reef catchment.

Greenhouse gas and climate change is of public concern and agriculture makes a significant contribution to net greenhouse gas production. Nitrogen fertilizers have been identified as a likely contributor to the agricultural total but there is very little empirical data.

The fertilizer industry has supported the development of improved information in each of these areas of concern. It has developed substantial policies to address the issues of concern, and it has used this position of responsible contribution to engage fully in the public debate and the formation of public policy.

This paper gives a brief summary of the issues of importance, some key references for further information and a summary of the Australian Fertilizer Industry’s response.

II. Background

Australia has a strong environmental movement and environmental issues are major policy areas for both State and Federal Governments. The role of agriculture is central to many of these debates both as a custodian of much of the land mass of Australia and as a contributor to the health and quality of air and waterways.

There are a number of environmental issues that arise when plant nutrients, either native to the soil or applied as fertilizers, move out of the farm production system. Eutrophication of waterways, pollution of groundwater and acidification are all significant issues where fertilizers are clearly identified as a contributing factor.

Greenhouse gas emissions from soil nitrogen are thought to be a significant contributor to Australia's total net greenhouse gas emissions.

Impurities in fertilizer products, notably heavy metals and fluorine, can present a food safety concern. Their accumulation in soils adds an environmental dimension to the problem.

All of these issues have a public profile in Australia and there is a significant amount of detailed information from credible sources that is very accessible to the public.

The level of public information and public concern ensures that high level public policy will be developed to manage these issues.

The fertilizer industry recognizes its responsibility for product stewardship. It has made a clear decision to become actively involved in the public debate, the formation of good public policy and delivery of significant initiatives to reduce the environmental risk of fertilizer use.

III. Impurities

The heavy metals lead, cadmium and mercury represent potential risks to human health if they enter the food chain in sufficient quantity. All can be present in various fertilizers as impurities, however plant uptake is only likely to be significant for cadmium. Whilst there is some risk of lead contamination through the use of foliar fertilizers, particularly trace elements, monitoring of produce in Australia has clearly shown that cadmium is the heavy metal of concern.

In 1991 FIFA, in conjunction with the Horticultural Research and Development Corporation (HRDC) funded a three year project by the Commonwealth Scientific and Industrial Research Organization (CSIRO) to study the effect of fertilizers on cadmium levels in vegetables.

FIFA continues its involvement in public policy development through involvement in the National Cadmium Minimization Strategy. FIFA is an active member of the stakeholder group the National Cadmium Management Committee that co-ordinates the strategy. The committee is made up of representatives of the farming community, CSIRO, State and Federal Government departments of agriculture, environment, and public health and FIFA. The committee co-ordinates activities of the strategy and reports to the Primary Industry Standing Committee which is composed of the relevant Federal and State Government Department CEO's.

Under this strategy the industry has:

- reduced cadmium levels in fertilizers through the selection of raw materials (particularly in relation to phosphate rock for single super phosphate manufacture.);
- produced low cadmium single super phosphate for use in higher risk situations;
- helped to develop maximum permitted concentrations of cadmium in fertilizers; and
- through the committee, produced targeted information packages for those agricultural industries where cadmium risks are greatest (potatoes and leafy vegetables on sandy and or acid soils).

The industry has also been active in promoting uniform product description laws amongst the Australian States to provide appropriate consumer information in the form of analysis of heavy metal content and warnings as to use.

Information on the management of cadmium in Australia can be found at:

<http://www.cadmium-management.org.au/>.

Information on food standards for cadmium in Australia can be found at:

<http://www.foodstandards.gov.au/foodstandardscode/standard14/index.cfm>.

A consequence of selecting low cadmium phosphate rock has been an increase in fluorine concentration in single super phosphate. Initial modeling in Australia and New Zealand suggests that in the medium term (50 years) current use rates could lead to problems in dairy cattle and milk supplies. FIFA is monitoring the development of data in New Zealand that will further explore this concern.

IV. Surface Water Quality

Nitrogen and phosphorus concentrations in waterways and oceans have a significant impact on fauna and flora composition. Significant changes in the concentration of nitrogen and phosphorus in waterways are therefore of major environmental concern, particularly in ecologically valuable areas such as the Great Barrier Reef and its rivers and estuaries.

The Australian Government has developed a comprehensive program of auditing and reporting on the state of the Australian environment, the Australian Natural Resources Audit and the State of the Environment Reports. FIFA member companies contributed to collection of data for this initiative by providing soil test and fertilizer use data. As a result of this program there is a lot of publicly available data on several environmental issues of relevance to the fertilizer industry.

Figure 1 shows a rating of Australian catchments for nutrient levels that exceed the desired water quality for environmental health. The areas on the map where nutrient levels are a major or significant issue represent more than 80% of Australia's agricultural land.

The public face of this issue is the occurrence of algal blooms in inland waterways that prevent use for recreational, domestic and livestock purposes. These blooms occur across wide areas on a regular basis.

The impact of nutrients on the water quality of the Great Barrier Reef and its catchment area is an area of particular public concern. A report prepared for the Great Barrier Reef Ministerial Council contains the following.

“The increase in pollution discharged to the Reef since c1850 is as follows:

- Sediment loads – up 300 – 900%
- Phosphate – up between 300 and 1,500%
- Total nitrogen – up between 200 and 400%
- Pesticide residues – now detected in tidal sediments.

Even more worrying is the fact that almost all pollutant loads are increasing annually and showing no sign of abatement. Of particular concern is the rapid increase in fertilizer delivered nitrogen (nitrate and ammonia) which is the most dangerous to marine ecosystems ...” (Great Barrier Reef Marine Park Authority (September 2001))

The report goes on to recommend that in order to reach water quality targets a mix of regulatory and non regulatory measures will be required.

Fertilizers have been clearly identified in the Great Barrier Reef catchment and are a contributor, amongst many others, to eutrophication issues more generally.

FIFA has responded to these issues by adopting a strategy that identifies eutrophication as a major issue and commits the industry to put in place an environmental product stewardship program. As most of the impacts occur at the user level FIFA has made a concerted effort to broaden its membership to include the distribution chain that will be critical to the successful implementation of effective product stewardship.

Armed with this commitment the industry has been able to participate in the debate on water quality, and in formulation of public policy, as a responsible and credible contributor. As a result, FIFA has developed cooperation with key stakeholders like the sugar industry, the Queensland Fruit and Vegetable growers and the World Wide Fund for Nature. This cooperative approach has been instrumental in the development of an Eco-Efficiency agreement with Environment Australia, the Federal Government Environment Agency.

Under the Eco-Efficiency agreement currently being developed, it is envisaged that the industry will develop national accredited training programs in environmental product stewardship for fertilizers. The programs will be targeted at three groups:

- all fertilizer sales staff
- fertilizer advisers and sales agronomists
- farmers

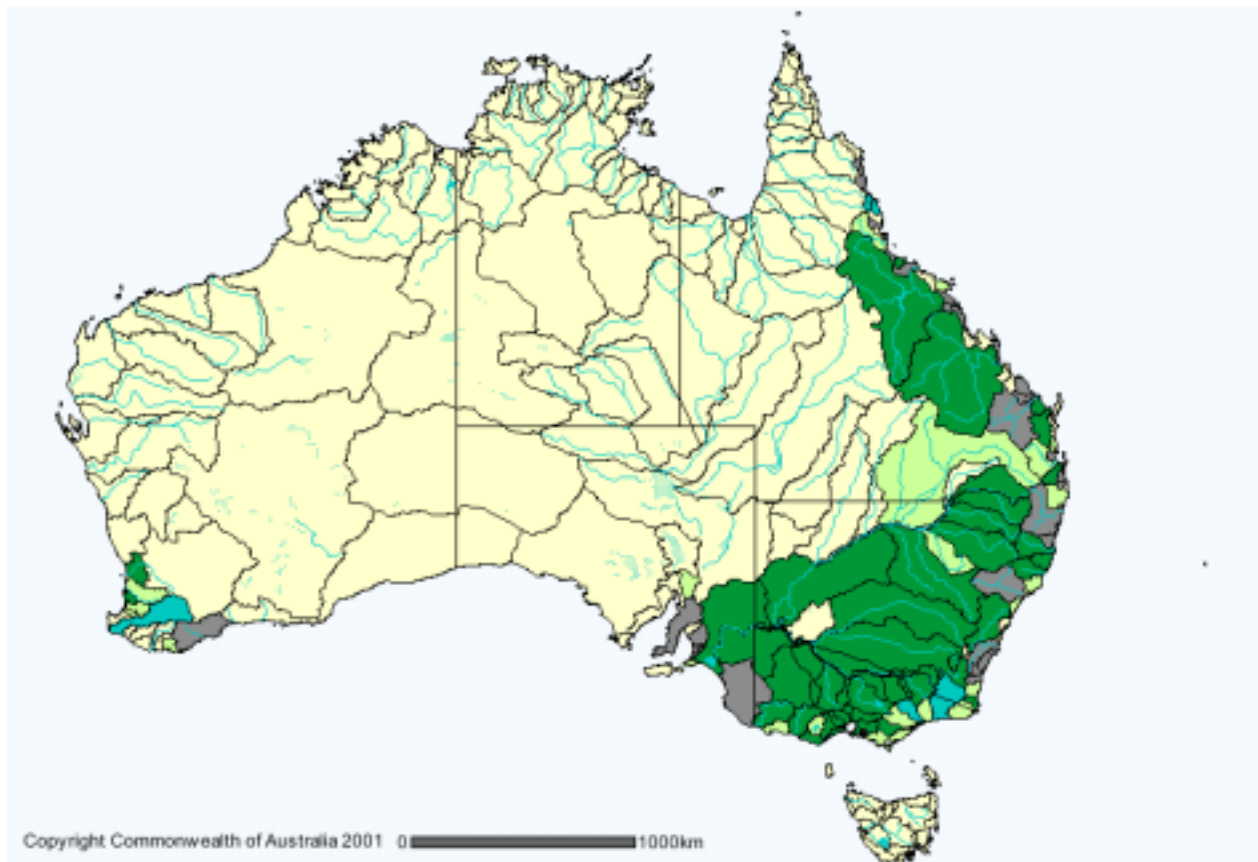
As well as the training programs, the eco-efficiency agreement will result in an industry audit of environmental practices over a three year period, with public reporting of the results.












The eco-efficiency agreement provides an opportunity for the industry to raise its public profile as a responsible contributor to environmental management. The public reporting is backed by an independent Government body that has significant influence on the development of public policy in this area. The agreement also offers significant funding to assist in the development of eco-efficiency initiatives in the industry.

Scientific information on the Great Barrier Reef can be found at the Reef Cooperative Research Centre: <http://www.reef.crc.org.au/> and at the Great Barrier Reef Marine Park Authority: <http://www.gbrmpa.gov.au/>.

Information on eco-efficiency can be found at: <http://www.ea.gov.au/industry/eecp/index.html>.

Figure 1. Water quality exceedence. (Australian Natural Resources Atlas 2001)



-  **State borders**
-  **Drainage - AUSLIG 10M**
- Waterbodies - AUSLIG 10M**
-  **Mainly dry**
-  **Intermittent**
-  **Perennial**
- Water quality - nutrient exceedence**
-  **Major issue**
-  **Significant Issue**
-  **Not a significant issue**
-  **Undetermined issue**
-  **No Coverage**
-  **Other**
-  **Coastline - AUSLIG 10M**

V. Groundwater Quality

There are parts of Australia, where groundwater resources are used for human consumption. Nitrate leaching into these aquifers would represent a human health risk and would be an issue of high public concern should it occur.

Current levels of concern are low and the industry will continue to evaluate the potential for the issue to develop, and respond appropriately. The National environmental product stewardship program will cover the issue of leaching and strategies to reduce risk.

VI. Soil Acidity

Soil acidity is a significant environmental issue in Australia. Whilst fertilizers play a role, the acidification of soil is an inherent part of productive agriculture. Soil acidity is a high profile subject amongst the farming and agricultural science community but is not high on the public agenda.

The fertilizer industry will include strategies to minimize the impact of fertilizer applications on soil acidity in the environmental product stewardship program, and promote the use of lime as an essential input to productive agriculture in soils prone to acidity.

VII. Nutrient Depletion

Nutrient depletion is identified in the Australian Natural Resources Audit as a bigger issue than salinity or acidity. Whilst there are limited circumstances in Australia where fertilizer is over applied, there is a large net deficit when nutrient removal in agricultural produce is summed with nutrient application as fertilizers.

For the Fertilizer industry in Australia this means that effective management of environmental impacts of fertilizer use should result in a significant increase in total fertilizer use.

Nutrient depletion is unlikely to become a hot public issue in Australia. In addressing those issues which are of high public concern the industry can also ensure that nutrient depletion is addressed. By working cooperatively with public policy makers, farmers, and the environmental movement the industry should be able to build broad support for fertilizer use in a sound environmental context.

Information on the Australian Environment including issues of surface water quality, acidity and nutrient depletion can be found at The Australian Natural Resource Atlas:
<http://audit.ea.gov.au/anra/>.

Greenhouse Gas

Global warming is an issue of very high public concern that is constantly in the news. Whilst the public expectation is that Governments need to act, the complexity of the issue confounds clear policy direction.

Nitrous oxide emissions from agricultural land have been identified as a major contributor (3.4% of total net emissions) but the confidence in this estimate is very low. (Table 1.)

FIFA is supporting a project by the Cooperative Research Centre for Greenhouse Accounting that will better define the contribution of soil based emissions. Information and practical advice developed by the program will be incorporated into the environmental product stewardship initiative.

This is in line with the FIFA strategy of engagement in public debate and public policy development and will ensure that FIFA is kept abreast of the scientific consensus, as it develops, and can respond appropriately.

Table 1. Agriculture sector CO₂-equivalent emissions, 2000 (National Greenhouse Gas Inventory 2000 with Methodology Supplements)

Greenhouse Gas Source and Sink Categories	CO ₂	CO ₂ -equivalent emissions (Gg)			%Total Net National Emissions
		CH ₄ ^(a)	N ₂ O ^(b)	Total (includes CO ₂)	
Total Net National Emissions	379852	121054	31906	535252	100.0
4. AGRICULTURE		72956	25484	98440	18.4
A Enteric Fermentation		61346		61346	11.5
B Manure Management		1765	615	2381	0.4
C Rice Cultivation		739		739	0.1
D Agricultural Soils		NE	18077	18077	3.4
E Prescribed Burning of Savannas		8844	6682	15526	2.9
F Field Burning of Agricultural Residues		263	110	373	0.1

(a) Global warming Potential (GWP) = 1 (b) Global warming Potential (GWP) = 310

An index that allows the potency of greenhouse gases to be compared. For example, carbon dioxide has a GWP of one and methane has GWP of 21 that is methane is 21 times as potent as carbon dioxide. GWPs for some other greenhouse gases are: nitrous oxide - 310; HFCs - up to 3000; PFCs - 2500 to 10,000; and, sulphur hexafluoride - 23,900.

More information on greenhouse gas in Australia is available at the Australian Greenhouse Office web site: <http://www.greenhouse.gov.au/index.html>.

VIII. Conclusion

There are a number of environment and food safety issues of genuine public concern where fertilizers can have an impact. In some cases this impact is directly related to fertilizers, in others fertilizers are likely to make some contribution as part of a complex system.

Eutrophication and heavy metals are the highest priority issues, both in terms of public pressure and actual risk.

Soil acidity is a widespread and serious issue for Australian agriculture but clearly linked more closely with productive agriculture in general than with fertilizer use in particular.

Nutrient depletion is a widespread and serious environmental issue that is unlikely to see widespread public concern. It is an issue that the industry can deal effectively with if it is included in programs that address those issues that have a high public profile. Dealing with nutrient depletion is a major commercial opportunity for the fertilizer industry in Australia.

The industry has dealt effectively with heavy metals, in particular cadmium. A process of active engagement as a responsible party has allowed the industry to play an effective part in developing strategies and public policy to minimize the risk to the food chain.

The industry is now taking a similar approach to the range of environmental risks associated with fertilizer use.

By actively engaging in public debate and contributing to the formation of public policy the industry can ensure that effective outcomes are achieved without unplanned disruption to the industry.

Regulation, co-regulation or self regulation are all useful policy tools in meeting public concerns. Through genuine involvement in public policy development the industry can ensure that the appropriate tools are used and that the outcomes are not only effective from an environmental and food safety view but are also efficient solutions from an industry view.

Demonstrating the industries commitment to responsible issues management has been a key enabler of our full engagement in both the public debate and in development of public policy.

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