

CHAPTER I

INTRODUCTION

A. ASSIGNMENT REFERENCE

1.1 This assignment in providing the consulting services towards preparing the National Inventory on POPs has been accomplished under the contract for the Project BGD/02/G31/IG/99 Bangladesh: Preparation of POPs National Implementation Plan under Stockholm Convention (POPs, NIP), Department of Environment (DOE). The Government of the People's Republic of Bangladesh has received a grant from the Global Environment Facilities (GEF) through UNDP toward the cost of preparing National Implementation Plan, to phase out Persistent Organic Pollutants (POPs) in compliance to the Stockholm Convention and this assignment has been carried-out with the same finance.

B. PROJECT REFERENCE

1.2 On May 23, 2001, a global, legally binding instrument called the Stockholm Convention on POPs was adopted. The Convention preamble expresses awareness of "Health concerns, especially in developing countries, resulting from local exposure to POPs, in particular impacts on women and, through them, upon future generations." The Convention's objective is to protect human health and the environment from POPs. The POPs are organic substances produced and released into the environment by human activity. The Stockholm Convention identifies 12 substances as POPs. They are (i) Aldrin, (ii) Chlordane, (iii) Dieldrin, (iv) DDT, (v) Endrin, (vi) Heptachlor, (vii) Mirex, (viii) Toxaphane, (ix) Hexachlorobenzene, (x) Polychlorinated Biphenyls (PCBs), (xi) Polychlorinated Dibenzo-P- Dioxins and (xii) Polychlorinated Dibenzo-P- Furans. Out of the first 8 are exclusively used as pesticides, the 9th one is used as pesticide as well as industrial chemical, the 10th is industrial chemical while the last two are unintentionally produced by-products of industries and other combustion processes. Regardless of their origin, POPs are potential threat to human health and environment.

1.3 The Government of the People's Republic of Bangladesh has signed the Stockholm Convention on POPs on 23 May 2001, after actively taking part in the negotiation process leading to the final Convention. As a Party and signatory to the Stockholm Convention, Bangladesh is required to take actions to generate general awareness of harmful consequences of POPs to reduce their releases, and their ultimate elimination. This project BGD/02/G31/IG/99 Bangladesh: Preparation of the POPs National Implementation Plan under Stockholm Convention is an initiative to this end of the Stockholm Convention.

C. SCOPE OF SERVICES

1.4 The Stockholm Convention as one of its objectives has made it mandatory to prepare Inventory of sources of POPs in each of its member countries, which would form the basis of its action plan for elimination of the POPs. In order to establish a solid foundation for developing such action plan for POPs most countries would benefit from or need to prepare an inventory of POPs. The Stockholm Convention does not require that any particular approach be used for preparing the inventory or developing the action plan for POPs. Nor does a country have to use any specific structure for presenting the inventory and the action plan. The work approaches and structures may be tailored to the individual country's needs and preferences. Accordingly, efforts have made under the assignment to:

- i. Prepare initial inventories of POPs production, unintentional sources, distribution, use, import and export.

- ii. Prepare initial inventory of obsolete POPs stocks, POPs-containing articles in use and contaminated.
- iii. Prepare initial inventory of POPs releases to the environment.
- iv. Prepare initial inventory of POPs presence, level and trends in humans and the environment.
- v. Prepare initial assessment of opportunities for disposal of obsolete stocks.
- vi. Review of existing POPs country specific exemption and initial proposals for their termination .

CHAPTER II

BANGLADESH PERSPECTIVE

A. GENERAL

A.1 GEOGRAPHICAL LOCATION

2.1 Bangladesh (the erstwhile East Pakistan), emerged as an independent and sovereign state on December 16, 1971 following the victory at the War of Liberation, from March 25 to December 16, 1971 against the Pakistani occupation, lies in the north eastern part of South Asia between 20°34' and 26°38' north latitude and 88°01' and 92°41' east longitude (Figure 1 of Bangladesh Map). The country is bounded by India on the west, the north, and the northeast, and Burma on the southeast and the Bay of Bengal on the south. The area of the country is 56,977 sq. miles or 1,47,570 sq. k.m. The limits of territorial waters of Bangladesh are 12 nautical miles and the area of the high seas extending to 200 nautical miles measured from the baselines constitutes the economic zone of the country.

A.2 ADMINISTRATIVE SETTINGS

2.2 Bangladesh is governed by a Parliamentary form of Government. The Prime Minister is the Chief Executive of the country. He/she is selected by the President from the majority party leader. He/she has a council of ministers, which assist him/her in the discharge of his/her duties. For the convenience of administration, the country is divided into six administrative divisions, each placed under a Divisional Commissioner. Each division is further –sub-divided into zilas. After the administrative re-organization carried-out in 1984, the country has been divided into 64 zilas. The administration of each zila is headed by a Deputy Commissioner who is assisted by other officials.

2.3 Zila is divided into a number of thanas, each headed by Thana Nirbahi Officer. Currently there are 496 thanas of which 36 are in Metropolitan cities.

A.3 CLIMATIC CHARACTERISTICS

2.4 Bangladesh enjoys generally a subtropical monsoon climate. While there are six seasons in a year, three namely, winter, summer and monsoon are prominent. Winter, which is quite pleasant begins in November and ends in February. In winter there is not usually much fluctuation in temperature, which ranges from minimum of 7.22 – 12.77 Celsius (45°F – 55°F) to maximum of 23.88 – 31.11 Celsius (75°F – 85°F). The maximum temperature recorded in summer months is 36.66 Celsius (98°F) although in some places this occasionally raises up to 40.55 Celsius (105°F) or more. Monsoon starts in July and stays up to October. This period accounts for 80% of the total rainfall. The average annual rainfall varies from 1429 to 4338 millimeter. The maximum rainfall is recorded in the coastal areas of Chittagong and northern part of Sylhet district, while the minimum is observed in the western and northern parts of the country.

A.4 POPULATION INDEXES

2.5 The population of the country was 111.4 million in 1991. The percentage of urban population was 20.1 million while the same rural population was 79.9 million. The incremental growth rate of population is estimated by using adjusted population of 1991 census is 2.1 per annum. Assuming medium variant of declining fertility and mortality the country is expected to reach a population of 129.6 million by 2000 A.D. The countrywide intensive family planning measure is aimed at reducing the growth rate. The density of population was approximately 647 per sq.km. in 1981. It has increased to 755 per sq. km. in 1991. The sex ratio of the population

is 106 males per 100 females. The literacy rate of the country was 32.4 percent in 1991 while it has now attained 52%. The percentage of Muslim population is 88.3 while that of Hindu, Buddhist and Christian were 10.5, 0.6 and 0.3 respectively. There are 19.9 million households in the country distributed over 59,990 mauzas (revenue villages). The enumerated population of the country stood at 123.1 million in 2001.

B. SOCIO-ECONOMIC SCENARIO

B.1 GENERAL

2.6 Bangladesh, once dubbed as “the test case of development” could achieve a wide range of social and economic successes seemed remarkable to many observers of development. The country’s recent economic history underscored the point that development is possible even in the most trying of circumstances. Although the gains are modest in relation to the magnitude of the overall problem, they defy the gloomy predictions and pessimistic apprehensions that dominated the global discourse about country’s long-term prospects till recently. The records of achievement includes acceleration in per capita income growth (.....), reduction in population growth from 2.9% per annum in the mid seventies to 1.5% in the late nineties; The infant mortality rate also declined from 153 deaths per thousand live births in 1975 to 94 deaths in 1990, dropping further to 66 in 2000; decrease in child malnutrition rate , the stunting rate for children in the age group of 6-71 months which was 69% in 1985/86 dropped to 49% in 2000. Depending on the definition of literacy adopted, the estimate of literacy rate varies considerably among various sources of data. Even the most optimistic estimate of 64% carried-out by the Primary and Mass education Division- as opposed to the rather conservative estimate of 45% provided by the Household Income and expenditure Survey (HIES) 2000 data must be considered modest. Bangladesh has achieved considerable success in mainstreaming women into the development process. The country has achieved gender parity in primary education and nearly removed gender gap in secondary education. It has also made success in the reduction of chronic food shortage and insecurity, enhanced capacity for disaster management, and sustained trends of decline in income-poverty. The growth performance was relatively modest with a per capita GDP growth of about 2% per annum. The growth performance started to improve only in the nineties. Similarly, the pace of income-poverty reduction was very slow. During the period between early eighties and early nineties, the incidence of income-poverty declined by 0.8% per year.

B.2 CROP SUB-SECTOR

2.7 Agriculture is the main occupation of the people. At the aggregate level, the country has achieved the desirable objective of near-self sufficiency in rice production with a declining cultivated area. The relatively high agricultural growth recorded in recent years was mainly achieved through the expansion of rice production. Rice occupied an area of about 10.66 million ha in 2001/02, which was about 82.00% of the total cropped area (13.00 million ha) (BBS 2003). It is grown in overlapping three seasons viz., Boro (November to April), Aus (B. Aus during March to August and T. Aus during April to September) and Aman (June to December) (BRRI 2004). The production of cereals increased at a trend growth rate of 2.4% per year between the early eighties and the late nineties. This was mainly achieved through expansion of rice areas under high-yielding varieties (HYVs). Given the declining profitability of rice farming, it is obvious that high agricultural growth cannot be maintained in the next decade only by relying on the expansion of HYV rice technology. The indiscriminate use of pesticides is also identified as one of the factors of declining rice production. Other crops that occupy only 18% of total cropped area (13.00 million ha) include, among others, sugarcane, jute, cotton, vegetables like brinjal, potato, beans etc., pulses, oilseed crops, fruits like mango, banana, pineapple etc.

B.3 LIVESTOCK AND FISHERIES SUB-SECTOR

2.8 Livestock and fisheries are the emerging sub-sectors having potential to contribute to the national economy.

B.4 LAW MAKING

2.9 The constitution provides for a unicameral legislature, which is called Jatiyo Sangsad. It consists of 300 members directly elected by adult franchise. The members of parliament elect another 30 female members. The JS is the national parliament and is vested with all powers under the constitution to make laws for the country.

C. BANGLADESH PERSPECTIVE: RELEVANT POLICIES AND REGULATIONS

C.1 AGRICULTURE SECTOR

C.1.1 National Agricultural policy

2.10 Perceiving the importance of agricultural development in the overall economic growth and self-reliance of the country, the National Agricultural Policy 2004 has been prepared in the context of the Millennium goal. The overall objective of the National Agriculture Policy is to make the nation self-sufficient in food through increasing production of all crops including cereals and ensure a dependable food security system for all. The policy set its objectives, among others, worth citing in relation to the POPs pesticides, is to take necessary steps to ensure environmental protection as well as 'environment-friendly sustainable agriculture' through increased use of organic manure and strengthening of the Integrated Pest Management (IPM) programme.

C.1.2 New Agricultural Extension Policy

2.11 In compliance with the National Agricultural Policy, the Government of Bangladesh has been implementing its agricultural extension activities adhering to the updated agricultural extension policy known as the "New Agricultural Extension Policy (NAEP) 1996" followed by "A Strategy for Implementing the NAEP- 1997". The NAEP comprises 11 key components; of which the one may be citable in relation to the POPs issues is "integrated environmental support". This component aims to maintain the ecological balance in the natural environment. The NAEP supports, among others, the following strategies -

- Integration of the environment into the overall agricultural policy to ensure a policy of sustainable agricultural development;
- Environmental impact assessment as an integral part of the development and testing of innovations by agricultural research institutes, universities, non-government organizations and the private sector;
- Promotion of environmentally sound agricultural practices, such as Integrated Pest Management, and active discouragement of damaging and hazardous agricultural practices;
- Monitoring the impact of agricultural practices by environmental agencies, and the use of findings to stimulate a continuous improvement of agricultural technologies and agricultural policies.

C.1.3 Integrated Pest Management Policy

2.12 In compliance with the provisions to ensure environmental protection and 'environment-friendly sustainable agriculture' of National Agricultural Policy and promotion of environmental sound agricultural practices including Integrated Pest Management of New Agricultural Extension Policy, the Government of Bangladesh has promulgated the "National Integrated Pest Management Policy, 2002" and is implementing its strategies through the Department of Agricultural Extension (DAE), Ministry of Agriculture (MOA). The most relevant provisions of the IPM Policy worth mentioning in respect of this Inventory include 2.2.2 Executing Appropriate Actions on Pesticides, which promulgates, among others, that "GOB has banned all WHO Class 1a pesticide compounds, based on formulations, for agricultural purposes and will eliminate compounds in Class 1b. New proposals for registration of any pesticide falling under the above categories will be declined" and "GOB will review pesticide rules and regulations and amend the same as and where necessary". Similarly, two of the most important national strategies stated under section 3.1 that "International Code of Conduct on the Distribution and Use of Pesticides" would be observed in relation to IPM activities", and "The Convention on Persistent Organic Pollutants (POPs) in reducing or eliminating the production and use of certain pesticides would be observed and implemented" are most relevant to the POPs elimination or reduction process. As an alternative to the pesticides, section 2.2.1 Maintaining Ecological Balance suggests, among others, that "Priorities will be given to the management of pests through the use of parasitoids, predators, insect pathogens, appropriate cultivation practices, pest tolerant varieties, mechanical control measures, crop diversification, botanical products and biopesticides".

C.1.4 Pesticide Ordinance

2.13 The Pesticide Ordinance, 1971 (Ordinance No. 11 of 1971) as modified up to 30th June, 1984 provides the legal framework to regulate the import, manufacture, formulation, sale, distribution and use of pesticides in Bangladesh. According to the Chapter I, Section 3 and subsection (n) of the Ordinance, "pesticides means any substance or mixture of substances used or represented as a means for preventing, destroying, repelling, mitigating or controlling, directly or indirectly, any insect, fungus, bacterial organism, nematodes, virus, weed, rodent or other plant or animal pest; but does not include a substance, which is a drug within the meaning of the Drugs Act, 1940". As per the Chapter II, Section 4 of the Ordinance, no person shall import, manufacture, formulate, repack, sell, offer for sale, hold in stock for sale, or in any manner advertise any brand of pesticide, which has not been registered in the manner hereinafter provided in the Ordinance. Similar to the registration, as per the Chapter II, Section 8A subsection (1) of the Ordinance "Any person may, after obtaining a licence granted by the licensing authority (the Director, Plant Protection Wing, DAE), import, manufacture, formulate, repack, sell, offer for sale, hold in stock for sale, involve in pest control operation on commercial basis or advertise in any manner any brand of registered pesticide". These provisions make registration and licence mandatory for dealing with any pesticide. Moreover, as per Chapter II, Section 5 the pesticides must satisfy a big list of criteria for being eligible to be registered. The most relevant criterion worth mentioning here as per Chapter II, Section 5, subsection (4) (d) of the Ordinance is "it is not generally detrimental or injurious to vegetation, except weeds, or to human or animal health even when applied according to directions". The most important provision of the Ordinance that empowers the Registration Authority to cancel the registration or deregistration is Chapter II, Section 7 of the Ordinance which states "if at anytime after registration of the brand of a pesticide, the Government (here PTAC) is of opinion that the registration has been secured in violation of any of the provisions of this Ordinance or the rules or that the pesticide is ineffective against pests or hazardous to vegetation, other than weeds, or to human or animal life, the Government may after giving to the person on whose application it had been registered an opportunity of being heard, cancel the registration". Exercising this authority the Government has already cancelled the registration of many hazardous pesticides including POP pesticides. Further the Chapter IV (Miscellaneous), Section 21 to 28 of the Pesticide Ordinance provides the provisions of "offences and penalty", "power of court", "Cognizance of offences", "Power to try offences summarily" and "Indemnity". These provisions

provide tools for prosecuting legal actions against any person dealing with pesticides not registered or deregistered. The only shortfall here is that the amount of financial penalty has been fixed-up by the Ordinance in the context of past time 1971, which now appears to be very minimum. This needs significant increase through amendment of the Ordinance, which is probably falls under the jurisdiction of the Ordinance Approving Authority.

C.1.5 Pesticide Rules

2.14 In exercise of the powers conferred to it under section 29 of the Pesticides Ordinance, 1971 (II of 1971), the Ministry of Agriculture (MOA) representing the Government of the People's Republic of Bangladesh, in consultation with the PTAC, has made "the Pesticide Rules, 1985" which details out the procedures, requirements and formalities in relation to the Provisions of the Pesticide Ordinance, 1971. In addition to all the provisions of the Pesticides Ordinance, 1971, "the worth mentioning provisions of the Pesticide Rules, 1985 are the Section 56. Disposal of used packages, condemned and surplus materials etc., which include subsection (1) stating that "it shall be the duty of manufacturers, formulators, repackers of pesticides and operators to dispose of packages, condemned or surplus materials and washing in a safe manner so as to prevent air, soil, water or other environmental pollution", subsection (2) stating that "the used packages shall not be left outside to prevent their reuse and subsection (3) stating that "the packages shall be broken, burnt, incinerated and buried away from habitation and water ways" will of worth mentioning in relation to the preparation of Inventory on POPs". In this case, the most important contradiction with the Stockholm Convention is the provision of "Incineration and Burning of packages/containers, which may cause emission of Dioxins and/or Furans.

C.2 ENVIRONMENT SECTOR

C.2.1 Environment Policy, 1992

2.15 The Environment Policy 1992 provides a comprehensive foundation to the formulation of the Environment Conservation Act, 1995 and Environment Conservation Rules, 1997. The section 2 of this Policy enlists the objectives of which subsection 2.3 included identification and control of all types of pollutants and degradation activities". Subsections 3.1, 3.2 3.4, of the Policy cover the provisions and actions for the identification and control/management of all hazardous chemicals, among many others, in agriculture, industry and fuel sectors respectively. The implementation strategy of the Policy also enlists with specific sector-wise work plan, which include the actions towards gradually phasing out and ultimately banning on persistent and accumulative pesticides such as DDT, chlorinated hydrocarbon, which are POPs pesticides. Similarly, appropriate measures need to be taken in each industry for controlling the industrial pollutants.

C.2.2 The Bangladesh Environment Conservation Act, 1995 and the Bangladesh Environment Conservation Rules, 1997

2.16 The Bangladesh Environment Conservation Act, 1995 originally published in Bangla in the Bangladesh Gazette, extra-ordinary issue of 16-2-1995 and amended by Act Nos. 12 of 2000 and 9 of 2002, followed by the Bangladesh Environment Conservation Rules, 1997 provide for the conservation of the environment, improvement of environmental standards and control and mitigation of environmental pollution. Although all the provisions are important in the context of environment conservation, the most relevant ones of the Act worth mentioning in regard to POPs are section 2 Definitions of "environment", "environment pollutant", "hazardous substances", "pollution" which are definitely applicable to POPs because of their similar nature and characteristics; section 6A (৬ক), which with the caption "*Restrictions on manufacture, sale etc., of articles injurious to environment*" states thator any other article is injurious to

the environment, the Government may, by notification in the official gazette, issue a direction imposing absolute ban on the manufacture, import, marketing, sale, demonstration for sale, stock, distribution, commercial carriage or commercial use, or allow the operation or management of such activities under conditions specified in the notification, and every person shall be bound to comply with such direction, empowers Director General of DOE to take necessary actions for putting ban on such substances or activities related to POPs or their emissions. However, slight shortfall, which may be taken care of is to specify the names of POPs substances and, where applicable their threshold levels, as hazardous. For this only a technical guideline prepared by the experts and subsequently included in the approved National Implementation Plan of POPs should be sufficient.

C.2.3 The Environment Court Act, 2000 (Act No. 11 of 2000)

2.17 The Environment Court Act, 2000 (Act No. 11 of 2000) published in the Bangladesh Gazette, extra-ordinary issue of 10-4-2000 and amended by Act No. 10 of 2002 is an Act to provide for the establishment of environment courts and matters incidental thereto. Where as it is expedient and necessary to provide for the establishment of Environment Courts for the trial of offences relating to environmental pollution and matters incidental thereto; enforces that any violation of environmental law, which means as per section 2 of the Environment Court act, 2000 this Act, the Bangladesh Environment Conservation Act, 1995 (Act No. 1 of 1995), any other law specified by the Government in the official Gazette for the purposes of this Act, and the rules made under these laws. Section 3 of this Act states that “Notwithstanding anything contained to the contrary in any other law for the time being in force, the provisions of this Act shall have effect”. Therefore, for prosecuting any legal action against violation of any provisions already existing in the relevant Acts, Rules, Ordinance related to POPs, the Environment Court Act 2000 might be quite adequate in its content.

CHAPTER III

APPROACH AND METHODOLOGY

A. APPROACH

3.1 The steps for developing a sound approach and methodology involved a ***clear and logical understanding of the ToR***, particularly in respect of its objectives and scope, the suggested methodology, time frame and rationale that led to the undertaking of the project and the ultimate use of the findings. With these perception and strategy, an attempt was made to very ***intensively and analytically study the ToR*** to pick up and segregate, in order of merits and weights, the key elements and issues of the ToR that were to be addressed in the assignment. Additional but more important steps that were adopted as approach to develop the methodology for the successful implementation of the assignment included, among others, ***review of the available reports and documents both hard copies as well as browsing of internets (<http://www.pops.int/documents/guidance/>) related to the Stockholm Convention on POPs and most particularly those related to Inventory Preparation, and visits to offices of some selected Focal Points including POP project to have interaction with the relevant and conversant personalities.***

B. THE METHODOLOGY

B.1 THE CONCEPTUAL FRAMEWORK

3.2 In the first place, the Consultants clearly understood the POPs, and the Stockholm Convention on POPs reviewing the relevant documents, and based on TOR the assignment- its objectives, scope of work, and the output. Moreover, the Consultants made an analysis to identify the target respondents and other stakeholders related to the study. Additionally they reviewed the approaches, methods and suggestions made in the guidance. Based on such analysis, the Consultants developed a solid, precise and overall understanding of the study.

B.2 PLANNING AND IMPLEMENTATION OF THE STUDY

3.3 The consultants then developed a ***Study Plan***, which comprised three distinct phases such as (i) ***Inception Phase: Basic Preparations***, (ii) ***Study Implementation Phase: Data Collection and Output Generation*** and the (iii) ***Reporting***.

B.2.1 Inception phase: Basic preparations

3.4 The Inception Phase involved the basic preparations for inventorying the POPs pesticides and thus exercises like the Critical Review of the Available Previous Study Reports, Preliminary Visits and Interviews, Designing the Methodology of inventorying the POPs pesticides, Preparation of Survey Plans, and Preparing the Inception Report were completed as presented below.

Critical review of the available previous study reports

3.5 These activities formed the crux of the assignment in the form of providing some basic information regarding POPs pesticides. A good number of articles, scientific papers, reports etc. on POP pesticides were collected and reviewed. The Consultants put a major thrust on collecting all such Documents/Reports/Literatures/Articles including those not available publicly. Some documents not available publicly and restricted within the Government Departments were collected through the Official Channel. The documents/reports were thoroughly reviewed for general information related to the rules, regulations, present status, import, storage, use, sources, effects, presence, impacts etc. A list of the documents collected and reviewed is provided in Annex 1.

Preliminary visits and interviews

3.6 The preliminary visits and interviews using a pre-designed checklist with the POP project authority including three major Focal Points (DAE, PDB and DOE) were undertaken. This visit enabled establish contact with the Focal Points, identifying the users, respondents, stakeholders, related officials, designing the schedule including mode of conducting the activities under the assignment and collect all necessary information for firming-up the methodology.

Designing methodology

3.7 The methodology for POPs Pesticide Inventory Preparation was designed based on the Guidelines of UNEP and IOMC (www.pops.int/documents/followup/nipguide/NIPGuidePartC2.doc). The methods included the followings:

- ◆ Collection of Information from Secondary Sources
- ◆ Collection of Information from Field Survey
 - Preparation of Filed Survey Plan
 - Questionnaire Survey/Personal Interview
 - Site Inspection
 - Spot Check
 - Case Studies
- ◆ Data Processing
- ◆ Report Preparation

B.2.2 Implementation of the study

3.8 The methods designed during the inception phase were followed in a sequential order as presented below.

Collection of information from secondary sources

3.9 A lot of very relevant information related to pesticides, in general, and on POPs pesticides, in particular, were collected from secondary sources. The most important sources of the most useful information were:

- Pesticides Ordinance, 1971 (No. of 1971) modified as 1985;
- The Pesticide Rules, 1985;
- List of registered pesticides available from DAE;

- Reports on sales and consumption of pesticides available from BCPA;
- The books on Entomology published in the 60's by Agricultural Information Services (AIS);
- Yearbook of Statistics, BBS;
- Yearbook Agriculture, BBS;
- Published scientific articles;
- Unpublished records and registers of PAB.

Collection of information from field survey

3.10 The field survey for primary data collection and physical verification involved questionnaire survey/personal interview, site inspection, spot check and case studies, which were undertaken following a pre-set survey plan. The details of field survey are presented below.

Preparation of Survey Plans

3.11 The survey plan was prepared as a self-content guide of the field survey. Among others, it contained the followings:

- Selected categories of information source;
- Methods of data/information collection;
- Approved Work Schedule;
- Task assignment;
- Specific interview schedule;

Selection of Different Categories of Information Sources

3.12 The following categories of information sources were identified and selected for information collection through different methods:

- Ministry of Agriculture (MOA)
 - Secretary, Pesticide Technical Advisory Committee (PTAC), and the concerned section for different aspects of pesticides particularly permission for import, passing of rules, regulations, and record of PTAC decisions;
- Department of Agricultural Extension (DAE)
 - Additional Director's Office of Barisal, Jessore, and Rajshahi
- Plant Protection Wing (PPW)
 - Director, Deputy Director, Pesticide Regulations Officer and Chemist of Plant Protection Wing for pesticide rules, ordinance, regulations, records of pesticide registration, licenses, list of registered pesticides, list of banned pesticides, records of pesticides marketing, consumption and crop/sector-wise use;
 - District and Upazila Level Office of DAE: Deputy Director (Agriculture)/Crop Protection Specialist and Upazila Agriculture Officer/Plant Protection Inspector at 10 District and 10 Upazila Agriculture Office of DAE respectively for the uses and quality of pesticides, records of government pesticides stores, private pesticide distributors, dealers, retailers, pesticide users etc, for POPs consumption, uses, dumping, containers etc. related information;

- Bangladesh Agricultural Development Corporation
 - Head Office, Krishi Bhaban, Motijheel
 - Port Office, Deputy Shipping Manager
- Directorate of Health (DOH)
 - Director General, and/or his representatives e.g., Assistant Director, Communicable Diseases Control Program, for records of DDT use;
 - Assistant Director (port Clearance Office) & MSD Godown, Agrabad, Chittagong
- Department of Public Health (DPH)
 - The office that maintains records of communicable and vector-borne disease control;
- Dhaka City Corporation (DCC)
 - The Medical section, for records of mosquito control activities particularly for DDT use records;
- Bangladesh Crop Protection Association (BCPA)/Pesticide Association of Bangladesh (PAB)
 - The Presidents and General Secretaries of PAB/BCPA for old and current records of pesticides import, marketing, sales, consumption, old stock, stockpiles, containers, dumping etc. including for information, particularly for POP pesticides prior to pesticides registration, and price imposition;
 - The companies that dealt with POPs pesticides; it is known that there were some specific companies for specific POPs pesticides prior to price imposition of pesticides as well as after registration system was introduced; such companies like Auto Equipment good sources of information particularly on the consumption, uses, dumping, containers of for Heptachlor and Chlordane;
- Customs Authority
 - Import data, customs records;
- The Ministry of Commerce (MOC)/ National Board of Revenue (NBR)
 - The records of pesticides import, Taxes, duty etc.;
- The Ministry of Industries (MOI)
 - The pesticide production plant particularly the DDT Manufacturing Plants, at Barabkundu, Sitakundu, Chittagong under Bangladesh Chemical Industries Corporation (BCIC), which produced and formulated DDT particularly for public health, and other Insecticide Formulation Plants including Mosquito Coil Factories for records and information of DDT;
- The Ministry of Finance (MOF)/External Resources Division (ERD)
 - For record of foreign Grants, Aids, loans, donations etc.; it is to be mentioned that initially the pesticides (which were mostly POP pesticides) were received/obtained in the form of foreign Grants, Aids, loans, donations;
- The Pesticides Distributors/Retailers/Dealers
 - For pesticide consumption, uses, dumping, containers related data since at the district, upazila and rural areas, the outlets of pesticides are Distributors, Dealers and Retailers;
- The Farmers
 - The users of pesticides at the village levels for information on POPs pesticide use and hazards.

3.13 The information was collected from personnel representing all of the above offices above district level. But in case of district and thana level office of DAE, the Pesticide Distributors/Retailers/Dealers and the farmers, the information/data were collected from selected samples. The samples selected were as follows:

Selection of District, Upazila and Villages

3.14 The districts, upazilas and villages were selected based on the analysis of information received from PPW and PAB/BCPC on the following aspects:

- The location of major old pesticide stores/godowns/warehouses;
- Indication of stockpiles and wastes of pesticides;
- Indication of dumping of pesticides and pesticide containers;
- Use and consumption of large quantities of POPs pesticides;
- The production and formulation sites of DDT and other pesticides.

3.15 Based on the analysis of above information, a total of 10 districts, 10 Upazilas and 50 villages covering 9 Agricultural regions were selected. The DAE officials and the officials of the offices at district/upazilas/sites as per list were interviewed.

Selection of Pesticides Distributors/Retailers/Dealers

3.16 The pesticide distributors, dealers and retailers covering different length of business period including pre-liberation were selected from the above selected sample districts, upazilas and villages. Thus a total of 100 pesticide traders were selected.

Selection of farmers

3.17 A total of **100 farmers** covering different age groups were selected from the above selected villages so that past and present information were available.

Selection of Dealers and Farmers for Case Studies

3.18 Based on the information collected during the interview, a total of 20 dealers and 20 farmers were selected randomly for case studies

Selection of Godowns for Case Studies

3.19 Based on discussion with the local officials of DAE, a total of 25 godowns/stores of DAE comprising 05 at Divisional level, 10 at District level and 10 at Upazila levels and 4 MSD godowns of DOH at Chittagong were selected for inspection and case studies.

Skill Development of Inventorying Personnel and Instruction Manual

3.20 Considering the technicality of POPs pesticide, the Enumerators deployed for data collection and Site Inspection/Spot Check were given a two-day training on specific skill along with the data collection and interview procedures. The training issues included identification, name, characteristics, uses, storage, sources etc. of POPs pesticides, handling and containerization procedures of POPs pesticides, meaning of stockpiles, wastes, inventory, expiry, products and articles containing pops pesticides, environmental risks etc. In addition to training an Instruction Manual (also translated into Bangla) containing all these pertinent information, clarification, procedures, questionnaires, checklist and instructions was made for the Enumerators.

Questionnaire Survey/Personal Interview/Case Studies of Whole-sellers, Retailers and Farmers

3.21 The information/data were collected on the pertinent aspects of POPs pesticides in a pre-designed and pre-tested questionnaire by personally visiting and interviewing the key selected sample informants. A team of 5 Skilled and trained Supervisors/Enumerators deployed under the direct supervision and participation of the Pesticide Expert and guided/monitored by the Pesticide Consultant of the POP Project collected the information/data and the Pesticide Expert and Consultant directly conducted the Case Studies.

Inspection of DAE Godowns and Case Studies

3.22 The selected sites were inspected by a team of 5 Skilled and trained Supervisors/Enumerators deployed under the direct supervision and participation of the Pesticide Expert and guided/monitored by the Pesticide Consultant of the POP Project. During inspection physical verification of the sites along with sample collection were done. During site inspection, the relevant officials/personnel of the identified sites were interviewed for pertinent information and data collection. A pre-designed checklist prepared in line with the questionnaire was utilized for collecting the pertinent information. The Pesticide Expert and Consultant directly conducted the Case Studies.

Case Studies of DDT Plant and MSD Godowns

3.23 The DDT Plant and the MSD godowns were physically visited, intensively investigated for quantities left, authorities, sources, dates, present condition, etc. During physical verification of the godowns, relevant papers were also collected. During inspection, the relevant officials/personnel were interviewed for pertinent information and data were collected in a pre-designed checklist. The Pesticide Expert and Consultant directly conducted the Case Studies.

B.2.3 Data processing and analysis

Data Processing

3.24 The analysis stage included most intensive deskwork involving processing, synthesising and analysis of data and presentation in appropriate format for incorporating in the report. Data processing and analysis included code construction, coders' training, coding, data verification and quality control, data punching, data processing and finally the analysis to facilitate the required output generation.

3.25 Computer aided data processing and analysis technique were employed for which a systematic approach was followed, where each and every activity was properly pre-identified.

Data Origination

3.26 The filled in questionnaires and checklists were considered as the source of raw data and for effective and accurate analysis and quality output generation the following activities were done on the collected data:

- Filing filled in questionnaire
- Editing and Coding questionnaire for entry to Computer
- Quality Control.

Filing Filled in Questionnaire

3.27 The filled in questionnaires and checklists were collected, filed in batches according to different POPs pesticides, sites and locations to enable easy operation for later processing steps (editing, coding, entry etc.)

Editing and Coding Questionnaire for Entry to Computer

3.28 Some of the collected data on the questionnaire were not available as prepared and organised (qualitative) enough to fulfil the pre-requirements of smooth and quick entry operation of data to the computer. So it was needed to code the entire questionnaire as per needs and suitability.

Data Analysis

3.29 The data obtained in this study were both quantitative and qualitative nature. For the purpose of data entry and ultimate analysis, appropriate software was developed that guided the field-level data recording, data entry into the computer as well as output generation.

3.30 All the above activities related to data processing and analysis were carried out under the direct supervision and coordination of Computer programmer.

B.2. 4 Preparation of inventory report

3.31 The report has been prepared in accordance with the requirement of the TOR and in compliance with the Guidance (www.pops.int/documents/followup/nipguide/NIPGuidePartC2.doc).

CHAPTER IV

RESULTS

A. PESTICIDES IN GENERAL

A.1 HISTORICAL BACKGROUND OF PROCUREMENT, DISTRIBUTION, USE AND REGISTRATION

4.1 The use of pesticides, in fact, started in Bangladesh (the erstwhile East Pakistan) date back to the mid 50's with the application of endrin in modern rice cultivation in around 1957/58. But unfortunately, no systematic record of pesticides' use particularly the initial stage of pesticide use is available. The information collected through interactions and consultation with different personnel during this survey, and supplemented with those presented by Rahman (2004) on the chronological development of registration system, procurement, use, storage and distribution of pesticides in Bangladesh is presented below.

4.2 **Period 1955- 73:** Deputy Director (DD), Plant Protection (PP), Directorate of Agriculture (DOA), Ministry of Agriculture (MOA), was the single authority, which based on literature, research results and manufacturers' information, used to list down the pesticides for use in agriculture. There was no standardization committee as such and no registration formalities. The manufacturers' local agencies maintained liaison and promotional activities. The pesticides were procured from abroad through supply credit, grant, loan, barter etc. provided by USAID, FAO, Danish, FRG etc. Up to 1965, Pakistan Central Plant Protection Department used to procure all pesticides, which were distributed to provincial directorate of agriculture (PP, DOA in erstwhile East Pakistan). But after 1965, BADC (the erstwhile EPADC) used to procure the pesticides based on requirement and list provided by DD, PP of DOA. Endrin was the first pesticide, 3 MT of which was received in 1955. Subsequently other pesticides were received. Meanwhile in 1971 the Pesticide Ordinance was promulgated but its actual enactment in Bangladesh was waiting till 1985, when the Pesticide Rules, 1985 was made.

4.3 **Period 1973-1979:** During this period also the DD, PP of DOA remained the single authority in respect of listing and standardization of the pesticides but a new system of standardization called "Score Card System" which used the efficacy trial report (mostly carried-out by Dr. M. Z. Alam) and information from other published literature and manufacturers.

4.4 During this period a good number of private agencies of the foreign manufacturers were involved as catalyst to the government in pesticide distribution and promotion. The **Pesticide Association of Bangladesh (PAB) now named as Bangladesh Crop Protection Association (BCPA)** was formed in **1975**, which played an important role in catalyzing the pesticide related activities including negotiation with the government for privatization of pesticides business.

4.5 Meanwhile in **April 1975**, **50%** subsidy was withdrawn from pesticides, and thus the pesticides were sold to the farmers at 50% price.

4.6 In 1979, the pesticides business was privatized, when 100% price was imposed. The respective brand/technical product of pesticide was given to the respective local agency for its import, marketing and promotion.

4.7 **Period 1980 – 85:** During this period the pesticide Standardization Committee comprising Joint. Secretary, MOA as Chairman, DD, PP as Member Secretary and Head of Departments of Entomology and Plant Pathology of BARI, BRRI, SRTI, TRI etc., as members was responsible for standardization of pesticides based on efficacy trial report, data from literature and companies. The list of pesticides approved by the Standardization Committee was prepared by DD, PP and accordingly based on allocations against each private company procurements were done.

4.8 **Period 1985 – onward:** The Pesticides Rules 1985, was made by the Government in consultation with the Pesticide Technical Advisory Committee (PTAC), in exercise of the Power given to it as per Clause 29 of the Pesticide Ordinance of 1971. As per the Pesticide Rules 1985, the Director, Plant Protection Wing (PPW) of Department of Agricultural Extension (DAE) became the registration authority. In exercise of the Clause 4 and 5 of the Pesticide Ordinance of 1971, the registration of pesticides started in 1986. Since then the pesticides are registered following subsequent approval of PTAC based on the report of the sub-pesticide technical advisory committee (Sub-PTAC), which evaluates several aspects of pesticides according to the prescribed format. Thus formal registration of pesticides started from 1986. However, initially all the pesticides listed by the Standardization Committee and procured/imported/marketed prior to it were registered post-facto in the name of the respective previous private agency/company.

A.1.1 Pesticide Distribution Network, Buffer Stock and Storage Godowns:

4.9 The pesticides procured were centrally stored in Central Stores at Shyambazar and then were distributed to the districts, where they were received by Plant Protection Inspector (PPI) of Directorate of Plant Protection (DPP) and stored in District Stores and then were distributed to thanas, where they were received by Plant Protection Assistant (PPA) and stored in Thana Stores. From thana the pesticides were distributed to the farmers free of cost until 1975 and then at 50% subsidy up to 1979. The PPI in the previous greater districts used to maintain buffer stock of pesticides received from BADC and distribute them down to the thana up to privatization of pesticide trade in 1979. Even after privatization of pesticide trade in 1979, PPI used to receive Buffer stock of pesticides from the DPP till 1982. Following merger of DPP with DAE in 1983 Deputy Director/ Assistant Director of Agriculture in the Districts used to receive and distribute buffer stock of pesticides.

4.10 Except a very few, most of the thana and district godowns of pesticides of the then PPW have been converted with renovation into Thana/Upazila/Zila/Regional office and auditorium of the DAE.

A.2 REGISTERED PESTICIDES: BANNED AND CONTINUING

4.11 In compliance with the provisions of the Pesticides Ordinance, 1971 and the Pesticide Rules, 1985, all pesticides legally marketed and used in Bangladesh are registered. The registrations of pesticides are also reviewed from time to time in the context of the International Code of Conducts and decisions taken in different international bodies/conventions including WHO, if they are ratified by Bangladesh. The pesticides are registered under two broad categories such as Public Health Pesticides and Agricultural Pesticides with the abbreviated identifications “PHP” and “AP” respectively. So far under PHP a total of 48 active ingredients and 122 brands, and under AP a total of 132 active ingredients and 813 brands have been registered through formal registration process starting from 1985 (**Annex 1**), of which the

registration of a total of 27 active ingredients and 68 brands have been cancelled, and a total of 10 active ingredients and 41 brands have been banned. The pesticides either banned or registration having cancelled mostly includes those belonging to either WHO Class 1a (extremely hazardous) and 1b (highly hazardous), or those belonging to Ozone Depleting Factors. Besides, registration of some pesticide brands has been cancelled due to non-compliance of official formalities. Nevertheless some of the banned pesticides incidentally fall under POPs pesticides, and thus at present no POP pesticide is on the continuing list of registered pesticides. Interestingly, DDT in spite of being a pesticide was never registered, the reason of which is not known. Thus it was never in the list of registered list of pesticides.

4.12 In spite of banning or cancellation of a number of pesticides (**Annex I.1**), still a total of 48 active ingredients and 122 brand of pesticides under PHP and a total of 95 active ingredients and 704 brand of pesticides under AP are available in the registered list, and most of them belong to organophosphates, carbamates, synthetic pyrethroids and botanicals (**Annex I**).

A.3 CURRENT SOURCES OF PESTICIDES AVAILABILITY

4.13 All the pesticides registered or legally marketed in Bangladesh are imported from abroad. Bangladesh does not manufacture any pesticide active ingredients. However, Bangladesh Chemical Industries Corporation (BCIC) manufactured DDT until 1992 The DDT manufactured and formulated in BCIC was used mostly for Malaria Eradication Program by public health department. Moreover, some agricultural pesticides, aerosol and mosquito coils are locally formulated out of the active ingredients imported from abroad. The pesticides are imported mostly from China, India, USA, and U.K., JAPAN.

A.4 PESTICIDES' TRADING

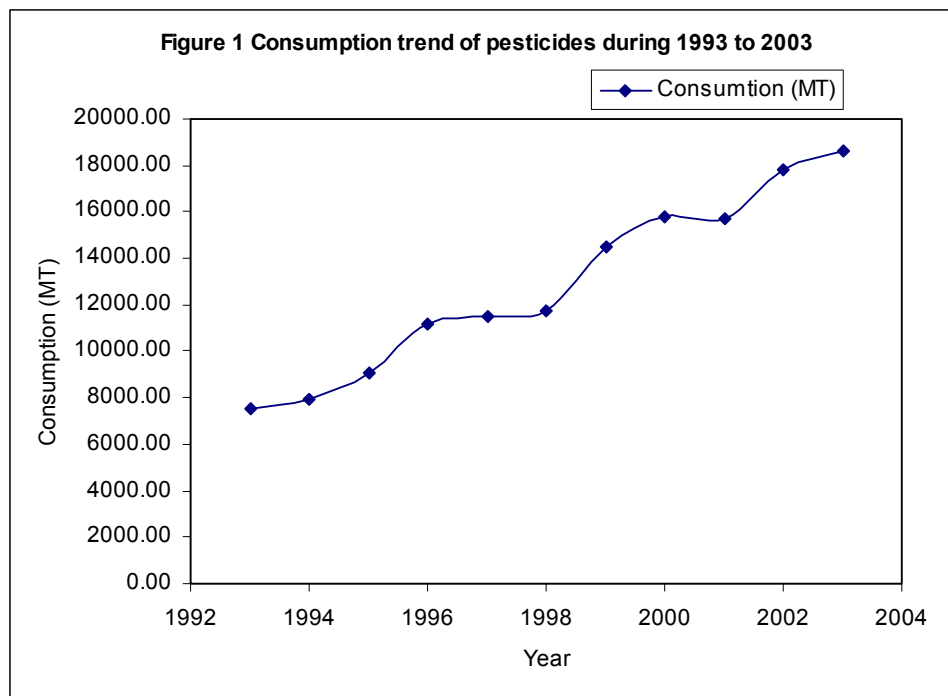
4.14 Pesticides' trading in true sense is completely privatised since 1979. For trading pesticides the companies must hold licence issued by the Director, PPW. Thus so far as many as 111 companies (Annex II) are involved in pesticides business. Of these 4 companies are multinational while the rest are local. Majority of the pesticide companies just import the finished products for their directly marketing. However, only few companies have formulation plants, and they do formulate their brands locally out of their own imported active ingredients. The pesticides' trading although is done at private level, the import is regulated by MOA and Customs and Excise Department of NBR. The pesticides trading down to the users level is done through the distributors, local dealers, retailers etc.

A.5 CONSUMPTION AND USE PATTERN OF PESTICIDES

A.5.1 Trend of Pesticide Consumption:

4.15 Pesticide use in Bangladesh got started from mid 1950s and gained momentum in late 1960s with the introduction of green revolution through the use of HYV rice in the country (Rahman, 2004). Before this period, the farmers were not aware of the use of chemical pesticides. However, they were accustomed to use casually in stored products the hand-made coarse powder or chips of dried plant materials like tobacco leaves, neem leaves, datura leaves, and sometimes neem oils. In case of disease control, they were known to use the ashes and smokes. But with the introduction of HYV crop particularly the IR20 in the late '50s, the farmers were motivated to use insecticides giving free of cost. Thus through the import of only 3 tons of insecticides, which included the chlorinated hydrocarbon like Endrin, the synthetic chemical pesticides entered the pest control scenario of Bangladesh in 1956. Since then pesticides,

particularly the insecticides came into the limelight and started gaining momentum and continued its up-trend during the initial phase of Green Revolution era during 1960 to 1970. The withdrawal of subsidy partially in 1975 and fully in 1979 initially caused a slight decrease in the consumption. But immediately after a short lapse of time the consumption again started gaining momentum. The data of those periods are not exactly available and thus could not be presented here. However, the consumption of pesticides in Bangladesh still shows an increasing trend as presented in **Fig. 1**.



4.16 The pesticide consumption in the country reached 18611 tons of Formulated Product (FP) in 2003 as against only 7500 tons in 1993.

A.5.2 Consumption of Pesticides by Type: 1998 to 2003

4.17 The trend of different types of pesticides consumption during 1998 to 2003 as may be seen in **Table 1** is positive and considerably increasing with the consumption of a total of 18611 MT in 2003 as against only 11743 MT in 1998. The consumption in all years was the highest in case of agricultural pesticides, which include insecticides (13741 MT) followed by fungicides (3465 MT) while it was the lowest in case of rodenticides (19 MT) in 2003, but unlike the past it did not include any sale of chlorinated hydrocarbon i.e. POPs pesticides during the whole period.

A.5.3 Pesticide Use Sectors/Crops

4.18 Pesticides are used mostly in crop sectors followed by public health. In case of crop sector, the maximum use of pesticides is in rice followed by sugarcane, vegetables, potato, fruits etc. Considerable amount of pesticides are also used in tea gardens. In case of crop sectors farmers are the direct users of pesticides, which they buy from the market except some special cases such as in case of sugarcane the contract growers get the pesticides as credit in kinds. In

case of Tea gardens the Garden Owners collect the pesticides. But the data on the use of pesticides in tea garden are yet to be made available.

Table 1 : Procurement & Sales of POP pesticides and Non-POP pesticides by Pesticide Companies during 1998 -2003

Category	POPs Pesticides	Non-POPs Pesticides						
		Quantity (MT) in Year						
		1998	1999	2000	2001	2002	2003	Total
A. Agricultural Pesticides (AP)								
Insecticides	0	10514	12814	13753	12301	13977	13741	77100
Fungicides	0	867	1228	1648	2457	2791	3465	12456
Herbicides	0	239	315	271	839	964	1344	3972
Rodenticides	0	92	120	122	70	36	19	459
Sub-total		11712	14477	15794	15667	17768	18569	93987
B. Public Health Pesticides (PHP)	0	0	0	7	24	0	10	41
Total	0	11743	14503	15827	15709	17796	18611	94188

Source: Bangladesh Crop Protection Association

4.19 In case of public health, DOH is the main user of pesticides. Different City Corporations also use pesticides. Such pesticides are mostly used in controlling mosquito for the prevention of vector-borne diseases like Malaria, Kalajar, Dengue fever etc.

A.5.4 Pesticide Use by DCC

4.20 Dhaka City Corporation (DCC) is large user of Public Health Pesticides. They have used as shown in **Table 2**, a total of 13 pesticides during 1999 to 2004, which did not include any POP pesticide.

Table 2. Pesticides Used by DCC during 1999 to 2004

Sl. No.	Name of the Pesticides	Purpose of Use	Quantity, Year Wise (Liter)					Total
			1999-00	2000-01	2001-02	2002-03	2003-04	
1	Abet	Larvicide	1440	11640	11660	0	10	24750
2	Ciko-Flying	Adulticide	154800	215540	70590	450	25000	466380
3	Malaria Oil-B	Larvicide	50200	58000	29345	5400	188400	331345
4	Cidial	Larvicide	4000	10000		0	0	14000
5	Newcidol	Larvicide	8990	10		0	0	9000
6	Icon	Adulticide	5000	23400	200	0	0	28600
7	Aktelic	Larvicide	0	0	0	7890	110	8000
8	Quick Kill Fogging Fluid	Adulticide	0	0	0	17593	0	17593
9	Malathion	Adulticide	0	0	0	0	2000	2000

Sl. No.	Name of the Pesticides	Purpose of Use	Quantity, Year Wise (Liter)					Total
			1999-00	2000-01	2001-02	2002-03	2003-04	
10	Anvil 10+10	Adulticide	0	0	0	0	5684	5684
11	Fenitox	Larvicide	0	0	0	0	10000	10000
12	Tepsy Liquid	Adulticide	0	0	0	0	44800	44800
13	ACI Liquid	Adulticide	0	0	0	0	75000	75000
All			224430	318590	111795	31333	351004	1037152

A.6 STAKEHOLDERS INVOLVED IN PESTICIDES

4.21 The pesticides are one of the major groups of inputs used by the farmers in agriculture sector as well as by people in general in public health sector. The farmers use pesticides buying from local dealers at their own cost, except in few cases like Sugar Mill Zones, where the contract farmers are provided some pesticides against credit. The people in general use public health pesticides also by buying from local dealers except in the municipality and malaria prone areas, where the City Corporations and the respective local government authority arrange for mass spraying. The pesticides imported both finished products and active ingredients for agricultural use do not enjoy any subsidy in any form while active ingredients imported for local formulation purposes for public health use enjoy a significant percentage of subsidy in the form of customs, VAT and/or tax rebate. The legal and regulatory aspects of pesticides are taken care of by the Ministry of Agriculture (MOA) through Pesticide Technical Advisory Committee (PTAC) as the supreme policy-making body, Plant Protection Wing (PPW) of Department of Agricultural Extension (DAE) as the implementing agency and Customs and Excise Department of National Board of Revenue (NBR) for customs and duty implications. The Secretary, MOA serves as the Chairman of PTAC, while Director, PPW, acts as its Member-Secretary. The other members of PTAC are drawn from different agricultural research institutes, universities, department of environment, and department of health, Dhaka City Corporation (DCC), NBR etc. The pesticides trading are completely done by the private companies each having well-organized network comprising headquarter management, distributors, dealers and retailers.

B. POP PESTICIDES

B.1 FINDINGS FROM PPW RECORDS

B.1.1 Legal Status and General Information

4.22 POP pesticides are virtually the organochlorine pesticides, the use of which, in fact, started in Bangladesh (the erstwhile East Pakistan) date back to the mid 50's with the application of endrin in modern rice cultivation in around 1957/58 and subsequently with the use of DDT in Malaria Eradication program. Although the procurement of POP pesticides started long before, some of them were registered from 1986 on-ward with post-facto effect of their previous uses. Thus, as per PPW records, Chlordane and Heptachlor were registered in 1986 and Dieldrin was registered in 1987. Accordingly, their formal 1st import was recorded in 1987 and the import was closed in 1997 with the banning of Heptachlor 40WP (**Table 3**). Surprisingly, DDT, the most commonly used POP pesticide in Bangladesh particularly in public health was never registered.

Table 3: Data on Registration Status of POP Pesticides in Bangladesh

POP Pesticides	Year of Registration	Date of 1st Import	Year of Banning	Date of last Import
Chlordane	14-12-86	06-05-87	01-06-97	06-05-97
Dieldrin (20 EC)	21-6-87	06-05-87	4-6-97	07-05-93
Heptachlor (40 WP)	14-12-86	06-05-87	04-06-97	07-05-97

Source: Records of PPW, 2005 and BCPA

NA- Information not available

4.23 Therefore, to speak documentarily, at present there is no legal use of any POP pesticides in Bangladesh. But since POP pesticides are persistent, some of which may persist even up to 35 years or more, and some old stock may be available as well as some might be available through other unknown source (s), it may be useful to present an account of POP pesticides' production, procurement, use and stock for the period from its introduction to date in Bangladesh. But unfortunately, no systematic record of POP pesticides' production, procurement, sales and use covering the period from start to the end is available anywhere. Under such circumstances, efforts have been made to collect such information through consultation with relevant officials, BADC records, PPW records, unpublished PAB records, published PAB records, BCIC published records, DPM (Malaria-VBDC) of Directorate of Health, MSD Registers, DAE division, district, upazila level officials, distributors//dealers/retailers interviews and farmers survey, godowns inspection, case studies etc. However, neither all the information could be completely collected nor all of the available information is presented in this report.

B.2 FINDINGS FROM CONSULTATION OF PAB RECORDS AND RETIRED OFFICIALS

B.2.1 Procurement, Distribution, Use and Stock of POP Pesticides: 1955 to 1974

B.2.1.1 Procurement

4.24 In 1955, 3 MT of Endrin was received in the form of barter through donor agencies. Its use was discontinued in around 1960 for its highly hazardous effects. But some endrin remained in stock even beyond 1964, when drums of endrin were found centrally as well as in districts. This was followed by introduction of DDT, BHC, heptachlor, chlordane, aldrin, dieldrin after 1960. But DDT, BHC and aldrin were discontinued in agriculture after 1965. Out of all these pesticides DDT were supplied by FAO, for which there was no local agent. DDT received through FAO was used in agriculture. The information on exact quantity of procurement of these POPs i.e., endrin, DDT, BHC, heptachlor, dieldrin, chlordane for the period from 1955 to 1974 are not available in records. However, it was known that based on this period's experience, the requirement of the continued POP pesticides was estimated and imported every year after 1974,

the record of which is available. Thus from the record of imported quantity of different pesticides during 1974 to 1985, the quantity of the continued POP pesticides received during 1955 to 1974 has been back calculated as shown in **Table 4**. Thus a total of 691.27 MT of different POP pesticides were procured during 1960 to 1974.

Table 4. Procurement of POP pesticides during 1955 to 1974 in Bangladesh*

POP Pesticides	Period	Estimated Quantity (MT)
Endrin	1955-1960	25.00
BHC	1960-1965	94.72
DDT	1960-1965	66.69
Aldrin	1960-1965	70.00
Chlordane	1960-1974	30.80
Dieldrin	1960-1974	227.33
Heptachlor (a.i)	1960-1974	186.73
Total	1960-1974	691.27

- Source: Personal communication, back calculation based on 1974-1985 data

B.2.1.2 Distribution/Use

4.25 The POP pesticides procured or received as above were distributed through Plant Protection (PP), Directorate of Agriculture (DOA) to the farmers free of cost and were used mostly in rice crops with some usage in sugarcane, cotton, jute etc.

B.2.1.3 Stock

4.26 No record of unused and leftover stock is available. However, according to PAB and PPW the POP pesticides procured or received during this period are not at all left as stock in any godowns or stores. They have been either used-up or destroyed completely.

B.3 FINDINGS FROM STOCK BOOKS EXAMINATION, FIELD SURVEY AND CASE STUDIES OF AGRICULTURE SECTOR

B.3.1 Import, Distribution, Sale and Stock of POP Pesticides: 1974 to 1985

B.3.1.1 Import

4.27 The formal import of POP pesticides, in fact, started after 1974, when BADC used to import. As shown in **Table 5** as per BADC Stock Book, a total of 276.03 MT of Heptachlor 40WP and Dieldrin 20EC were imported during 1974 to 1985, which did not show any Chlordane while as per PAB records the quantity imported during 1976 to 1985 was 357.105 MT of Heptachlor 40WP, Dieldrin 20EC and Chlordane.

Table 5. Import of POP pesticides during 1974 to 1985 in Bangladesh

POP Pesticides	As per BADC Records*		As per PAB Records**	
	Period	Quantity (MT)	Period	Quantity (MT)
Chlordane	1974-1985	-	1976-1985	2.2
Dieldrin 20 EC	1974-1985	156.78	1976-1985	194.851
Heptachlor 40 WP	1974-1985	119.25	1976-1985	160.054
Total	1974-1985	276.03	1976-1985	357.105

Source: * BADC; ** PAB Record, 1984/85

4.28 However, consultation of the Stock Book of 4 sample Divisions, District/Upazila Agriculture office during filed surveys revealed that as shown in **Table 6**, a total of 6545 pounds of Chlordane 40WP had been received by those offices, which indicated that import of POP pesticides by BADC during 1974 to 1985 included Chlordane 40WP too. But the record of such information is missing. The import of Chlordane 40WP is also supported by the PAB records.

Table 6: Record of Received and Distribution of POP pesticides in some Sample division/district/upazila agriculture office

Division/District	Date		Pesticide	Quantity received & Distributed
Chhagalnaiya /Feni	22.10.75 to 07.02.76		Chlordane 40WP	240 Lbs
DD Bogra	25.06.74 to 05.12.75		Chlordane 40WP	2706 Lbs
DD Barisal	25.06.74 to 01.07.75		Chlordane 40WP	2600 Lbs
DD Jessore	01.07.74 to 05.10.77		Chlordane 40WP	496 Lbs
Bheramara/Kushtia	27.04.1974		Chlordane 40WP	500 Lbs
Total				6542 Lbs

B.3.1.2 Storage, Distribution and Sale

4.29 The POP pesticides imported were distributed to districts and subsequently to thana and ultimately distributed and sold at subsidized price during 1974 to 1979 and thereafter at non-subsidized price up to 1985 to the dealers/farmers through DAE network. The distribution of Heptachlor 40WP and Dieldrin 20EC received during 1974 to 1985 to different districts and received by the respective PPI as shown in Annex III also confirms the quantity of those POP pesticides import and distribution.

4.30 In addition to DAE network, out of total procurement during 1974 to 1985 as shown in **Annex III**, 108.00 MT Heptachlor 40WP procured in 1978 were directly distributed to 15 Sugar Mills.

B.3.1.3 Stock

4.31 The stock distribution record of pesticides maintained at BADC shows no balance of POP pesticides at BADC central stores. However, the Stock Books of District and Thana Stores

checked during sample survey revealed a total of 8,127 Lbs balance/stock of POP pesticides comprising 7,150 Lbs Dieldrin 20EC and 977 Lbs Heptachlor 40WP after their distribution to the thanas/farmers. Such balance/stock of POP pesticides along with their total receipt at and distribution from District and Thana Stores according to Stock Book is shown in **Table 7**. But the physical verification of existing godowns did not show any content/stock of any POPs pesticides. The interviews with the persons concerned revealed that the stock shown in Stock Book has been either destroyed or buried-down long before. The physical inspection of those godowns/stores during case studies also confirms the non-existence of any POP pesticides in those stores/godowns. The details of the Case Studies are furnished in **Appendix I (will be submitted with final report)**.

Table 7. Balance/Stock of POPs pesticides at District/Thana Stores after distribution to thanas/farmers during 1972 to 1985.

Name of PP Store/ Districts	POP Pesticides	Period	Quantity Received (Lbs)	Quantity Distributed (Lbs)	Balance /Stock (Lbs)	Remarks upon physical Inspection
Thana Store, Chhagalnaiya, Feni	Chlordane 40WP	22.10.75 to 07.02.76	240	240	Nil	5 Kg DDT (reported as Seized quantity) along with some unidentified obsolete pesticides were found in store.
PP Store, Rajshahi	Dieldrin 20EC	17.3.80 to 21.4.81	9960	9940	20	Balance is not in store
	Heptachlor 40WP	-	60	54	6	Balance was declared damaged on 24.4.80, no stock was found.
Thana Store, Kashba, Comilla	Dieldrin 20EC	28.02.80 to 17.03.80	218.40	218.40	Nil	
Adamdighi Thana Store, Bogra	Dieldrin 18.6%	1974 to 30.6.80	1297	1297	Nil	
	Chlordane 40WP	25.6.74 to 5.12.75	2706	2706	Nil	
Santahar PP Store, Naogaon	Dieldrin 18.6EC	10.01.72 to 25.5.72	25650	22,950	2700	Distributed to thanas and Sugar Mills, rest 2700 Lbs found in stock
	Heptachlor 40WP	10.1.72 to 11.1.72	3700	3700	Nil	Distributed to Rajshahi district
PP Store, Barisal	Dieldrin 20EC	1.7.75	700	-	700	Committee declared the stock on 20.5.76 unsuitable. Stock not found.
	Heptachlor 40WP	1.7.75 to 20.1.76	2697	2302	395	Stock not found except some remnants and 10 empty drums.
	Chlordane 40WP	25.6.74	2500	2500	Nil	
PP Store, Jessore	Dieldrin 20EC	13.3.76 to 14.6.80	38584	34834	3600	150 Lbs leakage loss. Stock not found.
	Heptachlor 40WP	23.10.75 to 5.10.77	9275	8693	582	Stock not found.
	Chlordane 40WP	1.7.74 to 5.10.77	496	496	Nil	.
PP Store, Khulna	Dieldrin	7.7.79 to	21500	21500	Nil	204 Lbs was sold on

Name of PP Store/ Districts	POP Pesticides	Period	Quantity Received (Lbs)	Quantity Distributed (Lbs)	Balance /Stock (Lbs)	Remarks upon physical inspection
	20EC	27.6.80				auction to Pubali trader on 21.4.80
Thana Store, Bheramara, Kustia	Dieldrin 20EC	4.6.76 to 29.6.78	1038	1038	Nil	
	Heptachlor 40WP	7.10.75	480	480	Nil	
	Chlordane 40WP	27.4.74	500	500	Nil	
All Sample Survey Stores/Districts	Dieldrin 18.6/20EC	10.1.72 to 30.6.80	88987.4	81837.4	7150	2700 Lbs found in store
	Heptachlor 40 WP	10.1.72 to 24.4.80	16152	15175	977	
	Chlordane 40WP	27.4.74 to 5.10.77	6202	6202	0	
	Total (POPs pesticides)	10.1.72 to 30.6.80	111341.4	103214.4	8127	2700 Lbs Dieldrin and 5 Kg DDT + some remnants

Source: Stock Books of Sample District and Thana PP Stores, and Physical Inspection during Case Studies

B.3.2 Import, Sale, and Stock of POP Pesticides: 1986 to 2004

B.3.2.1 Import

4.32 Following the enactment of the Pesticide Rules, 1985, BADC no longer imported or held responsible for regulating the import of pesticides, thus the official record of pesticide import was available with PPW. The private companies with the clearance of PPW/MOA directly imported the pesticides. Thus as per PPW records and PAB records, a total of 406.18 MT of Heptachlor 40 WP and 56.52 MT of Dieldrin 20EC were imported during 1986 to 1997 as shown in **Table 8**. Although chlordane was in the registration list, no amount was imported.

Table 8: Import of POP Pesticides during 1986 to 1997 in Bangladesh

POP Pesticides	Period	Quantity (MT)
Chlordane	1986-1997	NA
Dieldrin 20 EC	1986-1997	56.52
Heptachlor 40 WP	1986-1997	406.18
Total	1986-1997	462.70

Source: PPW Record and BCPA Record

B.3.2.2 Sale/Consumption

4.33 The pesticides imported during 1986 to 1997 were marketed and sold directly by the companies through their whole sellers and retailers.

B.4. FINDINGS OF WHOLE-SELLER AND RETAILER SURVEY AND CASE STUDIES

4.34 The sample Whole-Seller and Retailers survey revealed some findings, which differed slightly from the Stock Book Survey but conformed, to some extent, to the PAB records and Field Survey. According to this survey, Endrin and DDT were also marketed in addition to Heptachlor, Dieldrin and Chlordane up to 1980 as shown in **Table 9**. This survey, however, confirmed that only Heptachlor 40WP and Dieldrin 20EC had been marketed up to 2000. Moreover, the findings of this survey also reinforced that there was no marketing or sale of any POP pesticides from 2000 onward and none of the Whole-sellers and Retailers had any POP pesticides in their stock any time previously and also at present. But the survey showed difference in sale of Whole-sellers and Retailers, which should not necessarily support the availability of any stock with the Whole-sellers because, not all the Retailers to whom they have sold the POP pesticides were included as the sample Retailers. During case studies none of the Whole-sellers shop or Retailers shop were found to have in stock any of the POP pesticides. The details of the Case Studies are furnished in **Appendix I (will be submitted with final report)**.

Table 9. Total Stock and Sale of POPs Pesticides by Sample Wholesalers and Retailers during 1971-2004

Whole-seller/Retailers	Year		Pesticides												
			Endrin		Chlordane 40 WP		Dieldrin/ Arodil 20 EC		Heptachlor 40 WP		DDT		Others	Total	
			Total Sale (kg)	Stock (kg)	Total Sale (kg)	Stock (kg)	Total Sale (kg)	Stock (kg)	Total Sale (kg)	Stock (kg)	Total Sale (kg)	Stock (kg)	Stock (kg)	Total Sale (kg)	Stock (kg)
Wholesaler	Up to 1979		1150	0	3150	0	11945	0	42920	0	1115	0	0	60280	0
	From 1980-Onward														
		1980-1990	0	0	500	0	14290	0	18850	0	0	0	0	33640	0
		1991-2000	0	0	0	0	480	0	2760	0	0	0	0	3240	0
		2000 - Onward	0	0	0	0	0	0	0	0	0	0	0	0	0
		<i>Sub-total</i>	0	0	500	0	14770	0	21610	0	0	0	0	36880	0
	Total	1150	0	3650	0	26715	0	64530	0	1115	0	0	97160	0	
Retailer	Up to 1979		580	0	2100	0	6050	0	13670	0	100	0	0	22500	0
	From 1980-Onward														
		1980-1990	0	0	1000	0	2110	0	12275	0	0	0	0	15385	0
		1991-2000	0	0	0	0	10	0	2640	0	0	0	0	2650	0
		2000 - Onward	0	0	0	0	0	0	0	0	0	0	0	0	0
		<i>Sub-total</i>	0	0	1000	0	2120	0	14915	0	0	0	0	18035	0
	Total	580	0	3100	0	8170	0	28585	0	100	0	0	40535	0	

B.5 FINDINGS OF FARMERS SURVEY AND CASE STUDIES

4.35 Farmers survey both by questionnaires and personal interview also revealed findings, which, with some exceptions, are in conformity with the Whole-sellers/Retailers Survey. According to this survey, as shown in **Table 10**, the farmers used POP pesticides such as Endrin, Heptachlor, DDT, Dieldrin and Chlordane before 1980 and used Heptachlor, Dieldrin and Chlordane up to 2000. The use of Heptachlor and Dieldrin by farmers up to 2000, when there was no sale of these pesticides by the Retailers/Whole-sellers raise the question of their availability although the percentage of such users is less (21%). Upon personal interview, such farmers indicated cross-boundary sources of availability of those pesticides. However, during case studies, no evidence of such use of POP pesticides was come across. The details of the Case Studies are furnished in **Appendix I (will be submitted with final report)**.

Table 10. Use of POP pesticides before and after 1980 by Sample farmers

Pesticides	Farmers (No. & %) by Year									
	Before 1980		After 1980							
	No.	%	1980-1990		1991-2000		2000-Onward		All	
	No.	%	No.	%	No.	%	No.	%	No.	%
Heptachlor 40 WP	23	23	12	43	4	14	0	0	16	57
DDT	20	20	4	14	2	7	0	0	6	21
Endrin	42	42	0	0	0	0	0	0	0	0
Chlordane 40 WP	1	1	2	7	0	0	0	0	2	7
Dieldrin/Aerodril EC	20	8	8	29	0	0	0	0	8	29
Total Sample	99	100							28	100

4.36 Before 1979 as shown in **Table 10 and Annex IV**, majority of the farmers (86%) used Endrin followed by Heptachlor (23%) followed by DDT (20%) and Dieldrin (8%), and these were used maximum in rice, sugarcane, rice, potato respectively. But after 1980 the majority of the sample farmers used the POP pesticides such as Heptachlor (57%) followed by Dieldrin (29%), DDT (21%) and Chlordane (7%). They used Heptachlor, Dieldrin, DDT and Chlordane maximum in sugarcane, rice and vegetables respectively.

B.6 FINDINGS OF QUESTIONNAIRE SURVEY OF DAE OFFICES FOR OBSOLETE PESTICIDES

B.6.1 Stock of Obsloete Pesticides at DAE Offices/Stores

4.37 The information collected through questionnaire survey on obsolete pesticides lying in DAE at their different offices/stores reveal that at present there is no stock of obsolete POP pesticides at any level of DAE, although DAE stores/offices in each division except Sylhet contain significant quantity of obsolete non-POP pesticides as shown in **Table 11**. Moreover, there are many containers and remnants of unidentified pesticides, some of which could be of

POP pesticides. Details of such containers and remnants including the stocks of obsolete non-POP pesticides at different levels of DAE have been provided in **Annex V**.

Table 11. Quantity of Obsolete Pesticides at DAE Offices in 2004

SI #	Division	POP Pesticides (Kg)	Non-POP Pesticides (Kg)
1	Dhaka	0	7605
2	Chittagong	0	2165
3	Rajshahi	0	1974
4	Khulna	0	962
5	Barisal	0	962
6	Sylhet	0	0
All		0	13668

Source: Questionnaire Survey of DAE Offices under NIP POP Pesticides Survey

B.7 FINDINGS OF SURVEY AND CASE STUDIES ON DDT IN PUBLIC HEALTH

B.7.1 DDT in Public Health: Historical Background

4.38 DDT is a pesticide, which, in accordance with the Pesticide Ordinance of 1971 and Pesticides Rules, 1985, must be registered. But in practice it was never registered and thus no record of DDT is available with the PPW or PAB. The information on DDT was mostly available from the Directorate of Health (DOH) and BCIC.

4.39 In fact DDT was mostly used in public health particularly in mosquito eradication program, which started in 1960 under the direction of the then Health Minister Mr. Habibullah Bahar. DDT was then supplied by WHO.

4.40 In mosquito control program formal use of DDT started in 1965, when every house was sprayed twice a year @ 2 gm per sq. meter. Later on when mosquito population was significantly reduced, DDT was applied @ 1 gm per sq. meter as "Focal spray" where significant population of mosquito was observed. Gradually the Focal spray was reduced, and was used only in indigenous case. In around 1992/93 use of DDT was discontinued, and the stock remained after that are used only in serious outbreak in some focal areas. For such use, DDT is still kept as buffer stock in different districts (ref. Letter from Director, Disease Control, DOH).

4.41 Information on exact quantity of DDT used so far in mosquito control is not available. However, an estimate of DDT use can be made from the DDT produced in Bangladesh.

B.7.2 Production, Sale and Stock of DDT at DDT Plant: 1966 to 1992

B.7.2.1 Production and Sale

4.42 The only pesticide produced in Bangladesh is DDT, which is a POP pesticide. To meet up increasing requirements of DDT in public health, Bangladesh Chemical Industries Corporation (BCIC) (the then East Pakistan Industrial Development Corporation-EPIDC) established DDT Plant at Barabkubndu in Sitakundu of Chittagong in 1966, and started DDT production. In 1982, this Plant was renamed as Chittagong Chemical Complex (CCC). The production of DDT by CCC was officially stopped on 1.12.91 as per the decision of ECNEC

meeting, but practically production was discontinued after 1992. During this period (1966 to 1992) DDT plant/CCC produced a total of 7706 MT of DDT Technical, of which 7604.49 MT was formulated into 12003.17 MT of 75% DDT (**Table 12**). Out of its total 75% DDT formulations, 11,793.27 MT was sold to Health Directorate for Malaria eradication program.

Table12 : Year wise Production, Sale and Stock of DDT at DDT Plant, BCIC

Year	Production of DDT Technical (MT)	Formulation of DDT Technical into 75% DDT (MT)	Sale	
			Technical (MT)	75% DDT Formulation (MT)
1966-67	180.71	-	-	-
1967-68	454.05	200.16	-	160.06
1968-69	357.26	552.69	-	546.91
1969-70	389.08	726.60	-	500.50
1970-71	314.01	508.91	-	702.04
1971-72	10.78	142.20	0.01	200.86
1972-73	188.86	116.60	-	0.06
1973-74	80.93	260.61	6.38	347.05
1974-75	93.91	161.35	-	189.55
1975-76	110.13	31.81	2.58	33.82
1976-77	115.65	270.23	9.40	213.00
1977-78	452.58	445.38	45.45	490.00
1978-79	360.15	460.44	29.55	439.40
1979-80	113.94	222.35	0.52	230.36
1980-81	751.17	1017.37	0.34	678.81
1981-82	600.85	780.46	0.51	514.11
1982-83	455.00	367.00	-	667.00
1983-84	691.00	1030.00	-	1175.00
1984-85	-	1252.00	-	1204.00
1985-86	-	808.00	-	907.29
1986-87	665.88	912.03	-	998.74
1987-88	526.14	706.33	-	714.86
1988-89	325.30	400.70	6.85	375.50
1989-90	182.18	131.10	0.10	201.40
1990-91	214.45	279.85	-	210.00
1991-92	72.53	219.00	-	92.95
Total	7706.49	12003.17	101.69	11793.27

N.B.- (7706.49 – 101.69) = 7604.80 MT DDT Technical used for preparing DDT 75%; 209.90 MT DDT 75WP distributed to DOH at the time of closing.

Source: BCIC DDT Plant Record

B.7.2.2 Stock

4.43 As per the production and sale records, a total of **101.69 MT technical** and **209.90 MT of 75% DDT formulation** should be left in stock. But at the time of closing this quantity of DDT 75% formulation has been completely distributed to DOH, thus no formulation of DDT is left in stock. Accordingly, only 101.69 MT DDT technical is left in stock. In addition, 32.037 MT of Microcell/Wassalom raw material of DDT production are in stock and stored in the godown, which could not be disposed of or sold even by auction.

B.7.3 Use and Stock of DDT in DOH VBDC

4.44 As communicated by the Director, Disease Control, DOH and prepared by the Deputy Project Manager (DPM), Malaria -Vector Borne Disease Control (Mal-VBDC) project of DOH, DDT are still supplied by the project from the DOH District Reserve Stores and Upazila Project Stores/Offices and are used in the especially Malaria prone areas of Bangladesh. Although the source of availability is not clear, the DDT is the stock of those distributed to DOH from DDT Plant, BCIC. According to their information, a total of 12.789 MT of DDT 75WP as shown in **Table 13** are still available as stocks in district reserve stores/upazila project offices of Mal-VBDC, DOH. From these stocks, the required amount of DDT is supplied to Malaria or Kalajar prone areas for their use against mosquito.

Table 13 Stock of DDT 75WP in different District Reserve Stores and Upazila Project Office of DOH

Sl. #	District	Location of Stock of DDT	Number of Bags	Quantity (Kg)	Condition
1	Rajshahi	Godagari Upazila Health Project	69.5	2979	Good
2	Madaripur	Shibchar Upazila Health Project	44	1751	Good
3	Barisal	Gouranadi Upazila Health Project	42	1428	Good
4	Pirojpur	Bhandaria Upazila Health Project	06	240	Good
5	Noakhali	Chatkhil Upazila Health Project	05	170	Good
6	Rangamati	District Reserve Store	06	300	Good
7	Chittagong	Hathazari Upazila Health Project	10	475	Obsolete
8	Kurigram	District Reserve Store	159	5406	Obsolete
		Bhurungamari Upazila Health Project	01	40	Obsolete
Total			342.5	12789	6868 Kg Good 5921 Kg Obsolete

Source: Director, Disease Control (Mal-VBDC), DOH, Vide Letter নং-স্বাঃ অঃ/পরিঃ(ডিসি)/পপস/পেস্টিসাইড-১/২০০৫ তারিখঃ ৩১/০১/২০০৫ ইং

B.7.4 DDT Import and Stock: 1982 to 1983 Under ADB Loan

B.7.4.1 Import

4.45 According to the information regarding the import of DDT published in a Daily Newspaper the special study was undertaken and subsequently, the physical inspection at MSD godowns of DOH at Chittagong during case studies explored that a total of **500 MT of DDT** were imported during 1983/84 under ADB Loan (Ref. A/T No.S-6/con/9/DDT/82-83/204 dt 29.12.83 under ADB Loan no. 504 BAN (S), Invoice no AL/249/84 dated 27th November, 1984, Contract no : S-6/cont/9/DDT/82-83/204 dated 29-12-83) but due to substandard these were not accepted by DOH.

B.7.4.2 Stock

4.46 The entire 500 MT of DDT imported but not accepted by DOH remained unused at the MSD godowns of DOH at Chittagong. Upon physical inspection during Case Studies, a total of

482.904 MT in 182000 cartoons held in 4 MSD godowns were found. The details of the Case Studies are furnished in **Appendix I (will be submitted with final report)**.

B.8 CUMULATIVE STOCK AND STOCKPILES OF POP PESTICIDES: STATISCAL AND ACTUAL

4.47 Cumulatively as per different sources of information stated above, and shown in **Table 14**, a total of **619.9715 MT of POP pesticides** comprising Dieldrin 9,850 Lbs, Heptachlor 977 Lbs, DDT Technical 101.69 MT, DDT 75% WP (local) 12.789 MT, DDT 75WP (imported) 500 MT, DDT 5 Kg, and another 32.037 MT Microcell/Wassalom Raw materials for DDT production should be left over as stock in different godowns of the country. However, all such quantities are very old stock and much of them have been either destroyed or buried. The physical verification of the godowns and information on actual condition reveals that a total of **598.734 MT of POP pesticides** comprising Dieldrin 18.6EC 1.35 MT, DDT Technical 101.69 MT, DDT 75% WP (local) 12.794 MT, DDT 75WP (imported) 482.90 MT, and another 32.037 MT Microcell/Wassalom Raw materials for DDT production still exist in the stores/godowns. Out of the actual total stock, except **6.868 MT of DDT 75WP** lying in DOH district/upazila stores, rest **591.866 MT POP pesticides** were found obsolete along with some other unidentified remnants of pesticides.

Table 14. Cumulative Stock of POP Pesticides and their Present Conditions

Name of POP Pesticides	Quantity in Stock as per Stock Book	Quantity Physically found in Stock	Location	Reasons for Reduction in Stock	Year of Procurement
Heptachlor 40WP	977 Lbs (0.4875 MT)	Nil	PP Stores at District and Thana	Destroyed/buried	10.1.72 to 24.4.80
Dieldrin 20EC	7,150 Lbs (3.650 MT)	2700 Lbs (1.350 MT)	PP Stores at District and Thana	Destroyed/buried	10.1.72 to 30.6.80
DDT formulation (local)	5 Kg (.005 MT)	5 Kg (0.005 MT)	PP Store, Chhagalnaiya, Feni		Seized from one dealer in 1987
DDT Technical	101.69 MT	101.69 MT	DDT Plant, BCIC	All obsolete	1971 to 1990
DDT 75WP (Local)	12.789 MT	12.789 MT	District & Upazila Stores of DOH	6.868 MT Good, 5.921 MT Obsolete	1968 to 1992 ??
DDT 75WP (Imported)	500 MT	482.90 MT	4 MSD Godowns, DOH, Chittagong	Lost, All obsolete	1984
*Microcell/Wassalom DDT Raw Material	32.037 MT	32.037 MT	DDT Plant, BCIC	All obsolete	??
Total (including Microcell)	652.0085 MT	631.771 MT			
Total POP Pesticides (excluding Microcell)	619.9715 MT	598.734 MT		591.866 MT Obsolete, 6.868 MT good + some remnants	

- May not be serious as POP pesticides, which should be confirmed.

C. POP PESTICIDES WASTES

4.48 The questionnaire survey, field survey and case studies reveal that the stock of POP pesticides comprising Dieldrin 20EC, Heptachlor 40WP and DDT mostly include obsolete pesticides as mentioned in Section 4.37 and Table 11. In addition, a significant quantity of unidentified and unmeasured remnants including a lot of damaged containers has also been physically observed during field survey and godown/store inspection. Such containers include iron drums, plastic drums, polythene packets, tin containers, plastic containers, bags, bottles, pots etc. All these obsolete POP Pesticides, remnants and containers that are contaminated with POP pesticides. The details of such contaminated containers, remnants are provided in **Annex V** while the obsolete quantities have been provided in **Table 11**. Besides POP Pesticides, a total of 13.65 MT of obsolete non-POP pesticides, which may also be considered as wastes have been recorded as mentioned in **Table 11** and **Annex V**.

D. CURRENT CAPACITY AND EXPERIENCE IN THE FIELD OF POPS PESTICIDES

4.49 The preliminary survey and information available from other sources demonstrate that the capacity in terms of physical facilities, trained and skill manpower, and logistics for different aspects of POPs such as analysis of samples, identification of all POPs pesticides, monitoring of POPs pesticides in different components of ecosystems, research on effects of POPs pesticides on human and other animals, movements of POPs pesticides, POPs wastes management etc., are quite inadequate and in many cases totally absent in the country. The term “POPs pesticides” is relatively new but the pesticides belong to POPs have been used since long. In that sense people are aware of the POPs pesticides and experienced experts and conversant professionals may available for general purposes but specific problem-related experienced expertise may not be so adequate. Detailed study may provide a clear current scenario of capacity and experience in the field of POP pesticides and actual estimates of requirements in the country’s perspective.

E. PRELIMINARY ASSESSMENT OF POPS RELATED HUMAN AND ENVIRONMENTAL RISKS

E.1 Scientific Evidence of POP Pesticides in Environmental Samples

4.50 The Presence of POP pesticides in environmental samples particularly in human milk (Daniel (1999), Beth et al. (1999), Laura et al. (1999), Haider (1995), Roger (1985), fish and water have been reported in many countries of the world. Thus in cognizance with the scope of inventory preparation, efforts were planned to have a preliminary assessment of POPs pesticides related human and environmental risks. But due to various limitations particularly constraints in terms of time, facilities and budget for samples analyses, the presence of POP pesticides residues in various samples collected at the time of the study could not be reported. Moreover, such studies in Bangladesh are very scanty, although some popular articles published in different dailies indicated hints on the possible hazards from contamination of food items and agricultural commodities. However, the information in the country on this aspect as revealed through a review of available literatures and scientific publications are presented in the following section.

E.2 Human Milk Samples

4.51 No study is reported in relation to the assessment of POPs pesticides in human milk samples in Bangladesh. However, it is suspected that since POP pesticides particularly DDT, Chlordane and Heptachlor have been used for long time in Bangladesh, and both rural and urban women have been exposed to it, the milk samples of such exposed women are very likely to contain residues of those pesticides.

E.3 Fish Samples

4.52 In Bangladesh both fresh water fish and sea fish are locally available and consumed by Bangladeshi people. Although it is apprehended that those fish may contain POP pesticides residues, no comprehensive study has been conducted so far in this regard. However, very limited studies have been reported in some floodplain fish species and dried fish. Such studies reveal that the levels of total DDT (including DDE and DDD) in the amount 0.025 mg/kg and 0.0171 mg/kg while those of dieldrin within the Codex Maximum Residue Limits (MRLs of 0.3 mg/kg) were found in the most contaminated fish (Matin et al. (1996).

E.4 Water Samples

4.53 Bangladesh is an intensively rice-growing area. Rice is grown in both rain-fed and irrigated habitats. Most of the pesticides are used in rice cultivation. Thus rice fields receive the highest amount of pesticides, and the water in rice fields as well as lakes and rivers, which receive run-off water, are apprehended to contain pesticide residues. But no comprehensive study has been conducted so far in this regard too. However, review of some sporadic studies conducted reveal that water of Meghna Dhonagoda Irrigation Project contained organochlorine at concentrations of 1.82, 1.91 and 2.39 ng/ml of water, while the water samples from some other locations of the same habitat contained residues of DDD, DDE, aldrin, dieldrin, endrin and heptachlor) at concentrations ranging from 0.20 to 6.75 ng/ml (Alam et al. 1999). Both surface and underground water samples collected from different regions of Bangladesh were also found to contain residues of DDT, heptachlor, lindane, and dieldrin within the WHO MRLs except the water samples from Begumganj irrigation project, which contained DDT residues at 19 µg/l, which is well above the WHO guideline value of 2 µg/l (Matin et al. 1998).

E.5 Stored Grain Samples

4.54 The stored products including fried fish are treated with different pesticides including DDT, lindane, heptachlor etc. for their protection against insect pests and diseases. Such products even after a long lapse of storage period may contain residues of pesticides. But no comprehensive study has been conducted so far in this regard also. However, review of some sporadic studies conducted reveal that DDT residues although decreased with time in both rice and wheat, considerable residues still remained even after 150 days of storage. Thus the surface residues, extractable residues, bound residues and total residues of DDT in rice were 0.038µg (25%), 0.015µg (10.0%), 0.007µg and 0.06µg while those in wheat were 0.04µg (27%), 0.019µg (12.8%, 0.008µg (5.2%) and 0.067µg (45%) respectively after 150 days of storage (Rahman et al. 1996). Similarly, varied quantities of DDT and its metabolites were detected in rice, wheat and pulses at different storage time interval. On the first day surface residues of DDT were 39.40 mg/kg, 37.73 mg/kg and 40.05 mg/kg in rice, wheat and pulse respectively, of which 60%, 80% and 92% respectively dissipated after 240 days of storage. The rate of formation of P, P' DDD gradually increased during 90-180 days, and gradually declining thereafter (Saifullah et al., 1995a; Saifullah et al. 1995b; Saifullah et al. 1995c).

F. PRESENT MANAGEMENT OF PESTICIDES, POP PESTICIDES AND EMPTY CONTAINERS

4.55 The concept of pesticide management in the country is not so much known even to the users and practitioners of pesticides. The pesticides are used by the farmers, regulated by the PTAC through PPW of DAE and marketed by private companies at present. The Pesticide Ordinance and Pesticide Rules provide stringent measures in respect of pesticide management including proper facilities and safety measures for the pesticide workers, pesticide applicators, as well as provisions of effluent and wastes and container management for the manufacturers, formulators and trader, these are not strictly practiced. The country still has not yet developed maximum residue level (MRL) or acceptable daily intake (ADI) value of its own for its people although it is fixed based on other's recommendation. The concerned people are imparted training on handling of pesticides, precautions in pesticide storage and transportation, treatment of pesticide poisoning cases, management of pesticide wastes and pesticide containers etc. But it is not sure that these are properly practiced in the country. The pesticide whole-sellers and retailers are supposed to have well-ventilated, isolated and protected stores but practically it is not seen. The data on obsolete pesticides and containers collected through this present survey as presented in Annex provide an indication of very poor management of wastes and containers. The pesticide stores are left with damaged, leaked and rusted containers, spilled-over deformed pesticides and intolerable bad smell. The empty containers normally are not used but their use in many cases cannot be overruled. The containers in many cases destroyed just by breaking and thrown away or buried.

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