

# An Assessment of availability and use of Carbofuran and other Agro-vet chemicals used to Poison Lions, around Queen Elizabeth Conservation Area (QECA) and in Kampala, Uganda



Edward Okot Omoya and Andrew J. Plumptre



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## INTRODUCTION

Carbofuran (2, 3-dihydro-2, 2-dimethyl-7-benzofuranyl-Nmethylcarbamate) is a widely used systemic and contact insecticide, acaricide and nematicide with a broad spectrum of activity against many agricultural pests (Otieno & Lalah, 2010). It has been reported to have relatively high mammalian toxicity (oral LD50 8–11 mg/kg in rats) and to be very toxic to invertebrates, fish and birds and should therefore needs to be handled with a lot of care to avoid environmental contamination and incidental exposure (Eisler 1985; Hodgson *et al.* 1991; Trotter *et al.* 1991; Mineau 1993, 2001). According to Otieno & Lalah (2010), acute uptake of Carbofuran through accidental exposure can result in acute toxicities and fatalities even in humans. Toxic effects are due to its activity as a cholinesterase inhibitor (it is thus considered a neurotoxic pesticide) (Harrison 2006). It has been used worldwide for control of pests in sugarcane, sugar beet, maize, rice and coffee and is very effective in controlling rice pests such as green leafhoppers, brown plant hoppers, stem borers and whorl maggots. Other pests which are resistant to organophosphorous insecticides (OP's) for example, white flies, leafminers, ants, mealy bugs, scale insects, cockroaches, wasps and aphids are also effectively controlled by Carbofuran. Carbofuran has rapid action against both nymphs and adults killing them within 20 min (Suett 1986).

There are basically three types of Carbofuran containing products on the Ugandan market today, namely: **Furadan 5G**, **Furan 5G** and **Agro-furan 5GR**. The name of the product is used in this report when targeting a specific product (for example Furadan). Otherwise the word Carbofuran is used to refer to all the three products.

However, in Uganda, according to Agro Input Policy Brief (2010), it is estimated that counterfeit and fake agro chemicals account for about 10% to 15% of the national agro-chemicals in the market valued at USD 6 million per year. This figure is alarming and leaves one wondering what the regulatory authorities are really doing.

In Uganda, there have been reported cases of misuse of Carbofuran, suspected to be Furadan, in the poisoning of wildlife both inside and outside protected areas. In Queen Elizabeth National Park (QENP), there have been several reported cases of poisoning of carnivores and birds of prey in the areas which were occupied by Basongora pastoralists, which has led to a decline in the numbers of these wildlife species (Okot, 2009). The invasion of the Park by the Basongora pastoralists in March 2006, led to depredation of cattle by lions in the Rwenjuba area, near Katwe, which prompted the pastoralists to lace the carcasses of the cattle with Carbofuran targeting the lions which would return to feast on the carcasses. There were a number of other large mammals and birds killed in addition to the lions. According to Okot (2009), 9 lions, 2 hyaenas, 24 Cattle egrets and 1 Marabou stork in Akabale succumbed to the poisoned carcasses at that time but others have died both before 2006 and subsequently.

In May 2010, 6 lions belonging to a pride of about 8 individuals died as a result of suspected poisoning in Kasenyi, near Hamukungu village, when two heads of cattle were killed by the lions. In addition to the lions, 16 vultures also died because they fed on the same carcasses, suspected to be laced with Furadan. Research projects carried out on lions in Uganda indicate that almost two males, and three females, are killed every year (Sewagudde, 2010). These series of retaliatory poisoning events have drastically affected the population of the main tourism prides in the Northern sector of the Park and must be addressed as a matter of

urgency, because the bio-accumulation of the toxic substances used in poisoning lions and hyaenas, affect wildlife health in its entirety.

Carbofuran has been sold in various agro-vet shops and locally distributed in Uganda in the past. As in other parts of the world, in Uganda, it is used to control soil and foliar pests in a wide variety of field crops, including rice, bananas, beans, pineapples, maize and coffee. One of the common sources of Carbofuran is Furadan which is manufactured by FMC. According to Otieno & Lalah (2010), in Kenya, Furadan was commonly used, although its adverse effects on wildlife, particularly birds, had been a concern amongst ornithologists since the mid-1990s. Furthermore, reports of misuse, particularly in resolving issues of human-wildlife conflict had alerted local conservation professionals to a potentially widespread problem targeting Kenya's wildlife resources. Mass die-offs of predators and scavengers as a result of poisoning have been witnessed in several parts of Kenya before and conservationists are concerned that this is having devastating effects on raptor and mammalian carnivore populations throughout the country (Odino & Ogada, 2008).

A statement from FMC's website highlighted facts about their operations and concerns on Furadan (<http://www.furadanfacts.com>), as follow:

*“FMC is one of the world's foremost, diversified chemical companies with leading global positions in agricultural, industrial and consumer markets. From its inception, our company and employees have maintained a commitment to pursue new technologies that improve quality of life and to conduct our businesses in a responsible manner.*

*FMC strongly condemns any misuse of its products and works diligently to address any incidence of alleged misuse. We take tremendous pride, not only in our products, but in our stewardship responsibilities. We have worked with government agencies, distributors and other pesticide manufacturers on stewardship initiatives around the world.*

*Furadan remains a useful product, vital to the sustainability of agriculture. FMC believes the proper use of Furadan does not create a risk to human health, wildlife, or the environment, and we will continue to promote its responsible use.*

*FMC Corporation has repurchased Furadan 5G from distributors and retailers in Tanzania, Uganda and Kenya. The buy-back program remains open for any product that might still be in commercial channels. Should any additional product be found in the marketplace, please let FMC know the location details so it can be repurchased. FMC has no plans to reintroduce the product in these countries in the future.”*



**Plate 1:** A Poisoned lion fighting for his life. (Photo: courtesy of Wildlife direct)

According to Odino & Ogada (2008), there was lobbying in Kenya by conservationists that FMC withdraws Furadan from the East African market, FMC claims that they withdrew all the stock from the market in response and there was no Furadan sold in the region. A recent news item on their website (above) indicated that they were finding fake Furadan 5G products for sale in Uganda (dated 1<sup>st</sup> March 2011).

The survey reported here was prompted by the fact that the pastoralists adjacent to QENP still seemed to be able to obtain Carbofuran products which were being used to kill lions and other wildlife.

**Main Objective:** Assess the availability of different types of poisonous chemicals with the potential to kill lions around Queen Elizabeth Park (QENP) and in Kampala.

**Specific objectives:**

1. To determine the availability of Furadan around QENP
2. To assess what other chemicals are available in Uganda that contain Carbofuran.
3. To collect information on the regulation of Carbofuran by the respective regulatory authorities

We implemented this study through an intensive market survey in towns around QENP and agro-vet stores in Kampala. Specifically, we collected information on the regulation, sale and use of the different poisonous substances from Government agencies, distributors and farmers or other end-users, and assessed the impacts of the use on the carnivores.

**METHODS**

*Study area*

Major towns and trading centres around Queen Elizabeth Protected Area (QEPA), and agro-vet stores in Kampala city were purposely selected as sites for the survey. The reason for selecting areas around QEPA was as a result of frequently reported cases of lion poisoning within the park. The concept was that, the potential sources of the poisonous substances would therefore be the agro-vet stores in areas surrounding the park and the Central Business District of Kampala. Kampala was chosen on the assumption that, the main distributors of agro-vet products were based here, and because there were a number of agro-vet retail outlets within the city.

1. Questionnaires

The questionnaires were administered to wholesale distributors and retailers:

- a) Distributor questionnaire- directed at agro-chemical stores who are responsible for wholesale distribution of imported agrochemicals into the country to the retailers. The purpose was to help understand the distribution chain in Uganda.
- b) Retailer questionnaire- directed to the retail outlets, to help us understand the demand and supply-side of the pesticides.

2. Interviews and focus discussion

Discussions were also had with the regulators of pesticides; The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and The National Drug Authority (NDA), to help understand their role in the regulation of pesticides and other dangerous agrochemicals in Uganda. We ascertained the level at which they keep track of licensed distributors, what measures would be taken in cases of misuse, and to identify possible alternative pesticides.



Plate 2: Furadan 5G in Kampala manufactured by FMC. (E.Okot Omoya/WCS)

## RESULTS

### Distribution of Carbofuran in Uganda

These are the three types of Carbofuran products on the Ugandan market;

1. **Furadan 5G**, manufactured by FMC and distributed by JUANCO SPS LTD, Juanco Centre, Nairobi Road, P. O. Box 20529, Nairobi, Kenya, Telephone: 045-40206, registered in Kenya (Plate 2),
2. **Furan 5G**, Manufactured by United Phosphorus Limited, Uniphos House, 11<sup>th</sup> Road, Madhu Park, Khar (W), Mumbai-400 052 and distributed in Uganda by Lipsun (U) Ltd, Plot No. 14, Ben Kiwanuka Street, P. O. Box 29497, Kampala (see cover photo of this report).
3. **Agro-furan 5GR** made in Singapore by Asiatic Agricultural Industries Pte Ltd, 150 Gul Circle Singapore and distributed in Uganda by General and Allied Ltd in Kampala (Plate 3)



**Plate 3:** Agro-Furan and Agro-Pyrifos. (E.Okot Omoya/WCS).

Furan like Furadan, is a broad spectrum, strong contact and stomach poison. It effectively controls White Grubs, Boll worms, Saw fly, White fly, Cut worms, Army worm, Root nematodes, Diamond Black Moth, Stem and Pod borers, Aphids and Jassids, Hoppers, Leaf Minor, Thrips, Weevils, Flea Beetles, Millipedes, Stalk and fruit borers to mention but a few, on crops like cotton, vegetables (Tomato, Egg plant, Potato, Peas, Cabbage, Cauliflower, Chillies, Onion, Cucurbits to mention but a few), Beans, Tea, Sugarcane, Banana, Citrus, Tobacco, Sorghum, Rice, Soya bean, Maize, Coffee, Ground nuts, Fruits and Ornamentals.

### ***Main Distributors***

There are a number of registered distributors of agro-chemicals in Uganda (Appendix I). However, we visited the three major distributors in Kampala namely; Cooper Uganda Limited, Quality Chemicals Limited, and General and Allied Limited. These are the three largest chemical distributors in Uganda and meeting with them enabled us to find out what products are distributed in Uganda.

#### *Cooper Uganda Limited*

Cooper Uganda Ltd is one of the major distributors of agro-chemicals and veterinary products on the Ugandan market. When contacted, the representative in charge made it clear that, they had stopped the importation of all Carbofuran products into the country because of the global concerns about the possible dangers associated with it, by the World Health Organisation (WHO), and the massive abuse, especially in the killing of wildlife and fish, and because of secondary poisoning due to the consumption of the poisoned fish and wildlife by humans. As a quality control measure, they have decided to completely stop the sale due to the fact that, they could not easily monitor the buyers and the end-users, in a bid to ensure strict adherence to the instructions governing application and precautionary measures.

#### *Quality Chemicals Limited*

We also visited Quality Chemicals, to assess whether they distribute Carbofuran to the retailers, the personnel who was a qualified veterinary doctor, pointed out that, they did not deal in Carbofuran products as well because of the global concerns resulting from their misuse. The products distributed ranged from agro-vet products to human products only. We actually did not see any Carbofuran product on the shelves, during our visit.

#### *General & Allied Limited*

This was the only importer and distributor of Agro furan 5GR (Uganda Registration No. UGC/2009/000715/IN-NC/RRR), a form of Carbofuran. They were officially registered by the Ministry of Agriculture, Animal Industry and Fisheries to sell the products to farmers. They sold a kilogram of Agro-furan 5GR at eight thousand Uganda shillings only (8,000/=). They did not sell Furadan from FMC. The Agro-Furan is a broad spectrum systemic stomach and contact insecticide and nematicide for the control of soil dwelling and foliar feeding insects and nematodes in a wide range of crops.

The other alternative to Agro-Furan which is also manufactured by the same company in Singapore is Agro-Pyrifos. This contains 480g/L chloropyrifos organophosphorous, a non systemic insecticide, effective by contact, ingestion and vapour action against a wide range of insect pests on all major agricultural and horticultural crops.

*Retailers***Table 1. Number of Agro-vet stores sampled to assess Carbofuran availability.**

<i>DISRTICT</i>	<i>AGRO-VET STORES SAMPLED</i>	<i>STORES WITH CARBOFURAN</i>	<i>Average Price per Kg (UgX)</i>
<b>Bushenyi*</b>	6	1	-
<b>Kampala</b>	35	13	7,500
<b>Kanungu*</b>	4	2	-
<b>Kasese</b>	18	5	17,500
<b>Rubiriizi*</b>	5	1	-

*\*Areas where prices were not obtained.*

The results of the survey on the distribution of Carbofuran show that, Kampala district has the highest percentage of agro-vet stores with Carbofuran 5% on the shelves, followed by Kasese, Kanungu, Bushenyi and lastly Rubirizi (Figure 1 & Table 1). This therefore shows that, the agro-chemical is readily available on the market and any one can have access to it at an affordable price ranging from seven thousand, five hundred Uganda shillings (UgX 7,500) in Kampala up to about seventeen thousand, five hundred Uganda shillings only (UgX 17,500), per kilogram.

*Kampala*

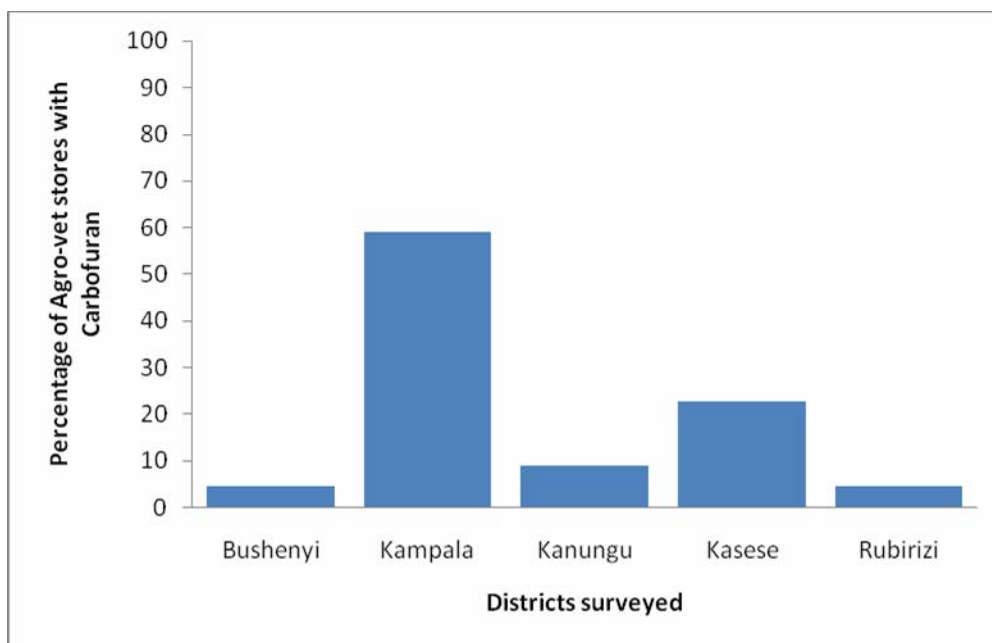
We chose Kampala because of the central location from a business stand point. There were also a number of major distributors based in Kampala (Appendix I). In addition to that, there were many retailers dealing in agro-vet chemicals in areas such as the container village, Cooper complex, Nakivubo place and Ben Kiwanuka Street among others. There was a ready availability of Carbofuran in 13 out of the 35 agro-vet stores randomly visited (Table 1 & Figure 1), representing a total of 60% of the total shops sampled country wide. Kampala is therefore an area with the highest potential of Carbofuran market in Uganda. The retailers reported that their clientele comprises farmers from the neighbouring districts of Kampala and others are from up-country locations. They prefer buying from retail outlets in Kampala because of the relatively cheaper prices compared to those up-country.

Kampala was the main location where Furadan labelled as FMC was found to be available for sale but as indicated in the introduction FMC has identified counterfeit products being sold in Uganda.

*Kasese*

Kasese emerged second in terms of percentage of Carbofuran available in the agro-vet outlets (Table 1 & Figure 1). This is the district which has had the highest reported cases of Carbofuran misuse against the lions in QENP by the Basongora pastoralists. No Furadan was found here.





**Figure 1.** The percentage of Agro-vet stores with Carbofuran in the surveyed districts.

*Kanungu*

In Kanungu, out of the four shops, two had Carbofuran (Figure 1 & Table 1). In terms of the percentage of Carbofuran availability, Kanungu emerged third after Kasese with 9% of the total number of shops surveyed in all sites. This can partly be explained from the point of view that, the area is known for the production of rice, potatoes, bananas, cassava, maize, millet, fruit and vegetables. In order to enhance their agricultural productivity, the large scale farmers buy agro-chemicals to kill pests that destroy their crops. Furadan was found for sale here and this was the only site outside Kampala where we found it being sold.

However, respondents reported that, some of their customers actually purchase Carbofuran for use against the baboons, monkeys, birds and other cats which stray away from the Ishasha sector of Queen Elizabeth National Park, into the community in search of food, leading to destruction of their crops and predation on their livestock. This therefore poses a very serious threat to the relatively stable population of the tree climbing lions in Ishasha, which is currently standing at only 30 individuals within this part of the park.

*Rubiriizi*

This area registered 5% Carbofuran presence out of the total shops sampled in this study (Figure 1 & Table 1). There were 5 shops sampled in that area, and one shop had Carbofuran. Since many of the inhabitants here are cultivators growing bananas, they buy the substance to safeguard their banana from the wilt disease. The retailers also informed us that, some of the farmers use Carbofuran to poison problem animals that come out of QEPA to destroy their crops.

*Bushenyi*

There were a total of 6 agro-vet stores sampled and one had Carbofuran. In terms of the total shops sampled in our study, this area also represented 5% of shops with Carbofuran availability (Figure 1 & Table 1). This area is also well known for banana production in the Western region. Perhaps that is why they still depend on the Carbofuran as pesticide and

nematicide. The farmers have also been reported by the retailers to use the product against problem animals.

### **Legislation governing Carbofuran in Uganda**

The 1995 Constitution of the Republic of Uganda in objective XXVII (iv) states that:

*The state, including local governments, shall-*

*(a) create and develop parks, reserves and recreation areas and ensure the conservation of natural resources;*

*(b) promote the rational use of natural resources so as to safeguard and protect the bio-diversity of Uganda.*

The above constitutional provisions clearly address the need to conserve, safeguard and protect the bio-diversity of Uganda. It is therefore unconstitutional for anyone to poison any wildlife in Uganda. The poisoning of lions using Carbofuran is a cruel form of killing that could potentially wipe out the remaining lions in Queen Elizabeth Park.

In addition to that, The Agricultural Chemicals (Registration and Control) Regulations, 1993 Section 35 (8) states that:

*Non target species shall be protected.*

It is the responsibility of the government of Uganda to provide protection for the lions and other wildlife which fall under the non target species. The Carbofuran registered for sale in the Country is the 5G or 5% concentration, and should only be used as pesticide or nematicide but not as poison against wildlife.

### **National Drug Authority (NDA)**

The National Drug Authority (NDA) was established by Section 3(1) of the National Drug Policy and Authority Act Cap 206 as a body corporate with perpetual succession and a common seal, and may sue or be sued in its corporate name (NDA, 2011). The mission of NDA is to ensure quality, safety and efficacy of human and veterinary medicines and other health care products through the regulation and control of their production, importation, distribution and use.

The authority is responsible for the regulation of the following products in Uganda: human drugs, veterinary drugs, herbal drugs, food and dietary supplements, public health products, and registration of all pharmacies (N. Aineplan, pers. Comm.).

However, the regulation of Carbofuran and other agrochemicals is the responsibility of the Agricultural Chemical Board, Ministry of Agriculture, Animal Industry and Fisheries, Entebbe. Dr. Aineplan was really concerned about the way pastoralists were misusing agro-vet chemicals in the poisoning of wildlife and reiterated that, should anyone be arrested with concrete evidence on the misuse of any veterinary product, in the poisoning of lions or any wildlife, he would work with us and the Uganda Police to bring the culprit to book (N. Aineplan, pers. Comm.).

### **Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)**

MAAIF is the Government Ministry responsible for the registration, regulation and control of all agro-chemicals imported into or manufactured within the Country. The back bone of Uganda's economy is agriculture; it would be disastrous to the farmers to ban Carbofuran, there are other pesticides which are equally as dangerous as Carbofuran. The only option suggested by the Commissioner Crop Protection in the MAAIF, is to offer a tracking

mechanism from the main distributors to the retailers. A receipt should be designed to capture all the details of the buyers, this will ensure an appropriate follow-up should any reported cases of poisoning arise from their area of origin.

However, they have pledged to partner with us to discourage abuse of the product and requested us to provide possible solutions to the prevailing situation. The Commissioner further reiterated that, he can organise a sensitization workshop for all the stakeholders so that we can educate people on the dangers of pesticide abuse to the economy as far as lions are concerned and wildlife in general.

## **DISCUSSION**

In the early 2009, FMC implemented a Furadan buy-back program from distribution centres and retailers in Kenya and towards the end of 2009, the company also implemented the same program in Uganda and Tanzania. FMC thereafter claimed to have exported from Africa all Furadan that it repurchased from Africa in February 2010. This was actually not reflected on the market in Uganda. Agro-vet stores re-stocked their shelves after the departure of the FMC team. Though the buy-back programs in Kenya, Uganda, and Tanzania still remain open today for any Furadan product that might still be found in these countries, there are a number of retail outlets selling Furadan with the FMC logo. What cannot be ascertained is whether the products are the counterfeits or the genuine ones, as per the latest claim by FMC (dated 1<sup>st</sup> March 2011). We purchased one sample and FMC has asked to come and check it to verify whether it is authentic or not.

According to Odino & Ogada (2007), in Kenya the government agency responsible for the regulation of Furadan is the Pest Control Products Board (PCBP), was not aware of any misuse of Furadan to kill birds or other wildlife, during their survey. They also found that, Furadan was widely available, it was relatively cheap compared to other pesticides, and was the most preferred pesticide by farmers. Farmers in Kenya misused Furadan to target 'nuisance' birds, especially raptors (Odino & Ogada, 2007). However, in Uganda, the Ministry officials admitted to having knowledge of abuse and are willing to work with us if we could come up with better options to curb the abuse of the chemical product by the pastoralists.

Since our survey took place we have seen an increase in the availability of Furadan on the shelves indicating FMC as the manufacturer. However, this may be either due to an operation conducted by the Crop Protection Unit of MAAIF at the time of our survey which aimed to remove illegal and counterfeit drugs, or due to the reported fake Furadan product that FMC states it has found on the Ugandan market which contains no Carbofuran. According to the results of the operation, many of the dealers in Kampala were found to sell expired drugs or have fake agricultural chemicals which they were selling to farmers (Ssebuyira, 2010). The operation was instituted to sensitize them about the exercise of good ethical standards in their business as well as ensure that farmers do receive the proper chemicals. According to J. Bazaale, a principal agriculture inspector (pers. comm.), in a similar operation conducted in August last year, they impounded fake chemicals worth Shs 40 million (approximately \$ 17,000 USD).

In the Agricultural Chemical Protection Act 2006, dealing in fake chemicals would attract a maximum penalty of five years imprisonment or a fine of Uhs.2.5 million. The law in itself is

a very good instrument, like many other good laws in Uganda; however, the implementation of such laws still leaves a lot to be desired.

Carbofuran is still available in Uganda and is relatively easy to obtain despite attempts by FMC to remove Furadan from the market. Given the finding that fake chemicals marked with the FMC logo and labelled Furadan are available in Uganda, it is now difficult for us to be able to state for certain if what we found is the real Furadan 5G manufactured by FMC or it was a fake product. The retailer we interviewed told us that the supply of Furadan is from Kenya and the customers like the 200g of Furadan 5G because of affordability, each 200g pack is sold at four thousand Uganda shillings (4,000/=), but a full kilogram would therefore cost up to twenty thousand shillings (20,000/=).

However there are two other Carbofuran products which are alternatives to Furadan which are officially registered and sold in Uganda. In Appendix II, we have a list of some other products which may also be used as poison against wildlife and birds.

## **CONCLUSION**

The assessment shows that the three forms of Carbofuran namely: Furadan 5G, Agro-furan 5GR and Furan 5G, containing 5% concentration, are readily available in Uganda. The most common type being Furan 5G (Carbofuran) in granular preparation. Unfortunately, in Uganda, the 5G or 5% Carbofuran is legally allowed on the market for use by the farmers. The Government only prohibits the 10G (Carbofuran 10%) concentration, because it is highly toxic and not permitted for use in Uganda by MAAIF. The most frequently sold are the 1 kg pack costing between seven thousand five hundred Uganda shillings (UgX 7,500/=) to seventeen thousand, five hundred Uganda shillings (UgX 17,500/=) only. The pesticide is widely abused amongst pastoral communities for retaliatory poisoning of lions and subsequent poisoning of other carnivores and raptors. The other forms of abuse by cultivators ranged from poisoning monkeys, baboons and birds that come to destroy their crops.

The Laws governing misuse of agrochemicals in Uganda are clearly stipulated, but the enforcement is a big challenge because, obtaining substantial evidence to convict a culprit is close to impossible. The efforts by WCS, UWA and other conservation partners may not bear any fruit unless we take drastic measures to sensitize the farmers who use Carbofuran, contact manufacturers of Carbofuran products to introduce chemical ingredients which are distasteful to mammals, and the regulatory authority to impose strict monitoring on the use of Carbofuran. All these can only be achieved with cooperation amongst all the stakeholders.

## **RECOMMENDATIONS**

1. Carbofuran surveys should be extended to areas neighbouring all the savannah National Parks of Uganda, hotspots for human-carnivore conflict. This include among others; Murchison Falls Conservation Area (MFCA), Kibale Conservation Area (KCA) and Kidepo Valley Conservation Area (KVCA).
2. Conservation Through Public Health (CTPH), Ministry of Health and Makerere University College of Health Sciences should carry out urgent human-health surveys in persons exposed to the chemical through its application on cultivated fields or by eating wildlife/birds killed by the chemicals to ascertain the dangers imposed to human life.
3. There should be an awareness campaign to enlighten people who are either using or misusing Carbofuran without knowledge of the dangers associated with it.

4. We should urgently address issues raised in this report with the Agricultural Chemical Board, Ministry of Agriculture, Animal Industry and Fisheries, since they are the agency charged with the regulation of agrochemicals in Uganda.
5. A meeting should be convened by MAAIF to include all stakeholders, to address the current threat of the continued misuse of Carbofuran and to jointly recommend initiatives to curb further destruction of carnivores and wildlife in general, and other natural resources in Uganda as a whole.

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Finally, we thank the retailers who took their time to give the responses that form the basis of this report.

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**APPENDIX 1: List of Agro chemical distributors in Uganda**

Serial No.	Name of Distributor	Address	Telephone Contact
1	General & Allied Ltd	Kampala Plot 21 Nakivubo Palce	+256 41 232 368
2	Quality Chemicals Ltd	Kampala Plot 64/65, Katwe Rd, Prince House	+256 41 347611
3	Harvest Farm Seeds Ltd	Kampala Plot 34/36 Kibira Road	+256 77 625301
4	Soil Science Society of East Africa	Kampala Makerere University	+256 41 540707
5	Eden Stores	Kampala Plot 14/18 Nakivubo Road	+256 41 235 511
4	Famous Distributors (U) Ltd	Kampala Plot 21 Nakivubo Place	+256 41 256 406
5	Industrial & Agricultural Chemicals Ltd	Kampala Embassy House, Plot 9/11 Parliament	+256 41 235 429
6	Old East	Kampala Plot 45, Lumumba Avenue	+256 41 232 526
7	Agri-Expt (U) Ltd	Kampala 6th Street, Kampala	+256 41 250746
8	Allied Chemicals Ltd	Kampala Plot 78/84 6th Street, Industrial Area	+256 41 254 414
9	Friends Corner Farm Supply	Kampala Plot 12 Nakivubo Road	+256 41 349 890
10	Agro Machinery (U) Ltd	Kampala Nkrumah Road	+256 41 235 429
11	Lipsun (U) Ltd	Kampala Plot 15 Nakivubo Road	+256 41 347 600
12	Mulamo Agro Enterprises	Kampala Plot 70 Ben Kiwanuka Street	+256 41 250 950
13	Family K. Farm Supply Shop	Kampala Plot 5/9 Nakivubo Place	+256 41 250 707
14	Cooper (U) Ltd	Kampala Plot 41/43 Nasser Road	+256 41 231 177
15	Kenfarm Supplies Ltd	Kampala Entebbe Road	+256 41 200 293

**APPENDIX II:** Agro-vet products and their availability in Kampala and around QENP. The number of stores selling the product are indicated.

<b>Product name</b>	<b>Kampala area n=35</b>	<b>QENP area n=33</b>
Glyphosate	0	1
2,4-D Amine	9	4
Abamectin and acelamiprin	1	0
Acephate	2	0
Actellic	1	0
Agro thoate	0	2
Agrocythrin	0	3
Agrolaxyl	0	2
Agrosate	0	4
Agrosupernil	0	1
Agrozeb	0	3
Alazine	1	0
Alfapor	0	4
Alphacyperm-ethrin	3	0
Altorarant	0	1
Aluminium phosphate	0	2
Aluminium phosphide	6	0
Amitraz	23	25
Antipyrine	0	1
Antkiller	0	1
Antracol	0	2
Atrazine	1	0
Azadirachtin	2	0
Beta cyfluthrin	1	0
Bilaben	1	1



**APPENDIX II contd:** Agro-vet products and their availability in Kampala and around QENP.  
The number of stores selling the product are indicated.

<b>Product name</b>	<b>Kampala area</b>	<b>QENP area</b>
Bird off	1	0
Buparvaquone	2	0
Butanchlor	4	3
Carbaryl	11	0
Carbendazim	0	1
Chlophritos	3	0
Chlorfenifos	3	1
chlorpyrifos	40	8
Cooper thoate	0	1
Copper oxychloride	1	0
Cyperlacer	0	2
Cypermethrin	82	27
Deltamethazone	1	0
Deltamethrin	4	2
Diathene	0	1
Diazinon	8	2
Dichlorofen	0	2
Dichlorvos	23	8
Difethialone	1	0
Dikatix	0	1
Dimethoate	0	3
Dimethomorph	1	0
Diothin	0	2
Dithane	0	2
Dithiocarbonate	0	1
Endosulfan	1	0
Enrovet	0	1
Ethoprophos	1	0

**APPENDIX II contd:** Agro-vet products and their availability in Kampala and around QENP.  
The number of stores selling the product are indicated.

<b>Product name</b>	<b>Kampala area</b>	<b>QENP area</b>
Ethoxylated Alkylphenol polysloxane	0	2
Fendagro 6 SC	0	1
Fenvalerate	5	0
Flocoumafen	4	0
Flumethrin	2	1
<b>Carbofuran 5%</b>	<b>13</b>	<b>9</b>
Fuzol	0	1
Glyphosate	58	35
Gramaxion	0	1
Green zeb 80% WP	0	1
Imidacloprid	6	0
Indofil M 45	0	1
Isometamidium chloride	0	1
Isopropyrainine	0	2
Lambda cyhalothrin	4	0
Liphosate	0	1
Malathion	12	13
Mancozeb	44	16
Metalaxyl	3	4
Micronised sulphur	1	0
Milbitraz	0	3
Mocap granules	0	1
Neomycin sulphate	1	0
Nortrazor	0	1
organophosphorous	1	2
Orthene 75%	1	0

**APPENDIX II contd:** Agro-vet products and their availability in Kampala and around QENP.  
The number of stores selling the product are indicated.

<b>Product name</b>	<b>Kampala area</b>	<b>QENP area</b>
Parvaquone	1	0
Pelercyber	0	1
Penavalerate	1	0
Permethrin	1	1
Pervexon	0	1
Phosphorothoate	0	6
Polytrin	0	3
Power dust	1	0
Profenofos	11	5
Propineb	1	0
Protaid	0	3
Pyrethroid	1	1
Pyrinex	1	1
Quickphos	0	1
Regimax	0	1
Renegrade	0	2
Rodomil	0	1
Round up 38% SL	0	2
Seradix 2	0	1
Seven dust	0	2
Shamba superdust	0	1
Sulfadimidine	2	0
Sumathion liquid	0	1
Supertix 10% EC	0	2
Supona extra	1	0
Thionex 35 EC	0	1

**APPENDIX II contd:** Agro-vet products and their availability in Kampala and around QENP.  
The number of stores selling the product are indicated.

<b>Product name</b>	<b>Kampala area</b>	<b>QENP area</b>
Thiovit	1	3
Topilite 70% WP	0	1
Tridex 80% WP	0	1
Tsetsetick	0	1
Ugonall	0	1
Uthane 80% WP	0	1
Vectocid	1	0
Victory	0	1
Zinc phosphide	3	4
Dimethoate	23	11
Lambdacyhalothrin	2	3
<b>Grand Total</b>	<b>444</b>	<b>285</b>