Pilot Pesticide Disposal Project[1]

Results on the Disposal of Obsolete Pesticides (1990-1999)

by Wolfgang Schimpf, GTZ

1 Introduction

In most countries in Africa, Asia, Latin America, and even in some Eastern European countries, rotten drums of old pesticides are left lying around in utterly inadequate storage facilities. Once supplied in large quantities, they were, for whatever reason, never used and eventually slipped into oblivion. No one knows their exact quantities and some of the storage sites would be difficult to locate. A number of sites are even located in the middle of densely populated areas. There is no doubt that some of these agents present major hazards for the people and their environment. These facts are all well known and documented in the FAO inventory (1).

To redress this situation, the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH launched a pilot project in 1990 geared to the disposal of obsolete pesticides. Since then, environmentally-sound disposal operations have evolved into a range of activities within the field of Technical Cooperation (TC). Since pilot projects are, by their very nature, always terminated, the Pesticide Disposal Project (PDP) was brought to an end in December 1999. In the course of its 10-year duration, the PD project disposed of more than 1,500 tonnes of obsolete pesticide stocks in 8 developing countries in Africa and Asia. It also carried out several large-scale analytical surveys and organised an international workshop in the field of prevention.

2 Project History

The GTZ's Pesticide Disposal Project was one of the first projects world-wide to work out practically-oriented solutions to the problem of obsolete pesticide stocks in developing countries. The idea for the project originated in Malaysia as a spin-off activity of the Malaysian-German Pesticide Project. It all started when the Department of Agriculture's extension service confiscated many tonnes of non-registered and prohibited pesticides from farmers and dealers leading, within a short time, to overfilled stores whose noxious contents could not be disposed of in an ecologically acceptable manner. The project, therefore, had to look for an alternative solution – which it found in the Rawang Cement Factory near Kuala Lumpur.

The cement factory management agreed to incinerate the obsolete pesticides in the cement kiln and the project first started with a number of test trials in which it measured residues, including dioxins, in clinker and emissions. Following the success of the initial test trials, a small-scale waste introduction system was designed to introduce liquid pesticides into the centre of the cement kiln's flame via the oil lance directly. The positive results obtained were presented at the Conference on Pesticide Management (2) in Pattaya, Thailand, in 1987.

---

[1] Wolfgang A. Schimpf; Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH Postfach 5189, 65 726 Eschborn, Germany E-mail: wolfgang.schimpf@gtz.de
presented at the OECD-FAO-UNEP-Workshop on Obsolete Pesticides. 13-15 September 2000; Virginia, USA

The results, and the idea to dispose of obsolete pesticides in a cement kiln, do not necessarily represent anything new, but the technique has never been used before to dispose of obsolete pesticides in developing countries.
Events developed fast after the presentation in Pattaya: USAID showed an interest in the method's potential and went on to use this technique on a larger scale in Pakistan where it helped dispose of obsolete pesticide stocks in the D.G. Kahn Cement Plant (3). The GTZ and the FAO recognised that developing countries needed support in the elimination of their obsolete stocks.
Thus, the GTZ's Pesticide Disposal Project was born, followed later on by an FAO project.
The GTZ was quick to launch the Pesticide Disposal Project which started work in January 1990 and ended in December 1999, a 10-year time span in which it implemented 25 individual measures and disposal activities

3 Project Activities

Following implementation of the Pesticide Disposal Project, a large number of developing countries requested assistance with their specific obsolete pesticide problems.

3.1 Disposal Operations

The PD project started in earnest in the Niger with the disposal of the banned product dieldrin. Operations were a joint affair between USAID[2] and the U.K.'s Shell Chemical Company, the insecticide manufacturer. The dieldrin recovered was subsequently sent back to Holland for final disposal – fully in keeping with the "return-to-sender" philosophy.

In virtually all of its other activities, the GTZ project collaborated with the waste generators and product manufacturers – mostly members of the GCPF[3], the pesticide industry federation.

Operations in Madagascar and Mozambique followed, again in close cooperation with Shell, in which dieldrin and monochrotophos-DDT were collected and sent to England for disposal.

The IRLCO-CSA[4] submitted an official request for help to the GTZ after two scientists discovered a large quantity of DNOC, an insecticide, used for locust control in Zambia and Tanzania. Leaking containers had been left on the shore of the Lake Rukwe where they had already contaminated the water. DNOC was also endangering the local population's fishing grounds and poisoning their drinking-water supplies.
After a fact-finding visit, the GTZ decided to start immediately with a so-called safeguarding operation. In a large-scale logistical feat, the project sent freight containers replete with the requisite equipment into the interior of Tanzania and Zambia, redrummed hundreds of DNOC drums and stored them in a safe place until preparations had been completed for their disposal.

The project itself had embarked on new ground. Indeed, at that time, Tanzania had not signed the Basle Convention, making it impossible to send the waste back to Europe for disposal. The project was therefore forced to look for an alternative solution.

[2] USAID – United States Agency for International Development
[3] GCPF - Global Crop Protection Federation
[4] IRLCO-CSA - International Red Locust Control Organisation for Central and Southern Africa (Ndola, Zambia

As a result, a field study was initiated to evaluate alternative disposal options within the country itself, whereby a local cement factory near Dar-Es-Salaam was finally selected for DNOC incineration (4). The GTZ developed a mobile Waste Introduction System (WIS) to feed the diluted pesticides into the kiln. The major materials and instruments required for this system were imported from Germany and assembled by the Engineering Department of the University of Dar-Es-Salaam.
Using the WIS, a high-pressure pump fed the DNOC, which had been diluted with kerosene, into the lance of the cement kiln; the DNOC was completely decomposed in the centre of the flame at temperatures of nearly 2000 ^{o}C (5).

Complete combustion of the pesticide has been confirmed by several test trials carried out in the laboratories at Bayer AG in Germany. In the end, the project disposed of 57 tonnes of dieldrin and recycled all the empty metal containers in a local steel mill. This was the first time that obsolete pesticides had been disposed of in a developing country using this pragmatic approach.
In retrospect, the 10-year Disposal Project has been one of the most difficult, but also one of the most fascinating projects to implement, one which has demanded creativity and imagination in order to overcome all of the logistical, administrative and technical problems.

The largest and logistically most demanding safeguarding and disposal operation took place in Mauritania where more than 175, 000 litres of dieldrin and thousands of empty pesticide drums were collected in the desert area, thousands of kilometres away from Nouakchott, the capital and harbour. Altogether, some 220 tonnes were shipped to Europe for disposal.

To complete this operation, the project used Isotanks, as they are known, i.e. special tanks for the transport of dangerous chemicals with a capacity of 22,000 litres each. This again was a joint operation between Mauritania's Plant Protection Department, the GTZ's Pesticide Disposal Project and Shell, which met all of the transport and incineration costs incurred.

Between 1992 and 1997, the FAO and the GTZ worked together on the disposal of 360 tonnes of mixed pesticides which were also transported to England for incineration, leaving the exporting country completely free of obsolete pesticides.

In addition to the activities described above, the Pesticide Disposal Project was also involved in a number of other disposal operations in Madagascar, Namibia, Pakistan and Jamaica.

3.2 Analytical Surveys, Risk Assessments and Prevention

Before disposal operations can be carried out, it is imperative to conduct an analytical survey and risk assessment.

Without any information on the ongoing situation on site and the quantity of obsolete pesticide stocks, as well as associated waste, disposal operations are virtually impossible to plan. Surveys of this kind should also include a risk assessment on the actual situation in and around the storage site, as well as the dangers for the participants, the public at large and the environment. This information provides the basis on which to plan safeguarding and disposal operations, as well as financing and the subsequent implementation of operations.

Taking these needs into account, the PD project has conducted a number of nation-wide analytical surveys in many countries leading, in some cases, to further activities through the GTZ itself or by other donor organisations. The main surveys conducted by the project were

carried out in Morocco, Mozambique, Mali, Namibia, Sudan, Nicaragua and presently in Pakistan.
Parts of the surveys were financed by other donor organisations, such as NORAD[5] and the RNE[6]. In Namibia and Pakistan, the surveys were followed by disposal operations, some of which are still in progress. In Mozambique, DANIDA[7] launched a disposal project on the basis of such a project survey whilst USAID and the FAO initiated further activities in Mali.

Besides the surveys and disposal operations, the Pesticide Disposal Project also focused on prevention to avoid the further accumulation of obsolete pesticide stocks. Having recognised that one of the main reasons obsolete stocks are generated in the first place is the lack of good practices in storage and transport management, the GTZ organised a 6-week training programme on “Pesticide Transport and Storage”, a practically-oriented event involving private industry, the pesticide manufacturers as well as governmental organisations. Feedback from the workshop was positive. Unfortunately, however, the project could not repeat the workshop – in spite of fervent demand.

The project has also been involved in internationally-oriented activities, such as participation on the FAO Task Force in Ethiopia, the FAO / WHO / UNEP Panel of Experts and FAO and UNEP workshops.
The great number of requests for disposal, as well as general enquiries, shows that the project has come to be recognised in the world of disposal companies, organisations and individuals. Indeed, it has had to reject a number of calls for support due to limited resources.

The Pesticide Disposal Project closed down officially at the end of 1999, but we are still working on a large disposal project in the province of Punjab, Pakistan. The project, which is financed by the Royal Netherlands Embassy, Islamabad, includes the disposal of 317 tonnes of obsolete pesticides from 13 high-risk pesticide stores and the survey of all 162 pesticide stores within the province of Punjab.

At that time 9 of the 13 pesticide stores have already been cleaned and around 220 tonnes of obsolete pesticides have been repacked and transported to Holland for final disposal. The project will be continued in October, once the monsoon season is over.

4 Experiences

A general policy of the Pesticide Disposal Project was that the owner of the waste had to take on full responsibility for the entire disposal operation. The GTZ’s role was merely to offer the owners of the waste all the financial, administrative, logistical and technical support they needed during implementation of the disposal operations.

[5] NORAD – Norwegian Agency for International Development
[6] RNE - Royal Netherlands Embassy
[7] DANIDA - Danish International Development Agency

4.1 Field Work

Before the first drum of pesticides could be moved, countless administrative hurdles had to be taken. First and foremost, the question of financing had to be resolved. All of the parties involved then had to sign a “Memorandum of Implementation” which specified the respective duties and responsibilities in full.
The export of waste to an OECD country required a number of sometimes difficult and lengthy diplomatic activities, especially if the country was not a member of the Basle Convention. Mauritania, for example, had to sign the convention specifically in order to see through disposal operations. In some cases, disposal operations were protracted, because of internal differences relating to competence. Another sensitive issue was generally the question of importing and exporting the necessary equipment and waste.
Obtaining a licence to import waste into an OECD country has proved very complicated in some cases.

These administrative processes normally take months; in one case, we needed two years to settle all the relevant questions. In comparison, the technical and logistical questions are easy to tackle. Projects with only one type of pesticide are easier than projects with a number of different pesticide types and formulations. Solid pesticides are easier to handle and to transport than liquid pesticides. Pesticides in the gas phase, like methyl bromide are the most problematic ones.
The next question is that of logistics. If the pesticide store is close to a harbour, the project is certainly simpler than a project with stores thousands of kilometres away from the next port, as in Mauritania, for example.

Clients frequently become impatient with the length of time it takes to implement the entire operation. All in all, from the official request stage through to the final disposal of the waste, two years or more are not particularly uncommon for a disposal operation of this kind.

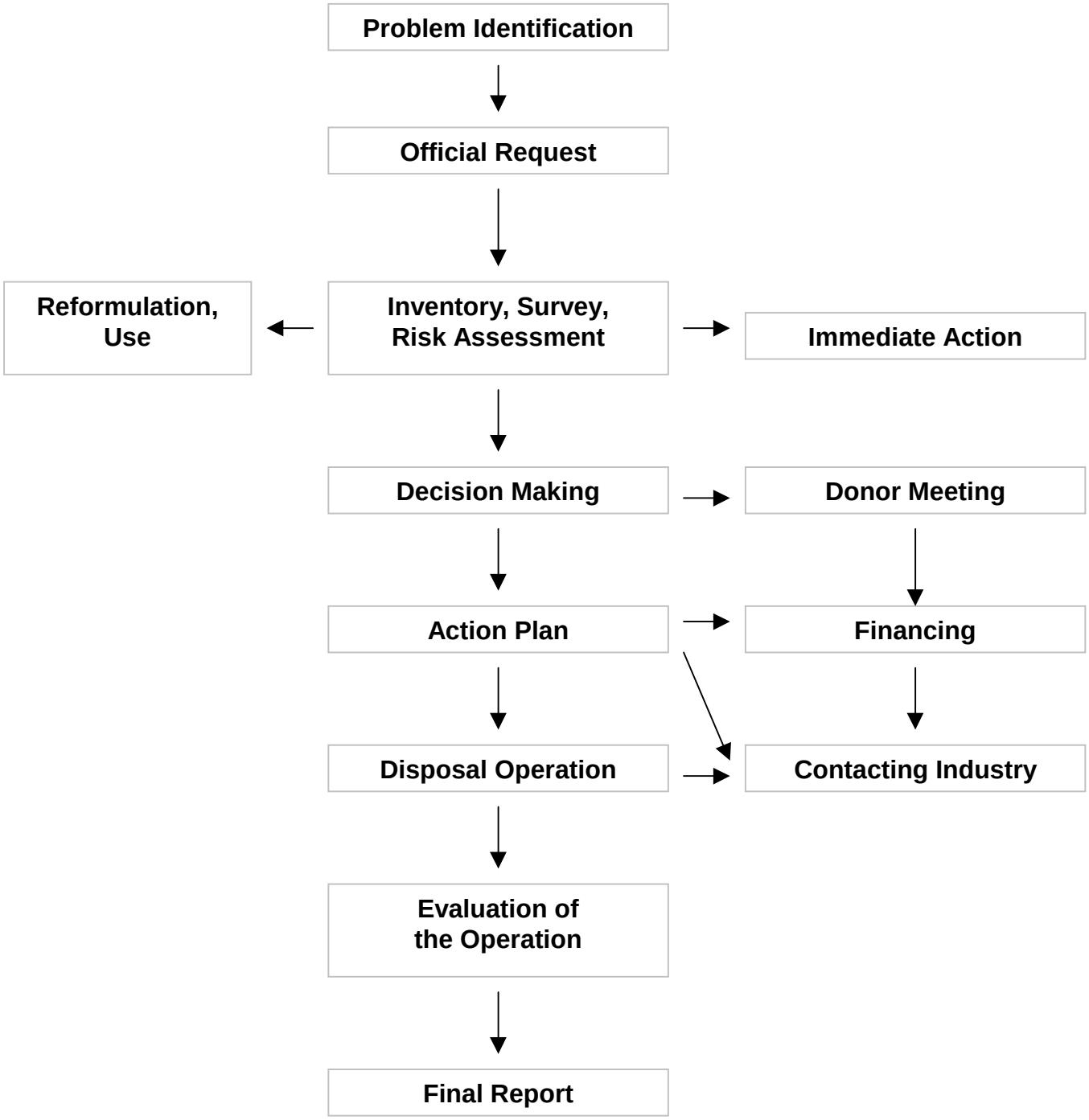
4.2. Procedure – Step-by-Step

The German Federal Ministry for Economic Cooperation and Development (BMZ) commissioned the pilot project to develop guidelines for the disposal of obsolete pesticides in developing countries. After 10 years’ experience with projects in different countries, it was discovered that this is not really possible, since each disposal operation has its own specific characteristics and problems – depending on the country, the pesticide and the general situation as well as the parties involved.
However, a general framework was developed as a basis for implementing safeguarding and disposal projects – starting with problem identification and ending with the Final Report (see table: From identification to evaluation).

4.3 Costs

The cost of toxic-waste disposal, and the procedures to be employed, depend on a number of parameters, like the quantity and type of waste, the type of packaging, the location where the waste is stored and the infrastructure there, as well as the method of disposal.
After all, it costs between US$ 2,500 and 4,500 per tonne to return waste to an industrialised country. The above figures cover the cost of everything from stocktaking to final incineration.

The General Procedure of a Disposal Project



From identification to evaluation

5 Framework Required

The Pesticide Disposal Project prefers joint disposal operations in which as many stakeholders as possible (waste owners, donors, pesticide manufacturers) are jointly involved in the execution of the entire operation. The duty of each partner organisation is specified, for example, in a Memorandum of Implementation.

5.1 General Framework

Every time the GTZ Disposal Project conducted a specific operation, the following general requirements applied:

- Disposal operations could not be a one-party operation - the partner organisation (= owner and/or generator of the waste) must play the most active role during the overall operation. (This means that a donor organisation and/or a commercial company do not carry out the operation single-handedly.)

- Joint operations in which a local a donor organisation, the manufacturer of the pesticide and the commercial disposal company work together would be given preference by the GTZ.

- The GTZ would act as mediator between the different stakeholders (e.g. local organisation, donor organisation, manufacturer and a commercial disposal company). The Pesticide Disposal Project has always supported local organisations and/or strengthened their capacity.

5.2 Role of Local Partner Organisation

The partner organisation, mostly the owner/generator of the waste (e.g. Department of Agriculture)

- must be nominated and has to play an active role in the administrative aspects of the operation and in hands-on implementation too

- the partner organisation has to take on full responsibility for the project

- has to execute all the administrative steps required to meet the requirements of the Basle Convention pertaining to the transport of waste to an OECD country, as well as all the steps required to authorise admission of the waste into the country in which it is to be disposed of

- is fully responsible for all the administrative steps within its own country (like custom-clearance processes, import and re-export documentation, waste write-offs etc.
- has to contribute to the operation, e.g. by providing staff, transport or financial contributions to the project.
- has to secure the necessary funding (e.g. together with the GTZ or another donor organisation)
- has to take preventive measures to avoid the future accumulation of obsolete pesticide stocks.

6 Conclusions

After 10 years' experience, the Pesticide Disposal Project came to the conclusion that certain changes and improvements, especially those on the administrative side, are inevitable, if disposal of the mountain of obsolete pesticides is to be speeded up.

Improved co-ordination of activities by all potential donor organisations is absolutely vital too. To make the process more effective, one organisation – which can really only be the FAO - should manage all operations, but should not interfere in activities directly.

The administration in developing countries should support the disposal projects and not obstruct operations, since this costs unnecessary time and money and is frustrating for the enthusiastic local staff and foreign experts who are committed to the task on hand.
To benefit most from the safeguarding and disposal operation, the relevant departments in the developing countries should carry out the operation by themselves and not let the work be done by commercial disposal companies. This is the only way to learn from each other and to transfer know-how as demanded in Agenda 21.

In the course of the past 10 years, from 1990 through to December 1999, in which the GTZ ran its pilot programme on the disposal of obsolete pesticides, it has channelled its expertise into some 25 activities and disposal operations, as a result of which more than 1,500 tonnes of obsolete pesticides have been disposed of – partly in cooperation with several pesticide companies as well as other donor organisations.
This is a good result, but it is still only a milestone on the long road to be travelled before this enormous problem is finally solved. On completion of project activities, all the experience gained by the Pesticide Disposal Project was documented in a GTZ brochure (6, 7). The Pesticide Disposal Project itself is now over, but its work lives on within the GTZ's "***Pilot Project Chemicals Management".***

References

1. FAO (1999): Inventory of obsolete and unwanted and/(or banned pesticide stocks in Africa and the Near East (003/99)
2. Schimpf, W. A. (1988): "Destruction of Pesticides and Chemical Waste by Means of a Cement Kiln"; edited by P.S. Teng and K.L. Heong; Consortium for International Development/Pest and Pesticide Management Project; Maryland, USA
3. Huden, G.H. (1990): Pesticide Disposal in a Cement Kiln in Pakistan; Report on a Pilot Project and Test Results from a Pilot Burn of Overaged Pesticides; D.G. Khan, Punjab Agency for International Development, AID/OFDA; Washington, D.C.; USA
4. Bolwerk, R. (1992) Feasibility study for the disposal of DNOC at the TWIGA cement works in Tanzania; GTZ
5. Schimpf, W.A. (1998): Disposal of Obsolete Pesticides in a Cement Kiln in Tanzania. 5th International HCH and Pesticides Forum; Leioa, Spain, 25 – 27 June
6. Obsolete Pesticides – A Dangerous Legacy: Results of a Pilot Project on the Disposal of Obsolete Pesticides; (GTZ), (2000)
7. Les pesticides périmés – un dangereux héritage: Résultats du projet pilote d'élimination des pesticides périmés; GTZ, (2000)