



Working Paper 8

OHS Implications of Agvet Chemical Regulation

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1. INTRODUCTION

This research critically examines current OHS policy/regulation as it relates to use of agricultural chemicals. We argue that the current regulatory system is inappropriate and that the problem must be viewed in a community, public health and environmental, rather than merely a workplace, context. This involves taking account of powerful market drivers such as supply chain pressures, technological developments, and the ongoing restructuring of agriculture and rural society. From a normative perspective, we consider how these forces might be shaped by government policy and civil society, and we identify points of policy leverage.

Our empirical focus is on Australia, a country with a substantial agricultural sector, and (in many other respects) one which is quite advanced in how it deals with OHS issues. However we argue that Australia, in common with many other countries, has failed to deal effectively with important dimensions of the agricultural chemicals challenge. In particular, a number of policy strategies it shares with other developed industrial nations, while achieving positive results in other areas of OHS, are ill-suited to address agricultural chemical safety in the economic and structural circumstances confronting agriculture globally. Many of the challenges encountered by Australian policymakers, and their likely resolution, are mirrored elsewhere, and the issues we raise, and the solutions we propose, may have resonance for a range of other developed countries.

Sections 2 - 4 of this paper outline the current regulatory framework and its limitations. In sections 5 – 7 we argue for the importance of harnessing the potential of new pest control technologies and the impact of market forces to influence farmers' pest control practices and improve agricultural OHS more generally. Finally in section 8 we explore the current and potential role of civil society in changing agvet chemical policy and practice and the ways in which the required changes can piggy-back off those needed to ensure food and environmental safety.

2. OHS & PESTICIDE USE IN AGRICULTURE

Agriculture is one of the most hazardous industries in both developing and industrialised countries. In 1997, the International Labour Organisation (ILO) warned that globally, agricultural workers “*run at least twice the risk of dying on the job as workers in other sectors*”¹ and noted that this disproportionate level of risk is not restricted to agricultural workers in developing countries. In the USA, the farmers and farm workers who comprised 3% of the workforce accounts for 8% of all work-related accidents, with per person occupational injury costs for farming approximately 3.2 times the national average.² In the EU agriculture ranks as one of the four most hazardous industries, alongside mining, fishing and construction.³

Australian studies also indicate that the incidence of work related death and injury in agriculture remains amongst the highest for any industry.⁴ In the early 1990s, the death rate for farmers was estimated to be 39% greater than the average for the working male population.⁵ In the late 1990s, Workers Compensation claims for work-related fatalities⁶ in agriculture were almost 3 times the all-industries average and around 50% higher for non-fatal injury claims.⁷ Farming fatalities in Victoria account for an estimated one third of workplace deaths annually, despite the industry having only about 5 percent of the State's total workforce,⁸ and there are also significant numbers of injuries amongst unpaid family members who live and work on farms - including children.⁹

There are many facets of agricultural production that contribute to this bleak picture. Of these, exposure to agricultural chemicals is certainly one of the most significant. But quite how significant remains unclear, because of almost insurmountable difficulties in documenting the true extent of pesticide poisoning in the agricultural workforce worldwide. First, since the agricultural workforce consists mostly of self-employed, family members or contractors rather than employees, only a small proportion of work-related farm injuries result in workers compensation claims¹⁰. Second, the available statistics refer almost exclusively to acute exposure¹¹ and rarely capture work related disease resulting from long term, chronic exposure - not least because of the long latency period between exposure and the onset of disease. Unsurprisingly therefore, the ILO notes that this problem is “*notoriously under-estimated*” while acknowledging it as a “*frequent occupational hazard*” for farm workers globally.¹² More boldly, the World Health Organisation (WHO) estimates that worldwide between 2 and 5 million workers per year suffer from pesticide poisoning, with some 40,000 fatalities.

It is similarly difficult to estimate the contribution that pesticide exposure makes to the high morbidity and mortality rates in Australian agriculture. Given the lack of public information about the amount and patterns of pesticide usage and associated adverse events,¹³ one must largely rely Workers Compensation (WC) claims data and on field studies. The former indicate that inappropriate pesticide exposure occurs in a variety of agricultural work situations and to an extent likely to give rise to substantial risk of injury or disease¹⁴. The latter provide evidence of inappropriate pesticide exposure in horticulture, vineyard, cotton and sheep farming, and are suggestive of similar problems in a variety of other industries.¹⁵ It must also be noted that the studies and statistics provide a significant underestimate of the overall extent and impact of pesticide exposure for the reasons described above.

One may conclude that, notwithstanding our limited knowledge of its precise dimensions, exposure to agricultural chemicals remains a problem with serious OHS implications. Overall, as in most developed countries, Australian farmers' use of pesticides is increasing and will continue to do so as Australian agriculture moves to more intensive farming practices focused on

increasing productivity. Whilst there is also a general trend away from more toxic and broad-spectrum pesticides towards 'softer', target-specific products and biological control methods, this varies significantly by industry sector and is highly dependent on crop/pest conditions.¹⁶ In recognition of this situation, safer pesticide use has become a high priority issue for a diverse range of government departments and non-government organisations (NGOs) concerned with agricultural OHS and public health.

3. CURRENT REGULATORY AND POLICY FRAMEWORK

In broad terms, regulation of agricultural and veterinary (agvet) chemicals in Australia takes place at both national and State/Territory (hereafter State) level. First, through the National Registration Scheme (described below) the Commonwealth has exercised its constitutional powers relating to the *manufacture* of agvet chemicals, the evaluation of their safety for humans and the environment, their efficacy and their registration for use. Second, regulation of the *use* of agvet chemicals, falls within the domain of the States and is subject to a combination of statutes, regulations and codes of practice. Some are specific to the use of pesticides in agricultural workplaces (the Agvet system; OHS regulations) while others are focused on limiting the public health and environmental impact of agricultural pesticides (food safety and environment protection laws).

3.1 The National Agvet system

Until the 1990s, the supply and use of agvet chemicals was regulated by State legislation with some national coordination of registration. Following the 1987 detection of exceptionally high organochlorine residues in Australian export beef and a subsequent Senate Select Committee Inquiry¹⁷, a single National Registration Scheme (NRS) was established in 1995. Its goals are to streamline registration, modernise review provisions and ensure national consistency for product labels, safety warnings and usage instructions. The NRS is underpinned by the 'Agvet system', a comprehensive framework of Commonwealth legislation, State Acts, regulations and codes of practice and Ministerial (inter-governmental) agreements, which regulate all phases of the agvet chemical life cycle (see Appendix 1 for full listing at 2000). It is administered by the Australian Pesticides and Veterinary Medicines Authority (APVMA),¹⁸ a Commonwealth statutory authority within the agricultural portfolio, which is responsible for the assessment and registration of agvet chemical products and their regulation up to the point of retail sale.

The APVMA *"assesses the safety and performance of products, determines whether their use is likely to jeopardise trade, and regulates the supply of agricultural and veterinary chemicals onto the Australian market by approving product labels and specifying conditions of use"*.¹⁹ Effectively it provides a first line of protection against hazardous agvet chemicals by regulating the market availability of pesticides and specifying conditions of use and safety directions. The latter are based on the hazard and risk assessments required for registration. These are specified on the product label and in 'off-label' permits that authorise (1) the minor or emergency use of a registered product not specified on the product label, and (2) use of an unregistered product.²⁰ The APVMA also regularly reviews all agvet products on a regular or 'as-needed' basis through the Existing Chemicals Review Program and may cancel registration or amend conditions of use according to the assessed level of risk.

Beyond the point of retail sale, safe use of pesticides is a State responsibility under 'control-of-use' regulations, which give force to the registration conditions and requirements. The regulations are variously administered by State departments of primary industry and health and environment protection authorities (see Table 1). Whilst State harmonisation has largely been achieved in regulating the use of veterinary products, there remain significant differences and overlaps in regulating the use of agricultural products, most notably in relation to off-label use, and also in licensing, training and record keeping requirements.²¹ Within State jurisdictions, there are also overlaps and inconsistencies with other regulatory frameworks, most notably with OHS regulations, as discussed below.

Table 1. Responsibility for State control-of-use regulation*

State/Territory	Administering authority
Queensland	Department of Primary Industry
NSW	Environment Protection Agency (pesticides) NSW Agriculture (veterinary products)
Victoria	Department of Natural Resources & Environment
Tasmania	Department of Primary Industries, Water & Environment
South Australia	Primary Industries & Resources SA
Western Australia	WA Health Department Agriculture WA (licensing aerial applicators)
Northern Territory	Dept of Primary Industry & Fisheries
ACT	Administered under Environment Protection Regulations

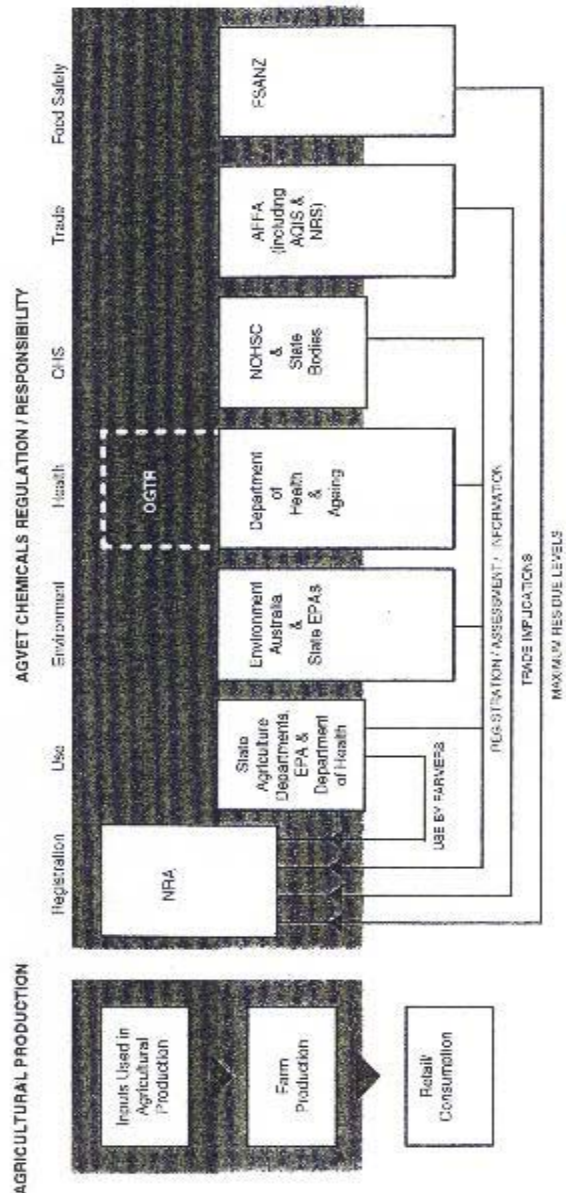
* At July 2003

3.2 Parallel OHS Regulations

As workplaces, farms are subject to State OHS legislation which imposes a general duty of care on all employers to *"provide and maintain so far as is practicable for employees a working environment that is safe and without risks to health"*.²² The employers' (including self-employed) duty of care extends further to ensuring that a range of others (non-employees including customers, by-standers) are not exposed to health and safety risks because of the way in which work is conducted.²³ In the case of farmers, this can extend to ensuring that public health and safety are not compromised by, for example, pesticide spray drift or run-off.

Farms are subject to the full range of OHS regulations including the Hazardous Substances and Dangerous Goods Regulations.²⁴ These regulations implement nationally consistent packages of standards, codes of practice and guidance materials which apply to all workplaces in which hazardous substances or dangerous goods are handled, used, stored or produced, and to everyone with potential for exposure in those workplaces. Both require farmers to implement a comprehensive risk management approach to farm chemicals, including identification of all hazardous substances, assessment of the risks arising from their specific conditions of handling, use and storage, and the implementation of appropriate measures to control risks as close to source as practicable. Farmers are also required to keep records of all these activities, to provide appropriate training and information to employees (including label directions and MSDS) and allow access by public authorities and emergency services to relevant information. The Dangerous Goods Regulations relate specifically to the transport and storage of workplace dangerous goods and to chemical waste disposal.

Figure 1. Jurisdictional responsibility for agvet chemicals
 From Allen Consulting Group (2002) Report to APVMA.



Note: While the NRA (now APVMA) seeks input from various regulatory agencies, it has legislative responsibility for health, environmental & OHS issues in so far as they relate to the registration of agvet chemicals.

3.3 Environment protection and food safety

The regulatory regimes established to ensure food safety and environmental protection are also in part concerned with the control of agvet chemical usage - that is with preventing or minimising human and animal exposure to pesticides and environmental contamination, and limiting pesticide residues in food, feed and fibre crops (for full listing see Appendix 1). Potentially, compliance with these regulatory and policy frameworks can lead to (1) significant reductions in the amount of pesticide used and the frequency of application, and (2) substitution of less hazardous pesticides and application methods with less potential for exposure. Consequently, whilst not directly concerned with the regulation of workplace exposure to hazardous pesticides, they have significant potential to decrease it.

Environment protection

As the environment shows increasing signs of stress, and as many serious environmental impacts associated with Australia's agricultural development become increasingly apparent,²⁵ so has the pressure on farmers to improve their environmental performance, itself increased. The public policy aspiration is to achieve ecologically sustainable development, a concept that permeates Australian natural resources law and policy at all levels of government.²⁶ ESD is defined as development meeting the social and economic needs of present generations while conserving ecosystems for the benefit of future generations.²⁷ Vehicles through which to achieve ESD include implementation of the precautionary principle, intergenerational equity, conservation of biological diversity and ecological integrity, and improved valuation, pricing and incentive mechanisms.²⁸

Several management strategies have been adopted to improve environmental protection and move closer to ESD. In 1992, the Council of Australian Governments produced the Intergovernmental Agreement on the Environment 1992 which highlighted the need for improved environmental regulation.²⁹ Critically, the Agreement recommended a move away from reliance on regulatory measures to a more market-oriented approach and implementation of nationally agreed principles and guidelines to provide '*minimum effective regulation*'.³⁰ More recently, the need for a mix of management strategies (regulatory, market, voluntary and institutional) has been advocated to achieve environmental regulation.³¹ It is argued that such an approach may achieve long term changes in land management practices through the promotion of partnerships between governments, industry and community groups.³²

Management strategies specifically aimed at achieving sustainable agricultural practices include encouraging best practice methods through sector-based extension (training and education) programs for farmers, and, jointly with industry associations, the establishment and support of industry specific research and development (R & D) corporations.³³ There is also strong emphasis on increasing community awareness and involvement through, for example, National Heritage Trust (NHT) programs and initiatives such as Landcare and Rivercare.³⁴

In relation to overuse/misuse of fertilisers and chemicals specifically, the most recent evidence suggest the virtue of combining abatement options to deal with the diversity of land users and.³⁵ The 'control-of-use' regulations³⁶ described earlier, are on part of this picture³⁷, but are or could be complemented by a variety of other mechanisms such as the introduction of buffer zones between crops and major water courses, licensing arrangements, the provision of subsidies for pollution abatement practices which are not otherwise profitable, and holding an auction where farmers can bid for public funds to reduce chemical levels in run-off³⁸. And some environmental agencies have

taken the initiative to engage directly with pesticide related issues. For example, in 2000, the Environmental Protection Authority (EPA) became the administering authority for pesticides in NSW. The EPA introduced new requirements under the *Pesticides Act 1999 (NSW)* for the purchase and use of pesticides to ensure appropriate user competencies, proper record keeping and information provision to users.³⁹ Notably, the Act aims to promote the protection of human health, the environment, property and trade in relation to the use of pesticides, having regard to the principles of ESD.⁴⁰

Food safety

Limiting and monitoring pesticide residues and other contaminants in food crops is an important aspect of food safety regulation involving Food Standards Australia and New Zealand (FSANZ)⁴¹, APVMA and the Australian Quarantine and Inspection Service (AQIS) at national level. Recommended maximum residue levels (MRLs) for pesticides in specific food commodities, are determined by the APVMA to reflect the conditions of agvet product registration and compliance with international food safety and trade standards. They are included in the national Food Standards Code (administered by FSANZ), to become part of all State food laws. Monitoring of pesticide residues in raw foodstuffs is conducted nationally through the Australian Total Diet Survey, the National Residue Survey and targeted testing programs for specific contaminants (organochlorines, chlorfluazuron, endosulfan). Testing for residue levels is also done at wholesale level by marketing authorities, export agents and the food retail chains, to ensure the safety and quality of produce prior to marketing.

Following well publicised instances of major food contamination, regulation of food safety is being strengthened in many countries, including Australia. Major food retailers too have responded to consumers' growing concern about the safety of their food by strengthening quality control measures – increasingly by requiring suppliers to adopt process based (HACCP⁴²) quality assurance (QA) programs. Farmers must ensure that their produce meets not only regulated standards but also retailers' production standards – or risk losing both domestic and export market access. These requirements undoubtedly have significant implications for the type and amount of pesticide used by growers⁴³ and the frequency, and method of its use – and consequently for improving agricultural workplace safety. However, it must be kept in mind that low pesticide residue levels in market produce can be achieved without correspondingly low workforce exposure to those pesticides during agricultural production.

4. LIMITATIONS AND EFFECTIVENESS OF THE REGULATORY STATUS QUO

The effectiveness of the current regulatory framework for agvet chemicals is limited by (1) the fragmentation and complexity of the regulatory framework and institutional arrangements, (2) the inappropriateness of the current OHS regulatory model to agriculture, (3) widespread reliance on relatively ineffective information and training strategies to encourage farmers' compliance with safety standards, and (4) lack of regulatory incentives to compliance. This section discusses the implications of these limitations and options for improvements within the existing framework. The authors conclude that whilst incremental improvements to the current framework can and should be made, they will likely be insufficient in themselves to substantially improve outcomes.

4.1 Regulatory complexity

The current regulatory framework for agvet chemicals is characterised by functional complexity and inconsistencies that farmers frequently perceive as creating conflicting compliance requirements. This results from both (1) the number (more than 60) of Commonwealth and State Acts, Regulations, Standards and Codes of Practice, which relate to the supply, handling, use, storage and disposal of pesticides (see Appendix 1 for full listing), and (2) their poor alignment, marked by cross-jurisdictional inconsistencies and overlaps. There are also significant differences in the institutional and enforcement cultures of the responsible departments and agencies across the Commonwealth and State jurisdictions, particularly between the Commonwealth/State Agvet system and the State OHS regulatory regimes (see Box 1).

In a 2003 address on future directions for the APVMA, the CEO, Alison Turner, acknowledged the impact of regulatory fragmentation ("*..horizontal and vertical fragmentation of responsibilities for agvet chemicals risk management with no clear responsibility for the total system*") and the differences in institutional culture. She noted that differences in which of the involved portfolios (agriculture, health, environment)

"owns" the Control of Use system in each State "*.. leads inevitably to different expectations and emphases about prime outcomes..*".⁴⁴ Turner's observations reflected the findings of the 2002 review of the agvet system, commissioned by APVMA. It reported that while the NRS may provide a rigorous program of assessment, registration and labelling, progress in the risk management of agvet chemicals has not kept pace with developments in related regulatory areas (eg food safety). The authors concluded that major system changes are needed to ensure "*a high degree of integration (adoption of common operating principles) and low fragmentation (a small number of decision makers)*".⁴⁵

The functional (practical) problems of implementing and administering such a complex regulatory system are also considerably exacerbated by the lack of adequate communication, liaison and coordination both between the involved government departments and agencies, and with stakeholders. These inadequacies increase the impact on farmers of the significant differences between the target groups, program delivery and regulatory objectives of the various government agencies and their enforcement cultures. They also severely limit agencies' functional capacity to implement agreed joint programs and coordinated strategies within a reasonable time

Box 1. Compliance requirements - the agvet system and OHS regulations

Both OHS regulations and control-of-use regulations are based on a risk management approach to safety, but the parallel systems overlap and differ in ways that have significant practical implications for farmers. The differences have resulted in some perception of conflict and confusion about appropriate procedures particularly in relation to the assessment and control of risk and provision of information. Research conducted in 2000⁴⁶ (when both had been operative for some time), found poor understanding of the objectives of the separate regulations and confusion about their target activities and audience. Significantly, there was most confusion about whether reliance on the product label safety directions obviated the need to undertake further use-specific risk assessments. The confusion both reflects and arises from differences in the focus and approaches to risk assessment and control in the complementary regulations.

The agvet regulatory system, based on prescriptive specification standards, requires product users to follow the safety directions printed on the label, which are based on risk assessments (by TGA, NOHSC, EA) made prior to product registration or when a product is being reviewed. The assessment is based on assumptions about normal farming practices consistent with the conditions of registration and do not take account of any subsequent deviations from that norm (eg off-label use). The safety directions also focus on lower order risk control measures such as the use of personal protective equipment (PPE).⁴⁷ Consequently, compliance with the product label safety directions will not necessarily produce compliance with the requirements of OHS regulations for (1) risk assessments based on the specific work-related circumstances of use (ie tailored to the particular circumstances of the workplace and work tasks⁴⁸) and (2) reliance on risk control measures that keep exposure as low as practicable, with a focus on higher order measures to control the risk closer to source (eg product substitution, use of closed systems). The OHS regulations also require risk assessments to be conducted in consultation with workplace health and safety representatives if practicable. Although the risk assessment required by OHS regulations effectively complements and extends that required by the APVMA for registration, many farmers perceive the regulatory differences as a conflict or as duplication of compliance requirements that add inappropriately to their regulatory burden.⁴⁹

Both regulatory systems require farmers to (1) obtain information about pesticides used and provide it to employees using them, and (2) ensure that product labels are correct and intact. However the control-of-use regulations specify the product label as the primary source of information whilst the OHS regulations require that an MSDS be obtained and provided for all hazardous products/dangerous goods. The MSDS is widely regarded by farmers as less immediately and practically helpful than label instructions and more difficult to obtain and disseminate to users. Many question whether they should have to make the extra effort required to obtain an MSDS for each of the many pesticides used (it is not necessarily provided by suppliers) and provide it whenever and wherever the product is used – which can involve many practical difficulties.

The training specifications in the OHS regulations and agvet system are similarly consistent albeit with significant differences. Whilst OHS regulations impose training requirements for users of hazardous substances, the agvet regulations generally only recommend training within codes of practice or guidance notes. However, the agvet system may also limit use of some 'restricted chemical products' to authorised persons, who must meet specified training and competency requirements.

frame. For example, even despite established formal inter-departmental consultation and liaison mechanisms, it took 8 years to produce the national management principles for spray drift⁵⁰ and after five years there is still no implementation plan for the ministerially endorsed 1998 National Strategy for Management of Agricultural and Veterinary Chemicals.⁵¹

At an individual level, the practical difficulties created by regulatory inconsistency and overlap can significantly reduce farmers' levels of compliance with regulatory requirements for safe use of farm chemicals. A study of NSW vegetable farmers⁵² in the late 1990s found widespread poor understanding of regulatory requirements and confusion about their practical implementation. A national review of pesticides undertaken by the Australian Academy of Technological Sciences and Engineering (AATSE), subsequently found a similar lack of understanding and confusion across all sectors of the industry- extending even to the staff of State authorities.⁵³ The AATSE report concluded that there was a consequent need for implementation of effective strategies to overcome the underlying complexity and fragmentation of the regulatory system – *“..effective implementation of a comprehensive overarching (national strategy) to provide a coherent framework for seamless integration of pesticide management and regulatory processes between the Commonwealth and the states/territories..”*⁵⁴ Overall, one can concur with the conclusion of the 2002 APVMA review, that the system is fragmented, poorly integrated, lacks strong feedback loops between the different elements, has limited capacity to respond flexibly to new circumstances and little capacity for continuous improvement.⁵⁵

4.2 Appropriateness of OHS legislation to agriculture

Application of OHS legislation to agriculture has long been regarded as problematic in Australia. Until the mid-1950s, agriculture was excluded from the scope of Australian OHS legislation, and remained largely so until the mid-1970s.⁵⁶ This was undoubtedly due in part to farmer organisations' influence on government policy through the Country/National Party. Until the late 1980s the National Farmers Federation (NFF) was opposed to the application of OHS legislation to farms and regarded *“more education and less regulation (as the) only way to promote safer working environments, particularly on farms”*.⁵⁷ The predominantly family based ownership of farms and the high proportion of family and indigenous workers in many sectors of agriculture also militated against the extension of industrial legislation to agricultural workplaces. Moreover, since much of the OHS legislation in place until the 1980s, was based on an essentially 19th-century British factory work model, there were convincing reasons, beyond sectoral self-interest, why it could be regarded as inappropriate and inapplicable to farms.

In the 1980s the States began to move away from detailed specification standards to *“a combination of general duties, supplemented by performance standards, process-based standards and documentation requirements in regulations and codes of practice under the OHS statutes.”*⁵⁸ This addressed (at least formally) most of the objections that had previously served to justify the exclusion of agriculture on the basis that it was a ‘special case’. Under the new regime, the intention was to apply a single set of principles and performance based standards to *all* Australian workers, and the legislation was couched in terms that facilitated this without need for specific provisions explicitly addressing agricultural and rural industries. For example, the new legislation broadened the scope of ‘duty holders’ to include all persons who could properly be seen to have responsibility for their own and other's health and safety, and ‘employees’ were defined in terms sufficiently broad to encompass workers employed in all types of workplaces. Faced with such a model and such a rationale, it was much harder for agricultural interests to plead for a special exclusion. However, notwithstanding the ambitions of the ‘new’ OHS legislation to be all encompassing, it is still largely premised on an industrial model of work and

workplace relations that is, in many significant aspects, inappropriate to agriculture or inadequate to address its specific conditions.

First, the legislation is based on a 'tripartite' model which has limited application in agricultural industries. The tripartite model allocates complementary roles in identifying and controlling OHS risks to government, employers, and employees. In the case of employees, the inherent imbalance of power between individual workers and employers is counterbalanced, at least in part, through the workplace presence of formal workers' organisations and the powers bestowed on worker health and safety representatives (HSRs) and workplace OHS committees supported by the OHS authorities.⁵⁹ However the agricultural workforce provides little support for the application of this model since it is characterised by small, dispersed, self-employed and family based work units with a relatively small proportion of employees (45% of the workforce, compared to an all-industry average of 86%) who are mainly seasonal or itinerant casual labourers (70% in NSW⁶⁰). Trade union membership is minimal at 5% (compared to an all-industry average of 25%), and is concentrated in specific sectors and occupational groups, such as in shearing. Consequently the usual industrial forces and mechanisms that function to identify and minimise safety risks at workplace level (particularly in large organisations) are rarely present in agricultural workplaces.

Second, the 'workplace' focused model of OHS regulation does not take into account the implications of the typical co-location of homes and workplaces on the majority of family-managed farms. Agricultural chemicals have many adverse consequences beyond the work situation and safe use of pesticides on farms is more than a matter of limiting worker exposure. It is also about ensuring that more vulnerable family members, particularly children, are not inappropriately exposed as they go about their daily activities on the farm and that spray drift and chemical run-off do not extend the threat of hazardous exposure to local communities. For these reasons, it is almost impossible to disentangle the OHS aspects from the public health and environmental aspects of agvet chemical usage on farms. Yet whilst OHS legislation does specifically acknowledge employers' extended duty of care for non-employees and others affected by the work done, this inter-connectedness is not reflected in OHS policy development as it related to agricultural workplaces and the use of agricultural chemicals. In particular, there is little practical acknowledgement of the diversity of legitimate agricultural OHS stakeholders, except more recently in the development and delivery of programs at regional level in some jurisdictions. At policy level (and particularly at national level) there is scant regard for the integration and involvement of all the stakeholders able to influence rural community safety norms. For example the success of Farmsafe Australia, in establishing national working coalitions between stakeholders to build rural community awareness of tractor safety, is far from reflected in national OHS policy and practice. Indeed the very existence of Farmsafe Australia is in doubt as neither of the federal government departments concerned with agricultural OHS (NOHSC, AFFA) now regard its funding as an appropriate responsibility regardless of the high and continuing industry rates of work-related death and injury.

4.3 Motivation & the role of information & training

Information provision and training programs are strongly endorsed by farmers, their industry organisations and government agencies concerned with all aspects of farm safety⁶¹. This support is central to the full range of programs conducted, often in parallel and jointly by government agencies, industry bodies and commercial organisations, with a variety of incentives to encourage and facilitate farmers' participation.⁶² However, the success of this approach – focused on informing and training individual farmers and agricultural workers - has been limited.

Training and information services work most effectively where the target group is ready, willing and able to comply, but lacks adequate knowledge of how best to do so. If the target group *lacks the motivation* to adopt greater precautions voluntarily then information and training, while still having a part to play, cannot be relied upon as the primary or exclusive instrument for achieving change.⁶³ And such is the case with farmers and agricultural chemicals. This might at first sight seem surprising since it is their own health and safety (and that of their families, close associates and local communities) that is at risk, as well as that of farm workers. But as we will see, despite continuing high rates of injury, illness and death, OHS remains a relatively low priority in the daily practice of most farmers, and there is considerable resistance and reluctance to accept and apply OHS regulatory provisions within the agricultural workforce generally.

There are both cultural and financial reasons for this. Most farmers' first priority is to maintain the economic viability of their farm, often under increasingly difficult economic circumstances, particularly in the case of small enterprises⁶⁴. In this context safety measures are frequently seen as a cost with minimal or intangible economic benefits and are consequently given a low priority.⁶⁵ Field studies indicate that farmers frequently exhibit "*a low perception of personal risk or a machismo attitude to risk taking interlinked with some resistance to changing traditional work practices and to outside influences that threaten farmers' independence.*"⁶⁶ It is unlikely that these groupings of farmers will heed the safety messages of information and training programs, which are fundamentally in conflict with their personal assessment of risk and how to best manage it.

The experience of the Roll Over Protection Scheme (ROPS) and work with NESB farmers (discussed later) indicates that information and training programs can encourage behavioural and cultural change. However, they have to be ongoing programs which are field based, involve credible community leaders within the farmers' peer groups, and offer practical assistance and solutions that demonstrate the possibility of safe practices that are also economically viable. European experience with roving or regional safety representatives working directly with farmers and agricultural workers (also discussed later) similarly supports the effectiveness of this approach. It is however unlikely that such an approach can be sustained without the involvement of a wider range of stakeholders than the current tripartite partners. It is similarly unlikely that any positive outcomes will be maintained in the longer term without additional regulatory and market incentives and more effective enforcement to encourage some change in community safety norms (as with ROPS).

4.4 Issues of enforcement

In circumstances where farmers are insufficiently motivated to improve OHS voluntarily, enforcement is an essential underpinning to 'softer' strategies such as training and education. Enforcement, in these circumstances, provides a compelling reason to comply that is otherwise lacking. But, as was observed by the national Industry Commission Inquiry into OHS in 1995, the current approach to enforcement is still "*not working*"⁶⁷ because it over-relies on education and persuasion and provides no credible threat of significant penalties even for repeated or serious non-compliance. Since 1995 there has been a significant shift to greater enforcement in some jurisdictions in some areas, as recommended by the Commission. However, in agricultural workplaces in all jurisdictions there has been little increase in the probability of detecting or prosecuting the still significant levels of non-compliance.

This failure of enforcement in agriculture is the consequence of a variety of intertwined factors. In part, enforcement has been limited by the isolation and dispersion of the agricultural workforce over numerous small farms, which makes regular inspection extremely resource intensive and arguably impracticable. It is also much harder to gather convincing evidence relating to chemicals related incidents than say, failure to guard machinery. These problems have been compounded by the lack of adequate inspectorate resources in rural areas - which follows in part from the philosophy that, whatever its virtues in other contexts, enforcement is almost entirely inappropriate in the agricultural sector. This philosophy is widely espoused by farming and other rural organisations, largely accepted by government bureaucracies (particularly agriculture departments), and reinforced by widespread farmer resistance to regulation, particularly its enforcement. In consequence, the role of the OHS authorities in agriculture has been largely limited to a handful of rural advisors providing information, advice and training.

In other areas of regulation relevant to agricultural chemicals, such as food safety and environmental protection, enforcement has remained similarly minimal.⁶⁸ These areas too, remain poorly resourced and with prosecution limited to situations that constitute a threat to export trade opportunities (eg. excess pesticide residues) or a major public health problem (eg bacterial contamination of fresh produce).

4.5 Towards Reform

As we have seen, the traditional regulatory approach to chemical safety and OHS in agriculture is seriously flawed – as clearly indicated by the failure to stem the excessive rates of work-related injury and loss of life in agricultural workplaces. The current system is limited by regulatory fragmentation and complexity and by inappropriate models that reduce the functional capacity of regulators to coordinate programs and resources and mobilise all potential stakeholders. The over-reliance on individually focused information and training programs and the virtual absence of effective enforcement measures, serve to compound the problem. A number of relatively modest reforms might at least mitigate some of the worst flaws of the policy status quo, although in some cases they too may require action on a broader front.

First, there is a need to replace the currently fragmented and inconsistent agvet system with a comprehensive and integrated regulatory framework – as recommended by a number of studies over the last decade. The most recent (2002) APVMA review of the current regulation and management of agvet chemicals, recommended structural reform to integrate regulatory functions

under a single agency in order to establish a nationally seamless system with consistent management of agvet chemicals based on clear regulatory goals (“horizontal integration” of all Commonwealth functions or, more radically, the “vertical integration” of all regulatory functions into one national body⁶⁹). While these suggestions are eminently sensible they may nevertheless be insufficient to achieve the level of reform necessary for substantial improvement.

The fragmentation, complexity and inconsistencies of the agvet system are in part a reflection of systemic problems arising from the presence of four separate and divergent national regulatory systems for chemicals in Australia – for food, industrial and agvet chemicals and therapeutic goods (see Figure 2).⁷⁰ It therefore seems unlikely that effective reform of the agvet regulatory system will be achieved without a whole-of-government approach to achieving greater harmonisation of the regulatory frameworks and institutional arrangements for all classes of chemicals across all Australian jurisdictions.⁷¹ Such an approach may be both facilitated and necessitated by the widespread adoption internationally of the Globally Harmonized System for Assessment and Labelling of Chemicals (GHS), which provides a common approach to defining and classifying chemical hazards (ie physical, health and environmental hazards) and communicating information to users (via labels and safety data sheets). For example, in adopting the GHS in 2001, New Zealand established a unified national system for the regulation and management of all chemicals under the *Hazardous Substances and New Organisms Act 2001*.⁷² The draft report of the Productivity Commission on evaluation of mutual recognition schemes, notes the difficulties arising from the current complex Australian regulatory framework both for industry within Australia (eg duplication of approvals, different label requirements) and for trans-Tasman trade.⁷³ It further suggests that “... *unless Australia eventually embraces the GHS, it will be out of step with most of its trading partners, its trade will be impaired, and progress over reconciling differences across the Tasman will be permanently constrained.*”⁷⁴

Second, there is the inappropriateness of the current OHS regulation to the circumstances of agriculture, especially in terms of (1) the inadequacy of the current tripartism as a basis for stakeholder involvement, and (2) failure to recognise the important implications of the co-location of homes and workplaces in agriculture. These problems might be mitigated by including farming and rural community organisations in the OHS policy-making process - rather than just the traditional stakeholders of government, employers and employee organisations. However, this must be done not just locally – in program development and delivery - but also at the level of state and federal policy development. Given that pesticide use (and agricultural safety more generally) is as much a rural public health and environmental issue as an OHS one, it is unlikely that it can be effectively addressed without greater participation of the broader group of rural stakeholders able to influence *all* the relevant community safety norms. Some recent initiatives at State level suggest that there is at least a growing recognition of the importance of better integrating OHS, public health and environmental initiatives in rural areas. For example, in South Australia, WorkCover is actively participating in the Safe Communities program (see Box 2) which focuses on developing systematic safety promotion in all areas of activity and partnerships between key agencies to increase the effectiveness of prevention strategies. The underlying assumption is that “... *the overall commitment of the community to safety is integral to safety in the workplace*” – a concept particularly relevant in rural communities.⁷⁵ Similarly in Victoria, the alliances built with farmers, rural community organisations and unions through Farmsafe, have assisted WorkCover to successfully develop new approaches to targeted compliance projects (Roll Over Protection Scheme, chemicals) in rural areas, and overcome previous farmer and community resistance and hostility (see Box 8).

Box 2: SA Workcover and the Safe Communities Program

Safe Communities is an approach developed by the World Health Organisation (WHO) based on experience in Sweden. Over the last 15 years it has been adopted in 150 communities around the world, including 12 rural and urban communities in Australia.

Safe Communities have adopted the strategy of forming local groups to act as catalysts to encourage cooperation and coordination between all agencies and community associations concerned with safety issues. SA WorkCover has supported the development of the Noarlunga Safe Community and is a major partner in the development of the Adelaide Safe Community.

WorkCover participation is based on the assumption that the “overall commitment of the community is integral to safety in the workplace”. It is developing a number of strategies to engage the community in “the power of working safely”, including programs to maximise the incorporation of safe work into all activities, and the development of alliances, partnerships and networks to increase the effectiveness of prevention strategies. For WorkCover, Safe Communities offers a model that allows agencies to share their knowledge and expertise and to learn from each other about how best to promote safety in all areas of community activity – including workplaces, particularly small businesses. WorkCover is currently conducting joint safety promotion programs with Adelaide City Council, SA Police and Ambulance, the Metropolitan Fire Service, and a number of NGOs around the four linked themes of road safety, occupational safety, environment and product safety and personal safety.

In Canada, the Safe Community Linked Employer Incentive Scheme (SCIP) promotes safety in the workplace and offers discounts on workers compensation insurance to small businesses operating in an area with an active Safe Community. Participating businesses gain access to health and safety training programs, resources and expert advisors to help them create better and safer workplaces. SCIP has been operating for about 6 years with some successes and many lessons learned about how to improve the program in the 21 participating Safe Communities.⁷⁶

Third, the limitations of current approaches to motivating farmers and agricultural workers, need to be recognised and addressed. Information and training is essential, but in their present form, these mechanisms have proved insufficient to motivate these groups to proactively manage complex safety problems. Crucial to success are the form of training and its capacity to engage farm workers and others in managing those problems in their daily activities. For example, some EU countries are exploring mechanisms that provide field based training and more actively engage the agricultural workforce in managing farm safety through the work of field based OHS advisors. These take the form of union supported roving health and safety representatives or regional OHS advisors supported also by employer organisations.⁷⁷ The potential value of such new partnership models (further explored in Section 8) and the impact of a similar scheme already introduced in the Australian shearing industry (by the AWU in conjunction with WorkSafe Victoria),⁷⁸ suggests that there are good arguments for experimentation with a similar approach within the Australian OHS context, encompassing a more inclusive involvement of rural stakeholders in agricultural OHS⁷⁹.

Fourth, we argued that even in more effective forms, such as roving safety representatives, education and training do not fully address the central problem: the lack of motivation to comply and the cultural and financial obstacles to compliance. To engage with these obstacles, effective compliance assistance mechanisms coupled with credible enforcement of legislation will also be necessary. In essence, voluntarism alone will not be sufficient to achieve substantially improved OHS outcomes. OHS agencies in some jurisdictions have recognised this and sought to introduce new initiatives designed to promote compliance and strengthen enforcement in agricultural workplaces. For example, some OHS authorities have established specialist rural industry groups within the inspectorates, introduced or revamped industry Codes of Practice and other guidance

materials to suit farming, and provided basic self-audit tools to promote compliance.⁸⁰ Social marketing campaigns and incentive programs have also been introduced to target major hazards along with focused enforcement programs and escalating penalties in some jurisdictions.⁸¹ While these campaigns have not focused specifically on agricultural chemicals they represent an approach and a model which can and should be transferred to that area. Certainly, the difficulties of detecting misuse of chemicals remain a substantial impediment, but since the *perception* of credible enforcement is as important as the reality⁸², a greater emphasis on enforcement, in conjunction with a variety of other strategies, remains desirable.

Finally, it is not sufficient to adopt any of the above reforms as 'single instrument' solutions. On the contrary, many are mutually reinforcing and are best used *in combination*. For example, the success of a 1998 Victorian WorkCover program requiring farmers to retrofit older tractors with rollover protection (ROPS scheme) resulted largely from such a collaborative approach to delivering a program that combined economic incentives (the ROPS rebate), clearly communicated regulatory compliance requirements, and the perceived 'threat' of alternative enforcement measures for those who remained unpersuaded by education and incentives (see further Box 8 below).⁸³ It could reasonably be anticipated that a similarly combined approach would achieve at least a modest and incremental improvement in the policy status quo.

Box 3. Roving Health and Safety Representatives in Europe

Worker participation (for example through safety representatives and/or safety committees) has made a substantial contribution to workplace safety in many large workplaces, at least where there is a strong safety conscious trade union organisation. However, in the agricultural sector, where unions may be weak, many workers are non-unionised, labour is casual and contingent, and workplaces small and isolated, there is less room for optimism about the contribution of worker participation. Even so, recent work in Western Europe suggests that worker representation can still make a valuable contribution to OHS, but only with some lateral thinking, and by taking a very different approach than that which has been adopted to “traditional” workplaces such as the manufacturing industry or construction sites.

In a number of jurisdictions, most notably in Sweden and Norway, there is statutory provision for the appointment of *regional* health and safety representatives, including agriculture. At least within the Scandinavian cultural context, these have been largely successful. However, in cultures where there is a history of conflict between employers and employees, the evidence suggests that unilateral approaches (even if underpinned by legislation) are less likely to achieve success than those that have the support of all the stakeholders. In the UK, after an unpromising beginning, a roving representatives scheme has gained greater credibility with employers and is gradually transforming into a joint initiative. Joint approaches and training provision for small enterprises are also developing in a number of other European countries, as are regional or sectoral joint safety committees which may distribute information, be involved in training, or oversee the activities of regional or roving representatives.

Drawing from the European experience, Walters has attempted to identify the factors that influence the success of worker representation approaches in the agricultural context. He points to the industrial relations culture, the degree of union density and the attitude of owners/managers to both health and safety and worker participation as critical factors. Regional safety representatives also face major challenges in terms of legitimacy and credibility, not only with farmers and small business owners, but also with workers themselves. These challenges may well make conflict-based approaches (such as the service of provisional improvement notices) counter-productive and suggest the importance of using the media to generate support. The other major obstacle is lack of resources: without adequate training and organisation, such representatives are unlikely to make a valuable contribution, and Walters points out that “*very few schemes have been developed without the injection of resources from one source or another*”.⁸⁴ Beyond all else, the widespread support of employers’ organisations, the public authorities and other stakeholders in the small business sector, seems central to the success of roving representatives.⁸⁵

5. FORCES FOR CHANGE

As we will argue in the following sections, the greatest opportunities for improvement in agricultural OHS and farm chemical safety currently lie *outside* the boundaries of the traditional regulatory system entirely. They relate to the profound changes occurring in global food production and trade, in the development of new agricultural and pest control technology and in (particularly rural) civil society. The ways in which these changes play out in Australian agriculture, arise from a range of intersecting tensions and contradictions between the interests of different stakeholders – farmers, agricultural workers, the large and mainly multinational food retailers and processors, rural communities, consumers and regulatory authorities. In broad terms they reflect conflicting economic forces, production pressures, cultural attitudes and priorities. For example, there are tensions between:

- economic pressures on farmers to produce crops for market at the lowest possible price, and community/consumer demands that agricultural production methods meet environmental and food safety standards which usually increase production costs, at least in the short term;
- multinational food retailers which use their market power to pass the responsibility and cost of guaranteeing food safety along the whole supply chain and agricultural producers with low profit margins;
- the multinational ‘crop protection’ industry’s promotion of biotechnology based pest control methods, including genetically modified organisms (GMOs), and public scepticism about the safety of GM food products;
- the short-term costs and benefits of the continued use of cheap, convenient, familiar and generally more hazardous pesticides and the longer term costs and benefits of adopting integrated pest management (IPM) and using new generation ‘softer’ and often more expensive chemicals;
- industry associations concerned to maintain members’ autonomy through self regulation and trade unions and NGOs seeking stricter external regulation of environmental and OHS practices; and
- maintaining traditional family-based farming and the large scale, cost-efficient production methods required to meet retailers’ demands for customised commodities for buyer controlled markets.

In some cases (as between international retailers and agricultural producers) the outcome of the conflict is almost a foregone conclusion. In others (as between proponents and opponents of GMOs) it will be some years before the outcome is known. And some tensions are likely to play out in different ways in different sectors of agriculture.

In the following sections we explore potential reforms that might be achieved by

harnessing technological developments (push factors), market forces (pull factors), and changing community attitudes to risk and safety against the backdrop of these conflicts and tensions. We examine the way they are likely to be resolved and the nature of these conflicts and tensions, the ways in which they are likely to be resolved, and the implications for agricultural OHS and farm chemical safety.

Strikingly, in many of the struggles currently taking place between different social forces, OHS is only a sideshow. That is, the contest involves stakes that the protagonists regard as far higher than OHS, which does not figure prominently, if at all, in the calculations of many key decision-makers. Nevertheless, we will argue that, for those concerned with improving agricultural OHS, there are windows of opportunity to engage in these struggles and to shape them in ways that could have far more profound OHS implications than almost anything likely to be achieved by conventional regulatory reform at a domestic level.

6. IMPACT OF TECHNOLOGY

Advances in agricultural technology over the last two decades have major implications for agricultural OHS and farm chemical safety. The new technologies have the potential to: (1) reduce the overall amount and frequency of pesticide used; (2) provide substitute products and methods less hazardous to health and environment; and (3) introduce application methods that significantly reduce the risk of exposure. Unfortunately, realisation of this potential is neither straightforward nor guaranteed. This section discusses (1) the nature of recent technological developments, (2) financial, cultural and institutional barriers to farmers' access and uptake of them, and (3) the lack of regulatory and market incentives to encourage substitution of safer products, and the need for new regulatory models and other means of encouraging their adoption.

6.1 Developments in crop protection technology

Over the last 20 years, the agrichemical industry has developed a range of alternatives to the widespread spraying of crops with hazardous broad spectrum pesticides (*"carpet bombing with dieldrin"*⁸⁶). These range from 'softer' pesticides that are less hazardous to health and the environment, to biological pest control methods based on insect growth regulators and pheromones, to genetically modified (GM) crops.

At a strategic level, the handful of multinational companies that dominate the agrichemical industry, are now shifting away from the development of pest specific chemical products, to biotechnology based whole-crop management strategies. The new approach, described by one study as a *"new agro-biotechnology trajectory (based on the) synergies between chemistry and biology"*⁸⁷ focuses on delivering integrated crop management packages of seeds and new biological products that provide a comprehensive protection strategy. The industry goal is not only the application of biotechnology to develop new and less toxic pesticides, but the development of GM crops that in themselves offer a crop protection alternative less based on the use of pesticides. Commercially, the developments have involved the increasing integration of the previously distinct agrichemical and seed industries - a change reflected in the new name (or brand identity) of the industry association - CropLife International⁸⁸ - signifying, as the industry literature notes, *".. the adoption of an expanded positioning of our industry from a purely chemical-based product range to a range that incorporates biotechnology ...moving away from*

*only traditional crop protection products to a broader product range that produces enhanced crops with better yields in an ecologically sound manner.*⁸⁹

There have also been major advances in application and spray technology that offer considerable potential to reduce both operator and general public exposure to pesticide spray drift. Equipment improvements include computerised equipment (eg nozzle calculators to match spray quality to prevailing conditions); GPS guidance of application allowing precisely targeted aerial spraying without human markers in the fields; greater use of closed systems (eg for mixing) and targeted low volume spraying; and improved product formulations and packaging (eg granulation, spill proof containers). The impact of this new technology has been particularly marked in aerial spraying, with the industry association (Aerial Agricultural Association of Australia (AAAA)) estimating widespread uptake and capital investment of over \$200 million in a range of increasingly sophisticated and specialised planes and spray equipment. The AAAA acknowledges that the uptake has been significantly motivated by industry concern to avoid stricter government regulation by demonstrating the capacity to self-regulate effectively. Here the focus has been on providing clear evidence of their adoption of best practice.⁹⁰ The uptake by ground contractors, although increasing, has been more variable according to their main commodity focus and the size of their operation.

6.2 Barriers to access and uptake of new technologies

Whilst much of the new pest control technology could significantly reduce hazardous pesticide exposure in the workplace, it cannot be assumed that farmers will necessarily adopt the new products and procedures. There are currently a number of barriers to increased uptake rates.

Lack of access: The uptake of new technology can be limited because it is not readily available on the Australian market. Low market potential for new and alternative products in the small Australian market provides little incentive for manufacturers to seek registration for new products or new uses for existing products or even to continue marketing products for which there is little demand. Consequently, Australian registration of a new product or new use (or re-registration of an old one) may not be sought if (1) predicted financial returns are too low to justify registration and marketing costs, or (2) there is a likely negative impact on sales internationally from, for example, lack of effective data protection requirements within the Australian registration process.⁹¹ It is perhaps not surprising therefore that the range of Australian registered pesticides remains limited for example for the less grown crops in the horticultural sectors (eg leafy Asian vegetables) that are dominated by small and intensively cultivated family farms which are often run by NESB farmers. The farmers in these sectors provide both a limited market for new products and little orchestrated demand for off-label permits that would allow new uses for existing products.

Financial barriers: Many smaller farms are economically marginal and under considerable pressure to maximise returns on their crops. Increasingly, the most viable means of doing so is to contain production costs. Since pest control accounts for a large proportion of these costs, the relative costs of alternatives will be a major factor in farmers' choice of products. Unfortunately, while established methods, although hazardous, may be demonstrably cost-effective in the short term (ie cheap with rapid knock down), while the benefits of new products may only become clear in the longer term. In such circumstances, many farmers will be reluctant to pay higher prices to substitute new generation pest control products and spray equipment (eg closed systems) for existing ones, even if they are demonstrably less hazardous to their health. Current contract growing and marketing arrangements exacerbate the pressures towards short-termism by

requiring growers to meet rising production costs without being able to adjust commodity prices commensurately. It is likely that this situation will continue without alternative marketing arrangements that allow negotiation of realistic commodity prices reflecting long-term production costs, including appropriate investment in safer plant and development of more sustainable farming methods.

Lack of Knowledge: Farmers' failure to adopt or use new technologies can also result from the lack of credible information about their likely financial, environmental and OHS implications.⁹² If the relative benefits of new products are not known, there is little incentive to substitute them for existing practices - particularly given farmers' culture of resistance to change and suspicion of new, untried methods. Lack of knowledge may be exacerbated by structural and socio-cultural factors, some of which are specific to communities, regions or commodity sectors. For example, work with non-English speaking background (NESB) Asian vegetable growers, in western Sydney⁹³ and the Northern Territory (NT)⁹⁴ indicates that a lack of appropriate knowledge is a major barrier to safe use practice, and to the uptake of new pest control products and more sustainable farming practices such as IPM. Safety can be compromised if farmers cannot read or understand the relatively complex instructions on the product label or MSDS (eg concentrations, re-entry times). More generally, NESB farmers may be unable to assess alternatives or calibrate and compare locally available products with those more familiar from their previous overseas experience.

There can be no argument about the need for farmers' ready access to appropriate and sound information that is provided in a user-friendly format. But the predominant method of doing so is still through the traditional training courses supplemented by print and electronic information materials. Programs such as the industry based ChemCert, provide a high standard of training courses and information resources but there is a notable lack of additional alternatives - such as field-based services to provide ongoing face-to-face, and situation-specific advice to farmers about the OHS implications of new and old agricultural chemicals. Government agriculture departments have long provided ongoing regional extension programs to address the problem of improving farmers' agronomic knowledge. More recently a similar model has been adopted to educate farmers and rural communities about the environmental impact of farming practices through Commonwealth and State funded but local council based, regional field staff.⁹⁵ But only the local agvet chemical retailers/resellers currently provide any such rural information network and they may be tempted to act as 'double agents' - providing advice which is consistent with the need to sell the products they stock and the interests of the manufacturers on whom they are dependent. The rural OHS inspectorate, who may have the necessary knowledge, have little capacity to provide an ongoing and personalised on-site advisory service given their limited staff and resources.⁹⁶

Local factors: Factors specific to the locality (eg size and ownership of farms), or the commodity sector (grower solidarity and support for industry associations) may also have significant implications for pest control practice and can serve as barriers to the uptake of new technology. Effective application of pheromone-based pest control measures, for example, requires the participation of all growers over a large area. This will likely be more easily achieved in localities with few large farms rather than many small ones, in socially cohesive communities or where farmers have strong common interests (eg all contracted to a single processor), or where there are strong grower associations able to represent, negotiate and organise for the farmers collectively.⁹⁷

6.3 Lack of Regulatory and Market Incentives

Although the major agrichemical companies are rationalising (reducing) their older product ranges in favour of new chemical and biological products, the more hazardous products are not necessarily being removed from the market or from use. The product rights divested by the major companies are being sold to smaller companies, which market them as (1) cheaper generics, when patents lapse, or (2) lower volume 'niche' products for specific and limited use. One typical company, American Vanguard Corporation/ Amvac Chemical Corporation, sells a range of more hazardous pesticides divested by multinational firms (organophosphates, pyrethroids) as cheaper generics and for alternative 'niche' uses, including in Australia.⁹⁸ For example, the 2002 Australian re-registration of the organophosphate insecticide mevinphos for use as a last resort against DBM infestation of brassica crops, was based on exposure research undertaken by Amvac that enabled its better positioning in the niche market.⁹⁹

In Australia, current APVMA policy does little to encourage substitution of more hazardous pesticides with safer products as they become available. The current regulatory framework allows the registration and continued market availability of a range of alternative products, with older and more hazardous products often holding a price advantage. The only regulatory disincentive for marketing and using more hazardous registered products when safer alternatives are available, is the stricter mandatory usage restrictions and safety directions that must be printed on the product label as a condition of registration. However, this requirement is not effectively enforced, and there is a heavy reliance on farmers' voluntary compliance, which is likely to be poor (see Section 4), particularly if the more hazardous product is cheaper.

The outcome is that despite the availability of safer alternatives, pesticides of high toxicity and with little margin for error (eg the organophosphate insecticide Mevinphos) remain available for use on Australian farms and farmers have little regulatory incentive to substitute safer alternatives. Marketing of some pest control products may be limited by resellers choosing not to stock them in areas or at times where use would be counter to registered restrictions. However inappropriate use after retail purchase is unlikely to be detected by anything other than food residue testing, which occurs infrequently and is anyhow a poor indicator of workplace exposure levels. As noted by the APVMA CEO in an address to the 2003 ABARE conference, other forms of outcome monitoring are *"either limited or invisible, and any indication of monitoring of air, water or other environmental impacts seems to become visible only when prompted by an emergency or scare."*¹⁰⁰

6.4 Policy implications

Realising the potential of next generation pest control technologies to reduce pesticide exposure in agricultural workplaces, depends on increasing farmers' uptake. This requires (1) establishment of strong regulatory and market incentives for substitution of safer products for more hazardous ones, and (2) removal of financial and institutional barriers to such substitution. Such changes can be driven by a mix of forces, including regulatory changes and the harnessing of supply chain pressures generated by industry (itself responding to growing public concern about pesticide contamination of their food and the environment). What is needed, and how successful new policy initiatives are likely to be, will vary substantially with the type of new technology involved.

In the case of the newer and less hazardous pest control products ('softer' chemicals and biological controls), the main challenges are to facilitate their substitution for traditionally used, more hazardous and often cheaper products. In part this requires a streamlining of the current institutional arrangements to remove the bureaucratic and administrative barriers to access and uptake discussed above. The APVMA has initiated some moves in this direction, for example better protecting the confidentiality of companies' commercially valuable technical data provided in registration applications. Joint programs have also been established with industry to facilitate the coordinated issue of off-label permits for smaller industry sectors. For example, Crop Protection Approvals was established in 1999 to secure off-label permits and registrations for pesticide use in the horticultural industries.¹⁰¹ These initiatives may usefully simplify the process for (particularly) small to medium enterprises (SMEs), but it is unlikely that streamlining alone will substantially increase ease of registration or farmers' uptake rate, without provision of stronger market and regulatory incentives. At present registration of agvet chemicals remains a lengthy and expensive bureaucratic process best suited to meeting the needs of the major commodity sectors (eg grains).

What is required is a more proactive approach with provision of stronger market and regulatory incentives. Unfortunately, the current role of the APVMA is essentially a reactive one which does little to provide an effective market advantage for safer products or to encourage farmers to substitute them for traditionally used and more hazardous pest control methods. There are however other demonstrably effective Australian and overseas models that give regulators a more proactive role and provide regulatory and market incentives for registration of needed or safer products. For example, the Therapeutic Goods Administration's Orphan Drugs Program enables it to take a more proactive role in ensuring the availability of needed drugs that are not commercially viable in the small Australian market. Under the Program, the TGA is able to (1) streamline and subsidise the approval process, and (2) provide commercial incentives, through waiving of government fees and listing on the PBS (which gives government subsidy of the product and a significant market advantage). Following a review of the program in 2001, the TGA is currently considering options for improvement including greater commercial incentives (sole listing rights on the PBS for a limited time), further reducing the regulatory burden of registration (streamlining procedures and reducing data requirements for approval) and applying some weighting to the standard cost-benefit analysis required for marketing approval.¹⁰²

Some overseas initiatives show that regulation, particularly product registration requirements and procedures, *can* provide significant incentives for registration and marketing of safer pest control products and disincentives for the continued domestic marketing of high risk products. For example, the *Food Quality Protection Act 1996* (FQPA) has changed the way the US EPA regulates pesticides and has significantly impacted on industry strategy. The new regulatory regime provides effective market incentives for (1) production and marketing of safer products, and (2) removal of higher risk products from the market in order to facilitate the registration and marketing of lower risk substitute products. The new arrangements give high priority to registering pesticides that are safer than those already on the market by fast tracking their registration and putting less restrictions on their use – giving them a significant commercial advantage in the marketplace. The FQPA also requires that prior to any registration for use on food or feed crops, the EPA must find that the product poses a "*reasonable certainty of no harm*" and is within its own '*risk cup*'. The risk cup is a theoretical construct used to indicate if the cumulative risk from all exposures to a group of chemicals (eg organophosphates) is within acceptable limits. When the 'risk cup' is full, the EPA will either not register any more uses for products containing that group of chemicals or existing usages will be further restricted.¹⁰³ The result is, in the words of one industry representative, to encourage development of "*greener products rather than products directed to a specific market*".¹⁰⁴

The EU has also targeted the better management of risks from chemicals in a number of areas. It is a major target of the EU environment strategy, *Environment 2010: Our Future, Our Choice*, with particular attention given to a strategy for reducing risks from pesticides to farmers, consumers and the environment whilst maintaining agricultural productivity. The proposed new EU chemicals legislation introduces a single, integrated system for the Registration, Evaluation, and Authorisation of Chemicals (REACH), which represents a major paradigm shift in chemicals regulation and policy; making the chemicals industry responsible for generating and providing the necessary information about their own products in line with corporate responsibility, rather than requiring the public authorities to prove that a chemical is hazardous (ie reversing the burden of proof). It is described as “*the first concrete example of the Commission putting its sustainability strategy into practice*”, and aims for improved protection of human health and the environment whilst maintaining the “*competitiveness and innovative capability of the EU chemicals industry.*” EU Environment Commissioner Margot Wallström, discussing the adoption of REACH, noted that the streamlining the current fragmented regulatory system together with the required testing of (an estimated 30,000) unassessed chemicals in current use, would not only provide a better information base but would also encourage innovation and substitution. Not least, it would overcome many of the problems of the current system, under which “*it is much less hassle to continue to market an existing chemical (that we really do not know anything about) than to put a new, less hazardous and more efficient chemical on the market because this requires testing.*” Whilst there some major differences (lack of large scale chemical production) these factors also have some significance for Australia, where fragmentation and lack of an effective information base, are also major issues in the regulation of agvet chemicals. The new EU legislation also provides a model for ensuring the centrality of sustainability as the policy mainspring in the registration and authorization of chemicals.¹⁰⁵

Australian adoption of a similarly more proactive regulatory model (allowing for differences in the overall legislative framework) would provide a basis for establishing the necessary disincentives for companies' continued marketing of a range of hazardous products, (often with a price advantage) at the expense of introducing and promoting new and safer products in the limited Australian market. The consequent improved access would likely go a long way to encouraging farmers' substitution of safer alternatives with obvious OHS improvements.

In the case of GM technologies, it is far less clear what a proactive policy might involve. First, the science itself is unclear and there are very considerable unresolved concerns about the safety and environmental implications of introducing GM technologies. Second, this is an area where there are a number of competing interests at play, and OHS is not seen as a major consideration in the decision-making process. While crop protection companies have lobbied strongly and have often succeeded in gaining the ear of government, they have been singularly unsuccessful in persuading consumer groups, environmental NGOs, and wide sections of the public, about the virtue of embarking on the GM path. In this continuing contest, it seems highly unlikely that OHS concerns will play any significant role, or that OHS policymakers can make any substantial contribution

In contrast, it is clear that advances in application and spray technology bring considerable gains to OHS with no apparent attendant disadvantages. There has been significant uptake of this new technology, but mainly by aerial contractors and the larger scale ground contractors, who generally regard it as providing further grounds to justify their argument for industry self-regulation. We return to the role of self-regulation in section 8 below, but note that circumstances where there is a substantial coincidence between the public interest in improved OHS and private interest in economic improvement are the most fertile for successful self regulation, or at least co-

regulatory initiatives. Overall, the new application and spray technology offers to significantly lower the risk of spray drift, environmental contamination and user exposure, dependent as with all plant on appropriate levels of maintenance and calibration. From a public policy perspective, the most obvious courses of action are to nurture co-regulation by working closely in partnership with the relevant industry associations, and to ensure that small farmers have sufficient information to take advantage of technologies which it is in their own self-interest to adopt.

Box 4. US Food Quality Protection Act (FQPA) 1996

The Food Quality Protection Act 1996 was unanimously passed by the US Congress and supported by a broad coalition of environmental, public health, agricultural and industry groups. It mandates a single, health-based standard for all pesticides in all foods; provides special protection for infants and children; expedites approval of safer pesticides; creates incentives for the development and maintenance of effective crop protection tools for American farmers; and requires periodic re-evaluation of pesticide registrations and tolerances (ie MRLs) to ensure that the scientific data supporting pesticide registrations will remain up to date.

The FQPA uses "a reasonable certainty of no harm" as the general safety standard and requires the EPA to consider all non-occupational sources of exposure, including drinking water, and exposure to other pesticides with a common mechanism of toxicity when setting tolerances. It also requires an explicit determination that tolerances are safe for children, includes an additional safety factor of up to ten-fold, if necessary, to account for uncertainty in data relative to children, and requires consideration of children's special sensitivity and exposure to pesticides.

The analogy of a 'risk cup' is used to describe aggregate exposure estimates. The full cup represents the maximum acceptable (chronic and acute) exposure level, with each use of the pesticides contributing a specific amount of exposure and adding a finite amount of risk to the cup. While the cup is not full, EPA can consider registering additional uses but once it is full or exceeded no new uses can be registered until the risk level is lowered. Depending on toxicity and exposure levels, a portion of the risk cup is reserved for sources of exposure for which there is limited or no data.

Unlike the previous US law, which contained open-ended provisions for the consideration of pesticide benefits when setting tolerances, the new law places specific limits on benefits considerations. They can apply only to the non-threshold effects of pesticides (e.g., carcinogenic effects) and cannot be taken into account for reproductive or other threshold effects. The level of risk that that can be offset by benefits considerations is reduced for both the acceptable risk in any one year and the lifetime risk and cannot be used to override the health-based standard for children. The FQPA further requires that all existing tolerances be reviewed by 2006 to make sure they meet the requirements of the new health-based safety standard.

The 'Right to Know' provisions of the legislation require distribution of a brochure in grocery stores on the health effects of pesticides, how to avoid risks, and which foods have tolerances for pesticide residues based on benefits considerations and specifically recognizes State jurisdictions' right to require warnings or labeling of food that has been treated with pesticides. It also incorporates provisions for endocrine testing, and requires that chemical manufacturers provide data on their products, including on potential endocrine effects.

To facilitate registration of safer pesticides, the FQPA expedites their review to help them reach the market sooner and replace older and potentially more risky chemicals. All older pesticides must be reviewed to ensure they meet current standards and all pesticide registrations must be regularly reviewed and tolerances reassessed to ensure they meet updated safety standards. There are also new provisions for minor use pesticides including, (1) programs to foster cross-jurisdiction coordination on regulations and policy, and provision of funds to support development of data necessary to register minor use pesticides, and (2) encouragement of minor use registrations through greater flexibility in data requirements and measures to expedite review of minor use applications, which are coupled with safeguards to protect the environment.¹⁰⁶

7. THE AGRIFOOD INDUSTRY & MARKET FORCES

Consumer concern about food safety and the environmental impact of food production has profoundly influenced the practices of the major food retailers and processors. They have responded by using their market power to insist on improved food safety and environmental practices on the part of the farmers with whom they deal. The latter, now substantially integrated into the global supply chains and increasingly dependent upon selling their produce to multinational retailers, have very few choices. Either they must meet the quality and safety requirements demanded by their supply-chain partners in order to protect their market access and financial viability, or they must seek out alternative markets, perhaps adopting more sustainable pest control methods and moving to organic production and/or developing alternative marketing arrangements such as farmers' markets. The choices (or often the lack of choices) have considerable implications for the safer use of pesticides, which we explore in the following sections. As we will see, sometimes resolving one tension raises other issues, and finding solutions that meet the needs of all stakeholders may not be practicable. Unpalatable trade-offs may be inevitable.

7.1 Industrialisation, consumer demands and industry practice

In the last several decades there has been widespread change in the economic and social context of Australian agriculture and in rural communities. Not only has there been major industry restructuring, accompanied by falling rural populations, but there has also been a steady decline in the terms of trade with falling commodity prices and increasing production costs. Small and diverse family owned and operated farms are being increasingly replaced by more economically viable larger scale enterprises that account for a steadily increasing proportion of turnover (see Table 2). These large agribusinesses can better meet processors' and retailers' requirements for specified quantities of standardised produce while absorbing increases in production costs through efficiencies of size.¹⁰⁷

Table 2. Number of Australian farm businesses by annual turnover.
1994/5 - 1997/8¹⁰⁸

Size of turnover	Number of farm businesses			Total turnover		
	1994-95 '000	1997-98 '000	% change	1994-95 \$m	1997-98 \$m	% change
< \$50,000	22.8	20.5	- 10%	696.1	620.9	- 11%
\$50,000-\$99,999	22.2	20.2	- 9%	1678.1	1562.6	- 7%
\$100,000-\$149,999	17.1	13.3	- 22%	2142.7	1666.2	- 22%
\$150,000-\$199,999	10.9	11.6	+ 6%	1928.5	2064.9	+ 7%
\$200,000-\$249,999	8.4	6.7	- 20%	1936.6	1514.8	- 22%
\$250,000-\$299,999	6.6	5.0	- 24%	1821.7	1398.2	- 23%
\$300,000 +	19.2 (18%)	25.0 (24%)	+ 30%	13312.6 (57%)	18472.5 (68%)	+ 39%
TOTAL	107.3	104.3	- 3%	23,516.3	27,300.1	+16%

There is also increasing mechanisation of agriculture, together with more intensive, planned and predictable (routinised) production and the introduction of new crops and plant varieties, providing higher yields. In this process of industrialisation, the traditionally independent Australian farmer

has become more and more integrated into the complex, market-driven supply chains of the global agrifood industries (eg multinational supermarket chains) which now have major influence on all aspects of agricultural practice – including pest control. Much of this influence has been achieved through the growth of contract farming¹⁰⁹, (particularly in horticultural industries). By contracting with farmers to pay a set price for a specified annual tonnage of produce of an agreed and consistent standard, food processors, supermarkets and fast food chains can effectively utilise their corporate market power to impose quality requirements on growers whilst minimising their direct exposure to the uncertainties and risks associated with farming.¹¹⁰ As a consequence of these changes, farmers are now much more dependent on external agents for both inputs and outputs – to supply the advanced technology required by modern farming methods, and to sell their produce into fresh food markets dominated by the multinational supermarket chains. In the words of Avcare, the Australian agrichemical industry organisation; *“Farms are having to become ‘production factories’ more than ever before. Farmers along with every other link in the paddock-to-plate chain, will need to guarantee their produce, and provide quality assurance, just as with factory-made products”*¹¹¹

Box 5. Supermarket domination of the fresh food market

The Australian domestic fresh food market is dominated by the two major supermarket chains, Woolworths and Coles, which buy more than 75% of fresh produce. Likewise the processed food and beverage industry, now the largest manufacturing sector in Australia, is dominated by a few large (mostly multinational) companies, many of them major employers in rural towns with little other industry. Their domestic market dominance enables the corporations to (1) set quality standards for fresh produce additional to the regulatory standards, (2) exclude non-complying growers from their vendor group, and (3) obtain favourable contract arrangements with growers that optimise guaranteed returns and limit exposure to risk.¹¹²

Similarly, growers seeking access to lucrative off-season export markets in Europe, North American and Japan, must meet both regulated standards for food exports/imports¹¹³ and, increasingly, the extra and higher quality standards of the major food retail chains. For example, EUREPGAP, is an international alliance of major food retailers formed to create and control harmonised industry standards in the supplier-retailer chain independently from governments. It requires suppliers *“to demonstrate their commitment to: a) maintaining consumer confidence in food quality and safety; b) minimising detrimental impact on the environment, whilst conserving nature and wildlife; c) reducing the use of agrochemicals; d) improving the efficiency of natural resource use; and e) ensuring a responsible attitude towards worker health and safety.”*¹¹⁴

Crucially, the quality requirements that retailers now insist upon, have come to include environmental and food safety considerations. This substantial shift of focus has come about largely in response to changes in consumer demand. Consumers increasingly expect their food to be guaranteed free from contaminants and chemical residues, as well as meeting a variety of other requirements such as taste, size, colour, freshness and lack of blemishes. This concern with safety is not surprising as globally publicised food scares (such as BSE, foot and mouth disease and the Belgian dioxin scandal) continue to erode consumer confidence in food safety and the capacity of government and industry to maintain adequate standards. Similarly, as the environmental impact of agricultural chemicals becomes more evident, consumer concern about the broader environmental and social impacts of food production *methods* is also increasing.

An underlying theme of this shift in consumer expectations concerns trust. Consumers are losing faith in the capacity of governments to safeguard their interests, and equally lack confidence that

commercial organisations will do so. While this trend is most pronounced in Europe, in the aftermath of the various food scandals, it is also evident in Australia. Avcare, for example, describes these growing consumer concerns as the *“emergence of the cautious customer – careful not so much with money, but with who and what they will trust.”*¹¹⁵

It is largely in response to this erosion of trust, and in an attempt both to capture greater market share and sometimes premium prices, that multinational food retail chains have adopted quality and safety standards that substantially exceed regulatory requirements. As well as the regulatory imposition of residue testing, the major food retailers are now requiring adoption of HACCP based quality assurance (QA) measures to guarantee safe food production methods along the supply chain. This has a number of advantages. It publicly demonstrates corporate concern and capacity to safeguard both the safety and quality of the food sold and the systemic health, environmental and social implications of food production methods - including use of pesticides. The retailers anticipate that this will both enhance consumer trust (and hence the value of their brand) and reduce their risk of legal liability. They have also successfully shifted responsibility for ensuring food safety and quality - and the costs involved – right along the supply chain to those who grow the food.

These developments have two potentially far reaching implications for agricultural OHS generally as well as, more specifically, for levels of workplace exposure to agricultural chemicals. First, the multinational food retail chains, by imposing standards above those required by regulation, are strongly influencing farmers' pest control practices. Of necessity farmers, faced with significant commercial disincentives, must be more careful about the quantities and types of pesticides used. They must minimise pesticide residues in harvested crops and (to a lesser extent) reduce environmental contamination or lose their access to a major sector of the fresh food market. Self-evidently, the consequent overall reductions in the amount and frequency of pesticide use can also significantly reduce the potential for workforce exposure.

Second, adoption of HACCP based QA programs greatly improves the potential for monitoring farmers' OHS practice, including workforce pesticide exposure, by making compliance highly transparent at all points. But even with widespread adoption of HACCP QA programs, improvements in OHS outcomes are not guaranteed unless they are specifically addressed in the retailers' protocols. Whilst extremely important, the measures required to ensure food safety do not necessarily ensure safer use of safer (or less) chemicals, and improved OHS practices. In the case of pest control, the cheapest option to achieve the required residue levels may *not* be the one least hazardous to farm workers' health. For example, farmers can continue to use hazardous organophosphate insecticides to control pest infestations on mature vegetable crops, despite the health risks, and still meet pesticide residue MRLs. Similarly, meeting environmental safeguards (eg limiting spray drift) does not necessarily guarantee close range operator safety. For example, over the last decade Australian growers of processing tomatoes have significantly changed their pest control methods with widespread adoption of IPM and an overall reduction in the frequency and volume of pesticides sprayed. However, the growers, working on low financial returns, still choose to use the newer, safer and more expensive 'softer' pest control products only when there is no cheaper, albeit more hazardous, alternative product.¹¹⁶

In response to growing community pressure for greater corporate social responsibility, some of the larger food retailers are also adopting protocols that emphasise the social impact of food production. Whilst the main emphasis is still on food safety and environmental protection, some major retailer organisations are extending their concern to OHS. For example the EUREPGAP Terms of Reference require the commitment of participating member organisations to; *“Respond to Consumer Concerns on Food Safety, Animal Welfare, Environmental Protection and Worker*

Welfare", and the 2001 Protocol for Fresh Fruit and Vegetables directly addresses agricultural OHS within a "*framework for good agricultural practice (GAP)*". It requires adoption of integrated pest and crop management (IPM and ICM) and includes both mandatory and recommended ("*encouraged*") provisions for comprehensive assessment and management of food safety, environmental and OHS risk¹¹⁷ - extending responsibility for the safety of both the production process and its outcomes along the whole supply chain.¹¹⁸

Thus in many respects, the tension between economic pressures on farmers to produce crops for market at the lowest possible price, and community demands that agricultural production methods meet longer term environmental and food safety standards, is being largely resolved in favour of the latter. Given the current level of market domination by the major supermarket chains and multinational food processors, many individual farmers have little option but to comply with their requirements. However, farmers' inability to increase commodity prices to meet increases in production costs, places even more economic pressure upon them, leading them to take other risks in relation to OHS in order to achieve short term economic goals. Not least, as noted above, farmers may continue to use the cheapest (and often most hazardous) pesticide available, provided crops can still meet the regulatory MRLs and other quality requirements demanded by retailers. Whilst the retailers' major concern is safe food of a quality acceptable to consumers, this is unlikely to change.

However, there is one other, and increasingly significant option available to farmers faced with the unpalatable requirements of industrialised production and multinational retailers: to find means of operating entirely outside of this system, thereby retaining far greater autonomy and with it, often a different approach to agricultural pesticide use.

Box 6. EUREP: Draft protocol on good agricultural practice¹¹⁹

EUREP (Euro-Retailer Produce Working Group) is made up of the leading European food retailers, including Tesco, Safeways, Sainsbury's, GB, Continent, Delhaize, ICA Hanlarna, KF, Albert Heijn, MARTINAVARRO, APO and Promodes. Its purpose is to raise standards for the production of fresh fruit and vegetables. In November 1997, members agreed on the first draft protocol for Good Agricultural Practice (GAP), which represented the first step towards integrated production, and a harmonisation of production standards. In August 1999, the first official version of the EUREPGAP Protocol was subject to consultation with growers, produce marketing organisations, verification bodies, agrochemical companies, farmers organisations and scientific institutions. All comments were considered and many of them were included in the new official GAP Version 2000.

The EUREPGAP Protocol sets out a GAP framework for farms which defines essential elements for the development of best-practice for the global production of combinable crops and defines the minimum standards acceptable to the leading retail groups in Europe. Accordingly, EUREP members recognise the significant progress already made by many growers, grower groups and organisations, local schemes and national schemes in developing and implementing best-practice agricultural systems with the aim of minimising adverse impact on the environment. They also encourage further work to improve growers' capability in this area. In this respect the GAP framework, which defines the key elements of current agricultural best-practice, is intended for use as a benchmark to assess current practice, and provide guidance for further development.

The main focus of the EUREPGAP Protocol is on environmental improvement in agricultural production. GAP is a means of incorporating Integrated Crop Management practices within the framework of commercial agricultural production. Adoption of this is regarded by EUREP members as essential for the long term improvement and sustainability of agricultural production. EUREP also supports the principles and encourages the use of HACCP. According to the EUREPGAP Protocol, it is essential that all organisations in the food production chain accept their share of the tasks and responsibilities to ensure the GAP is fully implemented and supported. If consumer confidence is to be maintained, such standards of good agricultural practice must be adopted, and examples of poor practice must be eliminated from the industry.

To this end, the EUREPGAP Protocol lists a number of environmental and food safety requirements for growers which cover all aspects of the production process, including crop protection practices, and worker health, safety and welfare. Growers are required to apply IPM wherever possible, use a minimum of the appropriate, officially registered pesticides according to expert advice, and undertake regular residue testing. Workers who handle and apply pesticides must be appropriately trained, provided with appropriate PPE and demonstrably follow label instructions and spray equipment must be suitable for the task, and properly maintained and calibrated. Storage, waste and pollution management, recycling and reuse measures are also specified. EUREPGAP mandates a number of general OHS measures including training and hygiene measures, and recommends assessment of risk as the basis to *"develop and action plan to promote safe and healthy working conditions."*¹²⁰

According to one participant in the EUREPGAP process, Willem Hoffmans, quality manager at Albert Heijn (part of the Dutch Ahold group): *"EUREP's approach to raising the production standards for fresh produce in a partnership with our growers ... is the only feasible way towards a safe and viable future"*. Despite such claims, the EUREP approach is not immune to public criticism. As one journalist explained, *"the program has come in for criticisms as being designed by supermarkets for their sole benefit, without due consideration of the implications for suppliers"*.¹²¹

7.2 Impact of market forces: Resistance Strategies

For growers the arrangements described in the preceding section provide some seasonal security, but they also increase growers' dependence on corporations continuing to buy their produce, particularly if it is specific to corporate requirements and not otherwise easily sold. Not all Australian farmers have succumbed to the pressure to enter into such arrangements. Some are responding in other ways that also have significant implications for pesticide safety. For example, an increasing but still small, proportion of farmers are adopting more sustainable methods of pest control (IPM, 'low spray') in order to penetrate alternative niche markets which are not dominated by the multinational retailers. Some are making a more major change and engaging in organic farming. There have also been moves to improve farmers' market position by identifying and expanding alternative market outlets that maximise growers' returns, such as farmers' markets. These initiatives are often closely connected. All have significant implications for improving farm chemical safety as well as agricultural OHS more generally.

Underlying these developments has been a concern to maintain price levels and increase returns through greater control over marketing and shortening the supply chain – cutting out the middlemen. This has traditionally been done through commodity marketing boards and growers' cooperatives - sometimes established with significant government assistance to facilitate export trade. But during the late 1990s the most visible manifestation of this trend there has been the dramatic increase in growers/farmers markets in major cities and regional centres across Australia. Whilst these initiatives currently represent only a small fraction of the Australian domestic fresh food market, they form a rapidly growing sector which offers a viable marketing alternative and incentive to low spray and organic farming. Similar developments in the UK¹²² have, over time, led to the development of larger commercial marketing ventures based on regional produce with an emphasis on high quality and low or no use of pesticides.

The growing number and popularity of the markets provide a significant increase in sales outlets that return premium prices directly to farmers, *particularly for high quality, organic or low spray produce*. The market emphasis is generally on regional premium quality produce and niche marketing of high value-added processed fresh food products (cheeses, condiments).¹²³ Given consumers' shifting preferences towards 'safer' food, premium quality in such markets increasingly implies a guarantee of either 'low spray' or organic production. However, not all of these initiatives are taking place independent of the global supply chain. More commercial support for organic farming is likely to come in the form of a growing demand from food retailers responding to consumers' increased preference for food guaranteed free from pesticides. In the UK, for example, Sainsburys is steadily increasing the proportion of organic food it stocks and minimal use of pesticides is becoming a selling point with produce promoted as 'low spray'. Local supermarket chain, Coles, is also increasing its stock of organic produce and promoting it in the company produced magazine, *Australian Table*.¹²⁴ The establishment of more transparent certification is likely to further bolster consumers' already widespread perception of organic food as safer and more nutritious. As more consumers become willing to pay the premium prices that organic produce already commands, and retailer demand increases, it is likely that more farmers will be willing to make the production changes required to produce it. These trends will result in further reduction in the use of

chemical pesticide and their substitution with biological and mechanical methods of pest control, particularly in vegetable and fruit growing.

Box 7. Farmers and Growers Markets

Over the last decade, there has been a dramatic growth in the number and spread in Farmers' Markets which allow farmers and producers to sell their home-grown and home-made foods directly to the public. By late 2002 there were nine operating in Sydney, another 15 in rural NSW with considerable further growth anticipated. The NSW Farmers Association plan to open a series of grower markets across the state, drawing produce from the association's 13,000 members who are unhappy with the retail system. This parallels growth in other Australian states as well as in the USA, Canada and in the UK, where the number of farmers markets has increased from none in 1997 to over 400 in 2002. The Markets commercial appeal to consumers is indicated by the experience of the first day of the Wauchope Farmers Market in early 2002, when an estimated 5000 customers cleared the 35 stalls of all their produce in less than two hours. Similarly the now well established monthly Market at Pyrmont in inner Sydney is consistently sold-out by mid-morning.

For more and more growers, the Farmers' Markets represent an alternative to the supermarket chains which dominate the food supply chain and provide low returns to growers. Direct marketing to the public provides additional returns to growers. By cutting out the middleman they maximise growers margins - estimated by one marketing consultant at up to 40%. They also provide the opportunity for growers to network and identify new markets for their products (eg direct to restaurants), to trial new products and sell produce not acceptable to supermarket chains (eg with superficial blemishes). Many Markets also give priority (and ensure premium prices) to produce that is grown organically or with minimal use of synthetic fertilisers and pesticides.

Consumers benefit from fresher and relatively lower-priced produce, and a social environment in which they can interact directly with those who produce their food. In this way Farmers' Markets are tapping into growing consumer concern about where their food comes from, and how it's been grown and their consequent willingness to make the extra effort and pay a premium price for freshness and product quality. Given the decline in rural areas, there is also the importance of supporting local farmers and bringing people to the area with economic spin-offs for the local community. Some local governments are supporting Farmers' Markets as part of regional development schemes providing opportunities for farm, food and cottage industries and increasing local employment.¹²⁵ In an interesting development on this theme in the UK, Sainsbury's supermarket chain (which itself stocks a significant amount of organic produce) allows farmers markets in their car parks on set days - and have documented significant increases in turnover on those days.¹²⁶

7.3 Policy Implications

Consumer demand for guaranteed food safety is having an important impact on pesticide use. Major food retailers and processors increasingly use their market power to demand that food growers with whom they contract, engage in changes in pesticide use to ensure food safety and to reduce environmental impacts. Increasingly, it is no longer just the outcome of pesticide residue levels (MRL testing) that matters: the whole production process must be guaranteed as safe and as having a reduced environmental impact to maximise market access and high returns.

While these changes have considerable potential to reduce workforce exposure to agricultural chemicals, they are not enough in themselves to ensure safe practice. As we have seen, farmers frequently give priority to cutting production costs and preventing crop failure over their own and workers' health. If necessary they use hazardous pesticides in ways that minimise crop residues but *do not necessarily reduce the exposure level* of those applying it. This situation is unlikely to change until farmers' financial incentive to risk their health to ensure productivity and financial viability is fully removed – either by market forces, or regulation or some combination thereof.

We made a number of recommendations for incremental improvements in the existing regulatory system in Section 6.4. In particular, we emphasised the need for regulation to provide both greater disincentives to the continuing use of older, more hazardous chemicals, and more substantial incentives for the adoption of the newer, softer and safer chemicals (and for the use of other strategies such as IPM which substantially reduce overall chemical use). However, while such changes could make a useful contribution, there may be other approaches that can be equally, and perhaps more effective. Of these, supply chain pressure is demonstrably the most powerful. However, supply chain pressure has not so far resulted in the rejection of hazardous first generation pesticides, if, following the withholding period, these do not result in unacceptable residues.

The problem is that OHS considerations and food safety considerations are not always closely aligned and multinational retailers only experience major consumer pressure to address the latter. However, this could substantially change, if an alliance of workers organisations, consumer groups and international NGOs were to bring pressure on retailers to expand their concerns to include OHS. The vehicle through which this might be achieved is the broader movement for Corporate Social Responsibility, which has been evolving rapidly over the last few years. Corporate social responsibility is about companies "having responsibilities and taking actions beyond their legal obligations and economic/business aims. These wider responsibilities cover a range of areas but are frequently summed up as *social and environmental where social means society broadly defined, rather than simply social policy issues*. This can be summed up as the "triple bottom line approach: i.e. economic, social and environmental".¹²⁷ Put differently, CSR concerns taking action not just when it is legally required, but also operating in a way that consistently exceeds legal, commercial, ethical and public expectations.

Large, reputation sensitive corporations have experienced pressures for some years to become more environmentally responsible, and the production of annual corporate environmental reports (albeit of varying quality) is one manifestation of this. But the movement towards 'triple bottom line' reporting – including issues of broader corporate *social* as well as economic and environmental responsibility – is of more recent origin and is still evolving. While such matters as human rights, the use of child labour in developing countries, and other exploitative practices are already on the CSR agenda of international NGOs, OHS has remained largely on the sidelines. However, there is no reason why this should continue to be the case. The NGOs involved are

sympathetic to OHS, but it is unlikely to be a priority unless other groups make it so. Hence the potentially crucial role of trade unions and others with direct interest in OHS, is to develop alliances with CSR oriented NGOs to bring it closer to centre stage. If this were done, and OHS reporting became a routine part of the broader exercise of corporate social responsibility reporting and accountability, it would be a small step for multinational retailers to demand growers ceased the use of hazardous first generation pesticide products altogether. However, this approach will not engage with the predominantly smaller agricultural producers who have sought to avoid the global supply chain altogether, and who have sought out alternative markets. For this group, government can play important roles, beyond those of conventional regulation and the provision of incentives to using safer products.

In the case of organic farming, there is, by definition, an absence of pesticide use and a consequent dramatic reduction in, or even eradication, of the risks associated with the use of agricultural chemicals. For this reason, the expansion of organic farming is clearly in the interests of improved OHS. But the proportion of organic farmers is still small, and with little government support.¹²⁸ Many more farmers would prefer to switch to organic farming but cannot afford the transition, and worry about if it could be achieved profitably – even in the longer term.¹²⁹ A 1995 study concluded that greater government support for farmers could well increase the rate of such change and further accelerate what is already the fastest growing sector of Australian agriculture.¹³⁰ Similarly, the adoption of IPM or other ‘low spray’ approaches, could be increased by greater government support to ensure its more widespread and rapid adoption in all industry sectors. There is potentially considerable incentive for such action by both government and industry. It is unlikely that the already demonstrated export trade advantages of Australia’s ‘clean and green’ image, will be maintained in the long run without development of such agricultural practices to reduce the now increasing user of pesticides in mainstream farming.

Finally, government could change the ground rules under which farmers seeking to work outside the global supply chain, can operate. Faced with growing market concentration and domination by a very small number of food retailers, processors and fast food chains, farmers have sought regulatory changes to protect their commercial interests within the domestic market. For this reason the NFF has proposed amendments to the Trade Practices Act allowing farmers to collectively negotiate for better returns for their produce and to protect them against the abuse of market power.¹³¹ In early 2003, the government review of the legislation proposed acceptance of these recommendations to facilitate farmers’ ability to collectively negotiate and introduce criminal sanctions for the worst cases of cartel behaviour. The NFF claimed that the changes will “.. go a long way to giving farmers a fairer go in domestic markets ... For too long farmers have been vulnerable to anti-competitive behaviour from buyers in the domestic market and NFF is delighted that farmers will now be better able to negotiate collectively to restore some balance into markets.”¹³² If such a rule change allows farmers to increase their rate of return it will remove some of the pressure to sacrifice long term benefits (including use of safer chemical products) to short term financial advantage, and in doing so, will indirectly assist the cause of improved chemical safety.

8. PRESSURE AND PARTNERSHIP – THE ROLES OF CIVIL SOCIETY

This section explores the current and potential role of civil society in changing agvet chemical policy and practice. We consider the role of rural community organisations, farmers and growers associations, unions and industry bodies and NGOs in changing pest control practice at farm level and in influencing government and industry policy. We also explore the extent to which the

changes required to improve agricultural OHS can piggy-back off those needed to ensure food and environmental safety.

More broadly, we also examine what has been termed ‘civic regulation’ through which the various manifestations of civil society act in a variety of ways to influence corporations, consumers and markets, often by-passing the state altogether. Sometimes NGOs take direct action, usually targeted at large reputation-sensitive companies. In others they seek to develop partnerships with such companies. However, as we will see, the evolving roles of civil regulation have not taken place entirely divorced from state intervention. On the contrary, partly in recognition of their own limitations, governments have taken a number of measures that have served to further empower communities, environmental NGOs and the public more generally.

8.1 Rural community organisations

One key role for civil society involves information and education. Information must not only be disseminated, it must also be received, and there is considerable evidence that the *source* of that information is all important¹³³. Information from trusted sources has by far the greatest impact.¹³⁴ In this context, rural communities have a potentially crucial role, since rural community organisations usually have far higher credibility with farmers than either government or third parties.

To a significant extent, some rural community organisations are already playing this role in relation to agricultural chemicals - largely focussing on changing pest control practices at farm level through collaborative programs that build on existing rural networks to promote relatively specific OHS outcomes. Some community based programs focus on discrete issues of farm chemical safety (eg on-site storage), while others tackle the larger systemic issues (eg spray drift) in conjunction with other organisations. The common theme in these programs is the identification of farm chemical safety as a shared issue for farmers/agricultural workers and rural communities. The activities of the CWA and FarmSafe in particular, provide good examples of how the broad membership and social inclusiveness of rural community organisations can create a comprehensive information network and are a powerful influence on local community norms and behaviour. Both organisations work within the local context, using culturally credible sources and materials to disseminate information and alternative community development programs to promote safer use of farm chemicals.

However, rural organisations have very limited resources and function far more effectively when a partnership is developed with government. For example, governments become wholesalers of information (which they are in a far better position than rural groups to obtain) while using community groups as information retailers/disseminators. Thus government continues to fulfil its traditional information and education function, but does so in a way that has greater credibility with and impact on, the target group, which also gains ownership of the process. In Victoria the close working relationship between the Victorian Farmers Federation, Farmsafe and Workcover was a major factor in the success of the ROPS scheme (see further Box 8 below) and has significantly increased farmers’ awareness and compliance with the regulatory OHS objectives. Indeed, there could be no better illustration of the benefits of an alternative model for OHS policy and practice in the agricultural industries, based on alliances between a broader group of stakeholders concerned with all aspects of rural health and safety, and of government/civil society partnerships, in conjunction with a *combination* of regulatory instruments.

Box 8. Roll Over Protection Scheme (ROPS)
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In Victoria in 1997/98, the ROPS Rebate Scheme facilitated fitment of ROPS to previously unprotected tractors, via a rebate of \$150 to farmers for each pre-1981 tractor fitted with a ROPS meeting the Australian Standard 1636. The situation before the scheme commenced was grim: during the period 1992-1996, tractors accounted for 61% farm work related fatalities amongst adults in Victoria; and roll-over events accounted for 33% of these tractor related fatalities

The scheme has been successful with the number of unprotected tractors in Victoria reduced by 70%. The proportion of tractors in the state without protection is now just 7% as against 24% previously (from an estimated 17,420 to 5,290).¹³⁵ Another benefit of the scheme has been increased farm safety awareness generally and strengthened partnerships between organisations.¹³⁶

The relationship between the regulator and the key industry organisation was particularly crucial in achieving this result. Not least: the OH&S Authority was active in agriculture and recognised it as a problem area and had appointed officers with a rural empathy; the conference of the Victorian Farmers Federation overwhelmingly supported the proposition from Farmsafe Victoria that there should be compulsion to fit ROPS to pre-1981 tractors; there were enough people in the Department and on the Minister's staff prepared to make it happen; and the VFF handled the administration which was entrusted to an enthusiastic, active member of staff.¹³⁷

The success of the rebate scheme also appears to be founded on a combination of complementary policy instruments. Specifically, the combination of regulatory amendments, publicity, and the rebate clearly provided the impetus for the action required to increase ROPS fitment. While the regulations themselves, and the perceived threat of subsequent enforcement, were significant factors, the effect would not have been as dramatic had these strategies been used in isolation. There had been considerable development of the partnerships over previous years, and the scheme was implemented at a time of increasing impetus in farm safety in Victoria.¹³⁸

However, whilst this grassroots focus may be critical to intervention at farm level, it is not sufficient to achieve the systemic change required to achieve better OHS outcomes at industry level. In the terminology of OHS – it may produce a number of (but not enough) 'safe persons' but is not sufficient to produce the industry wide 'safe place' or 'safe system' approach needed to substantially improve OHS outcomes. Achieving this outcome, requires direct policy input from rural community based organisations, which often have the greatest insights into on-the-ground practical problems and the trust of farmers and farm workers. Their direct participation in the policy process would enable them to bring the necessary understanding of rural issues to the policy and regulatory processes and enable them to more effectively influence government policy and practice in the area of farm chemical safety. Most importantly it would also enable OHS issues to piggy-back off other safety issues with already greater acceptance and higher importance in rural areas (eg child safety on farms).

This contrasts sharply with the status quo. There is currently little rural input to OHS policy at national level, with no rural representation on NOHSC and little emphasis on agricultural industries despite their poor OHS outcomes.¹³⁹ Within the APVMA, the Community Consultative Committee (CCC), which includes a range of stakeholder representatives, is a "*vehicle for two-way communication*" with a limited advisory function.¹⁴⁰ The institutional arrangements provide little opportunity or capacity to build on rural communities' knowledge and experience or to use their social resources to develop policy and regulatory alternatives that are both acceptable to

farmers and better address farm chemical safety and agricultural OHS at an industry, rather than individual farmer, level.

8.2 Industry organisations and unions

OHS legislation and the ongoing industrial negotiation of work conditions provide both industry (employer) associations and unions with significant roles in the development of OHS policy and regulations at national, State and workplace level. They have significant influence on policy development through their representatives on major government advisory and consultation bodies and participation in decisions about technical issues (eg methods of risk assessment, acceptable MRLs) at international and national level. They can also have considerable political influence, dependent on which political party is in power¹⁴¹. Beyond this, both industry associations and trade unions have important, but quite distinctive potential roles, which we explore below.

Industry associations, in at least some sectors, have taken significant initiatives to improve the safety, health and environmental practices of their member organisations. For example, some conduct comprehensive training and accreditation programs for members that demonstrate considerable industry capacity to self regulate and achieve better stewardship of agvet chemicals. Organisational motivation for such intervention includes the perceived need to demonstrate industry capacity to safeguard community and environmental safety in order to avoid the alternative of stronger national and State government regulation, optimise market opportunities and protect members' interests.

The most comprehensive programs are conducted by the agrichemical (crop protection) industry body, Avcare and the agricultural pilots' association, Aerial Agricultural Association of Australia (AAAA). Both have a relatively small membership but are critical to safer use of agvet chemicals – through control of retail access and aerial spraying. Avcare, currently sponsors a range of stewardship and training programs, some in conjunction with government, to improve chemical safety, including (1) Agsafe, an accreditation program for retailers/resellers of agvet chemicals with strong government sanctioned commercial disincentives for non-participation, and (2) organised programs to collect unwanted agvet chemicals and containers, drumSafe and ChemCollect. AAAA similarly conducts an industry training and accreditation program for agricultural pilots (Spraysafe) that meets government licensing requirements and even exceeds the required national competency training standards. Strong regulatory and commercial incentives ensure high levels of industry participation in both programs and members' compliance with associated industry Codes of Conduct. Avcare, for example, has ACCC approval to apply economic sanctions to non-complying retailers and AAAA training is nationally recognised for licensing purposes.

Growers associations in some commodity sectors have similarly played a major role in developing comprehensive strategies to reduce and better manage pesticide use and can be pivotal to achieving widespread grower support for change. For example, they can access and organise the necessary R&D and advisory services and negotiate the economic incentives that facilitate adoption of new farming practices. The Batlow Growers' Co-operative provided the major coordinating and driving force behind growers' adoption of a comprehensive IPM/ICM program to improve exports of Pink Lady apples into the European market with a 'clean and green' advertising campaign.

Now is not the place for a detailed examination of these and other industry programs. However, in policy terms, it should be noted that they can play an important role in improving chemical related OHS. In essence, the more agricultural enterprises can be persuaded to do for themselves, the more committed they are likely to be to the outcomes and the more successful they are likely to

be in achieving them. In any event, in circumstances where government inspectors only have extremely limited capacity to reach and influence small enterprises directly through inspection and enforcement, few other options are available. However, many self-regulatory initiatives are little more than a sham: a spurious means of keeping government regulation at bay, and much depends on how such mechanisms are designed. We draw a crucial distinction between pure self-regulation and co-regulation. The former involves giving industry very considerable autonomy in relation to both goal setting and implementation, and has (with limited exceptions) an unhappy track record.¹⁴² The latter refers to a hybrid policy instrument involving a combination of government set targets and industry-based implementation, with even this latter element being underpinned by government controls¹⁴³.

Co-regulation may have a considerable role to play in some contexts, and circumstances. The crucial question is which ones? Canadian research suggests the following criteria for identifying a sector's readiness for co-regulation or self-management:¹⁴⁴ a successful track record of professional development programs by the industry, such as a code of ethics; a documented history of consultation and partnership with government and others to solve marketplace problems; a demonstrated capacity to perform some legislated functions on behalf of government; the existence of a representative national or provincial industry group or association; and proven ability to represent a balance of interests. Even when these criteria are largely satisfied, industry co-regulation is clearly no panacea, and must be used selectively and with caution. Nevertheless, one is usually comparing grossly imperfect regulatory options and before dismissing the potential role of co-regulation as being flawed one has to ask: compared to what? As one of us has argued elsewhere, there may be some contexts in which it may represent the most viable regulatory option for dealing with small enterprises, particularly where government resources are very limited¹⁴⁵.

Trade unions can also play a variety of important roles, some of which have already been mentioned. While membership of unions in rural industry is small, nevertheless the British experience suggests that much can be achieved through initiatives such as roving or regional safety representatives, supported by unions and in conjunction with farm industry organisations. In Victoria, the Australian Workers Union (AWU) has been a major driving force, (together with WorkSafe Victoria), in the introduction of a Code of Practice for the shearing industry which addresses the root causes of injury through better design of workplaces and systems of work, rather than relying primarily on provision of information and training of individual workers and farmers. The AWU has also introduced some innovative joint programs in partnership with the CWA to increase OHS awareness amongst rural women and to harness the CWA's considerable potential to change rural safety norms, including farmers' and farm workers' attitudes to workplace safety.

8.3 NGOs

Public campaigns by NGOs concerned with consumer rights (eg Australian Consumers' Association) and the environment (eg Total Environment Centre) have given high visibility to the issues of pesticide residues in food, pesticide contamination of water and soil and the impact of spray drift and run-off on the health of local communities and wildlife. Largely as a result, public concern about pesticide use is mainly focused on its health and environmental implications. The OHS impact of pesticide use is, by contrast, a comparatively invisible issue and largely tangential to the primary focus of public campaigns - guaranteeing food and environmental safety through changing pest control practice at farm level. Few organisations other than trade unions and farmers' organisations consistently raise the OHS aspects of farm chemical safety in the public

arena – and then it is generally viewed as a sectoral issue for farmers and agricultural workers, not one of concern to the whole community.

Yet there is considerable potential to harness the energies of NGOs in the interests of improved agricultural chemical safety. One means of doing so – through alliances committed to more effectively incorporating OHS under the broader rubric of corporate social responsibility – has already been canvassed. This approach involves various institutions of civil society exerting pressure on large, reputation-sensitive corporations to persuade them to do what they would not choose to do voluntarily.

Another, less confrontational approach, is the development of partnerships between NGOs and industry, or even between NGOs, industry and government under arrangements from which all parties gain benefits. This approach is exemplified by “green alliances” established between an agricultural sector or an individual enterprise, and one or more environmental organisations. Such alliances involve collaboration between business and environmental groups. Most commonly, business seeks to obtain the political goodwill and credibility which NGOs bring to the partnership – benefits which may translate into risk reduction, decreased costs or increased revenue through market advantages. In exchange, environmental groups will expect a commitment to improved environmental (and sometimes OHS) practices on the part of their industry partner. For example, an environmental organisation might bestow an environmental logo that would appear on approved agricultural produce, or they might participate in a joint environmental marketing program for an entire agricultural sector, in exchange for specified and measurable environmental improvements. Since consumers (and export markets) express a preference for “green” produce (although they are not always willing to pay a price premium for it) such environmental group endorsement, provided it is recognised in the market place, may be a particularly valuable asset. It may assist the sales of agricultural produce, either in terms of greater market share, access to new markets or conceivably, price premiums.

While many such alliances have only marginal implications for OHS, and for agricultural chemical safety in particular, others have the potential to achieve far greater OHS improvements than most conventional policy instruments. For present purposes, we provide two such examples. First, we refer to the role of partnerships in increasing the uptake of integrated pest management, which is likely to involve a much reduced risk of chemical related occupational injury and disease. Lori Ann Thrupp has demonstrated, through a series of case studies, in both developed and developing countries, that partnerships between farming groups and NGOs (and often scientists and government or inter-government institutions) to replace chemical-intensive farming methods with alternative agro-ecological approaches¹⁴⁶ can be highly effective. All the projects studied: significantly reduced agrochemical inputs and costs, as well as health risks; regulated pests and diseases at acceptable levels; maintained or increased yields, contributing to productivity and food security; increased ‘health’ of the farming system (eg soil quality and resilience); and spread the benefits widely and/or empowered communities.

Thrupp demonstrates how:

“Forging interactive connections among research institutions, extension services, non-governmental organisations and farmers has proven to be a very effective way to develop and spread alternative agricultural practices, and a viable alternative to the conventional top-down approach to technology transfer ... New knowledge and skills, cost-sharing, and functional complementarities all make it easier to carry out on-farm research, field demonstrations, education and training sessions, outreach and other activities. Moreover, the linkages foster an

interdisciplinary approach that is critical to sustainable agriculture. And communication grows among NGOs, farmers, researchers and other groups as they work together."¹⁴⁷.

A second example involves the Wisconsin Potato and Vegetable Growers Association (WPVGA), who for many years had been concerned to reduce the use of broad-spectrum, high risk pesticides¹⁴⁸. There were a variety of reasons for this. Economically, the Wisconsin potato industry had been under considerable economic threat, exacerbated by increases in pest management costs. By 1996 the Wisconsin potato growers did not recover production costs. There were also compelling reasons of health for reducing pesticide use: high levels of pesticide spraying were associated with serious health problems for rural community residents, farmers and their families. Finally, reducing pesticide use would improve the purity of the region's shallow ground water and enhance the quality of wildlife habitat and diversity of species sharing the agricultural landscape.¹⁴⁹

For all of these reasons shifting to IPM had considerable attractions, not least because of: *"its capacity to expand profit margins by avoiding unnecessary pesticide applications and reducing pest pressure through a variety of means, some of which entail little or no cost"*.¹⁵⁰ Means of achieving this included cropping systems which enabled less pesticide use while still achieving acceptable levels of control, the success of border sprays or partial field applications, cultural practices that reduced Colorado beetle survival and movement from field to field, the introduction of an effective, affordable and safer insecticide for Colorado potato beetle control, and innovative applications of global positioning systems and precision farming techniques to identify variability in pest pressure, enabling spot sprays and more effectively timed applications to achieve maximum efficiency with minimum applied product.

WPVGA did not need a partner to develop IPM but it did need some means of marketing the environmental advantages of low residue Wisconsin potatoes, and help in developing a premium market for environmentally friendly potatoes. Enter the World Wildlife Fund (WWF), an international and high profile environmental NGO whose panda logo and reputation could potentially provide considerable public relations, marketing and credibility advantages to WPVGA. In particular, the potato growers hoped the partnership with WWF would: (1) document progress in the adoption of bio-intensive IPM and reduction in reliance on high-risk pesticides; (2) quantify public health and environmental gains achieved as a result of industry-wide commitment to IPM; (3) gain recognition for Wisconsin potato products, especially in quality conscious markets; and (4) support policy reform and public and private investments needed to enhance the effectiveness and lower the cost of bio-intensive IPM.¹⁵¹

For WWF, the partnership also held considerable attractions. For some time, WWF had been concerned to lessen reliance on pesticides and had identified IPM as the surest way to achieve this objective. Through the project WWF hoped to demonstrate: (1) the value of setting measurable pesticide use, risk, and IPM adoption goals, and ways to do so; (2) how monitoring and rewarding progress toward concrete goals can build the momentum needed to overcome technical and marketplace hurdles; (3) a cooperative model for partnerships involving environmental and commodity groups committed to common goals; and (4) analytical tools and policy innovations that will help achieve national IPM, food safety and environmental quality goals.¹⁵²

While the success of this partnership is by no means clear, it does illustrate how groups which have traditionally adopted adversarial positions, both have much to gain through cooperation, and how this could have considerable spin off benefits for OHS in some contexts. Notwithstanding difficulties that emerged in the partnership arrangement, the early results from the project

demonstrated a quite striking level of success: *“Wisconsin reduced use of high-risk insecticides by over 60% in a year when national insecticide toxicity units per acre went up 6%. Toxicity units associated with all herbicides, insecticides and fungicides applied in Wisconsin fell 20 percent between 1995 and 1997, but rose 16% nationwide.”* As WWF put it: *“Toxic pesticide use has been dramatically cut on Wisconsin potato farms through a unique collaboration between environmentalists and farmers designed to protect human health, improve wildlife habitat, and help develop a premium market for environmentally friendly potatoes.”*¹⁵³ WWF also pointed to evidence that farmers who use fewer pesticides significantly increase their profit margins.

Finally, within Australia, one may refer to the partnership developed between the Victorian Vegetable Growers Association (VVGA) and the Victorian Environment Protection Authority. This partnership in essence involves a commitment by the industry association to develop and implement an environment improvement plan (EIP) with an emphasis on cleaner production and involving, in its initial stage: a pollution audit; an awareness program and management audit; environmental management guidelines; and a training program. In return the industry gains credibility and EPA endorsement of its environmental credentials. What precipitated the partnership was an industry fear that if it were to proceed with environmental improvements, such as the implementation of industry-based environmental management system, *in the absence of substantial EPA engagement* then others, including the supermarkets and the wider community, might not believe its claims to be achieving sufficiently high environmental standards. From the perspective of the EPA, this partnership also has attractions: through a partnership, vegetable growers may be persuaded to improve their environmental performance to a level that is greater than that achievable through traditional regulatory approaches alone.

However, the success of the partnership in its present form is not guaranteed. It has been argued elsewhere that if the vegetable growers partnership is to prosper rather than merely survive, then further measures will be necessary. Not least, EPA must be prepared to contribute to it not just financially but also in substance. Efforts must be made to harness the supply chain pressure that the supermarkets can provide and the community must be empowered to become an active participant in the process and outcomes of achieving cleaner production. It is only by harnessing these pressures, by nurturing cleaner production initiatives through an industry partnership and by providing an underpinning of regulation for worst performers who do not respond, that regulators can achieve a long term improvement in industry standards. The result is that the best chances of a successful partnership in this sector involve multiple party, multiple instrument arrangements¹⁵⁴.

Governments can also empower NGOs directly. Perhaps the most powerful means of doing so is by what is becoming known as *“informational regulation”*¹⁵⁵ which has been defined as *“regulation which provides to affected stakeholders information on the operations of regulated entities, usually with the expectation that such stakeholders will then exert pressure on those entities to comply with regulations in a manner which serves the interests of stakeholders”*¹⁵⁶. Informational regulation involves the state encouraging (as in corporate environmental reporting) or requiring (as with community right to know) the provision of information about environmental impacts but *without* directly requiring a change in those practices. Rather, this approach relies upon economic markets and public opinion as the mechanisms to bring about improved corporate environmental performance. As such, informational regulation *“reinforces and augments direct regulatory monitoring and enforcement through third party monitoring and incentives”*¹⁵⁷.

Informational regulation is targeted almost exclusively at large enterprises, and in particular at public companies (which are vulnerable to share price and investor perceptions) and those who are reputation sensitive, because it is essentially these types of enterprise which are most capable of being rewarded or punished by consumers, investors, communities, financial

institutions and insurers on the basis of their environmental performance. The overall strategy is to empower these groups to use their community and/or market power in the environmental interest by providing them with a sufficient quality and quantity of information as to enable them to evaluate a company's environmental performance. Such a strategy becomes even more effective as companies recognise the importance of protecting their "social license" and the need to improve their environmental performance in order to do so¹⁵⁸. For example, in the case of pesticides, a government regulation might require supermarkets to list the level of pesticide residues (and those of their rivals, thereby creating a 'league table) based on periodic testing. Or they might require disclosure of the particular chemicals used by their growers in the course of production of particular produce.

9. CONCLUSIONS

Exposure to agricultural chemicals poses a serious, albeit in some respects incalculable, threat to farmers, agricultural workers, and others. Yet the traditional regulatory approach to chemical safety and OHS in agriculture is seriously flawed – as clearly indicated by its failure to stem the excessive rates of work-related injury and disease and loss of life in agricultural workplaces. The effectiveness of the current system is seriously compromised by regulatory fragmentation and complexity and by inappropriate models that together limit the functional capacity of regulators to coordinate programs and resources and mobilise all potential stakeholders. This is compounded by over-reliance on information and training programs that focus on changing the behaviour of individual farmers and farm workers, and rely heavily on voluntarism, and by the virtual absence of effective enforcement measures.

A number of incremental improvements to the current framework can and should be made to mitigate the worst of these problems. First, there is a need to replace the currently fragmented and inconsistent agvet system with a comprehensive and integrated regulatory framework. This should be done as part of a whole-of-government approach to achieving greater harmonisation of the regulatory frameworks and institutional arrangements for all classes of chemicals across all Australian jurisdictions. Second, the inappropriateness of the current OHS regulation to the circumstances of agriculture, should be addressed by including farming and rural community organisations in the OHS policy-making process not just locally – in program development and delivery - but also at the level of state and federal policy development. Third, the limitations of current approaches to motivating farmers and agricultural workers, can be mitigated by expanding the roles of trade unions (via roving health and safety representatives), of regional OHS advisors supported also by employer organisations, and other partnership models. Fourth, compliance assistance and effective enforcement of legislation will also be necessary, with a particular focus on self-audit tools, incentive programs to target major hazards and focused enforcement programs with escalating penalties. Finally, it is not sufficient to adopt any of the above reforms as ‘single instrument’ solutions. On the contrary, many are mutually reinforcing and are best used in combination.

These relatively modest reforms could mitigate some of the worst flaws in the status quo. However, the greatest opportunities for improving agricultural OHS and farm chemical safety lie *outside* the boundaries of the traditional regulatory system and depend on harnessing the potential of: new agricultural and pest control technology; the market forces driving global food production, and powerful forces within civil society (including changing community attitudes to risk and safety). The ways in which these forces play out in Australian agriculture largely reflect the tensions arising from the often conflicting economic interests, production pressures and cultural priorities of industry stakeholders – farmers, agricultural workers, rural communities, multinational food retail chains, consumers and regulatory authorities. The outcome of these struggles will likely have far more profound OHS implications than almost anything likely to be achieved by conventional regulatory reform.

New pest control technology and crop management methods have the potential to substantially reduce the current extent and frequency of hazardous pesticide exposure in the workplace. But realisation of this potential is neither straightforward nor guaranteed. Lack of market availability, cost factors and knowledge and cultural barriers combine to limit farmers’ uptake of next generation pest control products. Yet the current agvet regulatory framework does little to provide an effective market advantage for safer products or to encourage farmers to substitute them for often cheaper, more hazardous pest control methods. Whilst streamlining of current institutional

arrangements may remove some bureaucratic and administrative barriers, it is unlikely to substantially increase the availability and uptake of safer pest control products without provision of stronger market and regulatory incentives for change. The adoption of an alternative regulatory model that proactively facilitates the registration and marketing of lower risk products, such as the US FQPA, would go a long way to encouraging their marketing and use. Like the EU REACH program, and FQPA, one aim of Australian regulation should be to encourage manufacturers' development and farmers' substitution of safer pesticides.

Market forces, acting through the global supply chains of the major food retailers, can also be powerful drivers of improved pest control practices by Australian farmers. In response to consumers' demands for guaranteed food safety, food retailers are using their market power to insist upon their suppliers adopting pest control measures that minimise pesticide residues and environmental impacts. These changes have considerable potential to reduce workforce pesticide exposure. However, they are not enough in themselves to ensure safe OHS practices since minimising crop pesticide residues does not necessarily reduce the exposure level of those applying the pesticide. Farmers frequently give priority to cutting production costs and preventing crop failure over their own and workers' health, and may continue to use hazardous pesticides in hazardous ways provided they can satisfy minimum residue requirements. However, it would not be a large step for major food retailers and other agrifood corporations' to insist upon improved OHS practices, for example as part of the overall QA requirements they impose on their suppliers. But they are unlikely to do so in the absence of external pressure. Such pressure is most likely to come from the Corporate Social Responsibility (CSR) movement that has been developing rapidly over the last few years. CSR implies that companies should operate in a way that consistently exceeds legal, commercial, ethical and public expectations – that is adopting the 'triple bottom line' approach. To date OHS has remained largely on the sidelines but there is no reason for this to continue if trade unions and CSR oriented NGOs further pressure corporations to adopt OHS as a routine part of CSR.

For smaller agricultural producers who do not participate in the global supply chains, government can have a similar influence on pest control practices through greater support for the expansion of IPM and organic farming. It can also regulate to give farmers power to bargain collectively, thereby enabling them to obtain better returns on their produce and protection against the abuse of market power. Such a move would remove some of the intense market pressures that often result in farmers risking their own and their employees' OHS to ensure short-term financial benefits.

Finally, various institutions of civil society have the capacity to play critical roles in changing agvet chemical policy and practice. Rural community organisations, farmers and growers associations, unions and industry bodies and NGOs can variously influence pest control practices at farm level and government and industry policy. For example, NGOs take direct action, usually targeted at large reputation-sensitive companies, and seeking to embarrass or otherwise pressure them into improved environmental performance, often with spill-over OHS benefits. In others they seek to develop partnerships with such companies as a more constructive means to achieve similar results. Rural communities and organisations such as the CWA, play an important role in disseminating information, since rural community organisations usually have far higher credibility with farmers than either government or third parties. They can also provide an important policy input provided they are facilitated to do so. Industry associations too, have taken significant initiatives to improve the safety, health and environmental practices of their member organisations and, through co-regulatory initiatives, may have the capacity to achieve better stewardship of agvet chemicals, at least in some contexts. Trade unions notwithstanding limited rural membership, can achieve a great deal through initiatives such as roving or regional safety

representatives, and innovative joint programs in partnership with rural organizations such as the CWA.

Two final points. First, many of the evolving roles of civil regulation have not taken place entirely divorced from state intervention. On the contrary, governments have taken a number of measures that have served to further empower communities, environmental NGOs and the public more generally, and, notwithstanding the retreat of the regulatory state, should continue to do so in the future. Second, recognising that all instruments have both strengths and weaknesses and that none is likely to be wholly successful in achieving its OHS goals, what is needed is an integrated strategy incorporating a variety of different, but complementary instruments. A sequenced approach, gradually escalating from more cooperative to more interventionist instruments, may not only make the best use of scarce regulatory resources, but also better motivate target groups.

APPENDIX. AUSTRALIAN LEGISLATION FOR REGULATION OF PESTICIDES¹⁵⁹

National Registration Scheme

- o Agricultural & Veterinary Chemicals Act (1992)
- o Agricultural & Veterinary Chemicals (Administration) Act (1992) & Regulations
- o Agricultural & Veterinary Chemicals Code Act (1994) & Regulations & Order
- o Agricultural & Veterinary Chemicals Code Regulation Act (1995)
- o Agricultural & Veterinary Chemicals Regulations (1999)
- o Agricultural & Veterinary Chemicals Code Act (1994) & Regulations (Vic)
- o Agricultural & Veterinary Chemicals (Western Australia) Act (1995) & Regs (WA)
- o Agricultural & Veterinary Chemicals (Tasmania) Act (1994) & Regulations (Tas)
- o Agricultural & Veterinary Chemicals (New South Wales) Act (1994) & Regulations (NSW)
- o Agricultural & Veterinary Chemicals (South Australia) Act (1994) & Regulations (SA)
- o Agricultural & Veterinary Chemicals (Queensland) Act (1994) & Regulations (Qld)
- o Agricultural & Veterinary Chemicals (Northern Territory) Act (1994) & Regs(NT)
- o Agricultural & Veterinary Chemicals Act (1994) & Determination (under Section 23)
- o Agricultural & Veterinary Chemicals Products (Collection of Levy) Act (1994)
- o Agricultural & Veterinary Chemicals Products Levy Imposition (Customs) Act (1994) & Regs
- o Agricultural & Veterinary Chemicals Products Levy Imposition (Excise) Act (1994)
- o Agricultural & Veterinary Chemicals Products Levy Imposition (General) Act (1994)

Victoria

Dept of Natural Resources & Environment

- o Agricultural & Veterinary Chemicals (Control of Use) Act (1992); Regulations 1996
- o Hormonal Growths Promotants Regulation (1993)

Environmental Protection Authority

- o Environment Protection Act (1970)

Victorian WorkCover Authority

- o Occupational Health & Safety Act (1985)

Victorian Local Government

- o Health Act (1958) (Nuisance provisions)

NSW

Environmental Protection Authority

- o Pesticides Act (1999)
- o Protection of the Environment Operations Act (1997)
- o Road & Rail Transport (Dangerous Goods) Act (1997)

NSW Agriculture

- o Stock Food Act (1940)
- o Stock (Chemicals Residues) Act (1975)
- o Noxious Weeds Act (1993)

NSW Workcover

- o Occupational Health & Safety Act (1983); Regulations (1996) & Codes of Practice

NSW Health

- o NSW Food Act (1989)

Queensland

- o Agricultural & Veterinary Chemicals Distribution Control Act (1996) (& Codes of Practice)
- o Agricultural Chemicals Distribution Control Regulations (1998)

- o Chemical Usage (Agricultural & Veterinary) Controls Act (1988)
- o Chemical Usage (Agricultural & Veterinary) Control Regulation (1989)
- o Environmental Protection Act (1994)
- o Workplace & Safety Act (1995) & Regulations (1997)
- o Health Act (1937)
- o Drugs & Poisons Regulations (1996)

South Australia

Primary Industries & Resources SA

- o Agricultural Chemicals Act (1955)
- o Stock Foods Act (1941)

Other relevant legislation

- o Dangerous Substances Act (1979)
- o Food Act (1985)
- o Environment Protection Act (1993)
- o Occupational Health, Safety & Welfare Act (1986)
- o Water Resources Act (1990)
- o Meat Hygiene Act (1994)
- o Livestock Act (1997)

Western Australia

WA Health

- o WA Health Act (1956)
- o Health (Pesticides) Regulations (1956)
- o Poisons Act (1964)

WA Agriculture

- o Agricultural Produce (Chemical Residues) Act (1983) & Regulations
- o Aerial Spraying Control Act (1966) & Regulations
- o Agricultural & Related Resources Protection (Spraying Restrictions) Regs (1979)

WA Worksafe

- o Occupational Health & Safety Act (1994) & Regulations (1996)

WA Minerals & Energy

- o Explosive & Dangerous Goods Act & Regulations (1998)
- o Dangerous Goods Transport Act & Regulations (1998)

Northern Territory

Territory Health Services

- o Poisons & Dangerous Drugs Act (1983)

Tasmania

- o Agricultural & Veterinary Chemicals (Control of Use) Act (1995)

Workplace Standards Tasmania

- o Workplace Health & Safety Act (1995)
- o Dangerous Goods Act (1998)
- o Poisons Act (1971)

ACT

- o Commonwealth Agricultural & Veterinary Chemicals Act (1994) (*applies Agvet Code directly to ACT*)
- o Environmental Protection Act (1997)

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¹ ILO Media Release (22/10/1997) <http://www.ilo.org/public/english/bureau/inf/pr/1997/23.html>

² Leigh J. et al (1999) Costs of Occupational Injuries in Agriculture. Uni of California Agricultural Health & Safety Centre. Uni of Calif. Davis.

³ Richthofen W (2002) Labour Inspection. A Guide to the Profession. ILO. Geneva.

⁴ There is currently no single source of comprehensive data on farm related morbidity and mortality in Australia. The data available from various sources has a number of gaps and limitations, including lack of sufficient reliable data to define and describe the agricultural workforce, and jurisdictional inconsistency in defining and recording data on farm injuries. The difficulties are further compounded by the small number (approximately 140,000) and great diversity of agricultural enterprises. Consequently it is difficult to closely assess and analyse the full extent and aetiology of work related injury and disease on Australian farms. The information available does however indicate that agriculture is one of the industries at highest risk for work-related injury, and that work related injury is also a major cost to the industry.

⁵ Associated particularly with circulatory disease, cancer and injuries. Fragar & Franklin (2000) The Health & Safety of Australia's Farming Community. ACAHS & RIRDC. Moree

⁶ i.e. non-intentional work related fatalities of employees

⁷ Fragar & Franklin (2000) op cit

⁸ www.workcover.vic.gov.au

⁹ Fragar L & Franklin R (2000) provide more detailed examination of the available data.

¹⁰ Overall only 10%-19% of work-related farm injuries result in claims since most farms are family businesses with a preponderance of self-employed and unpaid family members in the workforce. Employees make up approximately 45% of the agricultural workforce and a high proportion are casual itinerant labour. Fragar & Franklin (2000).

¹¹ Fragar & Franklin (2000) review of evidence indicates that acute exposure of adults and children to farm chemicals, including ingestion, appears to account for an overall 1–2% of presentations to rural GPs and hospital emergency Departments (EDs) and WC claims. A study of 1995-96 presentations to rural hospital Emergency Departments and GPs in central Queensland, found that "poisoning" accounted overall for 1.7% and 1.8% respectively. The proportion varied across the industry commodity sectors and areas, from 2.1% in sugarcane production and 2.5% in horticulture nationally to 3.1% in on-farm cotton production and 5% in WA horticulture. A study of unintentional farm work related fatalities in the period 1989 to 1992, also indicated that exposure to farm chemicals and other hazardous substances accounted for approximately 1% of the 373 fatalities.

¹² ILO Media Release (22/10/97) op cit

¹³ Despite the continuing and extensive use of pesticides, there is currently no nationally comprehensive collection of data (by product, crop, pest, region, method of application) to clearly indicate actual usage patterns. Nor is there any national system for reporting and recording adverse incidents involving pesticides. Consequently there is no reliable information on the extent and nature of (particularly chronic) poisoning caused by pesticide exposure. It is therefore not possible to determine the precise extent to which pesticide use contributes to the incidence of work related fatalities and illness amongst farmers and agricultural workers.

¹⁴ NOHSC published Workers Compensation (WC) claims data for 1994/95-1998/99 indicates that in the five years 1994/95 to 1998/99 there were 402 claims nationally associated with agvet chemicals - 86 (21%) of them from agricultural workers predominantly in horticulture & fruit growing horticulture (orchards and viticulture, vegetable, banana and greenhouse crop production).

<http://www.nohsc.gov.au/Statistics/publications/#compendium>

¹⁵ Fragar & Franklin (2000) & Parker F (2002) Developing an understanding of the OHS practices of market gardeners & cut flower growers of non-English speaking background in the Sydney basin. NOHSC. Canberra. Note: Methodological problems with sampling, suggest that the samples in all these studies were most likely biased towards the most informed or concerned sections of the workforce in the industries.

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- ¹⁶ Radcliffe J (2002) *Pesticide Use in Australia*. Review undertaken by the Australian Academy of Technological Sciences & Engineering. AATSE. Melbourne
- ¹⁷ Senate Select Committee (1990) *Report on Agricultural & Veterinary Chemicals in Australia*.
- ¹⁸ Previously the National Registration Authority for Agricultural and Veterinary Chemicals (NRA) changed its name in 2003 to the Australian Pesticides and Veterinary Medicines Authority (APVMA) to better indicate its functions. [http:// www.apvma.gov.au](http://www.apvma.gov.au)
- ¹⁹ [http:// www.apvma.gov.au](http://www.apvma.gov.au)
- ²⁰ A permit is required only if the off-label use is contrary to State control-of-use laws.
- ²¹ Shaw A & Mahon D (2000) *Simplifying the Safe Use of Chemicals on Australian Farms*. Unpublished report prepared for NOHSC and APVMA.
- ²² Johnstone R (1999) *Paradigm Crossed? The statutory OHS obligations of the business undertaking*. *Aust J of labour Law*, 12, 73. p80
- ²³ Note State/Territory differences in definitions and extent of coverage outside workplace
- ²⁴ Dangerous Goods Regulations are being adopted in all States to implement the 2001 National Standard and National Code of Practice for the Storage and Handling of Workplace Dangerous Goods.
- ²⁵ Some of the major environmental impacts include land degradation (such as water logging, soil erosion, salinity and acidity), weed and pest infestation, degradation of creeks, rivers and groundwater aquifers, and loss and fragmentation of vital habitat such as forests and wetlands has contributed to species extinction.: Industry Commission (1998) *A Full Repairing Lease: Inquiry into Ecologically Sustainable Land Management- Executive Summary*, Industry Commission, Canberra, p 2.
- ²⁶ Industry Commission (1998) *ibid* p 2. See generally Bates, G (2002) *Environmental Law in Australia* (5th Edn), Butterworths, Sydney at p 76, 119-126.
- ²⁷ World Commission for Environment and Development (1992) *Brundtland Report – Our Common Future*.
- ²⁸ Section 3, Inter-government Agreement on the Environment (IGAE): Council of Australian Governments IGAE (1992), Canberra available at <http://ea.gov.au/esd/national/igae/> accessed on 1/7/03; National Strategy for Ecologically Sustainable Development, AGPS, 1992.
- ²⁹ The Agreement recommended the adoption of mechanisms to clearly define the roles of different levels of government, reduce the number of disputes between the levels of government on environmental issues, provide greater certainty in government and business decision-making, and encourage better environmental protection: Inter-government Agreement on the Environment (IGAE): Council of Australian Governments IGAE (1992), Canberra available at <http://ea.gov.au/esd/national/igae/> accessed on 1/7/03. See also Productivity Commission (1993) *Chapter 6 Environmental Regulation – Environmental Waste Management Equipment, Systems and Services* (Report No 33), Productivity Commission at p 93.
- ³⁰ Inter-government Agreement on the Environment (IGAE): Council of Australian Governments IGAE (1992) *op cit*. See also Gunningham, N (2002) *Beyond Compliance: Next Generation Environmental Regulation*, presented at the Current Issues in Regulation: Enforcement and Compliance Conference, Australian Institute of Criminology et al. , Melbourne, 2-3 September 2002.
- ³¹ Gunningham, N & Young, M (2001) *Redesigning Environmental Regulation: The Case for Biodiversity Conservation*, Australian Centre for Environmental Law, Canberra at page 1, available at <http://www.elaw.org/resources> accessed on 1/7/03; Gunningham, N (2002) *Beyond Compliance: Next Generation Environmental Regulation* *op cit*.
- ³² Gunningham, N & Young, M (2001) *op cit* p1, available at <http://www.elaw.org/resources> accessed on 1/7/03; Gunningham, N (2002) *ibid*
- ³³ Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry - Judith Troeth (2001) *Address at the Chemcert (NSW) Conference Chemical Training from the Federal Government's Perspective* available at <http://www.affa.gov.au/ministers/troeth/speeches/chemcert.html> accessed on 1/7/03.
- ³⁴ These programs are strongly locality or region based but within a national network: Landcare (2003), *Landcare Australia*, available at <http://www.landcareaustralia.com.au> accessed on 1/7/03. AFFA (2003) *About Rivercare: National Rivercare Program*, available at <http://www.affa.gov.au/content/output.cfm?ObjectID=D2C48F86-BA1A-11A1-A2200060B0A04245> accessed on 1/7/03.
- ³⁵ *Industries, Land Use and Water Quality in the Great Barrier Reef Catchment* Productivity Commission, Melbourne, Feb 2003.

³⁶ Turner, A (2003), A National Risk Management System for Agvet Chemicals A System View available at http://www.apvma.gov.au/about_us/turner.pdf accessed on 1/7/03.

³⁷ Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry - Judith Troeth (2001) op cit

³⁸ Industries, Land Use and Water Quality in the Great Barrier Reef Catchment Productivity Commission, Melbourne, Feb 2003, Ch 9.3.

³⁹ EPA (2003) Managing Pesticides: Who Does What, available at <http://www.epa.nsw.gov.au/envirom/pestmngng.htm> accessed on 1/7/03. See also EPA (2003) Pesticides Act 1999: Your Responsibilities available at <http://www.epa.nsw.gov.au/envirom/pestact.htm> accessed on 1/7/03.

⁴⁰ Section 3(a), Pesticides Act 1999 (NSW).

⁴¹ Formerly Australia and New Zealand Food Authority (ANZFA).

⁴² The HACCP (Hazard Analysis Critical Control Points) approach is based on seven principles aimed at identifying hazards in food production, controlling hazards at critical control points in the process, and verifying that the system is working properly. (1) Identify the hazards and list preventive measures to control them; (2) Determine the critical control points; (3) Establish limits at each critical control point; (4) Establish procedures to monitor the critical control points; (5) Establish corrective action to be taken in case of a deviation; (6) Establish procedures to verify that the systems are working correctly; and (7) Establish effective record-keeping. HACCP enables potential safety hazards to be controlled throughout the process. The application of HACCP principles in the production of food is recommended by Codex Alimentarius, the international standard-setting organization for food. <http://www.inspection.gc.ca/english/fssa/polstrat/haccp/overvuee.shtml> (29/7/03)

⁴³ The practical commercial implications may also be factored into some decisions about agvet product registration and usage restrictions, eg, the economic advantage to farmers of using a pesticide with a short withholding period prior to marketing, may be a factor in approving registration of a pesticide for specific uses, as in the re-registration of mevinphos for treating diamondback moth infestation in brassica crops.

⁴⁴ Turner (2003) op cit

⁴⁵ Allen Consulting Group (2002) A National Risk Management System for Agricultural & Veterinary Chemicals. Positioning for the Future. A strategic review for the NRA. NRQA. Canberra

⁴⁶ Shaw & Mahon op cit

⁴⁷ There a range of methods that can be used to control hazards (referred to as the Hierarchy Of Hazard Controls). The emphasis is on controlling the hazard at the source, by giving preference to the use of the engineering controls, which eliminate or reduce the hazard. These strategies are preferred because they are less subject to failure and less disruptive and uncomfortable for workers. The control measures are, in order of preference, (1) Safe design measures that 'design out' hazards; (2) Removal of the hazard through substitution of less hazardous materials, equipment or substances or adoption of safer systems; (3) Enclosure or isolation; (4) administrative controls such as job rotation, training; (5) Use of appropriate & properly maintained personal protective equipment (PPE).

⁴⁸ Victorian Code of Practice for Hazardous Substances (2000), Workcover. Victoria.

⁴⁹ Shaw and Mahon op cit & personal communications with members of farming organisations.

⁵⁰ Primary Industries Standing Committee (2002) Spray drift Management principles, Strategies & Supporting Information. Report 82. CSIRO Publishing Canberra

⁵¹ ARMCANZ (1998) Management of Agricultural and Veterinary Chemicals. A National Strategy. Dept of Primary Industry & Energy. Canberra (Now available from Australian Pesticides & Veterinary Medicines Policy Committee. AFFA Canberra).

⁵² Winder C et al (2001) Hazardous Substances & Chemical Safety in the Australian Agricultural Industry. An assessment of the ability of the NSW agricultural industry to comply with the 1996 NSW OHS (Hazardous Substances) Regulation. A Report to NSW WorkCover. UNSW School of Safety Science. Reports in Safety & Environmental Science.

⁵³ Radcliffe (2002) op cit

⁵⁴ ibid

⁵⁵ Allen Consulting (2003) *op cit*

⁵⁶ There was a widely held policy assumption that the self-employed did not need to be regulated in order to protect their safety at work

⁵⁷ Houlihan P (1991) *Sins of commission – the national OHS system Farmsafe 88 Conference*. UNE. Armidale. The NFF remains a strong proponent of training as more appropriate than regulation for improving OHS outcomes on farms.

⁵⁸ Johnstone (1999) *op cit*

⁵⁹ Although initially Robens and subsequently many others reject any notion of a conflict of interest in relation to OHS.

⁶⁰ Personal communication with members of NSW Farmers Federation (2002)

⁶¹ All have traditionally emphasised the primary importance of information and training to improving farm chemical safety and as the best way to ensure that the aspirations of the OHS regulatory system are applied in farm workplaces and work practices. Whilst giving practical support to many of the voluntary information and training programs for farmers, the agricultural chemical industry has taken a non-voluntary approach to training of resellers of agvet chemical products. They are required to complete competency based training as part of an industry accreditation program (Agsafe) with strong commercial disincentives for non-participation. Similarly, the AAAA (Aerial Agricultural Association of Australia) program SpraySafe, provides the competency based professional training and accreditation required for State licensing purposes.

⁶² Programs range from crop/pest specific programs to more comprehensive chemical safety training such as ChemCert, a national industry program that has trained more than 140,000 primary producers since its establishment in 1991.⁶² More general risk management training is also provided by the Farmsafe Australia program, Managing Farm Safety, run nationally through a network of Farm Safety Training Centres and accredited instructors. Provision of chemical safety information and training is also a major component of industry based programs to facilitate farmers' adoption of Integrated Pest Management (IPM) and other sustainable agricultural practices as well as QA programs to improve market opportunities.

⁶³ See Gunningham (1998) *Smart regulation. Designing Environmental Policy* OUP for further discussion of this issue.

⁶⁴ For further discussion of this and associated issues see Mayhew (1997) *Barriers to implementation of know OHS solutions in small business*. Worksafe Australia & Qld Div of Workplace Health & Safety.

⁶⁵ As indicated by studies of SME farms in North America, UK & continental Europe eg Perry & Bloom (1998) *Perceptions of pesticide associated cancer risks among farmers: a qualitative assessment*. Human Organisation 57(3) 342-9

⁶⁶ Cassell E & Day L (1998). *Constraints on the adoption of safety measures on Australian farms* ANZ J of OHS 14(5) p447

⁶⁷ Industry Commission (1995) *Work, Health & Safety. An inquiry into Occupational Health & Safety*. Report 47. p102

⁶⁸ See reports of prosecutions and other enforcement activity in the annual reports of the environment protection agencies and ANZFA.

⁶⁹ For full discussion see report of Allen Consulting *op ci*

⁷⁰ The agvet system is one of four separate national schemes for the assessment and registration of chemicals administered by different Commonwealth agencies – food (FSANZ), industrial chemicals (National Industrial Chemicals Notification and Assessment Scheme (NICNAS)) and pharmaceuticals (Therapeutic Goods Administration (TGA)) - all in the Health ministerial portfolio - and agricultural and veterinary chemicals (APVMA) - in the Agriculture ministerial portfolio.

⁷¹ There are a number of public management models that could be used to achieve this, including the 'joined up government' approach, articulated and applied in the UK to deal with "cross-cutting" issues (that "cut across departmental boundaries") and the New Zealand model of public management based on cross-portfolio objectives (Strategic Results Areas). For more details of these models see UK Cabinet Office, Performance & Innovation Unit Report (2000) *Wiring It Up*

(<http://www.number10.gov.uk/output/Page77.asp>) & for NZ see NZ paper to NOHSC seminar on GHS as per FN 72.

⁷² For further information on the New Zealand experience refer to the paper presented to the 2002 Seminar 'The GHS of classification and labelling of chemicals and its implementation in Australia and overseas' by

the NZ representative. Hannah, D. *Adoption and Implementation of GHS in New Zealand*. Papers available from NOHSC.

⁷³ Productivity Commission.(2003) *Evaluation of the Mutual Recognition Schemes*. Draft Research Report.

⁷⁴ *ibid* p134

⁷⁵ Moller, J (2002) *Adelaide Safe Community*. A vision for a safer future. Unpublished report prepared for SA WorkCover. For more information about the SA WorkCover Safe communities initiatives refer to WorkCover Corporation Health & Safety Bulletin 21 March 2003.

⁷⁶ *ibid*

⁷⁷ For further discussion see Walters D (1997) *The role of worker representation in health & safety in agriculture in Western Europe*. Labour education 1-2; Walters D (2001) *Health & safety in Small enterprises*. European Strategies for Managing Improvement. PIE Peter Lang. Brussels; & Proceedings of the 1997 Australian National Pesticide Risk Reduction Workshop organised by Bureau of Rural Sciences, AFFA

⁷⁸ See

<http://www.workcover.vic.gov.au/dir090/vwa/publica.nsf/Site+Search/575BB9E5BC5851454A256AA3001FA438>

⁷⁹ Nevertheless, success is far from guaranteed, and any initiatives should proceed slowly and on a limited geographical basis - seeking to gain wide stakeholder support before consideration is given to the introduction of any statutory underpinning.

⁸⁰ For more information about initiatives in each state go to the State OHS authority websites accessible through the NOHSC website Links (<http://www.nohsc.gov.au/OtherRelatedSites/>)

⁸¹ See in particular the Victorian ROPs program. See Woods B *Victoria's rollover subsidy – A safety success in the Proceedings of Farm Injury Prevention* 99.

⁸² Simpson S (1990) *Corporate Crime, Law and Social Control*, OUP, Ch 2.

⁸³ Woods (1999) *op cit*

⁸⁴ Walters, D *op cit* p93

⁸⁵ Walters *op cit*

⁸⁶ Personal communication, RIRDC meeting 2002.

⁸⁷ Tait J & Wield D (2001) *PITA Project: Policy Influences on technology for agriculture: Chemicals, biotechnology & seeds*. Final report. TSER Program. European Commission-DG XII p19

⁸⁸ The name change also extends internationally to all the regional bodies.

⁸⁹ Editorial Agrolinks 4, 1. March 2002. p3. For further discussion see Tait & Wield (2001) *op cit* and Tait J (2000) *How are governments influencing innovations & uptake of technologies for sustainable farming systems: pesticides and biotechnology*. Proceedings of Wageningen Workshop. Adoption of technologies for sustainable farming systems. OECD Paris

⁹⁰ Personal discussions with industry representatives and material in organisational publications.

⁹¹ Allen Consulting (2002) *op cit*. It should also be noted that Australian registration may be sought regardless of a low return on local sales if it provides a market advantage internationally.

⁹² For further discussion refer initially to Williams R & Walcott J (2002) *Sustainable agriculture – using best practice to manage the paradoxes facing land managers and agronomists*. Proceedings of Australian Agronomy Conference.

⁹³ See Parker (2000) *op cit*

⁹⁴ Morgan W (2003) *Communication with Asian non-English speaking background vegetable growers*. A pilot project for adoption of best practice. Publication 03/034. RIRDC Canberra.

⁹⁵ Programs funded by Australian Greenhouse Office and conducted collaboratively at regional level though local government to make industry bodies and individuals more aware of the impact of their activity on the generation of greenhouse gas pollution.

⁹⁶ The information/advisory role of OHS field officers and inspectors in rural areas has generally been limited to training sessions at rural events and provision of printed materials and, more recently, referral to electronic sources for advice and compliance information. The issue of limited and expensive access to telephone and internet services is also a major barrier to information access for rural communities, particularly remote communities and farms. It has been the subject of a number of inquiries and will not be further discussed here.

⁹⁷ Personal communication, Shepparton 2002

⁹⁸ See <http://www.amvac-chemical.com>

- ⁹⁹ APVMA (2002) *Reconsiderations of the approvals & registrations associated with the organophosphorous insecticide Mevinphos. Supplementary Review Summary at*
<http://www.apvma.gov.au/chemrev/mvnphsrev.pdf>
- ¹⁰⁰ Turner (2003) *op cit* p11
- ¹⁰¹ For more information about the role and activity of Crop Protection Approvals refer to the website
<http://www.cpaltd.com.au/>
- ¹⁰² For more information about the TGA orphan drugs program see
<http://www.health.gov.au/tga/docs/html/orphan.htm>
- ¹⁰³ For further information on FQPA see <http://www.epa.gov/opppsps1/fqpa/>.
- ¹⁰⁴ Tait (2000) *op cit* p77
- ¹⁰⁵ Press release & speeches at
<http://europa.eu.int/comm/enterprise/chemicals/chempol/whitepaper/reach.htm>
- ¹⁰⁶ Information summarised from US EPA website
<http://www.epa.gov/oppead1/fqpa/backgrnd.htm#implementation>
- ¹⁰⁷ For more information on the industrialisation of Australian agriculture and its socio-economic impacts refer initially to Lockie S & Bourke L Eds (2001) *Ruralities Bites. The social & environmental transformation of rural Australia*. Pluto Press Australia Sydney; & Black A et al (2000) *rural communities and rural social issues: priorities for research*. RIRDC. Canberra
- ¹⁰⁸ Summarised from ABS statistics.
- ¹⁰⁹ There is also an increase in corporate farming ie one company owns and controls the whole process of production and distribution in for example feedlot production of beef and large-scale production of pork Burch R & Rickson R *Industrialised Agriculture: Agri-business, input-dependency, & vertical integration in* Lockie & Bourke (2001) *Ruralities Bites* *op cit*
- ¹¹⁰ Also significantly favours larger farming businesses that can reliably deliver large volumes of consistent quality produce over extended periods – contributing to trend mentioned earlier. Risk is even further minimised when contracting is done through wholesale agents/category managers who source produce from a range of areas and growers.
- ¹¹¹ Editorial Agrolinks 4(1) 3
- ¹¹² See for example the Woolworths requirements for suppliers of fresh foods who must standards required to gain the Woolworths Vendor Quality Management Standard (WVQMS) certification.
<http://www.woolworths.com.au/vendors/vendorguide/index.asp>
- ¹¹³ The Australian food export trade is dominated by commodity exports to a limited group of APEC trading partners (accounting for around two-thirds of Australian food exports). The main growth is in export of fresh food which must comply with national and international standards requiring implementation of externally monitored QA programs.
- ¹¹⁴ Eurepgap Protocol for Fresh fruit and Vegetables. 2 September 2001. Foodplus Germany.
<http://www.eurep.org>
- ¹¹⁵ Avcare Insights 2001 Vol 1
- ¹¹⁶ Personal communication, Shepparton 2002.
- ¹¹⁷ Eurepgap (2001) *op cit*
- ¹¹⁸ This development is also a response to concern over GM foods and represents a way of keeping the two systems – GM and non-GM – separate in the supply chain .
- ¹¹⁹ For more information see <http://www.ehi.org/arbeitskreise/seiten/eurep-ak-eurep.htm>; and
http://www.eurep.org/download/EUREPGAP_CC/EUREPGAP-CC-V-0-3a_150101-KM.doc.pdf
- ¹²⁰ EUREPGAP (2001) *Protocol for Fresh fruit and Vegetables*.
- ¹²¹ Fox T "Supermarket Squeeze" *Tomorrow*, September/October, 2000, pp 24,
- ¹²² Marsden T & Bristow G (2000) *Food supply Chain Approaches: exploring their role in rural development*. *Sociologia Ruralis* 40(4) pp424-38
- ¹²³ Hoy A, (2002) *Meat & True Veg Bulletin* 21/5/2002 pp22-27
- ¹²⁴ *Australian Table* is a food and lifestyle magazine available at Coles supermarket checkouts
- ¹²⁵ Information from various websites concerned with Farmers Markets including
<http://www.hydroponics.com.au>, <http://www.thepaper.org.au> (Edition 033), <http://bulletin.ninemsn.com.au> (Edition 15/5/2003)
- ¹²⁶ For more information on farmers markets see Hoy A (2002) *Meat & True Veg Bulletin* 21/5/2002 pp22-27

¹²⁷ See European Union Corporate Social Responsibility Main Issues at http://www.europa.eu.int/rapid/start/cgi/questen.ksh?p_action.gettxt=gt&doc=MEMO/02/153|0|RAPID&lg=E N. John Elkington Cannibals with Forks: The Triple Bottom Line of 21st Century Business, Capstone, UK, 1997, was the catalyst for many of the subsequent developments in this area.

¹²⁸ A 2003 RIRDC study of R&D funding for the organic industry concluded that "the total amount spent on R&D into organic agriculture in Australia falls well short of the \$656,200, the amount collected from organic farmers and matched with Commonwealth contributions (in 2000-01)" RIRDC (2003) Organic Agriculture in Australia. Levies & Expenditures.

¹²⁹ *ibid.* The feasibility and profitability of organic farming on a larger scale, continues to be a matter of contention.

¹³⁰ Between 1990 and 1995, the number of certified organic growers in Australia increased by 57% (from 491 to 862) and is estimated to grow by another 40% by 2006. Lockie S (2001) Positive Futures for Rural Australia in Lockie & borke (2001) op cit p294

¹³¹ NFF Press Release NR51/2002 1/7/02 Farmers seek fair access to collective negotiations. In response to the 2002 government review of the Trade Practices Act, made the point that "... many farmers believe that they are getting ripped off and have no power against the major retailers and other purchasers of their product." To counter this, the NFF proposed that the current legislation (which prevents individual farmers working together to negotiate better deals for their produce) be amended to allow farmers to collectively negotiate for better returns for their produce and to protect farmers and small businesses against the abuse of market power.

¹³² NFF Media Release 16/4/2003

¹³³ See for example, S C Winter and P May "The Role of Information and Interest-Organisations in Fostering Environmental Regulatory Compliance" Paper presented to Law and Society Association and Research Committee on Sociology of Law, Budapest, Hungary, July 4-7, 2001.

¹³⁴ See generally, N Gunningham and D Sinclair Leaders and Laggards: Next Generation Environmental Regulation, Greenleaf, UK, Ch 2.

¹³⁵ Day L & Rechnitzer G (1999) Evaluation of the tractor rollover protective structure rebate scheme. At <http://www.whs.qld.gov.au/conference/rural99/rural9911.pdf>

¹³⁶ Woods, op. cit.

¹³⁷ Source: John Dawson, Chair, Farmsafe Victoria

¹³⁸ Day & Rechnitzer op. cit.

¹³⁹ Although NOHSC is a member of the Farmsafe Australia board, it did not regularly participate in Farmsafe meetings or activities over several years other than for a brief period in 2002 prior to when it provided funding and management assistance for a 6/9 month period.

¹⁴⁰ Based on information provided in personal conversation 13/5/03 with Dennis O'Leary AVPMA PR Manager. The Community Consultative Committee's role is limited to provision of recommendations to the Board on issues related to the technical role of the APVMA (eg registration of specific chemicals, establishment of adverse events register for pesticides). Policy functions rest within the AVCPC (Agvet Chemicals Policy Committee), a national committee of agriculture departments and CSIRO, situated in AFFA. The 2002 revamp of AVCPC resulted in the removal of all other portfolios (Health, EA, NGOs) into subordinate advisory bodies from whence communication is only through 'channels' - significantly limiting their influence on policy development.

¹⁴¹ For example, the influence of the national and State Farmers Federations has been a major factor shaping government policy on agricultural OHS towards reliance on information and training rather than regulation. Unions' ongoing strong advocacy for improved workplace safety in sectors such as shearing was reflected when the newly elected Victorian ALP government's more recently improved allocation of resources to agricultural OHS. The main and most significant difference is an essentially ideological one with major regulatory implications – industry association support for self-regulation or co-regulation and union support for stronger government regulation in OHS.

¹⁴² See generally N Gunningham and P Grabosky Smart Regulation: Designing Environmental Policy OUP, 1998, Ch 4.

¹⁴³ *Ibid* pp50-56

¹⁴⁴ Lonti and Verma cited in Leaders and Laggards op cit Ch 2.

¹⁴⁵ N Gunningham and D Sinclair Leaders and Laggards: Next Generation Environmental Regulation Greenleaf, UK 2002, Ch 2.

¹⁴⁶ Thrupp LA *New Partnerships for Sustainable Agriculture* World Resources Institute, Washington DC, 1996.

¹⁴⁷ *Ibid* pp, 14, 17)

¹⁴⁸ For a fuller discussion see N Gunningham and D Sinclair *Environmental Partnerships: Combining Sustainability and Commercial Advantage in the Agricultural Sector*, Report to RIRDC, 2001, Chap 6.

¹⁴⁹ Benbrook, *Attainment of 1997 Industry-Wide Pesticide Risk Reduction Goals*, Technical Report to WWF and WPVGA, unpublished.

¹⁵⁰ *ibid*.

¹⁵¹ <http://www.pmac.net/wwfwpvga/actvties.htm>

¹⁵² *ibid*

¹⁵³ Wisconsin Potato Growers Cut Toxic Pesticide Use by 25 Percent, Press Release, WWF, 15 June, 1998.

¹⁵⁴ See N Gunningham and D Sinclair *Leaders and Laggards: Next Generation Environmental Regulation*, Greenleaf, UK, 2002, Ch 5.

¹⁵⁵ (Sabel C, Fung A, and Karkkainen B *After Backyard Environmentalism* Boston, MA, Beacon Press, 2000.

¹⁵⁶ Kleindorfer P and Orts E *Informational Regulation of Risks* (Working Paper. Philadelphia, PA, Wharton School, University of Pennsylvania 1996).

¹⁵⁷ Kleindorfer P and Orts E *Informational Regulation of Risks* (Working Paper. Philadelphia, PA, Wharton School, University of Pennsylvania 1996: 1).

¹⁵⁸ See Gunningham N, Kagan R and Thornton D, *Shades of Green: Business, Regulation and Environment*, Stanford University Press, 2003, chs 3 and 4.

¹⁵⁹ From Radcliffe (op cit)