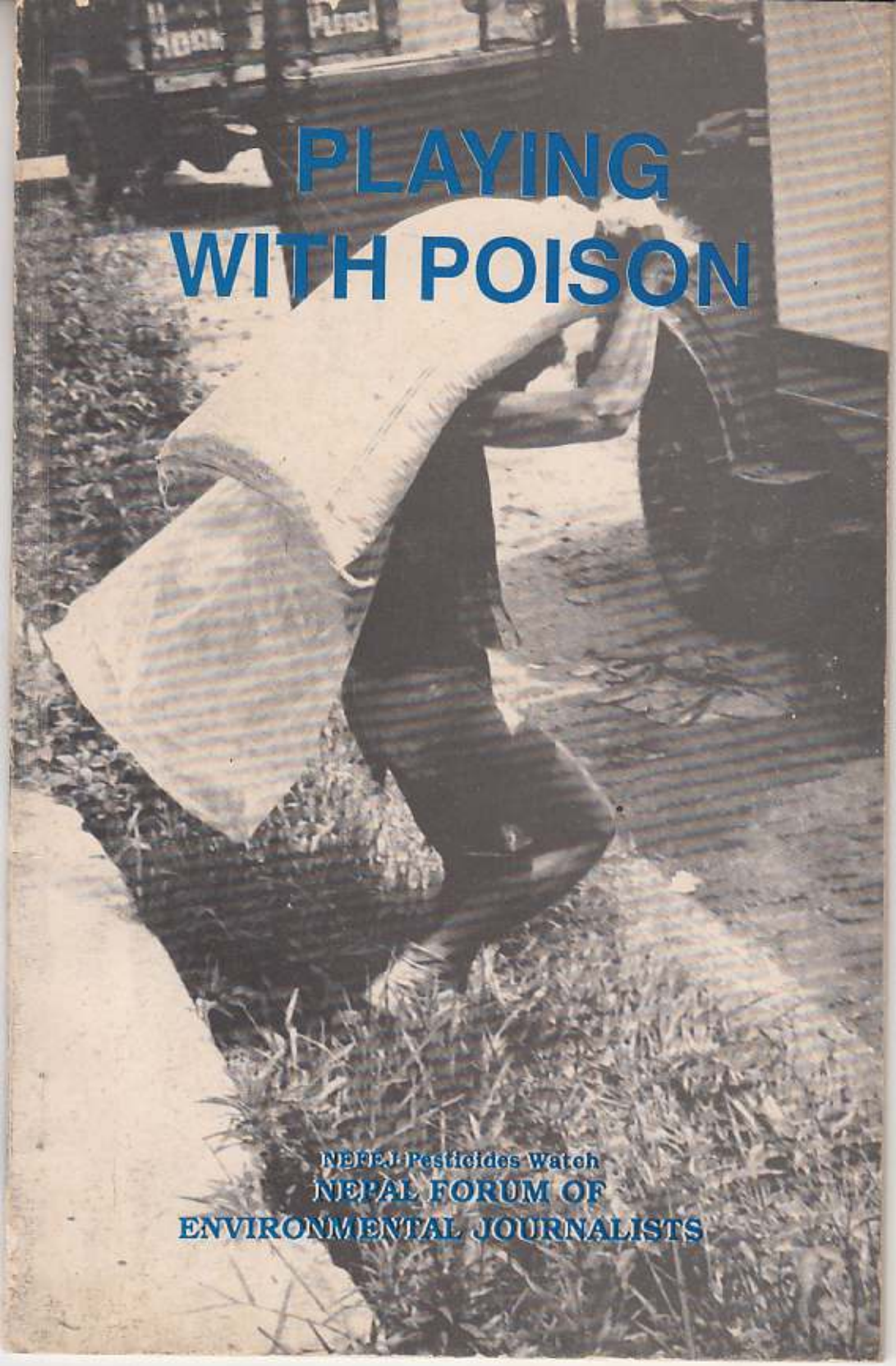

PLAYING WITH POISON

NEFEJ Pesticides Watch

NEPAL FORUM OF ENVIRONMENTAL JOURNALISTS

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Foreword

Although the government documents appear unsatisfied with inadequate use of pesticides pesticides-related problems have already threatened the environment. Misuse or overuse of pesticides, lack of agriculture extension facilities, inadequate legal provisions and pesticide disposal activities that are hazardous have encouraged us to prepare this report.

Journalists in Nepal, as elsewhere in the world, are often blamed for superficial reporting of technical issues. To place ourselves on the safe side we tried to collect as much information as possible and contact as many concerned individuals and authorities as possible. But it was very difficult to get information on such serious issues. Our efforts to acquire information from the Department of Agriculture Development, Ministry of Agriculture, member of the post-evaluation team of ADB, ANZDEC Limited were virtually futile. The information provided by them was quite contradictory. An academician, who was the project coordinator (before November 1992) of the pesticide disposal activities and was reportedly collecting all the original documents from the Department of Agriculture during his term of office always appeared willing to share the information he had but his verbal assurances could not be materialised even after repeated efforts on our part. Having experienced the buearocratic nature of the scientific community we were forced to come to the conclusion that it is very difficult for report writers, whether journalists or people of other professions, to prepare a report that covers all the related issues.

The Pesticides Watch established under Nepal Forum of Environmental Journalists (NEFEJ) has prepared this report as a first step towards monitoring the pesticide-related activities in Nepal. Due to various reasons this report does not cover the issues such as the use of pesticides in tea gardens, cotton and jute farming, although they are believed to be using large amounts of pesticides. As the purpose of preparing this report is just to present the picture of the problem of pesticide disposal it does not include case studies or actual amounts of pesticides being

used in Nepal. With the cooperation of environmentally conscious individuals and institutions we can do this in future.

We would like to thank those who helped us in preparing this report by providing information at their disposal and those who inspired us by not providing the same. We would like to apologise for probable inconveniences that may be caused to some because of wrong information, if any.

Keshab R. Kandel

Mohan Mainali

Playing with poison

Dr. William Klarman, while preparing the report 'Pesticide Use in Nepal' for a World Bank funded project in 1987, found that the way the date-expired and highly toxic pesticides were stored posed a serious threat to human beings and the environment. Though he did not notice the existence of a disposal problem with pesticides handled by the private sector not because of their efficiency in handling these pesticides but because of the malpractice of changing the labels and adjusting the dates valid for use, he did find the disposal problem very serious in the case of the Agriculture Input Corporation which handles persticides in the public sector.

In many parts of the country, much of the date-expired pesticides have been stored in densely populated area. In some places, pesticides have been stored in the same building where the people were residing. In his report Dr. Klarman not only highlighted the poor situation of stores and absence of handling techniques and regulations for the disposal but also the need for the disposing them. " This situation is a time-bomb that can only lead to a major catastrophe if not corrected", he wrote.

In his recommendation he suggested that the storage and disposal problem should be solved with greatest urgency as the problem could become worse because too many kinds of pesticides were purchased. There should be regulations for disposing pesticides and someone must take responsibility.

He concluded that "the often insidious nature of pesticide related problems may make it difficult to realize the cause until the catastrophe is well under way". In fact, the catastrophe was already under way.

Realising the need for taking measures to solve the existing problems and to avoid such unwanted situation in future United Nations Development Programme(UNDP) provided Nepal with US $ 577,000 grant assistance which was administered by the Asian Development Bank (ADB). The project has been completed but more than 36 metric

tonnes of pesticides — up from the previously disclosed 26 tonnes — of the 'date-expired' chemicals have piled up in the godowns of the Agriculture Input Corporation (AIC) and no one seems to know what to do with it. In November 1992 when the pesticides were being put into steel drums the consultant estimated that there was more than 50 tonnes of pesticides.

But information related to even the previously completed "pesticide disposal" project has not been made public by the Department of Agriculture Development (DAD) or the AIC.

The Asian Development Bank started administering the grant assistance with the objective of helping the government to establish and strengthen an "institutional system" for safe use of pesticides. But as the project progressed the Bank was compelled to concentrate more on the disposal part, according to Jyoti Lohani of the ADB Country Office in Kathmandu. A member of the post-evaluation team from the Bank's headquarters, who was here to evaluate the agricultural project "which focussed on pesticides" was, however, silent on the issue, Lohani maintains.

"You should pressure your government to implement the pesticide law rather than talk about disposal of pesticides which is not so important. About 100 tonnes of pesticides have been safely disposed," was all he said.

The UNDP grant was provided to prepare a pesticide regulation and dispose some 150 tonnes of date-expired pesticides which were in the country at that time.

ADB was entrusted with the responsibility of administering the grant and it contracted ANZDEC Limited, a New Zealand based consulting company to carry out the task.

Previously 84.5 tonnes dust, 38.59 tonnes granules, 88,276 tubes and 14,548 litters of liquid pesticides in different warehouse of the AIC were identified by the AIC and ANZDEC Limited, according to T. K. Biddhyarthi, Divisional Chief, Marketing Division of AIC. The quantity of these date-expired pesticides later went up as they searched in more warehouses. In 1990 ANZDEC Limited collected and classified the pesticides.

Inventory of date-expired pesticides before the launching of disposal programme

Place	liquid (litre)	Dust (MT)	Granules	Tubes
Bheri Karnali	3709.80	23.40	4.51	12488
Seti-Mahakali	404.80	1.57	0.05	794
Bagmati	538.30	1.73	0.05	1802
Gandaki-Dhawalagiri	97.60	1.33	.13	220
Lumbini	1685.00	1.98	9.47	3234
Rapti	56.00	1.00	-	-
Mechi	289.70	0.28	-	328
Koshi	762.60	5.80	2.25	3932
Sagarmatha	488.30	0.27	0.66	107
Janakpur	1567.40	16.99	0.37	8428
Narayani	*	*	*	*
Total	14548.00	84.15	38.59	88276

*Unavailable

Source: AIC

Of the 127.5 tonnes of pesticides in AIC godowns, 23 tonnes were given free of cost to Nepal Pesticides, a private company for reformulation. Of the remaining chemicals, 30.2, 23.1, 1.8 and 14.87 tonnes of pesticides were sprayed and buried in jungles near Birgunj, Bhairahawa, Janakpur and Nepalgunj respectively, according to AIC.

Ten tonnes of pesticides were distributed to agricultural farms for use. The rest, i.e. 26.5 tonnes of pesticides, believed to be highly toxic, were supposed to be incinerated in the kiln of the Hetauda Cement Factory. Permission for the this method of disposal was granted in November 1990.

The final report of the consultants has contradictory data. According to the report, of the 150 tonnes of date-expired pesticides, 74.5 tonnes was buried or spread over the ground, 16 tonnes was used, 23 tonnes was reformulated and the rest or 36 tonnes is securely stored.

Dr. Graham had planned to incinerate the 26.5 tonnes of pesticides at the Hetauda Cement Factory in August 1991 which was supposed to take about a month. The consultants visited the site many times.

This, however, did not take place after different Nepali environmental groups including Green Peace (international) expressed their concern about the implications of this method of disposal. Their concerns focussed on toxicity of pesticides, the disposal of mercury compound and the

possible impact of incineration on the local environment.

The final report presented by ANZDEC to the ADB said that 'considerable amount of misinformation was spread about the operation, and this, aided and abetted by international environmental groups and local public concerns, led to the decisions being taken not to proceed with incineration in the cement kiln'. The report also claimed that the consultants had held meetings with community leaders; this, we believe, is quite baseless. In fact, Dr. Graham did not have enough confidence to face the public hearing which was organised in Hetauda. When the local people and NGOs asked him to present evidence that the incineration was not harmful to the environment he promised to do so. The local people and NGOs organised a meeting with him but he did not show. The report, however, accepted that they had prepared a press statement but it was never released. Although he did not say anything to the public his report to ADB mentioned that mercury was not supposed to be incinerated.

Dr. Graham said that the protest was based on the belief that mercury was being incinerated. Well, his disposal plan may not have intended to incinerate the mercury but the mere plan (which the public never heard of) did not assure the public that the mercury was not to have been incenerated. And, there is a strong basis for not believing his claim. He, for example, did not have a plan to bury mercury-containing pesticides in the jungle of Amlekhgunj near Hetauda but they were buried. Previously, he mentioned that there were about 2.5 tonnes of mercury compound but later on, he confessed that the amount of mercury compound was 7.4 tonnes, about three times the amount mentioned earlier. He may not have intended to incinerate the 2.5 tonnes of mercury but what about the remaining 5 tonnes?

Subsequnetly, the Environment Division of ADB hired another consultant, Steven E. Dwinell from the United States to review ANZDEC's work in Nepal.

Dwinell ruled out the appropriateness of using cement kiln for incinerating pesticides - a method identified by the ANZDEC consultant as being appropriate.

Dr. Graham himself did not rule out the inappropriateness of incinerating the organo-chlorins in

cement kilns but he repeatedly tried to prove the need for using the kiln on the ground that it would be costlier to ship the pesticides to other countries with well-developed kilns.

Making the plan to use a cement factory for incinerating these highly toxic pesticides was itself regarded as quite ridiculous. Here at this stage, one must calculate the economics of the high cost of incineration in well-developed kilns and the relatively 'low cost' of using cement kilns. It is estimated that the incineration of 26.5 tonnes (previously weighed amount) of pesticides would cost about US $ 79,500 (at the rate of US $ 3,000 per metric tonnes) which would be only 13 percent of the total amount of the process.

But he never thought of the amount of money paid by ADB for the whole operation. Instead of paying so much of money to the consultant it could have been better to take pesticides out from the country to dispose them in especially built facilities in Europe.

The review team not only ruled out any plan of incineration but also found that the burials were conducted hazardously. But the member of ADB post evaluation team who was in Kathmandu in March 1993 said that 'the previous disposal was quite safe.'

The team found that some of the pits were open and within the eroded fills which would lead to the contamination of surface water by the pesticides. The team identified some 1.3 tonnes of mercury compound buried in the jungle. Following these findings the team collected ten 10-liter buckets and six sackfull of pesticides for safe storage. It also recommended the removal of recently buried material.

The team found that the burial site was near a village where they saw grazing cattle and a running deer. A strong smell of pesticides was evident in the area. It clearly indicates that those disposed chemicals have had very bad effects on the wildlife, cattle and even the people. There were many unopened bottles of pesticides and some of the pits were opened. There, definitely were chances that people had taken bottles of these persticides for household use. The final report of ANZDEC repeatedly mentioned that burials which were carried out in the presence of the consultant and Mr. Baral, the AIC counterpart, were quite satisfactory but those which were done by the local staff

who had been 'trained' by the consultants were not done properly.

An employee of AIC disagrees: "It was a minor issue. Some pits were opened by local people or wild animals, that was all." Later, the chemicals unearthed in this so-called "minor issue" were collected and brought back to the godown.

How much pesticides are stored?

The concerned authorities provided this Pesticides Watch group with contradictory information regarding the amount of pesticides stored in the warehouses.

Following the abandonment of the plan of incineration, 24 tonnes of pesticides were sealed into steel drums which are now in the warehouse. The remaining two tonnes (which in fact is 7.4 metric tonnes) of "highly toxic" pesticides had to be buried because of the dangers associated with storing it according to Lohani. He, however, could not provide other details.

Mr. Dwinell, who prepared the report, Assessment of Pesticides Disposal Activities in Nepal, estimated that there were some 30-35 tonnes of pesticides in storage.

A member of the post evaluation team estimates that some 20-25 tonnes of pesticides are in the Amlekhgunj warehouse of AIC.

Both Lohani and the member of the post evaluation team do not seem to be aware of the fact that a letter written by Dr. Bruce W. Graham, the ANZDEC consultant, to the General Manager of AIC in October 1992 mentions that 50 tonnes of pesticides including 7.4 tonnes of organo-mercury and 22.5 tonnes of unidentified — largely organochlorins and organo-phosphates dust, were stored in the warehouse.

Dr. Graham, in the same letter, also says that the initial estimate of pesticides in store (26.5 tonnes) was "inaccurate." However, at the end of his term the pesticides in store was 50 tonnes.

By the time of the completion of the project the figure had gone down to 36 metric tonnes .

Inventory of stocks at Amlekhgunj , Oct. 1992 (estimated only)

	Material	Quantity	Packaging
1.	Endrin liquid	1200 lt.	19 drums
2.	Organomercury	7.4 tonnes	43 drums
3.	DDT dust	1.0 tone	5 drums
4	DDT dust	2.2 tonnes	44 sacks
5.	Agrimycin	o.5 tonne	3 drums
6.	Cindane granules	0.5 tonnes	3 drums
7.	BHC dust	1.7 tonnes	10 drums
8.	BHC dust	5.1 tonnes	102 sacks
9.	Organophosphates	Li.900 lt.	15 drum
10.	Methyl Parathion	320 lt.	32 cases
11.	Atrazine	0.4 tonnes	3 drums
12.	Chlordane dust	1.2 tonnes	24 sacks
13.	Unidentified dust*	5.2 tonnes	29 drums
14.	Unidentified dust*	17.3 tonnes	346 sacks
15.	Diathane M-45, Z- 78	2.0 tonnes	80 cases
16.	Z, 4-D	1.0 tonnes	40 cases
17.	Zinc Phosphates	1.0 tonnes	40 cases
18.	Almunium Phosphates	2.0 tonnes	
Total (1 lit= 1 kg.)		50.9 tonnes	

(Source: Letter to the General Manager, AIC, by Dr. Bruce W Graham, Pesticide Disposal Specialist, ANZDEC Limited, dated 27 October, 1992.)

Inventory of the pesticides in the warehouse

Materials	Quantity*
2, 4-D	4 drums
agrimycin	3 drums
atrazine	3 drums
BHC dust	29 drums
chlordane dust	5 drums
DDT dust	16 drums
dithane M-45, Z-78	25 drums
endrin, liquid	19 drums
lindane granules	3 drums

organomercury compound	47 drums
organophophates, liquid	23 drums
unidentified dust	104 drums

Source: Regristration, Regulation and Use of Pesticides-Nepal; Final Report, March 1993 , ANZDEC Limited, Consultants

* The figures in the table are still based on a significant amount of guess work, as it was almost impossible to count every small bottle or packet and to weigh every bag before disposal actions were taken.

Some of the concerned people said that the amount had gone up because they did not have enough data (supposed to have been provided by AIC) to estimate the exact amount of the pesticides to be disposed until they started storing the pesticides into steel drums in late 1992. If their origional plan of disposal had received the green light they did not have to place the pesticides in steel drums. Also, they did not have chance to know exactly how much pesticides were to be disposed of because they did not think it neccessary to determine the quantities of the pesticides before they prepared the plan.

It clearly incidates that the consultants prepared the disposal plan without possessing the basic data. It is a well-established practice to observe that "Before options for managing pesticides waste can be identified, it is important to determine the type and quantity of pesticides that require disposal." One can easily imagine the consequences of the implementation of the plan based on totally inaccurate data.

Now finally, a wall has been constructed around the Amlekhgunj warehouse to prevent people from entering into the compound.

The fate of the pesticides

In late 1992 Dr. Brain B. Watt, another ANZDEC consultant, came to complete the assignment. When contacted for information Dr. Watt maintained that the "task had been completed." He did not elaborate on the processes used and said that the detailed report was available at the Department of Agriculture Development

(DAD). But Ms. Ram Badan Pradhan, Project Coordinator, has "not seen the report."

When Dr. Graham left Kathmandu on October 28, 1992 after completing his assignment there were 19 tonnes of pesticides packed in 130 steel drums. He mentioned that he was awaiting directions from ADB which would probably be to seal the rest of the pesticides into 190 drums. The final report mentioned that 36 tonnes of pesticides were kept in 281 steel drums.

The Nepali Institutions, namely DAD and AIC were not aware of the need to acquire information on the disposal activities. "We feel that the project was completed satisfactorily; we do not believe that there still are date-expired pesticides in Nepal," Ms. Pradhan, Coordinator of the Project (after November 1992) said.

What can be done?

One of the most serious questions to be asked about these pesticides is how long can we keep them in this way? The member of the post evaluation team expressed his view that the pesticides should not be stored for a long time in the types of warehouses where they are now kept. They must be disposed of.

Dwinell in his report prepared for ADB dated April 30, 1992 suggested the disposal of the pesticides by either incinerating them or deactivating the chemicals or by applying some other means which were not yet identified. He suggested storing the pesticides (although he himself agreed that storing such highly toxic pesticides in warehouses so close to human settlements poses a threat to the environment, especially at the time of disasters like fire and earthquake) pending the identification of suitable disposal method. They may be disposed of either in Nepal by appropriate means or by transporting them to Europe or North America where such facilities exists.

The consultants, in their final report, regarded the decision not to proceed with incineration as the most unfortunate. They still believed that the pesticides other than organomercury compound could be safely incinerated. However, it is clear that the government must approach donor agency (ies) for resources to rectify the situation.

The problem lies there

Nepal in the past regarded pesticides only as the means of protecting agriculture products from pests. "We purchase pesticides in bulk in advance to control expected endemics. The headquarters of the AIC used to purchase and distribute them through its branches, private dealers, Sajha dealers, etc. The practice of purchasing pesticides in bulk without assessing the demand has resulted in large stocks of unused date-expired pesticides in warehouses. Since 1981 (2036 B.S.) we have given up that practice and authorised the zonal branches to purchase the required pesticides by themselves", says an employee of the AIC.

According to the Klarman report, the problem of date-expired pesticides has arisen because of the procurement of too many kinds of pesticides, not according to the actual need but according to availibility or sales pressure.

In Nepal the technique for safe disposal of pesticides has not been developed. In 1981 AIC made a futile attempt of calling bids to dispose of the date-expired pesticides. An Indian bidder was awarded a contract to collect all the pesticides which he was supposed to take to India. But later he refused to accept the contract because of the 'objection from government authorities at the Nepal-India border.'

While the AIC is facing the problem of disposing date-expired pesticides, the private dealers that are emerging as the main sources of pesticides in Nepal are not facing the same kind of problem. Dr. Klarman did not identify expired materials in private shops. However, this is not because they manage it well but because they adjust or alter dates on the containers with date-expired pesticides. It is also reported that some of the pesticides have been disposed of by the private dealers in a manner which could pose serious threat to the environment.

"Since no expired materials were observed, one must conclude that all pesticides were sold prior to expiration (highly unlikely), or that they were disposed of in some manner. Although it was not possible to determine how much pesticides is disposed of, the amount is probably considerable and the method is usually by burying in the soil," Dr. Klarman wrote.

Asian Development Bank's Reponses

[In response to our request (a) to provide necessary information on the pesticides disposal activities during the preparation of this report (b) to comment on the draft report, the Asian Development Bank (ADB) country office, Nepal has organised two meetings to share information, ideas and views on the issue and provided us the Final Report of the Registration, Regulation and Use of Pesticides-Nepal. Similarly, the Environment Division of the ADB has called from Manila showing its concerns. To present a better and more objective picture it was necessary to represent views of the ADB. With this in mind we tried to include the views of the ADB based on the meeting held on May 23, 1993 at the ADB country office, Kathmandu which was participated in by Mr. Rajat M. Nag; Deputy Resident Chief-ADB, Mr. Jyoti Lohani of ADB, Mr. Rajendra Dahal, General Secretary of the Nepal Forum of Environmental Journalists (NEFEJ), Mr. Keshab R. Kandel, Associate member of NEFEJ and member of the Pesticides Watch (PW), Mohan Mainlai, then Executive Director, NEFEJ and a member of the PW.]

When the ADB started the project in 1990 the quantity of pesticides was estimated to be 180 Metric tonnes. At the time that they came up with this figure it was very difficult to know exactly how much pesticides was spread throughout the country but as they began collecting the pesticides they announced the updated figure of 150 metric tonnes. This has caused confusion among the NGOs and the press. 114 tonnes out of the 150 has been disposed of by burials or by spreading, reuse and reformulation. The remaining 36 tonnes are stored in steel drums.

The pesticides, except the organomercury group (which were estimated to be 26 tonnes initially), were supposed to be incinerated at the Hetauda Cement Factory. The consultants quite clearly said that their plan was to incinerate organochlorines not organomercury chemicals.

They feel that this misinformation had aroused unnecessary sentiments leading to the hiring of another consultant, Mr. Steven Dwinell who was less enthusiastic

about incineration. But ANZDEC Limited still feels that the organochlorines could have been burnt at Cement Factory.

There are some differences of opinions among the professionals. We are not qualified to judge what is right and what is wrong. But we could safely say that if there is even minimum of risks involved in the process of incineration we should not proceed with the plan. Because of concerns shown by environmental groups the ADB cancelled the previous plan of incineration.

The pesticides awaiting safe disposal are now in much safer condition than they were before. The government has enough time to decide what to do with them; whether to send them to especially designed kilns or to incinerate them somewhere else. It has enough time to look at the pros and cons of the matter and also the costs of the different options. Previously, there was an urgent need for action as the the pesticides were stored in an extremely unsafe manner.

During the period of the implementation of this project pesticide law has been prepared and awaiting implementation.

Misuse and hazardous handling

BHC: one of the widely used pesticides

Binaya Kumar Kasaju, a Palpa-based journalist, in late 1991 writing for Himal magazine reported that when the local people saw large number of fish floating on the Barangdi river near Palpa they caught as much as they could. This excitement, later on, resulted in severe physical weakness and mental disorder among those that ate the fish. The fact was that some fishermen had used pesticide to catch fish in an easy way.

Jagrit Bhetwal, Member of Parliament from Chitwan told us a similar story that took place in late 1992 or early 1993 in Birendranagar, Chitwan. The local people were worried that their domestic animals were getting sick. Later, some of the villagers themselves were admitted to the hospital with some unknown disease. They learnt that they consumed water contaminated with poisonous pesticides. Some villagers were charged with pouring pesticides into the water tank that supplied drinking water to the villagers. They did so to catch fishes raised in the tank.

He says fishermen from India also are using pesticides as an easy means of fishing in Narayani River.

"People are using bottles of liquid pesticides in both small and large rivers like the Rapti", says Dilli Bahadur Chowdhary, President and Project Chief of the Dang- based NGO, Backward Society Education (BASE). "As the pesticides kill not only fishes and other acquatic animals but also human beings, it is a very serious problem", he adds.

Immediately after the restoration of democracy in Nepal in 1990, poachers used pesticides in the Narayani River and killed four one-horn rhinos.

The warden of the Chitwan National Park, Mr. Shyam Bajimaya said that poachers have been pouring highly toxic-pesticides in the pond for killing wild animals of high value. Because some wild animals live in the vicinity of certain water sources and drink water frequently in the same place it is very easy for poeachers to use this means. This is happaning because pesticides are freely available in the market and there is no regulation to control it.

The restaurants along the highways are suspected to be serving fishes contaminated with pesticides. Explosives, electrical shock and natural herbs, often used as methods in fishing are being fast replaced by the easily available pesticides because the latter does not need much preparation and does not take much time or effort for the fishermen. But what about the safety of the consumers, acquatic life and the environment? They are definitely in grave danger.

There are some evidences of the misuse of pesticides by farmers even in their own fish ponds.

The higly persistent pesticides like BHC is frequently

used by women and children to kill lice on their bodies and bugs in their beds. This has reportedly resulted in the deaths of many of the users.

It is not just the ignorant farmers and fishermen that are misusing and handling pesticides hazardously but even well-informed and well-equipped government institutions are handling pesticides poorly.

The potential safety hazards to pesticide handlers in all locations are both acute and chronic. In almost every location, there are reports of workers who became ill with headaches, vomiting, and sore eyes. They were given rest for a period of time and then sent back to work, or in extreme cases, were given some money and told to get medical help. In a few instances, there were reports of the deaths of workers, Klarman reported.

The poor producers

Nepal Pesticides and Chemicals Company (NPCC) is believed to be producing 60 kilolitres and 3,00 metric tonnes of BHC, malathion and parathio-methyl. Other small industries like Jaya Kisan Seed Center in Birgunj are also said to be producing the pesticides but no details are available.

The main market for the NPCC products is AIC which covers 75 % of the market in Nepal. And the rest of the 25 % of the pesticides is marketed by the private dealers.

NPCC has been criticised by foreign and local experts and the press for the deplorable condition of the factory and the way its production methods. Dr. Klarman in 1987 found that even during the off-season the floor was covered with 1-2 mm of malathion dust and methyl parathion which leaked on the floor and soaked the mounds of malathion dust. No safety measures were provided to the employees. According to the Klarman report the factory should not be allowed to operate.

Pesticides residues in food articles

Because of increasing populatiion there is an emphasis on the need to increase food production. In this process the use of pesticides is also increasing. One of the direct and obvious effects of modern agricultural practices is the increased use of pesticies. Improper use of pesticides in Nepal has been found in different reports and the situation is alarming. Highly persistent pesticides like DDT, BHC, Aldrin and Toxaphene are widely used. Because of their long persistence in the environment these pesticides contaminate foodgrain, vegetables, fruits which have mutagenic, teratogenic and carcinogenic effects to the consumers. The effects of different pesticides used by different farmers in the country may be more severe than commonly thought.

In many places it has been found that farmers use pesticides just prior to harvesting. The Central Food Research Laboratory in Kathmandu had done a study on pesticides residues. They have detected pesticides residue in many food samples. This indicates that consumers face a potentially serious problem.

Another study conducted by the same laboratory has found that the residue level of DDT had come down from 94% in 1978 to 74 % in 1986 . This is, indeed a good sign but the decrease in the level of DDT was actually due to the reduced use of DDT in this period. Now again the country has imported large amount of DDT . This means we will be adding more DDT to the environment. The residue in food products will certainly go up in future.

An assessment of the organochlorine and organophosphate pesticides residue in the vegetables of Kathmandu Valley was carried out by the Central Food Research Laboratory. They have detected both organochlorine and organophosphate residues in different samples. They were higher than the maximum residue levels fixed by Codex Alimentarous Commission.

Therefore, the possible harmful effect of pesticides on consumers is serious. CFRL had done some work on the

monitoring of pesticides residues during the project period. The process has been very slow because of the lack of resources. And, it is very difficult to get accurate results.

There is no fool-proof means by which pesticides residues can be detected. It is necessary to conduct a study on residual effect of pesticides especially on the vegetable crops which may have high toxic effect on people. There are many reports of the spraying of pesticides just before harvest. The users never follow safety instructions and thereby make the food poisonous. A safety period is usually specified between spraying and harvesting to allow time for pesticides to evaporate or decompose. Organochlorides disappear very slowly. Therefore, this category of persticides should not be recommended for food crops.

Monitoring of the residues of pesticides is one of the most important means of minimising potential hazard to human health. Ms. Urmila Joshi of CFRL recommended that once residues higher than the acceptable level is detected an appropriate action to eliminate the source of residues is necessary. But is such a practice in existence? Ms. Joshi say: "No". "We are not able to monitor pestidcides residues as we did in past", she adds. Although it is a must it seems too expensive to afford.

Therefore, not only should the monitoring of pesticides residues be made effective but appropriate actions should also be taken to eliminate the sources of such residues.

Toxicity of peticides

Toxicity of pesticides varies with the species and concentration of the chemicals. Human exposure to pesticides may be through oral, dermal, inhalation or contatct. Major categories of pesticides used in Nepal are organochloride, organophosphorous, carbamate, nitrochlorophenol, biphiridyls and pyrethroid.

Most of the pesticides used in the country are organochlorines which are persistent in the environment and some of them are stored in human tissues. The organophosphorous pesticides are less persistent in the environment but they are more toxic.

Phosphines and phosphides used in Nepal are in the form of tablets, pellets or powder. Zinc phosphide is used for rat control and aluminium or magnesium phosphides are ussed to control insects in store rooms. Many government organisations and families use this chemical to control pests in stored grain in a hazardous way. There are many reports of how people use celphos or phosphine

tablets inside houses where people are living. They never care about the possible effects of the chemicals they have used. Phospine affects the guts, kidneys, liver, heart and brain.

Organic mercurial compounds are being used for the treatment of seeds It is absorbed by animals thourgh skin and by inhalation. It causes damage to the central nervous system.

Inorganic mercurial compounds and dithiocarbamates are also used in the country. Inorganic mercurial compounds are highly toxic. Dithiocarbmates have toxic effects when alcohol is taken within 8 days after or before the exposure. People using these chemicals do not know their effects and the way they should be handled.

Pyrathrin and syntehtic pyrethroid are used in agriculture and horticulture. Natural pyrathrin has low toxicity whereas synthetic pyrathrin has a high degree of toxicity. The use of synthetic pyrathrin is increasing. It affects the central nervous system.

The use of pesticides has become a regular phenomenon in agriculture, forestry and public health. The use of pesticides is growing day by day. There is no restriction on the use of pesticides and there is uncertainity about the increasing resistence to pests. So, the never-ending process of developing or manufacturing new pesticides by commercial companies to combat the resistent pests is alarming.

Use of pesticides in agriculture

The use of pesticides in agriculture in Nepal is very low compared to most other countries. In 1987 it was estimated that infestations from a wide range of pests caused 15 to 20 percent loss in yield. The introduction of hybrid crops and indiscriminate use of pesticides in the past have necessitated the use of large quantity of toxic pesticides.

In Nepal pesticides are being supplied by AIC, private Nepali dealers, and Indian suppliers who come across the border to sell their pesticides, often of low quality. Nepal Tea Development Board and Cotton Development Board are also believed to be supplying pesticides for particular purposes.

In the past, pesticides were imported from Japan, India and Europe for agricultural use. Some of the pesticides were imported as commodity grants from donor countries and some were purchased by AIC and others.

According to the Agricultural Statistics of Nepal-1990, AIC has sold 3,915 tonnes and 52,816 litres of pesticides between fiscal year 1980/81 and 1988/89. The statistics do not mention the types of pesticides.

Another source, namely the summary of the report of the Commission formed to investigate the alleged corruption in AIC during the interim period, however mentioned that in the five years between fiscal year 2040 and 2045 B. S. AIC distributed some 3,166.31 metric tonnes and 36,772 litres of pesticides.

Yet another source, the Economic Survey 1990/91 claims that during fiscal years 2038/39 and 2047/48 AIC distributed 5,665 tonnes and 61,607 litres of pesticides.

Previously, AIC dealt with almost all of the required pesticides in Nepal but as private dealers with 'proven capacity' to supply pesticides in easily accessible regions emerged, AIC began to focus on those areas where the private sector does not have a reach. This means that the private sector has been playing a vital role in the distribution of pesticides.

At present, pesticides handled by AIC is only a small portion of the total need of the country. Private dealers have a major share in the market and a wide range of pesticides (from moderate to highly toxic) are available in the main shops in the market.

(See annex for the list of pesticides available in Nepal).

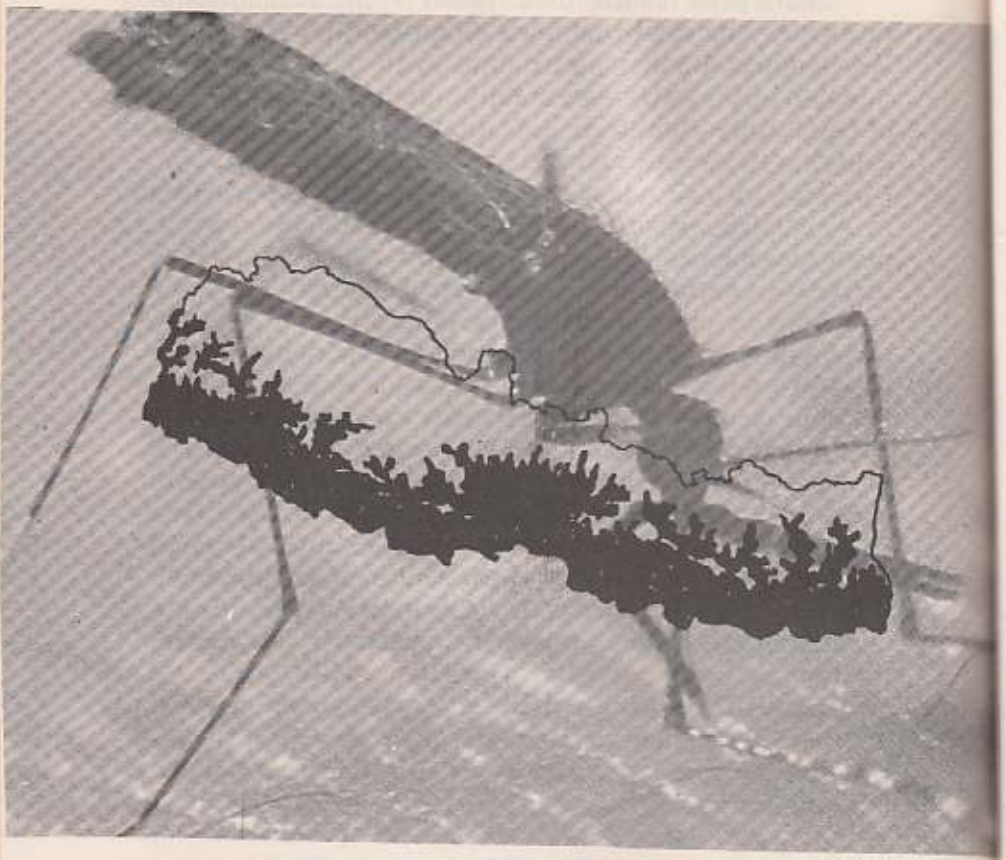
There is no reliable information on the availability of pesticides that are being used in agriculture. The Asian Development Bank reported that such data were being updated by the FAO Office in Kathmandu and the Ministry of Agriculture. But Mr. L. K. Gautam of FAO, Kathmandu said that it has not updated the data.

And, the AIC, one of the major suppliers of pesticides in Nepal felt ashamed even to share information on pesticides it is dealing with. The Annual Report published in The Gorkhapatra, a Nepali daily (this being the only way employed by most of the public enterprises in Nepal to inform the public about their activities) did not contain a single word that showed that AIC deals with pesticides, let alone give details of its pesticides business.

As no pesticides are legally banned in Nepal many kinds of pesticides, irrespective of the threat they pose to human beings and the environment, are being used. The BHC is being so indiscriminately used that the demand from farmers for this type of pesticides is all-time high. When there is a lack of effective extension services it is not surprising that farmers use the pesticides just before theharvest.

The BHC powder which has a very high residual effect on the environment is increasingly used by farmers whereas the production and use of BHC has been banned in many countries.

Use of insecticides in public health programmes



USAID

Malarious areas of Nepal 1959

The use of insecticides in public health services in Nepal has fluctuated depending on their availability and need. Altogether 98.23 metric tonnes of Fican, 4,195.85 tonnes of DDT, 3,243.26 tonnes of malathion, 139,998 litres of Actellic and 8.61 tonnes of Icon were used in the malaria control programme between 1976 and 1992.

Use of insecticides in the malaria control programme

Year	Fican (mt)	DDT (mt)	Malathion (mt)	Actellic (litre)	Icon (mt)
1976	-	604.78	157.06	-	-
1977	-	897.18	203.43	-	-
1978	-	964.73	148.63	-	-
1979	-	241.37	29.78	-	-
1980	-	474.00	106.00	-	-
1981	-	207.00	174.00	-	-
1982	-	186.00	563.00	-	-
1983	-	226.00	159.00	-	-
1984	-	64.00	484.00	-	-
1985	18.00	159.00	490.00	-	-
1986	22.00	112.00	110.00	-	-
1987	28.00	50.00	54.00	39949	-
1988	9.07	8.78	220.21	37628	-
1989	6.84	1.01	245.27	111	-
1990	6.14	-	78.19	59060	-
1991	2.43	-	20.51	3250	2.16
1992	.35	-	.18	-	6.45
Total	92.83	4195.85	3248.26	139998	8.61

Source: Division of Malaria Control, Ministry of Health.

DDT has not been used since 1990. However, in 1993 the Division of Malaria Control imported 200 tonnes of DDT from Indonesia, the country that banned the use of the insecticide in the country considering the ill effects of DDT on public health. As malaria-carrying mosquitoes in Nepal have already developed resistence to DDT, it will now be used only against Kalajar. The Division has imported some 250 tonnes of pesticides from Denmark to combat malaria as assistance from DANIDA.

" We are facing problems in terms of insecticides. We cannot supply insecticides even in badly needed areas," says Dr. Oleg L. Lossev, malariologist at WHO in Kathmandu.

Malaria is on the increase and so is kalajar which demand more pesticides to control these endemics. At the same time the supply of pesticides has been decreasing, he adds.

Nepal follows the global strategy of spraying insecticides only in endemic areas. The Division of Malaria Control sprays two rounds of insecticides, one in April-May and another in July-August, to protect 600,000 - 800,000 people from the disease. But because of the lack of insecticides the summer cycle was missed except some terai area of eastern Nepal in 1991. In 1990 and 1991 insecticides were sprayed in very limited areas.

Dr. B. L. Shrestha, Chief of the Division of Malaria Control, comparing the population protected from malaria by spraying insecticides says, Nepal is the least user of insecticides to control malaria. In India 30 percent of the total population are protected from malaria through spraying. In Sri Lanka it goes up to 40 percent , while in Nepal it is only about 3 or 4 percent.

Nepal is believed to permit producers of insecticides to experiment their products and import even the hazardous pesticides from countries where they are banned.

History

In November 1952, for the first time 800 houses were sprayed with pesticides in order to protect people from malaria. The initiative taken by the Insecticide Borne Diseases Control Beauro to make the fertile land in the terai habitable has been been the largest user of insecticides. These areas in the terai were till then known as Kalapani because of the prevalence of malaria. Originally the institutions, both donors and counterpart, did not intend to use pesticides on a continual basis. At the time when the Beauro succeeded in protecting 60,000 houses from malaria by spraying DDT it believed that they would control malaria completely by 1961. Again in 1958, at the time of the establishment of Nepal Malaria Eradication Organisation, they had dreamed of eradicating malaria from Nepal within 8 years. With help from international organisations like UNICEF, UNDP, USAID and WHO malaria seemed to be under control to large extent. In 1968 the number of malaria cases came down to 2,468 from two million a year in the 1950s. This grand achievement of reducing the number of malaria cases to 3,000 led the authorities to the conclusion that insecticides were not

necessary to control malaria.

But unfortunately, this conclusion proved premature when the number of malaria cases rose dramatically to 8,500 in 1973 and 14,600 the following year. Again, the government and donor agencies decided to resume insecticides spraying.

Bad effects

The major shortcoming of the eradication era was that the programme was aimed at protecting people by spraying insecticides which later on proved wrong. The overuse of DDT for about two decades has made the task of controlling malaria even more difficult. Malaria carriers developed resistence to DDT. 'The programme has been the victim of the grand success it had achieved in the past,' concluded USAID, the long-time partner of Nepal in the malaria programme.

Nepal's efforts to keep cases of malaria under 3,000 per year (1975-80) ended without success. With this failure the government and donor agencies felt the need for new and more effective measures to combat the disease. USAID, that had stopped supplying insecticides as assistance has reviewed its decision and has provided Nepal with insecticides from 1980 to 1988.

United States Agency for International Development (USAID), Japan International Cooperation(JICA), British ODA, WHO and DANIDA have helped Nepal to purchase and bear the cost of transportation for insecticides in the past.

Need for insecticides

About 65 percent of Nepal's population are exposed to malaria risk. About 3,860,000 people who live on the fringes of forested areas, in the vicinity of forests, the foothills and the inner terai are exposed to high risk of malaria.

Confirmed cases of malaria has fluctuated between 1987 and 1992. In 1991 it went up to 29,135 from 22,333 in 1989. It is believed that in 1992 it came down to 22,000.

Because of the side-effects of the integration of the malaria control programme into the basic health services

the number of blood samples collected has sharply declined. The practice of visiting every household once a month is no longer followed. Seventeen hill districts of western Nepal are deprived of blood collection facilities. It is feared that the number of real cases of malaria would go up.

The increase in the P. falciform that leads even to death heralds the seriousness of the problem. And, the news that Bhutanese refugees are infected with malaria in large number indicates a deteriorating situation. Out of 24,407 blood samples collected from the Bhutanese refugees 2,299 were found infected with malaria. According to the Division of Health, Jhapa more than 50 percent (1,258) had p.f. and less than 50 percent (1,032) had f. vivax, the rest with a mix. The refugees can transfer malaria not only to fellow refugees but also Nepali citizens living in neighbouring areas.

Though 67 out of 75 districts in Nepal are at risk from the spread of malaria, it is at present highly concentrated in seven districts. In 1990 and 1991 seven districts, namely Jhapa, Morang, Dhanusha, Mahottari, Sarlahi, Kavre and Sindhuli contributed to 59.6 percent of total malaria cases. The contribution of these districts regarding cases of p. falciform is 87 percent.

Kalajar: additional problem

While kalajar is active in the southern parts of some terai districts: Morang, Sunsari, Saptari, Siraha, Dhunasha, Mahottari, Sarlahi and Rautahat, the spread of malaria is more prevalent in forest fringes, foothills, inner terai and even in hilly districts like Kavre and Sindhuli. This means spraying needs to be carried out in different areas at different times.

"In order to control kalajar insecticides are sprayed on a highly selective basis depending on the risk of the disease spreading. We are facing pressure from politicians and people with false certificates," Dr. Shrestha explains that they need more insecticides because "we are facing pressures from politicians and people with false certificates".

The 200 tons of DDT imported from Indonesia (a country that has put banned its use) will be used to control kalajar.

Legal provision

Nepal faces severe problems associated with pesticides. It has yet to formulate by-laws to implement the Pesticides Act prepared some two years back to control and regulate the import, export, production, sale, use and disposal of pesticides. In the past, two divisions of the Ministry of Agriculture, Entomology and Plant Pathology, were engaged in recommending pesticides. But because of the lack of coordination between these divisions and the prevailing legal mandate they were not effective. There was a general rule that the recommendation of the concerned divisions (Entomology/Plant Pathology) was needed prior to the import of pesticides. This was never implemented. Not only private sector but also government sector went about in their own way. There are instances when even government-owned Agricultural Input Corporation (AIC) did not follow the directions of these divisions. The Division of Entomology, for instance, did not recommend DDT for agricultural purpose in the late 1960s but the AIC was selling it till 1980.

The Asian Development Bank (ADB) while preparing the Handbook on the use of Pesticides in the Asia-Pacific Region in 1987, found a lack of legal provisions. It recommended the preparation of law and its implementation to regularise and register pesticides.

In 1988 the United Nations Development Programme(UNDP), keeping this need in mind, offered US $ 577,000 as grant assistance to be administered by the Asian Development Bank (ADB). The grant contained two parts: disposal of date- expired pesticides and preparation of the Pesticides Act. The ANZDEC prepared the Bill and the interim government that held also the legislative power in 1991 passed the Bill. But it has not been implemented yet.

The Act has provision for forming a committee to recommend measures for the formulatiion of a National Policy on pesticides and its implementation to the government. The committee consisted of the Secretary of the Ministry of Agriculture as Chairman and Chief of the Division of Entomology, Chief of Plant Pathology, Chief of the Malaria Control Division, representatives of the office of

Standards, Central Food Research Laboratory, Division of Fisheries, three scientists, a pesticides entrepreneur and a consumer as members.

The committee was to advise the government on the formulation of a national policy concerning pesticides, establish coordination between the private and government sectors engaged in the field of pesticides, encourage private sector to invest on pesticides industry, maintain standards for the pesticides industries, and also to determine the standards of pesticides.

There is also provision for the establishment of a pesticides registration unit which would bear the responsibility of scrutinising the applications to register pesticides and to register and issue certificates to the appropriate pesticides and to establish the infrastructure that guarantees the rational use of pesticides.

Any individual, institution is required to register with the registration unit and receive certificate prior to engaging in import, export, production, use and sale of pesticides.

The government would make a list of registered pesticides to control non- registered pesticides and appoint inspectors to oversee the situation.

There was no question of forming such a committee under the Act until the Act itself comes into effect. But the committee has already been formed.

The by-law has already been prepared and now it is awaiting the approval of the Ministry of Law and Justice, says Dr. Bhimsen K.C., former member-secretary of the Pesticides Committee formed under the Act that is yet to be implemented.

The government plans to implement the Act in 20 districts of the terai that are believed to be using pesticides in large amounts and depend mostly on sub- standard pesticides that come from across the open border with India.

According to Ram Badan Pradhan, Chief of the Plant Protection Division, Department of Agriculture they have already trained about twenty persons to take over responsibility as inspectors.

There is little hope for improvement of the situation even after the government implements the laws. The implementation aspects of any of the existing Acts are

always questioned. The provisions for punishment seem too weak to control the misuse of pesticides. It is silent about the possibility of the repetition of the disposal problem in future.

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Pesticides available in Nepal

Trade Name	Common Name
	alachlor
Aldrex 30 % EC	aldrin
Aldrin 10 % Dust	aldrin
Aldrin 30 % EC	aldrin
Alliette 50 % WP	phosetyl aluminium
	atrazine
Atrazine 50 WP	atrazine
BHC	BHC
BHC 10 % Dust	BHC
Basalin 50 % EC	fluchloralin
Basudin 10 G	diazinon
Bavistin 50 % WP	carbendazim
Bengard	carbendazim
	bromodiolone
	butachlor
Butachlor 50 % EC	butachlor
Calixin	tridemorph
Camacide	parathion-methyl
	captan
	carbaryl
	carbendazim
	Carbocil
carbofuran	carbofuran
	carboxin and thiram
Celphos	aluminium phosphide
Chaubattia Red paste	red oxide
	chlordane
Cholordane 10 % Dust	chlordane
	chlorethephon
	chlormequat chloride
	chlorpyrifos
Cilcord 25 % EC	cypermethrin
Cygon	dimethoate
Cyperkill 25 % EC	cypermethrin

Cypermar 10 % EC	Cypermethrin
cypermethrin	cypermethrin
Cythion	malathion
Cythion 5 % Dust	malathion
2, 4-D	
2,4-D Sodium salt	2,4-D
Decis	deltamethrin
	deltamethrin
	demeton-S-methyl
Derosal	carvendazim
	diazinon
	dichlorvos
	dicofol
Dimecron	phosphamidon
	dinocap
Dithane M-45	mancozeb
Durmit	chlorprifos
Emisan-6	methoxy ethyl mercury chloride
Endocel 35 % EC	endosulfan
	ethion
Ethrel	chlorethephon
Fen-Fen 20 % Ec	fenvalerate
Fenicron	fenvalerate
	fenitrothion
	fenvalerate
	fluchloralin
Furadan 3G	carbofuran
Glycel 41 % SL	glyphosate
	glyphosate
Hexacap	captan
Hexafuran 30 % EC	carbofuran
Hexagor 30 % EC	dimethoate
Hexasulfan 35 % EC	endosulfan
Hexathir	thiram
Hexavin 50 % WP	carbaryl
.Hinosan 50 EC	edifenphos
	isoproturon

Karathane	dinocap
Karathane 48 % EC	dinocap
Kaydol	parathion-methyl
Kaymet	phorate
Kelthane	dicofol
Kevin	carbaryl
Killins	dichlorvos, tetramethrin, chlorpyrifos, pyrethrins, malathion
Kripcord	cypermethrin
Krogard	dimethoate
Ksulfan	endosulfan
Kthon 5	malathion
Kthion - 50	malathion
Lasso 50 % EC	alachlor
Lihocin	chlormequart chloride lindane
Machete	butachlor malathion
Malathion 5% DP	malathion
Malathion 50 EC	malathion mancozeb
Manzeb	mancozeb
Marvex Super - 100	dichlorvos
Metacid 50	parathion-methyl
Metapar 50	parathion-methyl
Metasystox 25 EC	demeton-S-methyl methyl ethyl mercury chloride
Miticil	thion
Monocil	monocrotopphos
Monophos-40	monocrotophos
Moss Moos	bromdodiolone
Neocidal 20 EC	diazinon
Nepcil CH-50	BHC
Nepcil Gammacide 10 % Dust	BHC
Nepcil Gammacide 5% Dust	BHC
Nepcil M50	malathion
Nepcil Parathion	parathion-methyl
Nepcil Suvan	dichlorvos
Nepcilon 5% DP	fenitrothion

Nepcilon 50 EC	fenitrothion
Nepcilphos	zinc phosphide
Nepciltox	fenitrothion, chlorphyrifos
pyrethrins	
Nepothion 5 % Dust	Malathion
Nocilion 75 WP	isoproturon
Nuvacron	monocrootophos
Nuvan	dichlorvos
Paramar M-50 50% EC	parathion-methyl
	paraquat
	parathion-methyl
	pendamethalin
	phoirate
	phorate
	phosphalone
phosphamidon	phosphamidon
Phosphamidon	monocrotophos
	Power
	propoxur
Quickphos	aluminium phosphide
Rasaon	aldrin
Rasayan 10 % DP	BHC
Rasayan 5 % DP	BHC
Rasayan Chlor	butachlor
Rasayan Lindane	lindane
Rasayan M 45	mancozeb
Rasayan Phos	monocrotophos
Rasayan Quat	paraquat
Rasayanquat 24 % AC	paraquat
	red opxide
Ripcord	cypermethrin
Rogor	dimethoate
Rogor 30 % EC	Dimethoate
Ruban	chlorpyrifos
Sevidol	lindane and carbaryl
Sevin 10 % DP	carbaryl
Sevin 5 % DP	carbaryl

Sevin 50 % WP	carbaryl
Sten 50 % WP	Carbendazim
Stomp	pendamethalin
Sumicidin	fenvalerate
Sumidon 85 % WSC	phosphamidon
Sumithion	fenitrothion
Suzon 20 % EC	diazinon
Termox 20 EC	aldrin
Thimet 10 G	phorate
Thiodan	endosulfan
	thiram
Tik-20 EC	propoxur
Tokan 50 % WP	isoproturon
	tridemorph
Vapona	dichlorvos
Vitavax	carboxin and thiram
Weedoff	glyphosate
Zinc Phosphide	zinc phosphide
Zolone 35 % EC	phosalone
Atrazine 50 % WP	
Butachlor 50 % EC	
Cypermar 10 % EC	cypermethrin
Fen Fen 20 EC	fenevelarate
Hexasulfan 35 % EC	endosulfan
Hexacap 50 % EC	captan
Basalin 50 % EC	fluchloralin
Bavistin 50 % WP	carbendazim
Bavistin 50 % WP	carbendazim
Calixin	tridemorph
Lihocin 50 % AS	cycocel
celphos	
Glycel 41 % SL	glyphosate
Nutron	tricontanol

Phorate 10 % GR	
Planofix	alpha NAA
Sevidol 4:4	carabaryl+g-BHC
Tolkan 50 % WP	Isoproturan
Rogor 30 % EC	dimethoate
Malathion 50 % EC	
Nuvan	
Nurahcron	
Diacron	
Fenocron	
Cythion	
Forate or Thimet	
Dermate	
Cygon	
Rogor	
Furadon	
Blitox	
Sumicidon	
Sumithion	
Zinc phosphide	
Indos	
Multiplex	
Acanicide	
Algaecide	
Arboricide	
Aricide	
Bactericide	
Fungicide	
Herbicide	
Insecticide	
Mollusciole	

Price: Rs. 100 US $ 2
(The sum collected from the sale of this report will be used for other activities of NEFEJ-Pesticides Watch)