

**Potential for the reuse
of unwanted agricultural
chemicals in the
Canterbury region**

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Potential of the Reuse of Unwanted Agricultural Chemicals in the Canterbury Region

***Results of a survey of farmers taken
during April 2002***

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Executive Summary - Agricultural Chemical Pilot Survey

Following a request by Environment Canterbury, a questionnaire was designed in association with the regional waste group staff, and a survey area carried out in Central and North Canterbury.

The aim of the survey was to investigate the potential for setting up a community-run agricultural chemical exchange, and determine whether two pilot studies should be carried out to assess the viability of such a scheme so that it should be applied elsewhere.

The only chemicals investigated were agricultural pesticides. Animal health products were excluded. It was thought that the repercussion of recycling them should some be incorrectly labelled was too high to consider as an option. In addition most of the animal health remedies have a relatively lower environmental hazard risk.

Forty sheep, beef and arable farmers in four groups were interviewed in the North Canterbury area. Two groups were members of a Landcare group while the other were outside Landcare groupings. Storage facilities inspected and a record of chemicals stored on farm were taken. This was broken up into pesticides that were stored for future use, those that could be recycled, and those that were redundant i.e. withdrawn, banned or severely restricted in use.

The farms had been in the present ownership for 20 years on average, allowing plenty of time for unused chemicals be accumulate on farms.

The number of Growsafe registered farmers was low with only 11 being registered (1 commercial applicator). Farmers, other than in the Mavern Landcare, either used contractors, or not were required to be registered as they were not supplying either processors or supermarkets.

There was a wide range of storage facilities, and usually animal health products were in a separate facility to agricultural pesticides. 87% were more than 30 m from the nearest water and above the water source, 52% were secure (locked), 20 % could be locked, and 28 % open sheds. The Landcare groups had on average a higher level of security than the other groups.

Only 3 (7.5%) of the sheds had bunding which would prevent spillages, but in the inspection I did not note any evidence of spillages. Generally the high cost of chemicals meant that farmers were careful with product. 60% of the floors were impermeable (concrete) and the balance were wood, linoleum, or packed earth. 82.5% of the sheds were enclosed, and in the balance the chemicals were stored in the back of open sheds out of rain and sun. Ventilation was normally windows or door, and none had forced ventilation. Few of the sheds had Hazchem signs on them as farmers considered that the signs were a invitation to thieves that valuable chemicals were on hand.

Container condition and labelling was good with all recent chemicals being in good conditions and readable, although some of the older chemicals (mainly redundant, withdrawn, or severely restricted) were average in both condition and labelling.

The layout and separation was generally good, but there are few oxidising agricultural chemicals, and no pool chlorine was seen in the inspections.

Most properties had minimal safety equipment, (usually impermeable gloves, and waterproof clothing) but arable farms usually had respirators on hand or in the spray truck.

No farms had a spill kit, and felt procedures and the cost of chemicals minimised the amount of potential for spill.

No farms had chemical record sheets, and while they considered them a good idea, few thought that they would maintain one. Many farms are required to maintain chemical use diaries for the processing companies.

All farmers were concerned about empty drum disposal, considering it a waste to burn a well designed and manufactured article. Most triple rinse and burn on a hot fire, and the only Agcarm incinerator was in poor condition. Generally there were few dumps of empty drums on farms. Setting up a recycling system for empty drums either for refill or else for re-manufacturing would be seen by most farmers as environmentally desirable. This would work best where large volumes of few chemicals were being used. (glyphosate, picloram, trimec, etc.) The plans of the Ministry for the Environment to ban the burning of plastic containers due to the release of dioxin into the air will mean that a viable option for recycling empty chemical containers will be required.

No farms had a dedicated filling and mixing area. Usually the chemicals would be taken to the area to be sprayed, and the chemicals diluted on site, whether on a crop or for scrub. This does reduce the potential for accidents on route, and if spillages occurred then it would be where the chemicals were being applied, and not concentrated near homesteading.

67% of the farmers were in favour of reusing surplus agricultural chemicals, 62% were interested in supplying and 57% in accepting chemicals. The concern from farmers was that the chemical was true to label, or was from unopened containers, or was still effective as most chemicals do not have a "Use by date". Non Landcare groups were more interested in exchange of chemicals than the Landcare groups. The Sheep and Beef farms tended to have a limited range of chemicals that were used such as Brush weed killers, and glyphosate and most farmers only buy what they need, carrying over surpluses from one season to the next, and consequently do not have chemicals for exchange for re-use. A number of cropping farmers considered the risk of crop injury was too great to consider using any chemical other than out of a sealed container.

It would be a requirement of any exchange that a statutory declaration was signed that the chemical was offered *as is*, and that there was no comeback on the donating farmer, the council, or associated people should the chemical not be true to label.

Of the total amount of agricultural chemicals on farm (estimated at 8.1 tonnes) only a relatively small portion (300 kg) is available for exchange. These chemicals tend to be specific for cropping, and are normally specific for a particular crop, and in many cases are for a small quantity. Therefore based on the information collected I do not recommend that a recycling system for unused agricultural chemicals be set up, although there may be individual cases where it may be possible. Where properties are sold, or when there is a change of landuse such as cropping to dairying, then an exchange could be considered. A

commercial collection scheme for disposal should be considered, leaving reuse on a farmer to farmer basis or else on a Landcare grouping basis.

1100 kg of redundant chemicals was identified, generally organochlorine (DDT, Dieldren, or Lindane) The largest single amount was about 750 kg of 20% Lindane prills. It would be desirable to establish a collection system for these chemicals as they are only going to stay on farms as the farmers can see no way of getting rid of them. There is a risk that these chemicals could get into the environment in time as containers degrade (as most of them are metal or paper). When farms change hand, the redundant chemicals either get sold at the clearing sale, get dumped somewhere, or occasionally are left at the back of a shed. The average amount of chemical was 22 kg/farm, but if the large store of about 750 kg was excluded as a one off then the average was only 3.8 kg/property.

Selling surplus chemicals at auction at clearing sales, is of concern as redundant chemicals and chemicals of doubtful quality often may be sold. A collection of all surplus chemicals at sale time would be useful in reducing the surplus chemicals in circulation.

The survey has indicated that

- the storage of agricultural chemicals is probably better than thought, but there are a few instances where improvements could be made.
- there is no big difference between Landcare and non Landcare properties.
- arable farmers have a wider range of chemicals than sheep and beef farmers.
- farmers are aware of the need to be careful with agricultural chemicals, both from a personal and environmental perspective, and are concerned about careful use.
- there is a definite need for a commercial collection of redundant, withdrawn, and restricted chemicals to minimise the risk to the environment. The amount of chemical is probably less than expected but there are a few instances where there is a significant amount.
- that farmers are keen to see recycling or re-manufacturing of empty containers. This could reduce the pollution of burning plastic containers on farms.
- that there is limited opportunity for recycling unused chemicals, and that may be best on a one to one basis. Including small amounts of useable chemicals with the collection of redundant chemicals for disposal could be considered.

Agricultural Chemical Waste Survey Pilot Study

Introduction

The Canterbury Councils have developed a regional hazardous waste management strategy that aims to improve the management of hazardous wastes within Canterbury.

The Councils include

- Ashburton District Council
- Banks Peninsula District Council
- Environment Canterbury
- Christchurch City Council
- Hurunui District Council
- Kaikoura District Council
- Mackenzie District Council
- Selwyn District Council
- Timaru District Council
- Waimakariri District Council
- Waimate District Council

The Strategy has identified seven priority waste streams one of which is agricultural chemical waste. There is a potential to reduce the risk of contamination of the environment, by reducing the amount of unwanted chemicals that remains in storage on farms.

Agricultural chemicals can be broken into those that are surplus to requirements, i.e. the container size is greater than is required for the specific purpose, those that are no longer used due to change in farming patterns (move from cropping to pastoral), and those that are outdated and cannot be used. Typical of the latter are organochlorines (DDT, dieldrin etc.).

In addition on a number of farms, small amounts of chemical are in storage, which have been left over from previous seasons, and a newer, or better chemical becomes available, so that it is not practicable to use a small amount when the farmer is looking at spraying all the crop with one particular chemical.

Many of the liquid chemicals presently in use in New Zealand are in 5, 10, 20, or 200 litre containers. Situations will arise where the correct amount of chemical for a particular situation is greater than 5 litres but less than 10 litres and the surplus is carried over to the following season. The farmer expects to use the surplus the following year but with changes in crop demand, the chemical stays in storage. Examples such as growing of onions for export, niche crops of beet and radish are typical examples.

On many commercial farms there are stocks of unused chemicals, which are the result of the above or sometimes the farmer is sold more chemical without realising that there are stocks of the same chemical already on the property.

Survey

Following a request from Environment Canterbury, a questionnaire was designed in association with regional waste group staff, and a survey area carried out in Central and North Canterbury.

The aim of the survey was to investigate the potential for setting up a community-run unwanted agrichemical exchange, and determine whether two pilot studies should be carried out to assess the viability of such a scheme so that it could be applied elsewhere.

The chemicals investigated were only agricultural pesticides and exclude animal health products. It was thought that the repercussions of recycling animal health products should some be incorrectly labelled were too high to consider the option. In addition most of the animal health remedies have a relatively lower environmental hazard risk.

In addition a list of the types of chemicals held on properties was collected, excluding domestic chemicals, along with condition of containers, labels, storage conditions etc.

The pilot survey covered 40 farms between the Rakaia River up to the Conway River. Ten farms in each of the following classes were surveyed to identify if there were significant differences between pastoral or arable, or between Landcare and others.

Malvern Landcare Cropping
North Canterbury Mixed Cropping
Central Canterbury Sheep and Beef
Coastal Conway Landcare Sheep and Beef.

Respondents names were either obtained from the Landcare chairmen, or in the case of the other groups, from personal contacts.

Each property had a personal visit, a questionnaire completed, and the chemical storage inspected, and a record of agricultural chemicals on hand (including animal health remedies) made. Details were taken of redundant chemicals (e.g. those that were not reusable), chemicals surplus to requirements (unlikely to be used in the foreseeable future), and chemicals being stored for later use.

Of the 40 initial farmers contacted, only one was not prepared to have a visit, and a substitute farmer was used giving a 97.5% response of the original list
The answers and details were stored in a database (Access) and analysed using Access and Excel.

Survey Results and Discussion

All properties were contacted by telephone and then followed up by a farm visit when the storage facilities were inspected, and a list of the chemicals on hand either for use, exchange or redundant chemicals, taken.

Number of farms in each survey area

Survey area	Number
Coastal Conway Land Care	10
Malvern Land Care	10
Malvern Sheep and Beef	10
Rangiora Cropping	10

These were chosen on the premise that Landcare farmers would be more aware of environmental issues than non Landcare farmers, and the farm types reflected both cropping and sheep and beef for each area.

Farm types by survey areas

Survey area	Farm type	Number
Coastal Conway Land Care	Cattle/contractor	1
	Dairy goats & beef	1
	Sheep & Beef	7
	Sheep, beef & deer	1
Malvern Land Care	Arable	6
	Arable/pigs	1
	Arable/sheep	3
Malvern Sheep and Beef	Sheep	6
	Sheep/Beef	4
Rangiora Cropping	Arable/sheep	8
	Arable/sheep/cattle	2

The farm classes are representative of the types of farms that may be expected in the various areas, except that dairying has been excluded in the sample that was selected. The objective was to select properties where agricultural chemicals are more likely to have been used.

Average farm sizes, maximum and minimum (hectares)

Survey area	Average Area	Minimum	Maximum
Coastal Conway Land Care	1081.3	80	2000
Malvern Land Care	309.5	100	765
Malvern Sheep and Beef	301.5	160	438
Rangiora Cropping	201.7	42	350

The average area is typical of the type of properties in the various areas, and indicates that the sample is representative of the farms. Lifestyle blocks were not included in the sample, but it is expected that they would have little chemicals on hand.

Length of tenure on farms

Survey area	Av. Years on farm	Av. Years in family
Coastal Conway Land Care	12.7	24.3
Malvern Land Care	24.7	66.9
Malvern Sheep and Beef	22.9	39.4
Rangiora Cropping	21.7	46.8

The rationale for this question was that when farms change hands, there is normally a clearing sale so that no chemicals are normally taken over by the new owner, whereas when the farm changes hand from father to son, then the stocks of chemical normally are carried over. The exception to this is when a farm is sold as a going concern which is uncommon now. The farms had been in the present ownership on average for 20 years, allowing plenty of time for chemicals be accumulate, and 44 years when family succession was taken into account.

Growsafe registration

Growsafe is a training course that trains farmers or applicators in correct application, storage etc. Processing companies such as Heinz Wattie, Talley, etc., or some super markets require suppliers to have done the course. Wattie only grow crops south the Waimakariri River so that while 90% of the Malvern Land Care have Growsafe, few have on the north side of the river. In addition most of the Malvern Land Care farmers do their own spraying, while the rest use applicators, and only do a small amount of knapsack work.

Conversely most farmers that supply stock to processors are accredited suppliers and are required to have records of animal health products used, dates, batch numbers, with holding periods etc., and have their yards inspected at regular periods.

In addition the Malvern Landcare group organised their own Growsafe training programme which would account for the higher level of registration.

Number of Growsafe registered farmers

Farm code	Growsafe	Number	Level
Coastal Conway Land Care	Yes	1	Registered applicator
Malvern Land Care	Yes	9	Standard
Rangiora Cropping	No	1	Applying
Rangiora Cropping	Yes	1	Standard

Storage of Agricultural Chemicals

Properties that use a greater number or amount of chemicals tend to have dedicated storage facilities, while sheep and beef properties use existing storage such as garages. Malvern Land Care had 8 chemical shed or containers, out of 10 stores, while the rest had chemicals in a wide range of sheds.

Storage of agricultural chemicals

Where are chemicals kept	Count
Chemical shed & garage	1
Chemical shed	11
Container (shipping)	3
Garage	1
Grain shed	1
Granary	3
Hut	1
Implement shed	2
Lockup	1
Old shearing shed	1
Shearers quarters	1
Shed	1
Shed in yard	2
Shed, and around yards	1
Store shed	1
Toolshed	1
Tractor shed	1
Unused woolshed	1
Woolshed	3
Workshop	3

Storage of Animal Health remedies

The storage of animal health remedies usually is near or in shearing sheds as normally the yards are in close proximity, and in some cases the processors require that it is stored in the woolshed. Normally animal health products are less environmentally hazardous, and are less toxic to humans. In addition most properties stored less animal health remedies and used them more promptly after purchase.

Animal health storage

Animal health products	Count
Chemical shed	4
Garage	1
Granary	3
Hut	1
Implement shed	1
Old shearing shed	1
Pump shed	1
Shearing shed	3
Shed in yard	1
Store shed	1
Woolshed	21
Workshop	2

Interest in an exchange of surplus usable chemicals

The primary reason for the survey was to find out if farmers would be interested in participating in an unwanted chemical exchange of surplus agrochemical. In addition they were asked if they would be interested in either supplying chemicals or accepting them. The critical aspect in accepting chemicals was that it was true to label, or was unopened containers. A number of cropping farmers considered the risk of crop injury was too great to consider using any chemical other than out of a sealed container.

Generally few farmers had unused chemical that were unwanted as most would store chemicals until required, or else the chemicals had been superseded by better or more effective ones. The non Landcare groups were more interested in reuse of surplus chemicals than the Landcare.

Response to interest in reusing agricultural chemicals

Farm code	Response	Interested	Supplying	Accepting
Coastal Conway Land	Yes	5	3	4
	No	5	7	6
Malvern Land Care	Yes	6	6	6
	No	4	4	4
Malvern Sheep and Beef	Yes	7	7	4
	No	3	3	6
Rangiora Cropping	Yes	9	9	9
	No	1	1	1

Total chemicals held on farms including animal health remedies in the four groups was as follows.

Total number of chemicals stored on farms

Survey area	Count of different chemicals
Coastal Conway Land Care	74
Malvern Land Care	351
Malvern Sheep and Beef	114
Rangiora Cropping	303

Chemicals available for exchange

Trade name	Common name	Total	Unit
2,4-D ester	2,4-D ester	1	litres
Afalon	linuron	2	litres
Alloxyl	sedoxythym	500	ml
Atradex	atrazine	8	kg
Basagran	bentazone	4	litres
Carbendazim	carbendazim	1.5	litres
Champ	copper hydroxide	3	litres
Chlorotek	chlorothalonil	2	litres

Diazinon	diazinon	2	litres
Dicamba	Dicamba	3	litres
Dowpon	22 DPA	5	lbs
Feratox	Potassium cyanide	8	kg
Fodderkleen	Picloram/Nitrofen	5	litres
Foliar fertiliser		100	litres
Frontier	dimethemid	19	litres
Gallant	Haloxypop	5	litres
Gesagard		4	litres
Gesaprim	atrazine	3	lbs
Glean	chlorsulforon	100	gms
Gramavin	22 DPA	30	lbs
Kerb	propyzamide	2	litres
Ketstrepto	Streptomycin	6	kg
Kocide	Cupric hydroxide	15	kg
Lasso	alachlor	5	litres
Lexone	metribuzin	2	kg
Linuron	Linuron	2	kg
Magister	clomazone	1	litres
Metasystox	Demeton S Methyl	6	litres
Nortron	ethofumesate	5	litres
Phosdrin	Mevinphos	500	ml
Probe		1	kg
Sencor	metribuzin	2	kg
Stomp	pendimethalin	4	litres
Surflan	Oryzalin	5	litres
Thiovit	Sulphur	20	kg
Tiptor		0.5	litres
Totril	ioxynil	9.5	litres
Tribunyl	methabenzthiazuron	4.5	kg
Velpar	Hexazinone	5	litres

Most of the more popular surplus chemicals were in small amounts, whilst the older chemicals (Dowpon) have probably been superseded by better and more effective chemicals. All of these chemical are suitable for recycling to approved users.

Options for reducing these smaller amounts in storage are

- Use up with before opening a new container
- Mixing with say a brushweed herbicide and spraying on gorse or broom
- Starting a collection of smaller amounts with redundant chemicals for destruction
- Collecting at the same time as redundant chemicals but recycling where possible.

A part of the problem is that with small amounts from open containers the effectiveness could have dropped over time and may not work as well as expected. In some cases the solvents, carriers etc. may have evaporated, or the active ingredient crystallised on the bottom of the container. The total amount of surplus chemical is relatively small at about 300 kg or litre equivalents, compared with the total amount assessed on farms at about 8 tonnes, and I do not expect that a reuse system would be effective in reducing the amount of unwanted chemicals on farms. A collection system should be set up in the same method as for banned, restricted

or withdrawn chemicals. Farmers may be prepared to pay to get rid of some of these chemicals where they do not see use in the future. The plans of the Ministry for the Environment to ban the burning of plastic containers due to the release of dioxin into the air will mean that a viable option for recycling empty chemical containers will be required.

Banned, restricted or withdrawn chemicals surveyed

Note was taken of the banned, restricted or withdrawn chemicals on properties. A list of the banned, restricted or withdrawn chemicals is appended at the back of this report. Generally the condition of the containers was of concern than for the more recent chemicals and likewise the labels were becoming more difficult to read with age.

The number and range was less than expected and included the following.

Trade name	Common name
DDT	DDT
DDT super	DDT + super
Dieslan	Dieldrin
Lindane	Lindane
Louse powder	Lindane
Mange dressing	Lindane
Mosskiller	Pentachlorophenol
Sinox PE	Dinoseb (DNPB)
Taslin	Lindane
Weedkiller	Sodium arsenate

Respondants were asked would they be interested in a

- commercial collection of these chemicals
- would they be prepared to pay
- how much they had on the farm.

This gives an indication of the willingness of farmers to finally get rid of redundant chemicals that are only going to end up in the environment otherwise. All these chemicals are not suitable for re-use

Commercial collection and response to charging (Only those with chemicals to disposal)

Farm code	Commercial disposal chemicals	Prepared to pay for disposal	How much at \$10/kg or litre
Malvern Land Care	Yes	Yes	20 kg
Malvern Land Care	Yes	Yes	20 litres
Malvern Land Care	Yes	Yes	50 litres
Malvern Sheep and Beef	Yes	No	25 litres
Rangiora Cropping	Yes	Yes	1litre
Rangiora Cropping	Yes	Yes	5 litres
Malvern Land Care	Yes	Yes	10 litres
Malvern Sheep and Beef	Yes	Yes	750 kg
Rangiora Cropping	Yes	Yes	4 litres
Coastal Conway Land Care	Yes	Yes	20 litres

While the farmer with about 750 kg of Lindane prills was prepared to pay for disposal the total cost could be a barrier to him . The question of commercial collection for disposal of small amounts of current chemical was not asked but could be considered as farmers would like to see them out of their chemical stores.

Other comments

Farmers were asked for any other comments regarding agrochemical issues. The individual responses are appended at the end of the report.

Local Problems

Respondents were asked if they knew of any other local problems with agricultural chemicals. Generally there were few responses, and these are detailed below.

Local problems in the area

Any local problems
Contractors filling at races
Bare patches by water races along roads
Beside roads/water-races
Spray drift and overflow from creeks
Spillage on cornering on road
Contractors washing out on side of road
Arsenic in local water supply
Spray drift
Question whether contractors do triple rinse
Condition of storage
Container disposal

Condition of storage

Each of the storage sheds on the farms were ranked as to the siting, security etc. (see attached matrix grid appended at the end of this report)

Siting

35 (87.5%) of the storage sheds were well sited being more than 30 m from water and above water source, 2 (5%) were between 5 and 30 metres, and 3 (7.5%) were poor with water races closer than 5 m. 2 of the poor sited sheds were near running water, and one was by a dry stockrace.

Security

21 (52.5%) of the stores were secure and locked, 8 (20%) were bolted and could be locked, and the balance were open sheds etc. The two Landcare groups had a higher quality of storage than the other groups. This may have been due to more dangerous pesticides being stored for either intensive cropping, or possum control (Ferotox) in the Coastal Conway group.

Bunding

2 sheds had good bunding (able to take the volume of the largest container), 1 had average, and the rest (92.5% had no bunding.).

Floor

The floors of the stores ranged from concrete through wood to earth. Where the concrete floors were in good condition they were upgraded from average to good. 15 floors (37.5%) were good, 9 (22.5%) were average, and 16 (40%) were poor. However during inspection of the 40 chemical storage stores I did not see any evidence of spillage. Rangiora cropping generally had poorer floors, along with Malvern Sheep and Beef, than the other groups.

Weather Protection

33 (82.5%) of the sheds had good protection by being enclosed, and the balance were average where the chemicals were in the back of sheds, out of sunlight and rain.

Ventilation

Ventilation generally consisted of windows, but in some purpose built sheds there was an air gap along the top stud which was filled with galvanised mesh to exclude birds. In these cases I have considered that the ventilation is good, even though there is not fan forced ventilation. 5 (12.5%) of the storage was good, 29 (72.5%) was average, and the balance (15%) was poor. Ex shipping containers were secure, impermeable, lockable, but had very poor ventilation.

Records

None of the farms visited kept a log book of chemicals. In some cases this meant that they bought additional chemical without realising that they had stocks on hand already. One comment from a cropping farmer is that it is very difficult to maintain a good system when chemicals are being dropped off by agents, amounts are being used all the time, and substitution of chemicals can occur. Never the less the cropping farmers thought that it was a good idea, but probably would not maintain records, while the sheep and beef farmers had less chemical and did not see the need.

Sheep and beef farmers supplying Alliance or PPCS processing works are required to maintain full records of all animal health treatments given, the date, the batch number, with holding periods etc., which can be asked for at any time by the company.

Cropping farmers supplying grain to Weston Milling, Champion Milling etc. are required to maintain crop diaries where the date of chemical application, chemical(s) used, amount, dilution, with-holding periods, application method etc. are recorded to be supplied with the grain on supply.

Container labelling

The condition of labels was generally good, being fully readable. In some cases with redundant chemicals the labels were more difficult to read, due to long periods of storage. In a few cases there were unlabelled containers, probably diluted chemicals that had been left over, and in one case the label had fallen off but was still with the container. Modern labels which enclose 20 litre containers or those with a mesh protection were better than pasted labels.

Container condition

The condition of containers was good with the exception of two properties in the Coastal Conway Landcare group that had taken over chemicals from the previous owner. In one case the contents had crystallised and dried out, and in the other I identified that it was MCPB, and MCPA which the farmer could use for thistle control.

Signage

Most of the chemical sheds did not have signs, but in one case the yard had a sign but not the store. 1 was good, (2.5%), 9 (22.5%) were average with the Hazchem sign (either 3 WE, or 4 WE), and the balance (75%) was poor. Many of the farmers preferred not to advertise to thieves the presence of valuable chemicals as much as anything. Malvern Landcare was the best with 7 with average signage.

Layout

The layout generally depended on the number of chemicals that were in the store. Most farmers had a system of placing chemicals that allowed easy access, but in some cases sheds that were too small compromised easy layout. There did not seem to be any significant difference between the 4 groups as shown by the chart. Typically powders were stored above liquids, mainly due to the lighter smaller packets, so they were evident.

Storage layout

Farm code	Layout	Count
Coastal Conway Land Care	Average	8
Coastal Conway Land Care	Good	2
Malvern Land Care	Average	1
Malvern Land Care	Good	7
Malvern Land Care	Good/ave	1
Malvern Land Care	Poor	1
Malvern Sheep and Beef	Average	5
Malvern Sheep and Beef	Good	2
Malvern Sheep and Beef	Poor	3
Rangiora Cropping	Average	6
Rangiora Cropping	Good	2
Rangiora Cropping	Poor	2

Separation

None of the chemicals on farms included oxidising agents (Pool Chlorine etc.) so that separation was not an issue. The land care groups generally had better separation but this may have been a chance effect.

Emergency and safety equipment

Most of the properties had non permeable gloves, waterproof overalls etc. but very few had good safety equipment with respirator, face shield, eye wash, gloves etc. The sheep and beef properties generally used less hazardous chemicals, or else the chemicals (Feritox) were in a form that reduced the hazard. There is a move to using less hazardous chemicals by reducing the organophosphate chemicals in favour of Insect Growth regulators, using Gaucho treated seed rather than Thimet etc. Some of the cropping farms with poor safety equipment may be using contractors for all spraying.

Emergency and safety equipment on farms

Farm code	Emergency/safety equipment	Count
Coastal Conway Land Care	Average	7
Coastal Conway Land Care	Good	1

Coastal Conway Land Care	Poor	2
Malvern Land Care	Average	8
Malvern Land Care	Good	2
Malvern Sheep and Beef	Average	3
Malvern Sheep and Beef	Poor	7
Rangiora Cropping	Average	7
Rangiora Cropping	Good	2
Rangiora Cropping	Poor	1

Spill kit

None of the properties has a dedicated spill kit. Generally farmers are very careful with agrochemical due to the cost, and less to the hazard. I did not observe any signs of spill in any of the 40 sheds that I inspected.

Empty drum disposal

All farmers were concerned about empty drum disposal. Normally they would use as many as they could for stock feed, salt, horse jumps etc., but considered that it is a waste to burn what is a well designed and manufactured article. Most drums are plastic and they would triple rinse and burn on a hot fire of branches etc. Metal drums are still used for spraying oils and generally they would let them rust out. The greater the scale of the enterprise, or for a contractor, the worse the problem.

Conway Coastal Landcare is looking at a recycling scheme and is intending to approach manufactures to take back empty drums in good condition. In the past Monsanto has taken back the Boomerang containers (50 and 100 l Roundup), but with the sale to Nufarm of the chemical business in New Zealand the situation could change. The Ministry For the Environment is running a number of seminars through out New Zealand with the aim of reducing pesticide use both in rural and urban areas, and I have suggested to the Conway Coastal Landcare that they could seek their support.

The return system will work best where larger amounts of relatively few chemicals are used and Coastal Conway could be a good pilot area. In a cropping area the wider range of chemicals would make a return more difficult if different containers were to be kept separate. Alternatively a collection of drums of only the more commonly used herbicides such as glyphosate, Trimec, fungicides such as Opus, Amistar, Twist, and insecticides such as diazinon, phorate could be instituted.

The chemical manufactures should be involved with any proposals for chemical drum return as they may have some reasons why drums should not be returned. As more consolidation of manufactures occurs with take-overs etc., the number of parties is reducing moderately quickly.

One respondent noted that New Zealand uses a lot more aqueous concentrates, emulsifiable concentrates, or suspension concentrates, than in Denmark where he had been working. The advantage of the water dispersible granules, or water soluble powder, is that the containers are more easily burnt, often being a plastic liner in a waxed cardboard outer. The small market volume for New Zealand, and the costs of registering a new formulation makes the move to more easily handled containers remote.

Empty drum disposal by group

Farm code	Empty drum disposal	Count
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Coastal Conway Land Care	Average	1
Coastal Conway Land Care	Good	8
Coastal Conway Land Care	Poor	1
Malvern Land Care	Average	3
Malvern Land Care	Good	7
Malvern Sheep and Beef	Average	1
Malvern Sheep and Beef	Good	8
Malvern Sheep and Beef	Poor	1
Rangiora Cropping	Good	10

AGCARM incinerator

Only one farm used a typical 44 gal AGCARM incinerator. On inspection it was full of ash etc. and I consider that it would not achieve the high temperatures that are needed. The ash indicated that other household waste is being burnt. This will block up the holes so that the incinerator would not achieve full combustion. The other properties would store up plastic containers until there was sufficient for a good hot fire.

Dedicated mixing and spray filling area

None of the properties had a dedicated mixing and spray filling area. In many cases the concentrate chemicals would be taken out to area to be sprayed (scrub or paddock) and the spray tank filled with water close to the sprayed area, either a stream or irrigation takeoff with cropping. This reduced the problem of potential spills close to the homestead, and reduces the possibility of an accident on the way to the job. The disadvantage of a dedicated area on a farm is that it has to be covered to prevent rain getting onto the pad, and it could concentrate any spills in one area, and the larger volume of dilute chemical would have to be disposed off subsequently.

In comments, farmers suggested that contractors could be responsible for the dead patches adjacent to water races along roads, and in one case pointed out a dead area where the contractor turned out from his yard onto the road. (e.g. overflow of the foam from glyphosate tank mixes flowing over when filling)

Some new spray rigs use direct injection of chemical into the water, rather than premixing in the tank. This minimises the problem of disposing of diluted mixtures, but may need special equipment to wash out empty chemical containers

Present method of disposal (concentrate first line, dilute second line)
⇒ Use what can.
⇒ Spray out on bare paddock
⇒ Keep for reuse
⇒ Uses knapsack, contractor otherwise
⇒ Store and carry over for next year
⇒ Spray dilutes on paddock
⇒ Store and use
⇒ Use all up
⇒ Store and use
⇒ Mainly use contractor
⇒ Aiming to organic, don't have surplus
⇒ Store and use
⇒ Use all up
⇒ Use what have got. Contractor application
⇒ Mix and spray out on paddocks
⇒ Uses contract spraying
⇒ Store and use if useful
⇒ Reused and sprayed on brushweed with Escort
⇒ Use them up
⇒ Dump washings under trees in past
⇒ Use what have.
⇒ Washings sprayed on paddocks
⇒ Both surplus concentrates and diluted spray mixed with gorse spray for roadsides
⇒ Use contractor for broadacre. Spray fencelines and gorse only. Sprayed out on target area.
⇒ Used by spraying on paddocks
⇒ Store until used
⇒ Dump into hole, or sprayed
⇒ Store and use
⇒ Uses contractor for crop spraying
⇒ Dilutes sprayed back on paddock
⇒ Concentrates stores for use
⇒ Store to use.
⇒ Contractor for broadacre
⇒ Store for use
⇒ Tank washings into dump area near shed
⇒ Store and use concentrates
⇒ Spray out washings
⇒ Store and use
⇒ No tank washings
⇒ Use following year
⇒ Sprays applied by contractor
⇒ No surplus- use contractor
⇒ Buy minimum and reuse
⇒ Special pit with shingle fill (earlier recommendation from Regional Council)
⇒ Store and use
⇒ Spray out
⇒ Dilute and use on fencelines
⇒ Use on paddocks
⇒ Store and use
⇒ Spray out
⇒ Store until required.
⇒ Spray on paddock where applicable

⇒ Mix and match
⇒ Use them up where possible,
⇒ Tank self emptying
⇒ Don't use many chemicals, retain and use
⇒ Contractor for precultivation
⇒ Store and use
⇒ Contract broadacre spraying
⇒ Mainly used up, contractor applies ground spray.
⇒ Store and use
⇒ Spray out
⇒ Stored to apply
⇒ Sprayed on yard
⇒ Use them up
⇒ Wash out and spray on paddocks
⇒ Store and use
⇒ Use all up
⇒ Only buy what need
⇒ Spray dilute on paddocks
⇒ Use what can
⇒ Back over same paddock.
⇒ Store and use
⇒ Use all up

Other comments
Firms running out of chemical before end of season so need to carry more on farm. Correct disposal of plastic drums. Agcarm burner not hot enough as no cardboard outers as overseas Hazno act requires full registration for formulation change, so unlikely to get new or modified chemicals Metal drum disposal - rolling & landfill. NZ market too small for new chemicals Pack sizes too big or too small. Granstar at 200 gms too small . Using Gaucho rather than Thimet as safer.
Waste in burning containers Keen recyclers
Problem with empty containers Get requirements in small amounts
Use Ferotox fort possum control Would recycle if easier Lead acid batteries to recycle
Cost of disposal could be a problem Interested in empty container recycling
People with the greatest surplus have the untidiest shed. Reusable containers needed. More powders in cardboard outers Problem with changes in formulation over time.
Concerned about proposal to ban burning containers Surplus due to change in production, has arranged for most of surplus to be transferred to another grower All contract spraying now Need smaller pack sizes Chemical containers should all be returnable and recycled. Mainly talk about recycling
Hydes fill from water races Can't burn metal containers Containers should be recycled
Containers should be stackable (esp. tins) Rapid change in chemicals used for niche crops means that part used containers are more common than for cereals.
Like to get rid of small amounts Look on case by case for accepting Burn empty containers or bury Use contractor for broadacre
Accept chemicals provided that label is correct Should sell chemicals in smaller amounts or have bulk supply
Try to minimise use and contact with chemicals. Disposal of containers contractors problem
Concerned about lack of knowledge by home gardeners Chemical too expensive to waste Use contractor mainly Problem disposing of metal containers Would like to get rid of small amounts
Burn empty containers, use Roundup Aim to recycle containers and wrap Use contractor who supplies chemicals
Disposal of drums big problem. Trounce containers good as burn. Give containers and burn some
Would like to recycle empty containers, silage wrap, synthetic string
Not happy with regional council in assisting with disposal of surplus waste (plastic, etc.) Need to have facility for chemical exchange
Disposal of animal health containers

Internet exchange worth pursuing. Problems with traceability of chemicals into store by agents etc.
Shares within grower group for chemicals
Want to see end of metal drums (disposal)
Less chemical used the better
Problem with empty containers, need safe disposal recommendations.
Recycling of waste oil required
Don't use much chemical, mainly herbicide, and use contractors
Circular bucket shaped drench containers with handle and tap would be useful later for storage etc.
Use contractor
Would prefer to burn scrub before spraying
Jolyn glyphosate labels poorly attached
Recycling probably not practicable
Badly designed containers to decant
Want manufactures to accept empty containers
Increased local use of chemicals with trees
Landcare recycling of chemicals
Do handspraying only, contractor otherwise
Simple crop rotation. Big burn of containers each year. Metal containers a problem
Frightened about toxic compounds
1080 media problem

Common names and amounts of chemicals identified during survey including animal health products and adjutants etc.).

(some chemicals have trade name as common name not available from older chemicals.

There may be errors in some of the names of outdated chemicals, and not all chemicals may be included in mixes. Amount is over all the farms surveyed.)

Common name	Amount	Common name	Amount
2,4,-D, dicamba	5.50	Crop oil	27.50
2,4,5-T butyl ester	13.00	cyanazine	46.00
2,4-D	16.00	cycocel	109.00
2,4-D amine	33.00	cypermethrin	3.50
2,4-D ester	116.00	cypromazine	50.50
2,4-DB	7.00	cyromazine	7.00
22 DPA	45.00	deltamethrin	3.00
abamectin	45.00	Demeton S methyl	8.00
agrotax	5.00	diazinon	217.00
alachlor	5.00	dicamba	73.50
albendazole	46.50	dichlofenthion	0.50
alpha cypermethrin	11.00	dichlorprop, MCPA,dicamba	20.00
alpha cypermethryn	1.00	dichlorvos	2.00
Amitole + ammonium thiocyanate	7.50	difenzoquat	9.00
amitrole	1.00	diflubendazole	7.00
Amitrole; 22 DPA	2.00	diflubenzuron	72.00
antracol	3.00	diflufenican/bromoxynil	74.00
asulam	20.00	diflufican	66.00
atrazine	84.00	difubenzuron	2.05
avomectin	4.00	dimethenamid	24.00
azoxystrobin	41.05	dimethioate	15.00
benalaxyl,mancozeb	2.00	diquat	211.00
bentazine	10.00	Diquat paraquat	9.00
bentazone	27.00	disulfoton	5.00
benzalkonium chloride	5.00	Drisan	60.00
Benzamidole	75.00	epoxiconazole	75.00
brodifacoum	21.00	eprinomectrin	26.00
bromoxonyl + MCPA	66.00	eprinomethrin	8.00
bromoxonyl, ioxonyl	6.00	esfenvalerate	0.50
bromoxynil, ioxonyl, mecoprop	9.00	famphur	1.00
carbendazim	40.00	fenitrothion	3.00
carbendazim, triadimefon	5.50	fenoxaprop-P-ethyl	29.50
chlofenvinphos	7.00	fenpropimorph	1.00
chlpyralid	32.00	flamprop isopropyl	23.00
chlorimuron ethyl	251.00	flocumafen	7.00
chlorolose	14.50	fluazifop-P-butyl	9.00
chlorophram	15.00	flumetsulam	357.00
Chlorothalonil	5.00	fluroxpyr	17.00
chlorothanonil	8.00	fluzinam	1.00
chlorryifos, cypermethrin	15.00	Foam marker	2.00

Common name	Amount
chlorpyrifos	46.00
chlorsulfuron	2390.00
Chlorpyrifos	2.00
clethodim	6.00
clodinafop-propargyl	202.50
combination drench	5.00
Copper hydroxide	41.00
Copper spray	3.00
Coumaphos	1.50
coumatetralyl	15.00
imazethapyr	9.20
loxynil	5.00
iprodione	8.50
ivomectin	30.50
lambda-cyhalothin	2.10
levamisole, albendazole	5.00
levamizole	65.00
Levamizole, albendazole	10.00
levamozole	20.00
linuron	19.00
maldison	2.00
mancozeb	26.00
mancozeb, metalaxyl	45.00
Marker	17.00
MCPA	204.50
MCPA, MCPB	187.00
MCPA, mecoprop, dichlopprop, dicamba	20.00
MCPB	150.00
mecoprop	25.00
mecoprop P	13.00
Mecoprop, MCPA, dicamba	125.00
mepiquat chloride	4.00
metalaxly, mancozeb	12.50
methabenzuron	10.00
methamidophos	8.00
methiocarb	10.00
metribuzin	11.80
metsulfuron	450.65
mevinphos	3.50
mineral oil	149.00
moxidectin	10.00
moxydectin	10.50
Oil	148.50
OP	5.00
organo silicone	5.00
oryzalin	0.50

Common name	Amount
Foamer	5.00
fodderclean	10.00
formalin	40.00
Fosamine	0.50
glufosinate-ammonium	37.00
glycol	2.00
glyphosate	2111.50
glyphosate trimesium	140.00
haloxyfop	47.50
hexazinone	9.00
pindone	10.00
pirimicarb	6.80
pirimiphos methyl	96.50
Potassium cyanide	1.50
Pouron	3.00
prochloraz	5.00
procymidone	4.00
prometryn	6.00
propetamphos	7.10
propiconazole	22.20
proponic acid	43.00
Propopiconazole, fenpropimorph	10.00
quizalofop-p-ethyl	6.00
rycobendazole	5.00
sethoxydim	2.00
Silicone wetter	1.00
simazine	8.50
Simazine, dalapon, amitrole	3.70
spray marker	51.00
stericide	1.00
Sticker	6.00
surfactant	41.50
surfactant, penetrant	14.00
tank cleaner	6.00
tau fluvalinate	2.50
tebuconazole	98.00
temephos	11.50
terbufos	10.00
terbuthylazine	191.00
terbutryn	2.00
terbutryn + terbuthyalzine	8.00
thifensulfuron methyl	700.00
thiodicarb	14.00
thiometon	5.00
thiophanate methyl	1.00
thiram	19.00

Common name	Amount
oxfendazole	3.00
Paraquat	146.00
Paraquat/diquat	10.00
parathion methyl	0.50
penconazole	0.25
pencyuron	6.00
pendimethalin	7.00
penetrant	19.50
phenmedipham, desmedipham	2.00
phorate	46.00
Picloram	459.50
picloram, 2,4-D	5.50
picloram, clopyralid	4.00
picloram, triclopyr	80.50

Common name	Amount
trace elements	10.00
tralkoxydim	19.75
tree protector	5.00
tri-allate	70.00
triadimenol	20.00
tribenuron-methyl	2250.05
tricypr	132.00
triflumuron	2.00
trifluralin	135.00
trifoxystrobin	26.50
trinexapacethyl	16.50
trisiloxane ethoxylate	1.00
Vegetable oil	15.00
wetter	12.00

Total amount of chemicals held on properties

Sum of Chemicals for Group	Unit				
Survey area	litres	generators	gms	kg	lbs
Coastal Conway Land Care	1167.5	0	0	1158	0
Malvern Land Care	2336	11	3690	433.95	6
Malvern Sheep and Beef	736.25	0	500	62.8	0
Rangiora Cropping	1981.5	3	2306	284.75	0
Grand Total	6221.2	14	6496	1939.5	6

Average amount of chemicals held on properties

Average chemical per farm	Unit				
Survey area	litres	generators	gms	kg	lbs
Coastal Conway Land Care	116.8	0.0	0.0	115.8	0.0
Malvern Land Care	233.6	1.1	369.0	43.4	0.6
Malvern Sheep and Beef	73.6	0.0	50.0	6.3	0.0
Rangiora Cropping	198.2	0.3	230.6	28.5	0.0

Maximum amount of chemicals held on one property

Max chemical per farm	Unit				
Survey area	litres	generators	gms	kg	lbs
Coastal Conway Land Care	444	0	0	1018.5	0
Malvern Land Care	205	6	1490	150	3
Malvern Sheep and Beef	145	0	250	16	0
Rangiora Cropping	223	3	800	42	0
Grand Total	444	6	1490	1018.5	3

The amount of chemical held on properties was at survey date. In the case of the cropping farms a number had bought in insecticide for grassgrub and slug control, while in the Landcare group a large contractor normally has a large amount but it has regular turnover.

Trade names to common names where identified.

(Some chemicals have more compounds than detailed here.)

Trade name	Common name	Trade name	Common name
2,4,5-T	2,4,5-T butyl ester	Citowett	Penetrant
2,4-D	2,4,5-T butyl ester	Classic	chlorimuron ethyl
2,4-D	2,4-D	Cleansweep	MCPA
2,4-D amine	2,4-D amine	Codacide	Vegetable oil
2,4-DB	2,4-DB	Combat	OP
Achieve	tralkoxydim	Combine	bromoxonyl, ioxonyl
Actellic	pirimiphos methyl	Commando	flamprop isopropyl
Actellic dust	pirimiphos methyl	Compitone	mecoprop
Actellic generators	pirimiphos methyl	Connect	Oil
Agritone	MCPA	Contact	surfactant
Agritox	agrotax	Coptrec	Copper spray
Albendazole	Albendazole	Cougar	diflufican
Albercare	albendazole	Counter 2G	terbufos
Amistar	azoxystrobin	CRT herbicide	glyphosate
Amitrole	amitrole	Cycocel	cycocel
Answer	metsulfuron	Cydectin	moxydectin
AP700	surfactant	Cypercare	cypermethrin
Arrest	levamisole, albendazole	Cyrazine	cyromazine
Assassin	Pourol	Daconil	Chlorothalonil
Assett	terbuthylazine	Dalapon	22 DPA
Asulox	asulam	DC Trate	mineral oil
Asuntol	Coumaphos	Decis	deltamethrin
Atradex	atrazine	Diazinon	Diazinon
Atrazine	atrazine	Diazinon dip	Diazinon
Avadex	tri-allate	Dicamba	dicamba
Avenge	difenzoquat	Dimilin	difubenzuron
Axall	bromoxynil, ioxonyl, mecoprop	Drisan	Drisan
Banvel D	2,4,-D, dicamba	Duplosan	mecoprop P
Banvine	2,4,-D, dicamba	Duracide	alpha cypermethryn
Basagran	bentazone	Dysyston	disulfoton
Basigran	bentazone	Ectomin	cypermethrin
Basudin	diazinon	Ekatin	thiometon
Baton	2,4-D amine	Embutox	2,4-DB
Bavisten	carbendazim	Eprinex	eprinomectrin
Bayleton	carbendazim, triadimefon	Erodox	Benzamidole
Betanal	phenmedipham, desmedipham	Escort	metsulfuron
Bladex	cyanazine	Fasinex	eprinomethrin
Blitz	diflubendazole	Ferrotax	Potassium cyanide
Bond	cyanazine	Fleece master	diflubendazole
Boost	penetrant	Flypel	chlorryifos, cypermethrin
Bravo	chlorothalonil	Foam marker	Foam marker
Bromocide	bromoxonyl + MCPA	Fodder kleen	fodderkleen
Browndown	surfactant	Folicur	tebuconazole
Buctril M	bromoxonyl + MCPA	Folidol	parathion methyl
Bumper	propiconazole	Formalin	formalin
Buster	glufosinate-ammonium	Freeway	organo silicone
Carbendazim	carbendazim	Frontier	dimethenamid
Carbendazin	carbendazim	Fusilade	fluazifop-P-butyl

Trade name	Common name
Centurion	clethodim
Cerous	triadimenol
Chloromequat	cycozel
Chloro IPC	chlorophram
Chlorypirifos	Chlorypirifos
CIPC	chlorophram
Garlon	Picloram, triclopyr
Genesis	avomectin
Gesagard	prometryn
Gesapon	diazinon
Gesaprim	atrazine
Gesaprim 80	atrazine
Gesatop	simazine
Glean	chlorsulfuron
Glyphosate	glyphosate
Gramoxone	paraquat
Granstar	tribenuron-methyl
Grazon	triclopyr
Harmony	thifensulfuron methyl
Harvest	glyphosate
Headland	proponic acid
Herbex	Amitrole; 22 DPA
Igran	terbutryn
Input	Silicone wetter
loxynil	loxynil
Ivomec	ivomectin
Ivomec p/o	ivomectin
Jaguar	diflufenican/bromoxynil
Karate	lambda-cyhalothin
Keymark	Marker
Kocide	Copper hydroxide
Kotek	mancozeb
Krenite	Fosamine
Kwickin	surfactant
Landmark	spray marker
Larbait	thiodicarb
Lasso	alachlor
Levamisole	levamisole
Leviban	Levamisole, albendazole
Levicare	levamisole
Lexone	metribuzin
LI 700	surfactant, penetrant
Linuron	linuron
Lion	glyphosate
Lorsban	chlorypirifos
Lypor	temephos
Maggo	propetamphos
Magnum	diflubenzuron
Malathion	maldison
mancozeb	mancozeb

Trade name	Common name
Fusilage	fluazifop-P-butyl
Galben	benalaxyl, mancozeb
Gallant	haloxyfop
Gallant NF	haloxyfop
Gardaprim	terbuthylazine
Gardoprim	terbuthylazine
Metasystox	Demeton S methyl
Millimark	Foamer
Mistral	fenpropimorph
Moddus	trinexapacethyl
Monceren	pencyuron
Mossoff	benzalkonium chloride
Multifilm	glycol
Nilverm	levamazole
Omnidel	22 DPA
Opus	epoxiconazole
Oxfen	oxfendazole
Paraquat	paraquat
Pasture kleen	2,4-D ester
Pasturekleen	2,4-D ester
Penetrant	penetrant
Perfecthion	dimethioate
Permazole SDA	Simazine, dalapon, amitrole
Pestoff	chlorolose
Pestoff wheat	chlorolose
Phosdrin	mevinphos
Pindone	pindone
Pirimor	pirimicarb
Poast	sethoxydim
PQ 200	Paraquat
Pre -empt	Paraquat
Preglone	Diquat paraquat
Preside	flumetsulam
Propineb	antracol
Protec	carbendazim
Pulsar	bentazine
Pulse	Oil
Puma	fenoxaprop-P-ethyl
Puma S	fenoxaprop-P-ethyl
Racumen	coumatetralyl
Radiate	picloram, clopyralid
Reglone	diquat
Relay	2,4-D ester
Ridomel	metalaxly, mancozeb
Roundup	glyphosate
Roundup Xtra	Glyphosate
Rovral	iprodione
Ruck	pendimethalin
Rycoben	rycobendazole
Rycomectin	abamectin

Trade name	Common name
Manzate	mancozeb
Mavrik	tau fluvalinate
Max MZ	mancozeb, metalaxyl
MCPA	MCPA
MCPB	MCPB
MCPB 400	MCPB
Merit	Propopiconazole, fenpropimorph
MesuroI	methiocarb
Metasyston	Demeton S methyl
Metasystox	Demeton S methyl
Millimark	Foamer
Mistral	fenpropimorph
Moddus	trinexapacethyl
Monceren	pencyuron
Mossoff	benzalkonium chloride
Multifilm	glycol
Nilverm	levamozole
Omnidel	22 DPA
Opus	epoxiconazole
Oxfen	oxfendazole
Paraquat	paraquat
Pasture kleen	2,4-D ester
Pasturekleen	2,4-D ester
Penetrant	penetrant
Perfecthion	dimethioate
Permazole SDA	Simazine, dalapon, amitrole
Pestoff	chlorolose
Pestoff wheat	chlorolose
Phosdrin	mevinphos
Pindone	pindone
Pirimor	pirimicarb
Poast	sethoxydim
PQ 200	Paraquat
Pre -empt	Paraquat
Preglone	Diquat paraquat
Preside	flumetsulam
Propineb	antracol
Protec	carbendazim
Pulsar	bentazine
Pulse	Oil
Puma	fenoxaprop-P-ethyl
Puma S	fenoxaprop-P-ethyl
Racumen	coumatetralyl
Radiate	picloram, clopyralid
Reglone	diquat
Relay	2,4-D ester
Ridomel	metalaxly, mancozeb
Roundup	glyphosate

Trade name	Common name
Salvo	MCPA,mecoprop, dichloprop, dicamba
Scanda	combination drench
SDA	Simazine, dalapon, amitrole
Select	MCPA, MCPB
Sencor	metribuzin
Shell spray	oil
Shirlan	fluzinam
Simaflo	simazine
Simazine	simazine
Simazol	simazine
Spinaker	imazethapyr
Sportak	prochloraz
Spraygrow	Paraquat/diquat
Starane	fluroxpyr
Stericide	stericide
Stomp	pendimethalin
Storm	flocumafen
Sumi Alpha	esfenvalerate
Sumisclex	procymidone
Sunspray	oil
Supastick	Sticker
Super bor	trace elements
Super wet	Vegetable oil
Supercharge	Oil
Superchargfe	Oil
Supersil	trisiloxane ethoxylate
Supreme	chlofenvinphos
Surflan	oryzalin
Swift	penetrant
Talon	brodifacoum
Tameron	methamidophos
Tanksafe	tank cleaner
Targa	quizalofop-p-ethyl
Terb 500	terbuthylazine
Terbogran	terbuthylazine
Terbuthylazine	terbuthylazine
Terpal	mepiquat chloride
Thimet	phorate
Thiram	thiram
Thiropel	thiram
Tilt	propiconazole
Tilt WG	propiconazole
Topas	penconazole
Topclip	diazinon
Topik	clodinafop-propargyl
Topogard	terbutryn + terbuthyalzine
Topsin 4M	thiophanate methyl
Tordon	Picloram

Trade name	Common name
Roundup Xtra	Glyphosate
Rovral	iprodione
Ruck	pendimethalin
Rycoben	rycobendazole
Rycomectin	abamectin
Salvo	MCPA, mecoprop, dichlopprop, dicamba
Scanda	combination drench
SDA	Simazine, dalapon, amitrole
Select	MCPA, MCPB
Sencor	metribuzin
Shell spray	oil
Shirlan	fluzinam
Simaflo	simazine
Simazine	simazine
Simazol	simazine
Soft Touch	MCPB
Tropotox	MCPA, MCPB
Trounce	glyphosate
Twist	trifloxystrobin
Tynallex	terbuthylazine
Uptake	Crop oil
Valbazin	albendazole
Vanquish	alpha cypermethrin
Vapona	dichlorvos
Velpar	hexazinone
Vengeance	temephos
Versatill	chlopyralid
Verthion	fenitrothion
Vetdectin	moxidectin
Vetrazin	cyromazine
Vetrazin	cyromazine
Warbex	famphur
Weedazol TL	Amitole + ammonium thiocyanate
Wetter 100	wetter
Wetting agents	Wetting agents
Wipeout	deltamethrin
Zapp	triflumuron
Zenith	diflubenzuron

Trade name	Common name
Tordon 2G	Picloram
Tordon 50 D	picloram, 2,4-D
Tordon 50D	picloram, 2,4-D
Tordon BK	picloram, triclopyr
Touchdown	glyphosate trimesium
Treepel	tree protector
Treflan	trifluralin
Tribuni	methabenzuron
Tribunil WP	methabenzuron
Tribunyl	methabenzuron
Tricombi	mecoprop, MCPA, dicamba
Tridan	trifluralin
Trident	dichlorprop, MCPA, dicamba
Trigon	dichlofenthion
Trimec	Mecoprop, MCPA, dicamba
Triton X 45	penetrant

Providing chemicals Yes/No _____

Accepting chemicals Yes/No _____

Are you interested in paying a company to remove banned, restricted or withdrawn chemicals from your property? Yes/No/NA _____

Would you be prepared to pay \$10 per litre/kg to get rid of these chemicals? _____

At \$10 /kg or litre what quantity of chemical would you want to dispose of? _____

What is your present method of disposal of surplus chemicals

Concentrate _____

Dilute e.g. tank washings? _____

Do you know of any local problems with agricultural chemicals? _____

Who would be a good local coordinator for recycling for reuse of agricultural chemicals? _____

Other comments? _____

Condition of storage	(Good / Average /Poor)
Siting of storage facility	_____
Security.	_____
Lockable?	_____
Floor	_____
Bunding	_____
Weather protection from rain and direct sun	_____
Adequate ventilation available	_____
Records. Log book of chemical purchases and use.	_____
Condition of container labeling	_____
Condition of containers	_____
Signage on shed	_____
Well organised layout	_____
Separation of incompatible chemicals	_____
Emergency / safety equipment	_____
Spill kit	_____
Empty drum disposal	_____
AGCARM incinerator used?	_____
Dedicated mixing and sprayer filling area	_____

Other (if not covered)

Pesticides Banned By Regulatory Action

The following pesticides have been deregistered (or registration has been refused) by the Board.

Chlordane	1992	Environmental impact
DDT	1990	Environmental impact.
Dieldrin	1990	Toxicology, environmental impact
HCB	1972	Bio-accumulation.
Lindane	1990	Environmental impact.
Mirex	1990	Environmental impact.
Organotin marine antifoulants	1991	Shellfish toxicity.
Strychnine	1977	High mammalian toxicity.
Sulfallate	1987	Suspected carcinogen.

Pesticides Voluntarily Withdrawn

The following pesticides have been voluntarily withdrawn by the proprietors following negotiations with the Board over the availability and acceptability of current health and safety data.

Arsenic compounds	1977	Environmental impact.
Aldrin	1985	Toxicology, environmental impact
BHC& e	1962	Toxicology, environmental impact
Binapacryl	1986	Potential teratogenicity.
Camphechelor	1976	Toxicology, environmental impact.
Chlordimeform	1976	Possible carcinogenicity.
Chorobromopropane	1980	Possible carcinogenicity.
Cytohexatin	1987	Potential teratogenicity.
Dinoseb	1988	Toxicology.
Endrin	1976	Toxicology, environmental impact.
Heptachor	1971	Bioaccumulation.
Isobenzan	1965	Bioaccumulation.
Leptophos	1976	Neurotoxicity.
Mercurous chloride	1972	Environmental impact.
Nicotine sulphate	1975	Acute toxicity.
Nitrofen	1987	Teratogenic potential.
Mercury compounds	1972	Environmental impact.
Parathion	1986	High mammalian toxicity.
Schradan	1976	High mammalian toxicity.
TDE dichlorophenyl dichloroethane	1976	Environmental impact

Pesticides Severely Restricted

The use and availability of following pesticides have been severely restricted by the Board:

Pentachlorophenol	1991	Restricted to use on export dressed timber, and only when applied-using a closed circuit "Prevac" treatment system. (Registration pending, subject to approval of waste disposal protocol).
Captafol	1990	Restricted to use as a paste formulation for tree wound treatments. Potential carcinogenicity.
Ethylene dibromide	1984	Restricted to use for import quarantine fumigation (fruit fly) only. Potential carcinogenic

Condition of storage matrix	Good	Average	Poor
Siting of storage facility	> 30 m from and above water source	5-30 m above water source	< 5 m or below water source
Security. Lockable?	Secure and locked	Door bolted	No door, easy access
Floor	Impermeable and coated	Concrete	Wood, dirt
Bundling	Take volume of largest container +10%	Minimal content	No bundling
Weather protection from rain and direct sun	Enclosed	Partially enclosed	Open to rain and sun
Adequate ventilation available	Forced (fan) ventilation	Window	None
Records. Log book of chemical purchases and use.	Legible, well used, current	Hard to read, intermittent	None
Condition of container labeling	All readable	Soiled, mainly readable	None
Condition of containers	All well sealed, good condition	Most sealed	Rusty, leaking, non approved
Signage on shed	Full signage with chemical content	Hazchem	None
Well organized layout	Good access, well laid out	On shelves, pwd above liquid	All on floor, poor access
Separation of incompatible chemicals	Full separation	Within same store	No separation
Emergency / safety equipment	Respirator, eye wash, overalls, gloves, faceshield	Gloves, overalls (non permeable)	None
Spill kit	Absorbent, plastic containers, shovel, broom	Sand, sawdust, no tools	None
Empty drum disposal	Triple rinse, landfill, Stored for later disposal in safe area	Triple rinse, AGCARM incinerator	Pit, heap by shed etc.
AGCARM incinerator used?	Good condition with ventilation holes	Some holes blocked up	Poor condition, low temp
Dedicated mixing and sprayer filling area	Bunded, impermeable pad	Concrete pad	Open ground

Chemical Record Sheet

Name					Address			
Date	Trade name	Chemical name	Formulation	Previous total	Add bought	Less used/returned	New total	Comments
Date	Trade name	Chemical name	Formulation	Previous total	Add bought	Less used/returned	New total	Comments
Date	Trade name	Chemical name	Formulation	Previous total	Add bought	Less used/returned	New total	Comments
Date	Trade name	Chemical name	Formulation	Previous total	Add bought	Less used/returned	New total	Comments