

# Unwanted Agrichemicals in New Zealand: Collection and Disposal

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## INTRODUCTION

New Zealand has something of an international reputation for being "clean and green". In part this reflects its geography. Although it has the same land area as the United Kingdom, New Zealand is relatively sparsely populated (3.5 million people) and its small industrial sector is dwarfed by the primary, agricultural sector. As a consequence, its unique geographic and economic characteristics impact on its waste management, so that it faces a different overall waste stream to many developed countries with which it identifies culturally and economically. Addressing specific waste management issues highlights some of the wider waste management policy issues relevant to New Zealand.

One of these issues has been the management of unwanted agrichemicals stored on farms around New Zealand. A recent collection of these chemicals by the Manawatu-Wanganui Regional Council highlights special waste management issues faced by waste managers in smaller countries, while raising some questions about wider, international, waste management policy.

## NEED FOR COLLECTING UNWANTED CHEMICALS

Pastoral farming has formed the backbone of New Zealand's economy since European colonisation last Century. Even now, it is a substantial part of the economy and landscape (with 50 million sheep and 5 million cattle).

Post-war economic growth was based significantly on increasing efficient pastoral farming practice, including extensive use of the then new organochlorine chemicals, including DDT, Dieldrin and Lindane. Although extremely successful agrichemicals in terms of reducing pasture loss from insects, their environmental impacts, especially bioaccumulation and magnification through the food-chain, were begun to be recognised from the 1950's.

At the same time, international resistance to their use grew. Consequent tightening of residual chemical levels in produce by export markets resulted in these chemicals being phased out of use. This culminated in a national recall in the early 1960's.

Anecdotal evidence to several Regional Councils suggested quantities of these chemicals, along with other more modern chemicals had accumulated on farms. This occurred for various reasons, some farmers missing the initial collection, and changing land-use and ownership. The primary concern was the chemicals would eventually enter the

wider environment from disposal in farm dumps or municipal land-fills, or from accidental spills as containers corroded or broke open when shifted.

While the total volume of chemicals was believed to be small compared to total historic use, collection was considered worthwhile for several reasons:

*Environmental effects:* organochlorine chemicals are environmentally persistent and biomagnify through the food chain, threatening higher trophic level species;

*Economic effects:* accidentally contaminated produce would jeopardise primary produce exports. Farm exports have been subjected to import restrictions by importing countries trying to protect their own internal producers from aggressive New Zealand sales. The use of "eco-barriers", whereby countries try to restrict imports by applying excessively strict (especially when compared to domestic requirements) chemical contamination levels is expected to increase in the post-GATT world economy and is seen as a real threat to export markets; and

*Human health effects:* pesticides are designed to kill, and there are reported and anecdotal incidents of accidental poisonings on farms resulting from mis-labelled or wrongly stored agrichemicals.

## CONSTRAINTS

Although the issue of a "chemical time-bomb" down on the farm had been raised at several times, little action had been taken to address it, either by government or the farmers themselves. Subsequent discussion showed although farmers knew they had chemical stockpiles, they held back from for several reasons, including:

- chemicals were often unidentifiable, as the labels had perished (snails ate many), or the chemicals were not in original containers. Some chemicals were left when a farm was sold or the farmer died, so that knowledge about the chemicals' identity was lost;
- ack of appropriate facilities with which to dispose of the chemicals, even if their identity was known. Until recently, with developments such as the American base-catalysed destruction (BCD), the only acceptable destruction process for organochlorines was high temperature incineration. However, no authorised high temperature incinerators exist in either New Zealand or wider South Pacific which could be used.

## COLLECTION

Several Regional Councils, which have policy and regulatory responsibility for natural and physical resource management in New Zealand, have addressed the issue of on-farm chemicals in their Regions. The rationale has been to manage risk by concentrating the chemicals at a few sites in managed situations, rather than leaving them scattered on farms in their regions.

Councils showed some caution, reflecting logistical concerns involved in collecting the chemicals, and also initial concerns that environmental groups could protest the collection and disposal of the chemicals. However, after trials were carried out by a few Regional Councils, the definitive model for collection was trialled under the direction of the author by the Waikato Regional Council, which with refinement has been used subsequently as a model for all other Councils.

The elements of this are:

- the chemicals are collected from farms by a dedicated collector with fully equipped vehicle, as opposed to farmers bringing chemicals to a central depot themselves. This ensures safe handling and treatment;
- district by district collection, with strong local identification and involvement by local people to encourage participation;
- high local public profile and publicity to encourage participation, especially as many farmers were embarrassed to admitting to having stockpiles; and
- practical farm chemical education at the farm, with the collector demonstrating safe chemical handling, safety equipment, and triple rinsing of containers.

This was achieved through:

- running high, targeted public awareness campaigns to increase awareness of the collection through media releases, talks to groups, information drops, posters and displays at livestock sale-yards and pubs, meetings with farmer groups, and distribution of newsletters through rural schools. Pamphlets were also translated into Chinese for distribution when targeting Chinese immigrant farmers in the market gardening districts;
- mailing every farm in the collection district a reply-paid post card enabling registration for collection;
- emphasising the collection was once-only, confidential, and free; and

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- forming local co-ordinating groups, involving prominent farmers, and representatives from Federate Farmers and Women's Division Federated Farmers (farm lobby groups), the local district council, farm industry, Ministry of Agriculture, and local Iwi (indigenous Maori tribal groups). These groups had local knowledge about best places to display information, where to hold meetings, people who should be contacted and so on. Often, they would canvas support for the collection among local farmers.

The collected chemicals were taken to a central depot for sorting, bulking and repackaging where appropriate, and storage for identification where necessary, and disposal.

## RESULTS

The results of the Manawatu-Wanganui Regional Council's collection provide typical results of these collections. The Region is some 22,000 square kilometres in the lower North Island, with a population of 226,000 and some 6,000 farms.

Over the 1995/96 year the Council mounted seven district collections within its Region. Some 57 tonnes of chemicals were collected from 1,200 farms in the Region. This averages some 46 kg per farm which significantly exceeded predicted quantities and reflects difficulties in making projections in this type of work.

Participation rates were high, with some 17% of farms providing chemicals. Previous work by Waikato Regional Council which has a similar agricultural composition suggests over 80% of farms with unwanted chemicals would therefore have been involved.

A wide range of chemicals were collected, with differing toxicity. These ranged from organochlorines such as DDT, to calcium cyanide powder used to kill rabbits, strychnine, and tear gas used for glass-house fumigation (table 1). Quantities of other hazardous chemicals, such as swimming pool chlorine were also collected. Accordingly, special care had to be taken at all times to protect workers and to avoid any hazardous incidents during handling, transport and storage.

As could be expected, volumes and types of chemicals collected differed among the districts, reflecting differing land-uses. For example, the market-gardening district of Horowhenua provided mainly horticultural

compounds: The extensive farming districts of Ruapehu and Taranaki delivered significant quantities of DDT used to kill grass grub, and arsenical compounds used for sheep dips.

Many chemicals were old but often well stored in their original packaging. The organochlorines must all be at least 35 years old, given the ban on their use was made in 1961. However, many modern chemicals were also collected, reflecting changes in land-use (e.g. from extensive to intensive farming or small lifestyle blocks,) or chemicals use regimes when more modern and effective substitutes became available.

5.5 tonnes of unidentified chemicals were also collected. These caused considerable difficulties. As an occupational safety measure, they had to be treated as extremely hazardous to minimise risk. Also, they need to be identified so that they can be disposed of safely, which is expensive.

## DISPOSAL

Cost effective disposal of the chemicals was and remains difficult. Many chemicals collected were modern and continue to be used in New Zealand. Where possible these were reissued to farmers showing they had the need and capacity to use them. Other chemicals were sprayed onto waste land.

However, this still left some 28 tonnes of chemicals requiring special treatment and disposal. Of these, some 8 tonnes of organochlorines and 4 tonnes of other chemicals are classed as intractable, as no facility in New Zealand is authorised or prepared to dispose of them. Indeed, hazardous waste disposal is nearly a monopoly in New Zealand offering limited range of services reflecting the relatively small quantities of hazardous waste generated in New Zealand and the consequent lack of investment in this sector. These chemicals are stored pending arrangements for disposal.

The Manawatu-Wanganui Regional Council is arranging disposal of these chemicals on behalf of the other Councils. An international call for registration of interest has identified several firms in OECD countries capable of destroying the chemicals. However the Councils face environmental lobby and bureaucratic challenges resulting from the Basel Convention on the Transboundary Movement and Disposal of Hazardous Wastes.

A high profile environmentalist lobby group opposes both incineration and export of hazardous wastes on principle and calls for national self-sufficiency for hazardous waste disposal. It claims support for the last two issues citing the Basel. Officials remain more concerned with working through the labyrinthine requirements of the Convention, given the number of transit stops any ship would make on its way half way around the world to a disposal facility.

These issues underline the need to think carefully about hazardous waste disposal in "small" countries and the appropriateness of self-sufficient solutions. The agrichemical collection addressed a legacy issue, and a

future national stockpile is considered unlikely given modern farm practices and chemicals use. Also, moves to cleaner production and wider environmental management systems by New Zealand industry suggests future quantities of hazardous waste will diminish. Already, the New Zealand hazardous waste disposal market has already seen a rationalisation reflecting limited market opportunities.

The danger of insularity would be to deny easy access to appropriate disposal hazardous wastes facilities, encouraging firms and individuals to seek their own solutions with resultant environmental impacts. In this context, promoting international trade, perhaps in New Zealand's case with Australia, would be a more cost-effective policy.

## CONCLUSION

The experience of New Zealand Regional Councils suggests the character of individual countries, and of their constituent regions can vary such to require differing waste management approaches. The agrichemicals collections have shown people are concerned to do the right thing, and given the opportunity do so, but that some form of government intervention may be necessary to precipitate action.

In seeking affordable public policy solutions however, the scale of the issue may need to be addressed so that countries can facilitate free trade of hazardous waste to properly managed facilities. The Basel Convention does not appear to encourage this.

## Solid Waste Management Training Programmes

WEDC is again running its Diploma and Postgraduate Certificate programme in Solid Waste Management.

The programme is especially designed for a wide range of professionals – from engineers and scientists to environment health officers and managers. We particularly encourage municipal officers and employees in non-governmental organisations (NGOs), ministries and the private sector to participate.

The standard Diploma programme runs from 6 January to 22 March. WEDC Three Week Programmes run during the same period should shorter and intensive programmes better suit your training requirements.

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Table 1: Quantities of chemicals collected in the Manawatu-Wanganui Region (tonnes).

Arsenic	3.6
Dalapon	2.8
Formalin	0.9
MCPA+B	1.5
Paraquat	1.1
Simazine	0.9
24D	4.2
245T	1.5
Dieldrin	1.1
DDT	3.8
Lindane	1.1
PCP	0.6

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