



International POPs Elimination Project

*Fostering Active and Efficient Civil Society Participation in
Preparation for Implementation of the Stockholm Convention*

Pesticide use in the processing and conservation of sea products



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About the International POPs Elimination Project

On May 1, 2004, the International POPs Elimination Network (IPEN <http://www.ipen.org>) began a global NGO project called the International POPs Elimination Project (IPEP) in partnership with the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Program (UNEP). The Global Environment Facility (GEF) provided core funding for the project.

IPEP has three principal objectives:

- Encourage and enable NGOs in 40 developing and transitional countries to engage in activities that provide concrete and immediate contributions to country efforts in preparing for the implementation of the Stockholm Convention;
- Enhance the skills and knowledge of NGOs to help build their capacity as effective stakeholders in the Convention implementation process;
- Help establish regional and national NGO coordination and capacity in all regions of the world in support of longer term efforts to achieve chemical safety.

IPEP will support preparation of reports on country situation, hotspots, policy briefs, and regional activities. Three principal types of activities will be supported by IPEP: participation in the National Implementation Plan, training and awareness workshops, and public information and awareness campaigns.

For more information, please see <http://www.ipen.org>

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This report is available in the following languages: English and full report in French

Pesticide use in the processing and conservation of sea products

Introduction

The project is included in the Stockholm Convention implementation process and in national and international actions to eliminate POPs. It contributes to inform and raise awareness among workers of the fishing sector and the larger Senegalese public in order to facilitate their participation in the fight against DDT and against all POPs.

The preliminary stage of the study targeted two sites: Mbour and Djiffer. These two sites are located in the regions of Thies and Fatick on the “Petite Côte” (Small Shore) and in the Saloum Delta. They occupy a crucial position of importance in the Senegalese traditional fishing sector.

Mbour is the first fishing port of the region of Thies and occupies the first rank of importance on a national level. As far as traditional fishing is concerned, quantities of sea products are estimated at around 276, 199 tons and 28,453 tons for products processed according to the 2003 report of the Ministry of Fisheries.

Justification

In Senegal, the use of hazardous chemicals concerns not only agriculture and the fight against diseases such as malaria. Indeed, pesticides are used in fishing activities, particularly in the processing and the conservation of sea products. Among these products, DDT is often cited by actors. It is recognized to be the pesticide most frequently used in the processing of sea products in Senegal according to witnesses. Included on the list of the dozen of chemicals (Dirty Dozen) targeted by the Stockholm Convention for being highly hazardous to biodiversity and health, DDT was introduced in fishing activities long ago. In spite of its ban and the control of relevant services (hygiene and health), other pesticides are used in the localities of Mbour and Djiffer which are as hazardous as DDT, particularly in the processing and conservation of sea products. The use of these products is then a real threat to populations, more particularly to people of this chain, the fauna and the marine biodiversity.

Women carrying out processing and their families are highly exposed to DDT. Investigations conducted in the eighties, have revealed DDT residues in human fatty tissues and the contamination of breast milk by this Persistent Organic Pollutant. The uncontrolled use of pesticides is then a real threat not only to populations of these production areas located on the “Petite Côte” but to all Senegalese people and even those living in the sub-region that is mainly supplied in pesticides from Mbour.

Because of risks that pesticide use represents for humans, the marine fauna and the environment, there is an urgent need to take initiatives promoting the elimination of these bad utilization techniques and illicit practices of these noxious products such as DDT, as well to raise awareness and mobilize actors of the fishing sector for the protection of marine and coastal resources and the rehabilitation of marine ecosystems. If a small number of people are aware of pesticide hazards and still use this product for personal economic interests, it has to be known that most of the actors do not know or have very limited knowledge about regulations into force and are not aware of noxious impacts resulting from these practices. It is equally noticed that professional organisations involved in this sector did not really include

the fight against chemical use in their priority actions and that relevant technical services seldom work in appropriate conditions to carry out monitoring and take educative and attendant initiatives for actors involved.

It is about promoting relevant human resources and creating synergies needed for the learning and a common action leading to behavioural changes regarding POPs.

Objective of the study

- Study on the use of DDT and other pesticides in the fishing sector in M'bour ;
- Gather information on conditions of use of chemicals in the processing of sea products
- Sample products processed and analyse them ;
- Collect available information on POPs, in particular DDT and other chemicals used in the processing of sea products ;

Globally, the study project will allow:

- Raise awareness of hazards linked to POPs use, more particularly DDT in the food production process ;
- Promote among actors involved in the processing of sea products research initiatives in seeking alternative methods to toxic chemicals ;
- Strengthen actors' knowledge on POPs ;
- Create synergies and cooperation between workers of the fishing sector, professional organisations and relevant technical services (hygiene and health) for common actions to eliminate DDT and all POPs ;

Methodology

- Identifying and getting in touch with stakeholders targeted and involved in the fishing sector and carrying out preliminary exchanges with agents of technical services (fisheries and hygiene)
- Collecting information, carrying out interviews with actors concerned, field visits, audiovisual reports, etc.
- Collecting samples of products processed and treatment products in the two sites targeted by the study
- Providing samples to be analysed in a specialised laboratory
- Analysing laboratory results
- Documentary research (administrative organisation of the fishing sector, organisation of the chain, legislation)
- Carrying out interviews in order to have more details on certain information
- Restoring information collected and skillsharing with actors concerned and writing the report

General presentation of the activity

The traditional processing chain: The processing of sea products is an old activity that has known a rapid growth with the modernization of the traditional fishing. It occupies a crucial rank in the Senegalese fishing sector and meets needs both of Senegalese consumers and international market, mainly in Africa. It represents 30%-40% of the Senegalese traditional fishing estimated at around 311,536 tons in 2002 (molluscs, shellfish and fish). To that may be added unsold items of the processing industries.

The traditional processing meets not only a specific demand of the market but is equally necessary to preserve fish when being distributed.

Globally, workers involved in the processing and marketing activities are estimated at 600,000 people in the traditional sector, that is 7,1% of the population according to the statistics of the Ministry of the Maritime Economy and 17% of the active population estimated at 3, 528,000 men and women in 1996. In fact, one Senegalese out of six is in the fishing sector according to the report of the Directorate of Fisheries. The processing chain is mainly composed of women. It has been noticed that there is a predominance of women over men in this activity. In Mbour for example the processing sector counts 320 women and only 97 men. In Djiffer, this sector counts 512 women.

Fish is mainly dried or smoked when distributed in inland towns. The drying and smoking are two techniques that resist vagaries, bad weathers and long distances. Great progresses have been made in the distribution of fresh or frozen fish.

Fish destined for local processing are brought around the processing sites in two ways: by cart or in baskets.

Products are unloaded on the beach and laid on the sand. Then, they are picked up and put in baskets by young people and sent to processing areas. If the products are unloaded on the wharf, they are transported by carts not meant for this kind of transport. The fish is wet when unloaded and unfortunately, the means of transport, up to the processing areas, both carts and baskets do not meet standards in terms of hygiene; regulatory texts recommend avoiding the wet fish being in contact with the sand between the small boat and the processing site. It is not the case.

As far as dried fermented products are concerned, they are first unloaded at ground level beside fermentation tubs so that the women carrying out the processing sort them out because the duration of fermentation depends on the size of the tub. Then products are soaked in this tub (made of cement and fixed in the soil) where sea water and salt are mixed. The conditions of cleaning of this tub are inappropriate. It happens sometimes that the same water is used many times for treatment which brings about a nauseating smell and attracts flies. Three days later, the product is released from the tub, cleaned or scaled on the spot or split or displayed on tables meant for drying. The product is covered with a mixture of salt and pesticides to fight against flies and other bacteria. As long as it will be on this table, the product will undergo many treatments based on this pesticide because it is in an environment that favours the development of bacteria and flies, particularly in the rainy season. To reach the local market, resellers buy it in these conditions. If the product is to go further, for example in the sub-region, it is put in baskets and the trader applies the pesticide after each layer of fish.

As far as Tambadiang (small entire fishes) is concerned, it is dried in the sun on stalls and is covered with a mixture of salt and pesticides. From time to time, pesticides are applied on the scales of the head.

As far as smoked fish is concerned, it is first smoked on the spot. A post-drying work has to be done at ground level. Only after this, will the product be treated with salt and pesticide.

Pesticides are literally used from the processing to the packaging in the conservation process.

Presenting and analysing results of laboratory- tested samples

A treated fish and a bag of powder have been taken as samples and sent to the Ceres-Locustox laboratory to be analysed.

The Foundation CERES-Locustox/*Centre de Recherches en Ecotoxicologie pour le Sahel* is operational, and has partners and clients at local, national, regional and international levels, including farmers' organizations, international NGOs, the Global Environmental Facility (GEF), a regional IPM programme (with the Global IPM Facility – GIF) and a regional programme on community-based water biodiversity conservation in the Senegal River and the Niger. The Foundation has the infrastructure, equipment and capability to provide scientific advice and information on ecotoxicology not only to the Government of Senegal, but also to the other CILSS (*Comité Inter-Etat de Lutte contre la Sécheresse au Sahel*) member countries. This information is required when evaluating pesticide use, taking into account human health and the environment. Today, the Foundation CERES-Locustox is the only African institution of its kind that has been certified as a Laboratory of Good Practices (“*Domaine 6*”) of OECD by the French Committee for Accreditation (*Comité Français d’Accréditation (CORAC/GIPC)*). The Foundation now holds a key position in the area of certification of agricultural exports to international markets, not only within Senegal, but also in the sub-region.

The following pesticides have been found: Chlorpyrifos (Mbour), and Fenitrothion (Djiffer)

The sample from Mbour: dried fish treated with salt, chlorpyrifos powder, and fish fat since the rainy season. Pesticide detected: Chlorpyrifos

The sample taken from Djiffer: dried fish treated with salt and Fenitrothion powder. Pesticide detected: Fenitrothion (see annexes Analytical Certificates)

CHLORPYRIFOS

Chlorpyrifos is an insecticide belonging to the class of organophosphates. It is manufactured by Dow Chemical and marketed in Senegal under the name of DURSBAN or NURELLE. Dow is no longer permitted to sell this chemical for residential use in the US after the US EPA entered into a voluntary agreement with the company in 2000. The action was motivated by large numbers of poisoning victims (including children) and effects on children's intelligence. Chlorpyrifos is banned in Cameroon. However, in Senegal, this insecticide is authorized for the fight against locusts and cotton pests by the CSP (pesticide Sahelian Committee) in charge of pesticide approval in the 9 CILSS member states. As far as toxicity

is concerned, the “acceptable” daily level for man is on the order of 0,001mg/kg. The use of Chlorpyrifos in the processing and conservation of sea products is not justified.

FENITROTHION

Fenitrothion is an insecticide belonging to the class of organophosphates. It is manufactured by Sumitomo Chemical Co. and banned in Germany, Netherlands, and Portugal. In Senegal it is marketed and better known under the names of Sumithion and Sumicombi. The CSP has authorized the use of Fenitrothion to fight against pests, locusts and grasshoppers. The substance is highly toxic to aquatic organisms and might be hazardous to the environment; a particular attention must be given to shellfish and bees. Fenitrothion builds up in the food chain of humans, mainly in fish.¹ For that reason, the use of this product is strictly banned in aquatic environments. In USA, this product is specially authorized for specific purposes.

As far as toxicity is concerned, the “acceptable” daily level for man is on the order of 0,005mg/kg. (Codex Alimentarius)

Actors directly involved in fish production and processing have noticed a decrease in reproduction that might be linked to the use of this pesticide in the region from Bargny down to Djiffer including Mbour and Joal. Indeed, the spreading of this pesticide is carried out nearby the ocean hence the contamination risk through seepage.

Problems linked to pesticide use

Conditions of use and supply circuits of pesticides

Supply circuits of pesticides are not clearly identified. The origin of these products is dubious. Many sources have been cited: stockpiles of chemicals used to fight against the locust attack in the country; certain neighbouring countries (Gambia, Guinea Bissau etc).

Products are imported by sea from Gambia and Guinea Bissau, according to investigations conducted in the fishing sites; Diaobe (a sub-regional weekly market located in the region of Kolda and gathering marketers from Gambia, Mali and Guinea Bissau) seems to play a key role in the illicit distribution of pesticides.

Women are exposed to risks when buying and getting their supply in pesticides. They usually acquire pesticides in weekly markets and stores on-the-spot. In Djiffer, products are marketed in shops, small stores, warehouses beside various other items such as hardware and rice. No precautionary measure is taken. Products stockpiled in stores are not well protected, which facilitates the contamination of other goods.

- Marketers do not use protective equipment. They sell products without wearing gloves. Products are put in plastic bags to be weighed. Instruments, notably scales are used both for toxic products and food products.
- Women (and other users) handle chemicals with no protective equipment and in very poor conditions, which exacerbates risks of contamination.
- Women interviewed are aware of toxicity of chemicals but still use them without caring about impacts on their health and that of people consuming their products.

- The lack of alternatives known is often put forward to justify the use of pesticides.
- Most of the people involved in the processing of sea products are illiterate (they speak or write neither French nor vernacular languages). They do not know or have limited knowledge about the nature of substances used and their impacts on health and on the environment...
- Actors of the fishing sector have very limited knowledge on the fishing code and laws and regulations into force relating to chemical manufacture and use
- Synergy between and roles of the relevant technical services of fisheries and hygiene have to be better coordinated and harmonized
- Many ministries are concerned by the pesticide issue: Ministry of the Maritime Economy, Ministry of Prevention, Public Hygiene, cleaning up and urban Hydraulics, Ministry of Trade and Ministry of the Environment. The low cooperation and coordination level between these ministries in administrative tasks relating to outreach, monitoring, information and awareness-raising activities does not facilitate the development of safe practices in processing.
- Professional organisations have not yet included in their priority actions issues relating to the fight against chemicals, protective equipments, technologies used when products are prepared, treated, packaged and marketed.

Health-related risks

Like other organophosphate pesticides, chlorpyrifos and fenitrothion inhibit cholinesterase which is necessary for proper signal processing in the nervous system. Inhibition of the enzyme can result in headaches, dizziness, nausea, restlessness, anxiety, blurred vision, mental confusion, shortness of breath, diarrhea, convulsions, coma, and death.

Human exposure to chlorpyrifos has resulted in impaired memory. Dermal exposure to bulls decreases sperm production and in utero exposure in rodents appears to increase birth defects and cause developmental neurotoxicity. (ATSDR 1997) US EPA determined that chlorpyrifos became one of the leading causes of insecticide poisoning in the US during the 1990s.

Fenitrothion causes chronic symptoms in humans such as fatigue, headache, loss of memory, inability to concentrate, nausea, cramps, muscular weakness, and tremors. Prenatal exposure to fenitrothion in rodents causes persistent neurological and muscular damage. Treatment of adult rats caused lung damage and Immunotoxicity. (Extotoxnet, University of Oregon)

The use of pesticides in the fishing sector is a real hazard to workers and consumers. This practice threatens humans, the fauna and the aquatic environment.

During the study, no poisoning case or disease related to these chemicals has been reported. However, an in-depth investigation among doctors treating women and men evolving in this sector might enlighten us on a possible link between health problems workers experience and chemicals they use.

“Kata”, a hazardous chemical might be the cause of tumours found in the ribcage of certain people, according to women carrying out processing and members of a local association called FENAGIE-PECHE of Bargny.

Pesticides build up in stomachs and might cause cancers.

Still, there are many risks related to pesticides used in agriculture and in the fishing sector. Indeed, these two pesticides belong to the class of organophosphates. These organophosphates

readily go through biological barriers. A small amount is sufficient to inhibit in few seconds almost the whole cholinesterase activity.

There are many risks mainly for women and marketers that handle directly products without any protective equipment. Children as well are exposed to these risks when accompanying their mother.

Environmental risks

The lack of systems permitting the draining of wastes resulting from the processing and treatment of products is a factor that can facilitates the contamination of soils, water and the sea.

An efficient use of the space facilitates the removal of wastes and other products mixed that otherwise run off and end up in the sea. Soil and water pollution has an impact on ecosystems

A worrying decrease of captures has been observed, which might be linked to the overexploitation of the aquatic resources and also to the pollution of waters in areas where processing activities are intensively carried out. Fish do not reproduce on the open sea but nearby the rivers and beaches where wastes stemming from the processing are dumped.

This is the main cause of the ban of Fenitrothion in the aquatic environment.