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**ETHICAL PESTICIDE POLICY:
BEYOND RISK ASSESSMENT**

MERIEL ANNE WATTS

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Abstract

This thesis sets out to develop a pesticide policy process that is ethical, one that fairly addresses the needs of society whilst at the same time minimizing the impact of pesticides on nature. The process that is developed here is context dependent: it is not a prescription for all public policy processes, but one specifically for pesticides in one country at a particular period in time. Nevertheless, the general principles are widely applicable to other areas of policy, particularly those involving technological risks, and to other countries. Much of the material used is drawn from the New Zealand experience, with two major exceptions: United States data is used to describe the toxicological risk assessment process and its failures, and studies conducted in Asia are used to illustrate community participatory research. The development of Auckland City's Weed Management Policy is used to illustrate the potential of the proposed approach to pesticide policy.

It is argued that the reductionist science of toxicology, on which current pesticide policy heavily depends, fails to accurately predict the effects of pesticides on human health and on the environment. It is shown to be based on a particular set of values that cannot be said to represent those of society in general. These two factors contribute significantly to the differences in the acceptability of risks from pesticides by lay people and by technical experts. There are also gender and race differences in assessment of risk.

It is argued that to base pesticide policy on toxicology is irrational because this science fails to incorporate ecological rationality, i.e. the interconnectedness of nature, and social rationality. It is also argued that pesticide policy based on the anthropocentric approach of the domination of nature, which broadly underlies the mechanistic worldview of science, is unethical because it fails to take into account the needs and interests of nonhuman nature. Ethical pesticide policy is therefore based on ecological rationality (as well as social rationality) and a recognition of the intrinsic interests of nature, both aspects of an ecocentric ethic. The ecocentric ethic is practically applied to pesticide policy processes by using the decision rule of the principle of minimum harm, which is an expression of the precautionary approach.

The objectivity and cultural authority of science are challenged and the way is cleared for the introduction of other knowledge into the ethical pesticide policy process. It is scientism, not science that is rejected, and science takes its place alongside other knowledge systems. Wisdom is incorporated into the policy process by including the knowledge of members of the community and of public interest groups who have

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understanding and experience of the effects of pesticides, and also the management of pest, weeds and disease in agri-ecosystems in ways that minimize harm to nonhuman nature, principally by the methods of organic agriculture and natural farming.

Democracy is improved by including in the decision-making those who lie in the path of the policy: public interest groups that bring expertise, experience, and social values, farming interest groups that bring the views of those who use pesticides and those who manage the agri-ecosystem without them, and the appropriate bureaucrats. The pesticide industry is not included in the decision-making group for ethical reasons. The tripartite approach is augmented by a person representing the interests of nonhuman nature, an ecocentrist whose role it is to ensure that the principle of minimum harm is adequately applied. This is an acknowledgement of the need for considerable attitudinal change, particularly on the part of bureaucrats and pesticide users, in order that the ethical pesticide policy process lives up to its potential. Distributional justice issues are addressed by requiring that the policy decision-making group consists of 50 percent women/50 percent men, and 50 percent pakeha/50 percent Maori, to reflect firstly the gender differences in the acceptability of risks from pesticides, and secondly the bi-cultural nature of New Zealand as afforded by the nation's founding legal document, the Treaty of Waitangi.

Supervisor: Dr Bruce Hucker

Academic Advisor: Ms Prue Taylor

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Abbreviations

ACVM	Agricultural Compounds and Veterinary Medicines: - Act 1997 - Group - Unit
ADI	acceptable daily intake
ADE	acceptable daily exposure
AGCARM	Agricultural Chemical and Animal Remedies Manufacturers Assoc.
AVMAC	Agricultural Compounds and Veterinary Medicines Advisory Group
BOD	biological oxygen demand
CACOChief	Agricultural Compounds Officer, Ministry of Agriculture
CDI	chronic daily intake
CNS	central nervous system
COD	chemical oxygen demand
DDT	Dichlorodiphenyltrichloroethane, an organochlorine insecticide
DES	diethylstilbesterol
DoC	Department of Conservation
EC50	environmental concentration of a pesticide required to kill 50 percent of a test population
EDSTAC	Endocrine Disruptor Screening and Testing Advisory Committee
ERMA	Environmental Risk Management Authority
FMFAF	Federal Ministry of Food, Agriculture and Forestry, Germany
FQPA	Food Quality and Protection Act 1996 (USA)
GATT	General Agreement on Tariffs and Trade
HortResearch	Horticulture and Food Research Institute of New Zealand Ltd
HQ	hazard quotient
HSNO	Hazardous Substances and New Organisms (Act 1996)
IDS	integrated defense systems
IPCS	International Programme on Chemical Safety.
IPM	integrated pest management
IUCN	International Union for the Conservation of Nature
IWMCS	Interagency Workgroup on Multiple Chemical Sensitivity
LC50	concentration of a pesticide required to kill 50 percent of a test population
LD50	dose of a pesticide required to kill 50 percent of a test population
LOEL	lowest observed effects level

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MAF	Ministry of Agriculture, and variously Fisheries or Forestry depending on date
MCS	multiple chemical sensitivity
MfE	Ministry for the Environment
MoH	Ministry of Health
M-WRC	Manawatu-Wanganui Regional Council
NOAEL	no observed adverse effects level
NOEL	no observed effects level
NRDC	Natural Resources Defence Council
NRC	National Research Council
NAS	National Academy of Science
OECD	Organization for Economic and Cultural Development
PAN NA	Pesticide Action Network North America
P/CCRARM	Presidential/Congressional Commission on Risk Assessment and Risk Management
PCP	pentachlorophenol, an organochlorine wood treatment pesticide
PHC	Public Health Commission Rangapu Hauora Tumatanui.
ppm	parts per million
ppb	parts per billion
PRS	pesticide rating system
RfD	reference dose
RMA	Resource Management Act 1991
SF	slope factor
TEL	tolerable exposure limits
TWPCRASC	Technical Working Party on Carcinogen Risk Assessment for Soil Contaminants
TT-WTWT	Talking Technology – Whiriwhiri Tahi, Whakatau Tahi
US EPA	United States Environmental Protection Agency
US FDA	United States Food and Drug Administration
WHO	World Health Organization

Glossary of Māori words and terms

The definitions given below are those provided by Williams' (1975) Dictionary of the Māori Language, unless otherwise specified, in which case the meaning provided is consistent with the context within which the word or expression was used.

Hapu	sub-tribe
Kaitiakitanga	the exercise of guardianship by the tangata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources; and includes the ethic of stewardship (Resource Management Amendment Act 1997, section 2(4)).
Karakia	a form of spiritual expression (Jarman <i>et al.</i> 1996)
Mana	vested with authority, influence or power
Mana putaiāo	interpersonal responsibility (Jarman <i>et al.</i> 1996)
Mana tangata	personal integrity, described by Jarman <i>et al.</i> (1996) as ensuring that "our actions have significance and we do not entertain wanton and callous destruction, or depletion of resources simply because we have a short term 'need'" (p.94).
Mana whenua	having authority over the land
Mauri	life principle
Mauriora	life principle, same as mauri.
Pakeha	person of European descent
Papatuanuku	Earthmother (Jarman <i>et al.</i> 1996)
Taonga	highly prized, treasure
Tangata whenua	local people, literally people of the land
Tapu	under a restriction of a religious nature, often referred to as sacred
Tikanga Māori	cultural and spiritual norms; defined by the RMA as meaning Māori customary values and practices
Tino rangatiratanga	an obligation, a duty and a commitment to interact with our world in the most responsible and appropriate way we see fit, in order to fulfil our needs (Jarman <i>et al.</i> 1996).
Tipuna	ancestor, same meaning as tupuna
Tupuna Māori	ancestors of the Māori people
Waahi tapu	sacred place
Whakapapa	common descent (Jarman <i>et al.</i> 1996)
Whanaungatanga	kinship-like relatedness (Jarman <i>et al.</i> 1996)