Obsolete Pesticides in Lesotho

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1.0 Country profile

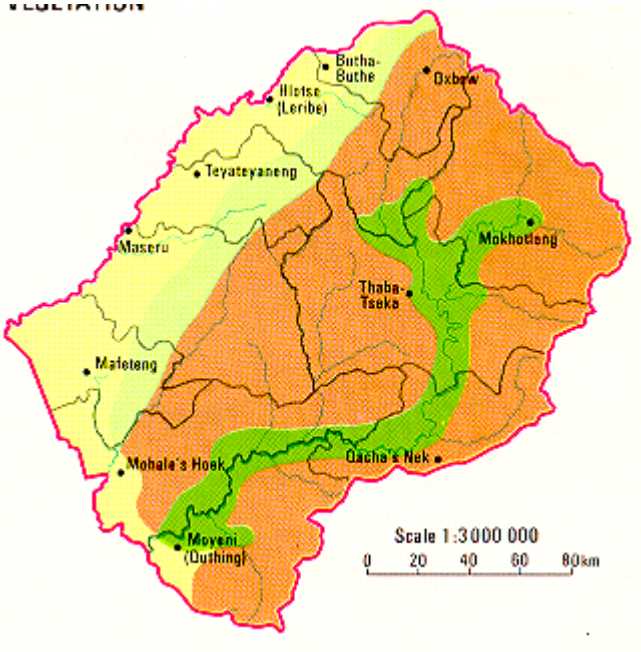
The kingdom of Lesotho is a small land locked country which lies between 28°35′ S and 30°40′ S and 27°00′ E and 29°20′ E. It is completely surrounded by the Republic of South Africa. It is the smallest country in Southern Africa after Swaziland. The Republic of South Africa is 40 times larger than Lesotho (Mcleod, 1989). The land area covers approximately 30.350 Km².

The country is mountainous and has four distinct ecological zones which are:-

- The lowlands that range between 1300 to 1800m above sea-level, and they cover 12% of the land. They are located along the Northern and Western edges of the country (**Map 1**).

- The foothills are found at the altitudes of 1800 to 2100m asl

  and cover 15% of land



MAP 1 : ***Map of Lesotho showing four ecological zones***

- The mountains that occupy the central and eastern reach 3482m asl and constitute 65% of the land

- The fourth is the Senqu valley which covers 8% of the country

The cultivation of crops is commonly carried out on the foothills and lowlands where the majority of the population lives. The arable land is estimated at 9% of the total.

The climate of Lesotho can be classified as continental and temperate. The country experiences four distinct seasons, which are spring, summer, autumn and winter. The summers often have high temperatures and precipitation due to the position of the Intertropical Conversion Zone (ITCZ) i.e. south of the equator. In winter, the presence of high pressure results in clear skies, dry air, warm temperature during the day but it quickly becomes cold after sunset. Lack of precipitation is a common feature in winter.

January is normally the hottest month of the year with average temperatures in excess of 20ºC being recorded in the lowlands. The coldest period is between June and July with an average of 8ºC. Temperatures in excess of 35ºC have been recorded particularly during drought e.g. 39.4ºC was recorded in Maseru in January 1973 (Mcleod, 1989). Low temperatures in the highlands are indicative of the effect of altitude on temperature e.g. a rare lowest of – 20.4ºC was recorded in the highlands in 1967 (Mcleod, 1989).

1.1 Population

The population of Lesotho is estimated to be 2.03 million people (Bureau of Statistics, 1996). The population is predominantly rural, with less than 20% of it living in the urban areas (Development Consultant International, DCI, 1997). The population census of 1986 registered a growth rate of 2.6% per annum over the period 1976 – 1976 – 1986 (Bureau of Statistics, 1996) During the intercensal period 1986 –96 the growth was estimated at 1.5%

1.2 Environmental Problems

According to National Environmental Action Plan (NEAP, 1989) the country is faced with the following environmental problems:-

- Overstocking and range management
- Soil erosion and fertility loss
- **Hazardous Agricultural chemicals**
- Uplanned urban expansion and settlement
- Pollution of soil, water and air

2.0 Regulatory Framework

Environmental issues are enshrined in Lesotho's constitution. Of particular relevance is section 36, which states that;

> "*Lesotho shall adopt policies designed to protect and enhance the natural and cultural environment of Lesotho for the benefit of both present and future generations and shall endeavour to assure all citizens a sound and safe-environment adequate for their health and well being*."

Currently there are no laws relating to management of pesticides in the country. The first attempt to put some regulatory instrument was in the form of *Pesticides Management Bill of 1986* which was intended to regulate the use of pesticides in general. There are no provisions for among others banning and or restricted use of some pesticides in the bill.

It is however worth noting that the environment Policy of 1998, the Environment Bill 2000, and the Environment Impact Assessment guidelines, 1999 do make the EIA a requirement for large scale application of pesticides. Such a study would cover among others type of chemical envisaged, degradation rate in the environment, efficiency, impacts on non-target species, alternative chemical, etc. In the same Bill, 2000, there are provisions (sections 82 and 83) for the management of hazardous chemicals which would form the basis for the drafting of regulations for pesticides management.

Unfortunately, whilst the Bill is still awaiting parliament's approval, EIA for the use of agrochemicals is not mandatory. The country is faced with a situation where any chemical could be used regardless of its significant impact on the environment and human health.

3.0 **Common Pests**

Agricultural productivity in Lesotho like other countries of the world is affected by some pests and diseases (table 1 and appendix 1). This has necessitated the use of some pesticides so as to keep the pests under control.

Table 1: **Pests and crop on which they feed**

Pests Common Names	**Species**	**Crop**	**Chemical Trade Name**	**Active Ingredients**
1.Stalk Borer	*Bassiola Fusca Chilo partelus*	Maize and Sorghum	Ambush	Cyfluthrin
2.American Boccworm	*Heliothis Armiqera*	Beans and Peas	Ripcord	Cypermethrin
3.Diamond Back Moth	*Plutella Macullipenis*	Vegetables	Dedevap Ripcord	Dichlorvas Cypermethrin
4.Cutworm	*Aquotis spp*	Maize and Sorghum	Karbaspray	Carbaryl
5.Codling Moth	*Cydia fomonolla*	Apples	Ripcord	Cypermethrin
6.Pollen Beetle	*Mylabris spp*	Maize and Sorghum Beans and other flowering crops	Karbaspray	Carbaryl
7.Aphids	Various spp	Vegetables and Fruit trees	Aphicide	Dimethoate
Diseases				
1.Common Smut	*Ustilago medis*	Maize and Sorghum	Cupravit	Copper Oxychloride
2.Mildew		Pumpkins	Antracol	Propeneb
3.Leaf Blight	*Xamnthomonas Phaseoli*	Potatoes and Beans	Cupravit	Copper Oxychloride

4.0 OPE-Current Status in Lesotho.

There was a study conducted by Partow and Mohai, 1996. It concentrated on obsolete pesticides. It established that some of the stocks had expired, others were leaking or poorly labeled. Worse still some were labeled in Chinese as such it was not possible to ascertain their identity. It must also be noted that since some of the stocks were quite old, it is possible that they are organochlorines (Partow, *per comm*., 2000). Below is an extract from the study:-

(i) **200** L x 3 of Fenitrothion 50% ULV

(ii) Dipterex Trichlorform organophosphate **2**kg

(ii) Dithane: M45 ai Mancozed =**2**kg containers

(iii) Dedevap: Dichlorofes: **5 L** x 6 containers

(iv) Sumicidin: **5**L

(v) Trifluralin: **5**L

(vi) Thirax= **25kg x 8bags**

(vii) 9 bags (estimate **50-75**kg) of unknown pesticide.

(viii) Paraquat; 8 containers

(ix) Round-up **20**L

(x) Thiodan (endosalfan)= **20**L

5.0 Strategies To Reduce Reliance On Pesticides

In recognition of high incidents of contamination of food, water and soil,the Ministry of Agriculture has taken drastic steps aimed at reducing reliance of synthetic pesticides particularly POPs. One of the measures adopted is the Integrated pest management (IPM). As the name implies IPM entails the use of more than one control strategies as indicated below:-

a) Cultural control tool – some commonly used are:

i) Ploughing in winter thus exposing insect larvae and pupae to temperature threshold (very hot and cold weather rain and air) also to predators.

ii) Crop rotation

iii) Fallowing of land (seasonal abandoning of fields)

iv) Hoeing to reduce weeds

v) Using pest resistant varieties (some have high sugar content which interfere with development and growth of pest)

vi) Irrigation to encourage rapid germination of weeds before planting.

b) Biological control tool – use natural enemies e.g. red ants (bones to entice) to control cutworm and stalk borer.

c) Quarantine control – is less practiced

d) Chemical control tool – the use of chemicals is used as a last resort.

Farmers are encouraged through extension services to use pesticides when pests are above economical threshold. They are however, provided with alternative control measures so as to facilitate decision-making. For example, dry wood ashes; soapy water plus nicotine; chilli plus garlic;flour; brightly- coloured containers with water to attract some insect pest. Brochures containing this information are given to farmers free of charge.

6.0 Recommendations (Regional & National)

- The first step is to make an inventory of chemicals and law controlling them. On the basis of data collected, develop a national action plan which would set out priorities e.g. awareness campaigns, safe disposal of obsolete stock.

- Instruments of ratification of Basel Convention (on the control transboundry movement of hazardous wastes and their disposal) have already been deposited. There is therefore a need to create enabling environment for the implementation of the Convention at national level e.g. formulate national laws relating to management of hazardous waste.

- The country is also involved in negotiations pertaining to international legally binding instruments on Prior Informed Consent (PIC) Procedure and Persistent Organic Pollutants (POPs) which would further facilitate international cooperation on management of hazardous chemicals. A national committee on chemical management has already been established.

- In order to prevent future stockpiles of pesticides, farmers are encouraged to buy enough pesticides for the current season.

- Strengthen research on integrated pest management so as to reduce reliance on pesticides.

- Studies undertaken by Partow and Mohai in 1996 should be updated and extended to cover the whole country.

7.0 Conclusion

Government and indeed the whole Southern Africa Development Community (SADC) region should consider establishing regional disposal facilities for all persistent toxic substances including pesticides. Some of the issues to be considered when deciding on the appropriate location are infrastructure, presence of expertise, accessibility, willingness of the host nation to accept chemicals from other countries, cost implications of exporting, etc. The study on obsolete pesticides revealed that Lesotho has small amounts of pesticides and as such do not warrant the establishment of a full operational state of the art disposal systems.

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Appendix 1

LIST OF CURRENTLY USED CHEMICALS

	Pest	Chemical trade name	Active ingredient
a.	Stalk borer		
	Busceda fusca	Ambush	Cyfluthrin
	Chilo partelus	Baythroid	Cyfluthri
	Sesamia calamistis	Ripcord	Cypermethrin
		Thiodan	Endosulfan
b.	Aphids		
	Opalosiphum maidis	Aphicide	Dimethoate
	Schizaphis graminum	Dedevap	Dichloruos
	Diuraphis noxia	Malathion	Mercaptothion
	Sitobion aveane	Metsystox R	Oxydemeton-methyl
	Aphis fabae	Thiodan	Endosulfan
	Brecicoryne brassicae		
c.	Bagrada bug		
	Bagrada hilaris	Aphicide	Dimthetoate
		Karbaspray	Carbaryl
		Thiodan	Endosulfan
d.	American bollworm		
	Heliothis armigeria	Ripcord	Cypermethrin
		Ambush	Permethrim
		Karbaspray	Carbaryl

e. Diamond-back moth		
Plutella masullipenis		
	Dedavap	Dichlorvos
	Ripcord	Cypermethrin
	Ambush	Permethrn
	Baythroid	Cyfluthrin
	Decis	Deltamethrin
f. Cutworm		
Agrotis spp	Karbaspary	Carbaryl
Euxoa spp	Ambush	Permethrin
	Ripcord	Cypermethrin
	Decis	Deltamethrin
g. Pollen beetle		
Mylabris spp	Karbaspray	Carbaryl
Ceroctis spp	Thiodan	Endosulfan
h. Spotted maize beetle		
Astylus atromaculutus	Karbaspray	Carbaryl
	Thiodan	Endosulfan
i. Codlign moth		
Cydia pomonolla	Ripcord	Cypermethrin
j. Mediterranean fruit fly	Malathion	Mercaptothion
Ceratitis capitata	Aphicide	Dimethoate
	Ripcord	Cypermethrin

k. Smut		
Ustilago midis		
Sporisorium sorghi	Cupravit	Copper oxychloride
Ustilago tritici	Vitavax	Carboxin
j. Mildew		
Erisyphe pisi	Cupravit	Copper oxychloride
Erisyphe fuligena	Antracol	Propinels
	Lonacol	Zineb
	Dithame M45	Mancozeb
m. Black rot		
Xanthomonas campestris	Thiulin	
	Cuprarit	Copper oxychloride
n. Anthracnose		
Colletotricum lindemuthianum	Antracol	Propineb
	Dithame M45	mancozeb
o. Blight		
Xanthomonas phaseoli	Cupravit	Copper oxychloride
Alternaria solani	Dithame M45	Mancozeb
Phytophthora infestans	lonacol	Zineb
Alternia cucumerina	Antracol	Propineb
p. Bacterial spot		
Xanthomonas	Cupravit	Copper oxychloride