



a toxics-free future

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International SAICM Implementation Project (ISIP)

In 2010, in an effort to demonstrate SAICM implementation via IPEN Participating Organizations, IPEN launched an International SAICM Implementation Project, also known as ISIP. ISIP aims to mobilize resources for initial enabling activities pertaining to national priorities, in keeping with the work areas set out in the strategic objectives of section IV of the SAICM Overarching Policy Strategy.

In particular, the ISIP supports the Governance objective of SAICM's Overarching Policy Strategy paragraph 26, which calls for enhanced "cooperation on the sound management of chemicals between Governments, the private sector and civil society at the national, regional and global levels."

In addition, ISIP builds on the 2008-2009 Global SAICM Outreach Campaign to raise awareness about SAICM and strengthen collaboration among the public interest, health and labor sectors.

ISIP Objectives

ISIP's four objectives include:

- Promoting the need for sound chemicals management
- Advancing National SAICM Implementation
- Promoting global SAICM implementation by global civil society
- Building capacity among NGOs developing countries and countries with economies in transition

Title of activity: POPs Pesticides Elimination Strategy for Vegetable Production in Tuba

NGO: Ecological Restorations

Country: Ghana

Date: June 2011

Elements of SAICM Covered:

Promote substitution for highly toxic pesticides including effective non-chemical alternatives (27); Provide training in alternative and ecological agricultural practices, including non-chemical alternatives (51); Encourage industry to extend product stewardship and to voluntarily withdraw highly toxic pesticides which are hazardous and cannot be used safely under prevalent conditions (30); Promote integrated pest and integrated vector management (29); Establish programmes for monitoring chemicals and pesticides to assess exposure (66)

Description of:

The highly hazardous pesticide(s) registered/sold and/or in use in your country:

The use of POPs pesticides in Ghana has been confined as much as possible to industry and agriculture. However, efforts are being made to eliminate or at least reduce their usage through voluntary approaches in view of the dangers these pose to human health and the environment. The chemical being used in the various sectors of the economy are:

Agricultural sector:

Until the early 1980's, the organochlorine insecticides, mainly, Aldrin, Dieldrin, DDT, and Lindane, have been used in controlling pests of crops in agriculture. Ghana has a warm humid climate most of the year. This situation creates favorable conditions for a large number of insect-pest species and disease-causing organisms to attack crops, making pest and disease organisms a potential threat to food security in the country. Pests outbreaks are rampant, hence a variety of highly toxic pesticides have been resorted to in the past. These have now been discontinued except Lindane, which has been restricted to capsids control in cocoa production for its welcome effectiveness.

Industrial sector:

Although there is an on-going screening program of chemicals in Ghana, through which dangerous or hazardous chemicals importation into Ghana is prohibited, the possibility of illegal import of POPs and related substances into the country cannot be ruled out. Monitoring of chemicals production, importation, distribution, storage, use and sale has not been easy. Quality assurance and chemical identification are expensive exercises, making thorough monitoring unattainable and thus making room for smuggling of products that have not been approved into the country.

Alternatives and/or bio pesticides available, if any:

Agriculture in Ghana depends much on inorganic pesticides, which come with their problems. This has necessitated the search for alternate pesticides. For instance, in the demonstration farm for vegetable farmers, it was realized that the main insects that attacked the cabbage plants were aphids, the Diamondback moth and cabbage budworm. The major pests found on okra were flea beetles, cotton stainers, epilachna beetles and cotton leaf worms. These pests were effectively controlled by spraying with AACP Neem oil pesticide solution. AACP Neem oil is obtained from neem kernel collected and crushed in Ghana. The neem oil contains a multitude of natural chemicals, one of which is azadirachtin, which contributes to neem pesticide potency. Neem oil as a pesticide provides an effective tool in Integrated Pest Management Strategy and organic farming. It works mainly as a repellent, anti-feedent and regulation of insect growth by disrupting hormone production associated with growth and moulting. It has a multi-pronged effect on larval or nymphal stages of insects. It is harmless to beneficial insect species such as bees and spiders.

In addition to this, *Bacillus thuringiensis* (Bt) was also used.

Health and environmental effects of the pesticides:

Not much has been done in this area in Ghana; however, some few researches by individuals list some of the effects suffered by farmers in Ghana.

Ecological Restorations in 2004 gathered from some vegetable farmers that ailments including headaches, dizziness and itchy skins are suffered after spraying of pesticides.

Residues of pesticides contaminate soils and water, persist in the crops, enter the food chain, and finally are ingested by humans with foodstuffs and water. Within the agricultural sector, vegetable production plays an important and varied nutritional as well as socio-economic role. Vegetable production in Ghana has developed from a mainly subsistence activity carried out by women to a commercial activity carried out by mainly young men and women. Vegetable production is done in rural, peri-urban and urban areas. Tomato, eggplant, pepper and onion

are grown in all ten regions of Ghana. However, some regions are more efficient and specialized in the production of only one or two out of above four crops. One of the biggest problems confronting vegetable farmers in Ghana is disease and pests which ravage their crops. Vegetables, generally, attract a wide range of pests and diseases, and can require intensive pest management (Dinham, 2003). The pest control practices in vegetable production in Ghana involve applications of highly toxic pesticides which are most of the time misapplied, and which result in pesticide contamination of the produce itself as well as the environment. While Ghana's elite is becoming increasingly concerned about the adverse long-term effects of pesticides on the environment and the health of the country's resources, little scientific research has been done to address the issue.

Urban food needs in cities and towns in Ghana are growing, and increasingly vegetables are grown in urban and peri-urban areas to meet the demand. However, traditional vegetable farming systems (i.e. without any chemical input) are incapable of meeting this challenging demand. In Ghana there are already some levels of contamination of pesticides in water, sediment, crops and human fluids in areas of highly intensive vegetable production (Ntow, 2001). While pesticides are generally considered a panacea for farmers' pest concerns, farmers' perceptions and use of the chemicals have not received much attention. In Ghana there has not been any known comprehensive study. However, the perceptions of the farmers regarding, in particular, pesticide risks to human health are important for a number of reasons: (Warburton *et al.*, 1995) first, they may influence decisions regarding pesticide use; second, if these perceptions differ from expert opinion, it is useful to know why and whether they lead farmers to take more risks than they realize; third, they may influence the methods of protection used against pesticides; and, last, technical advice given to farmers on pesticide use and crop protection may be inappropriate and irrelevant if it does not tally with their own views of pesticide health effects.

Information on pesticide levels in the environment, in food, or in people:

Not much work has been done to determine the level of pesticides in Ghana. However Ecological Restorations in collaboration with Centre for Scientific and Industrial Research (CSIR) conducted a laboratory analysis to ascertain the level of contamination in some vegetables produced and sold in the Accra Metropolis between March -November 2008. Samples of the vegetables were purchased from four (4) different vegetable market places, namely Maamobi, Agbogbloshie, Mallam Atta and Buulu Djaano – all in Accra and analysed in the laboratory. The outcome of the analysis is summarized in Annex 2 and summarized as follows:

- Tomatoes had levels of both BHC and DDE exceeded their limits for human consumption well over 500 times. The levels of pesticides found in tomatoes from various sources in Ghana have proven beyond doubt that all is not well in eating raw tomatoes.
- Both cucumber and carrots recorded values that exceeded their guideline values in the following parameters and BHC, BHC, DDE, DDT, endosulfan, endosulfan. High levels of endosulfan and DDE in carrots were observed in both Lashibi (5.498 mg/kg endosulfan and 12.69 mg/kg of DDE) and Ashanti Mampong (13.95 mg/kg endosulfan and 10.93 mg/kg DDE) respectively.
- In terms of the levels of pesticides analysed in the vegetables, carrots have shown the potential of being able to accumulate so much of endosulfan and DDE.
- The BHC levels in cabbages, lettuce and cauliflower were all higher than their guideline values. Cabbages cultivated at Weija (0.8327 mg/kg), Aburi (0.1085 mg/kg), Kumasi (0.2242 mg/kg) and Techiman (1.228 mg/kg) showed levels BHC above their maximum residual limit (MRL). This is an indication of the high usage of agrochemicals because of lack of education on the part of the farmers. One striking feature is the high level DDE in cabbages from Techiman (1.228 mg/kg), which is an indication of the high use of the pesticides in the area.

Existing pesticide legislation in your country:

In 1985, a chemical monitoring programme was initiated by the Environmental Protection Agency (EPA) of Ghana. Under this programme, importers of all types of chemicals (industrial, agricultural consumer/commercial) were obliged by the government directive to obtain a clearance permit from the EPA, before delivery of their consignment at the ports of entry was granted. This was to ensure that chemicals importation and manufacture are screened in order to ensure that only safe and effective chemicals - chemical products are allowed into the country.

The implementation of this directive involved other government agencies such as Ghana Ports and Harbour Authority (GPHA), the Customs Excise and Preventive Services (CEPS), the Ghana Standards Board, the Ministry of Food and Agriculture (MOFA) and Factory Inspectorate Department of Ministry of Employment and Social Welfare.

To improve upon this existing procedure for controlling and managing chemicals, the Pesticides Control and Management Act, 1996 (Act 528) was enacted to ensure proper control of pesticides manufacture, importation, storage, distribution, sale, use and disposal. A substantial body of this legislation relates to agriculture and health Sectors. The operationalization of this Act coupled with the Environmental Protection Act (Act 490) has helped to reduce risks associated with the use of chemicals.

The Registration of Pesticides and Chemicals Stipulated under Act 528 and the Environmental Impact Assessment of activities and projects provided under Act 490 worked together to integrate environmental pollution and risks reduction.

Use of IPM and ecological agriculture:

One major problem confronting the cultivation of the crop is the incidence of pests and diseases (Oduro, 2000; Obeng-Ofori and Sackey, 2003). The declining soil fertility due to continuous and intensive use of the land over the years also reduces crop productivity. For a long time, farmers had relied heavily on synthetic pesticides, fungicides and artificial fertilizers to combat the numerous pests and diseases that attack the crops and to increase the fertility status of the soils. Apart from the ever-increasing costs of these chemicals, they are known to have negative impacts on the environment. They destroy the natural environment and leave residues in food, water bodies and the soil which become toxic to man (McKinley, 1992).

This therefore calls for Integrated Pest Management systems that would make very minimal use of these synthetic pesticides and fertilizers. One component of such a system would be the proper fertilization of the growing crop to promote vigorous crop growth and subsequently enabling the crop to withstand the deleterious effect of most pests and pathogens (Prately, 1992). Organic farming can be defined as an approach to agriculture aimed at creating integrated humane and environmentally sustainable agricultural production system. It is a production system which avoids or excludes the use of synthetically compounded fertilizers, pesticides and growth regulators. It relies upon crop rotations, crop residues, animal and green manures, legumes, mechanical cultivation and biological pest control methods to maintain soil productivity and to control insect pests, diseases and weeds.

Practitioners of organic farming endeavour to produce wholesome products devoid of chemical residues, using farming practices with minimum or no adverse impact on the environment. The organic production of agricultural products is regulated by agencies set up by government. This sets out strict requirements which must be met before agricultural products may be marketed as organic. In particular, the regulation severely restricts the range of products that can be used for fertilizing and for pest and disease control.

Training farmers in organic farming helps to expose them to the products that can be used as inputs in organic farming and where to get such products. The market price for such products are higher, therefore, farmers need to be trained to get the maximum yield from their products. The way in which they are produced involves less intensive use of the land hence farmers can use their land efficiently.

With the current drive of most agricultural countries toward the use of natural or biological compounds that will be less damaging to the environment and user friendly but equally effective in the control of pests and diseases and improve soil fertility, it is important that farmers are encouraged to use such organic substances to produce food crops especially vegetables.

Project Outcomes:

Description of the activity conducted to reduce the threat posed by highly hazardous pesticides and advance this SAICM aim.

- a. The Ecological Restorations (ER) collaborated with EPA and obtained 100 copies of the PESTICIDES CONTROL AND MANAGEMENT ACT, 1996, ACT 528, which has been summarized and reduced into simple English with illustrations;
- b. Two community meetings were held for 60 vegetable farmers to explain the provisions in ACT 528 to the farmers. Each farmer was given a copy of the ACT 528. Together with the Environmental Protection Agency staff in the area, 5 chemical sellers in and around Tuba were educated on the banned chemicals and encouraged to report illegal sellers to the IDA;
- c. Two staff members of Irrigation Development Authority (IDA) and three field officers of Ecological Restorations conducted one-week outreach programme to educate all vegetable farmers operating in the dam area on the wrong use of chemicals in vegetable production;
- d. The ER encouraged the chemical stores to voluntarily withdraw highly toxic pesticide found on their shelves. The farmer Task force visited the sellers regularly unannounced to check the presence of illegal chemicals;
- e. The project organized one district level workshop to share the finding of the laboratory analysis of POPs pesticides in vegetables. The workshop was attended by local farmers, Policy makers, Vegetable Consumers and Researchers;
- f. The Ecological Restorations assisted the IDA to develop a draft local strategy to eliminate harmful effects of chemicals in vegetable production in Tuba. This will serve as an input towards the formulation of a District level strategy to control pesticides at farm levels; and
- g. The project promoted the substitution for highly toxic pesticides including effective non-chemical alternatives by providing two week on-farm training to 30 farmers in alternative and ecological agricultural practices and integrated pest management.

Impact on target groups:

- a. Following the outreach, the local farmers voluntarily selected and formed a nine-member Chemical Control Task Force to create awareness on the enforcement of the laws on POPs pesticides. The Task Force was trained in chemical monitoring, identification, detection and disposal of banned chemicals. They were empowered to report or cause to arrest any chemical shop within the project area that was found selling any of the banned chemicals to the farmers;
- b. The project beneficiaries agreed to introduce IPM in vegetable cultivation. 25 farmers agreed to pilot organic vegetable production by cultivating half area each of organic vegetable farms;
- c. The Crop Science Department of the University of Ghana conducted two week training for 30 farmers in compost preparation and application, preparation of organic pesticides using neem;
- d. Staff of government agency collaborated with staff of non-governmental agency to provide outreach and extension services to vegetable farmers and promoted sound chemical management in the Tuba irrigation area;
- e. Member of print and electronic media paid a visit to the demonstration farms in Tuba to interact with the farmers and technical men on the use of IPM in vegetable production;
- f. The one day stakeholder workshop held in Accra brought together 100 stakeholders made up of: Policy Makers (10 representatives from the Ministries of Food and Agriculture, Land and Natural Resources, Environment Science and Technology, Local

Government and Rural Development), 60 Vegetable Producers and NGOs from Tuba, Ashiaman, and Accra Metro 10 Consumers (restaurant operators, vegetable sellers, drivers & market queens) 10 Researchers and Academicians (CSIR, University of Ghana, Water Research Institute, Water Resources Commission) 10 press members (electronic and print media). The workshop adopted a resolution for the consideration of the policy makers;

- g. 30 vegetable farmers in Tuba were trained in Integrated Pest Management (IPM) in vegetable production. The Crop Science Department of the University of Ghana, Legon provided the technical support;
- h. Two chemical shop owners voluntarily withdrew highly toxic pesticide (including DDT) found on their shelves. The banned products were bought by the project and given to the EPA for disposal; and
- i. The project has provided training to peasant farmers in alternative and ecological agricultural practices including non-chemical alternatives, and promoted pest and integrated vector management.

Impact on target policies:

- i. The project has helped stakeholders to understand the provisions under PESTICIDES CONTROL AND MANAGEMENT ACT, 1996, ACT 528;
- ii. A district strategy towards pesticides control in the Weija Irrigation area was formulated to help implement the provisions in ACT 528 and promote substitution for highly toxic pesticides including effective non-chemical alternatives;
- iii. The awareness creation established the basis for developing monitoring indicators for chemicals and pesticides used in the area by the area Task Force;
- iv. Policy Makers, Farmers, Vegetable Consumers and Researchers have met to discuss and adopt a common approach to promote substitutions for highly toxic pesticides;
- v. Provisions of the international policies on the wrong use of chemical were implemented;
- vi. Stakeholder collaboration to eliminate harmful chemicals has been tested and proved to be workable; and
- vii. Through the intervention the project has promoted substitution for the banned and highly toxic pesticides being used in the area.

Outreach to stakeholders:

The project was implemented under participatory arrangements involving all primary and secondary stakeholders. The stakeholder's involvement in the project is summarized in the matrix below:

Project Activity	Stakeholders Involved
1.1 National workshop organized to disseminate the laboratory report on the presence of POPs in vegetables among vegetable farmers, policy makers and major vegetable consumers in Tuba traditional area	<ul style="list-style-type: none"> • Researchers – Council for Scientific and Industrial Research shared the results of the laboratory analysis conducted in 2008 with important stakeholders in Accra. For the first time researchers and non-literate practitioners met to exchange views on how to promote ecological farming in Ghana. • Academics – University of Ghana, Legon Crop Science Department was involved in the training of farmers and sharing of best practices on the field. The Academics interacted with the farmers

Project Activity	Stakeholders Involved
	<p>and learned from them some indigenous knowledge in pest management.</p> <ul style="list-style-type: none"> • Policy Makers – The Ministries of Food and Agriculture, Land and Natural Resources, Environment Science and Technology, Local Government and Rural Development met to discuss issues of common interest – wrong applications of chemical and how to monitor the inflows of banned chemical. They also assisted in drawing up of a strategy for the implementation of district level plans to control and manage pesticides in a vegetable growing area. • The Press – The media houses were instrumental in generating public discussions on the high levels of POPs pesticides in food and advocated for strict enforcement of ACT 528. The interest of the Press was developed through the project to create public awareness of the harm effects of POPs pesticides.
1.2 Support the Irrigation Development Authority of the Ministry of Food and Agriculture to mainstream and enforce the laws on POPs and sound chemical management in the district policy on vegetable production in Tuba.	<ul style="list-style-type: none"> • Agriculture Extension Services – through the project intervention the staff of the Agriculture Extension office was strengthened to interact more with the farmers. • Traditional Authorities – have been drafted into the monitoring of highly toxic chemicals on the local market. • Chemical Sellers – have been briefed on the legislations on pesticides and are involved in the monitoring of banned chemical in agriculture
2.1 Support the Irrigation Development Authority staff of MOFA at Tuba to revise strategies that will eliminate harmful pesticides in vegetable production	
2.2 Organize participatory meeting to assist the local vegetable farmers to adopt indicators for chemical monitoring 2.3 Organize community level training for vegetable farmers to build their capacities in chemical monitoring, identification, detection and destruction of banned chemicals	<ul style="list-style-type: none"> • Local Farmers – have been supported to develop capacities and invest in alternative and ecological agricultural practices including composting and preparation of organic insecticides. Most farmers are now investing in integrated pest/vector management. Farmers are involved in the monitoring highly toxic chemicals in the project area.

Deliverables, outputs and/or products:

Project Activity	Deliverables, Outputs and Products
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Project Activity	Deliverables, Outputs and Products
1.1 Organize district level workshop to disseminate the laboratory report on the presence of POPs in vegetables among vegetable farmers, policy makers and major vegetable consumers in Tuba traditional area	<ul style="list-style-type: none"> • 60 brochures of the summarized Pesticides Control and Management Act 1996, Act 528 in simple English. • 100 posters on the impact of POPs pesticides on human health developed by the EPA and ER was distributed. • One stakeholder workshop report on the harmful effects of POPs pesticides in vegetable. • One media (Graphic) report on the presence of POPs in foods.
1.2 Support the Irrigation Development Authority of the Ministry of Food and Agriculture to mainstream and enforce the laws on POPs and sound chemical management in the district policy on vegetable production in Tuba.	<ul style="list-style-type: none"> • One draft strategy document to monitor illegal (banned) agrochemicals sold on the local market
2.1 Support the Irrigation Development Authority staff of MOFA at Tuba to revise strategies that will eliminate harmful pesticides in vegetable production	<ul style="list-style-type: none"> • An association of chemical sellers in Tuba was formed to monitor the sale of banned /highly toxic chemicals
2.2 Organize participatory meeting to assist the local vegetable farmers to adopt indicators for chemical monitoring	<ul style="list-style-type: none"> • One handbook on the adoption of integrates pest management in vegetable production (organic farming)
2.3 Organize community level training for vegetable farmers to build their capacities in chemical monitoring, identification, detection and destruction of banned chemicals	<ul style="list-style-type: none"> • A nine-member Task force to monitor, identify and report banned chemicals within the Tuba irrigation area

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NGO Recommendations for next steps:

The results of this project have shown the need for the following:

1. Conduct laboratory analysis on the presence of POPs pesticides in vegetable produced and sold in the country;
2. Promote organic farming and Integrated Pest Control Methods in vegetable production in the major vegetable producing areas of the country; and
3. Support the introduction of Green labeling of vegetables produced from organic sources on the urban markets.