

THE MANAGEMENT OF PERSISTENT ORGANIC POLLUTANT PESTICIDES IN NEPAL

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As a gesture of its commitment to global environmental protection and sustainable development, Nepal has enacted the Pesticides Act 1994 and Pesticides Regulations 1994. However, the Nepalese government still confronts numerous constraints in terms of lack of qualified and trained personnel as well as the technical capacities in pesticide management. These areas need to be substantially strengthened for the government to effectively regulate the production, importation, distribution and safe use of pesticides. The problem has been compounded by transboundary movement and illegal import of banned pesticides; these issues could be overcome through strong coordination between different stakeholders in agricultural research and development. This requires more efficient policies to improve management programs for persistent organic pollutants (POPs) and update them with the latest knowledge.

I INTRODUCTION

A pesticide is any substance or mixture of substances intended for defoliating or desiccating plants, preventing fruit drop, inhibiting sprouting, or for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, bacteria, weeds, or other forms of plant or animal life or viruses, except viruses on or in living humans or other animals.¹ According to the *Cambridge Advanced Learner's Dictionary*, pesticide is defined as 'a chemical substance used to kill harmful insects, small

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¹ *List of Definitions* (2005) Clemson University, <<http://entweb.clemson.edu/pesticid/Document/Deflist.htm>> at 21 November 2009.

animals, wild plants and other unwanted organisms'.² The United States Environmental Protection Agency (EPA) defines pesticides as 'any substance or mixture of substances used to destroy, suppress or alter the life cycle of any pest which can be a naturally derived or synthetically produced substance. Though often misunderstood to refer only to insecticides, the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests'.³ The *International Code of Conduct on the Distribution and Use of Pesticides* defines pesticide as follows:

Any substance or mixture of substances intended for preventing, destroying or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs, or substances which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies. The term includes substances intended for use as a plant growth regulator, defoliant, desiccant or agent for thinning fruit or preventing the premature fall of fruit, and substances applied to crops either before or after harvest to protect the commodity from deterioration during storage and transport.⁴

These chemicals are poisons that in certain circumstances and doses kill organisms harmful to crops. Chemical pesticides by their very nature are toxic and hazardous. However, they have become an important tool for improving agricultural systems and public health over the past few decades.

The modern use of pesticides dates back to 1867, when Paris Green was first used to manage Colorado potato beetle. After that, various inorganic or plant originated pesticides came into existence. The successful discovery of the use of 1, 1, 1-trichloro-2, 2-bis (p-chlorophenyl) ethane or dichloro-diphenyl-trichloroethane (DDT) by the Swiss scientist Paul Hermann Müller in 1939 opened the floodgates worldwide for more and more pesticide synthesis and use, especially for the control of agricultural pests and vector-borne diseases.

Persistent organic pollutants (POPs) are chemical substances that persist in the environment, bio-accumulate through food webs, and pose a risk of causing adverse effects to human health and the environment.^{5;6;7} Moreover, POPs are transported

² 'Pesticide', definition of pesticide noun (2009) *Cambridge Dictionary Online* <<http://dictionary.cambridge.org>> at 21 November 2009.

³ *Pesticides* (2009) US Environmental Protection Agency <<http://www.epa.gov/pesticides/index.htm>> at 21 November 2009.
Javier Martinez, *Guideline on environmentally sound management of obsolete pesticides in the Latin America and Caribbean countries* (2004) Basel Convention Coordinating Centre for Latin America and the Caribbean, Montevideo, Uruguay.
Linda S Birnbaum, 'Endocrine effects of prenatal exposure to PCBs, dioxins, and other xenobiotics: implications for policy and future research' (1994) 102 *Environmental Health Perspectives* 676-679.

in the environment in low concentration by movement of fresh and marine water and they are semi-volatile, enabling them to move long distances in the atmosphere, resulting in widespread distribution across the earth, including regions where they have never been used which causes international cross-boundary pollution problems and requires international cooperation and efforts.⁸ As a result of which, in 1997 under the aegis of United Nations Environmental Programme (UNEP), efforts were made on a global level to deal with the problem of POPs. The *Stockholm⁹ Convention on Persistent Organic Pollutants (Stockholm Convention)* aims to restrict or eliminate the production, use and release of persistent organic pollutants and protect human health and the environment. The 12 chemicals also known as the 'dirty dozen' are prohibited under the *Stockholm Convention*. They are; Aldrin, Dieldrin, Endrin, Chlordane, Heptachlor, DDT, Mirex, Toxaphene, Hexachlorbenzene (HCB), Polychlorinated biphenyls (PCB), Polychlorinated Dioxins & Furans. Of the 12 POPs, nine are pesticides (Aldrin, Endrin, Dieldrin, Heptachlor, Chlordane, Mires, Toxaphene, DDT and HCB).¹⁰

II TRENDS IN PESTICIDE MANUFACTURE, USE AND TRADE

A Pesticides Use Pattern

Pesticides are an integral part of agriculture and horticulture and are widely accepted as necessary in the production and conservation of food resources.¹¹ Pesticide use is still a common practice for the control of insect pests worldwide, and Nepal is no exception. Although in recent years the use of toxic chemicals for health purposes has reduced drastically, on the other hand it is continuously increasing in the field of agriculture. With the introduction of high-yielding varieties and cultivation of other commercial crops as cotton, tea, vegetables etc. the consumption of pesticides is increasing.

Nepal remained unaware of modern chemical pesticides until the 1950s and was dependent upon traditional organic techniques for killing pests. With the aim of controlling for a resettlement program at the southern plains of the country in 1950s, Nepal's Malaria Eradication Programme (NMEP) was the first to initiate the use of pesticides in Nepal. Subsequently, in November 1952, DDT became the first

J C Hansen, 'The human health programme under AMAP. AMAP human health group, Arctic monitoring and assessment program' (1998) *57 International Journal of Circumpolar Health* 280–291.

⁷ J L Herrman, 'The role of the World Health Organization in the evaluation of pesticides' (1993) *17 Regu. Toxicol. Pharmacol.* 282–286.

⁸ Hong Zhang, Yonglong Lu, Yajuan Shi, Tieyu Wang, Ying Xing and Richard W. Dawson, 'Legal framework related to persistent organic pollutants (POPs)' (2005) *Environmental Science and Policy* 153–160.

Stockholm Convention on Persistent Organic Pollutants, opened for signature 22 May 2001, [2004] ATS 23 (entered into force 17 May 2004).

W Dongbin, T Kameya, and K Urano, 'Environmental management of pesticidal POPs in China: Past, present and future' (2007) *Environmental International* 894–902.

¹¹ Rashmi Sanghi, *Living in chemical environment - Persistent Organic Pollutants* (2001) Indian Institute of Technology, Kanpur, India.

chemical pesticide to be introduced in Nepal by Ministry of Health (MOH)/ His Majesty's Government of Nepal (now Government of Nepal, GON).¹² This marked the introduction of pesticides in Nepal. Not only this but also in 1955, Paris Green, Gammexene and nicotine sulfates were imported for the same purpose of eradicating malaria.¹³ These pesticides were mostly provided by US Agency for International Development (USAID), which sponsored programs through grant assistance primarily for the control of vector-borne diseases.

After that year, the number of malaria incidences declined from 2 million cases in 1950s to 2468 cases in 1968. However, after some years, the number of cases rose to 8500 in 1973 and 14,600 in 1974, which resulted again in insecticide spraying by MOH. To effect this, USAID, Japan International Cooperation Agency (JICA), British ODA, World Health Organization (WHO) and Danish International Development Agency (DANIDA) assisted Nepal to purchase and provide aid the transportation of insecticides. This was followed by importation of 300 tons of DDT from Indonesia¹⁴ in 1993 by NMEP as grant assistance for controlling black fever ('*Kalajar*'), another hazardous disease. In the meantime, 205 tons of other insecticides were imported with the assistance of DANIDA to control malaria.¹⁵ The pesticides used at those times were mostly from the organochlorine group.¹⁶

With the passage of time, the Department of Agriculture (DOA) started to apply chemical pesticides in the agricultural sector for pest control purposes from 1956. The chronological order of different groups of pesticides introduced in Nepal is: 1950s - organochlorines; 1960s - organophosphates; 1970s - carbamates; 1980s - synthetic pyrethroids.¹⁷ The use of pesticides for plant protection has steadily increased, with the introduction of high-yielding varieties of rice, maize, and wheat which led to the formation of the Agriculture Inputs Corporation (now Agriculture Inputs Company, AIC) in 1967 to deal with agricultural inputs including pesticides.

While the trend of current use of pesticides in Nepal has moved away from the most toxic POPs, there are reports stating that 'most of the Nepalese people are using chemicals that are banned for agricultural practices. Organochlorine pesticides such as DDT and BHC are still used in some parts of the country'.¹⁸ The majority of pesticides entered Nepal in the form of aid packages from developing countries, as well as purchases made by the Government of Nepal.

Kehsan R Kandel and Mohan Mainali, *Playing with Poison* (1993) NEFEJ Pesticides Watch, Nepal Forum of Environment Journalists, Kathmandu, Nepal.

¹³ Leela Dahal, *A Study of Pesticides Pollution in Nepal* (1995).

¹⁴ Indonesia banned the use of the insecticides in its country considering the ill effects of DDT on public health.

¹⁵ Kandel and Mainali, above n 12, 4.

¹⁶ S L Baker and B K Gyawali, *Promoting Proper Pesticide Use: Obstacle and Opportunities for an Integrated Pest Management Programme in Nepal* (1994) GON /MOA / WINROCK International.

¹⁷ Nepal National Implementation Plan (NIP) for the Stockholm Convention on Persistent Organic Pollutants (2007) Ministry of Environment, Science and Technology.

¹⁸ I P Subedi, 'Harmful effects of pesticides' *The Rising Nepal*, (Kathmandu)13 June 2001.

Effective from April 9, 2001, the Government of Nepal has banned pesticides such as DDT, BHC, Aldrin, Dieldrin, Endrin, Chlordane, Lindane, Heptachlor, Toxaphene, Mirex, Phosphamidon and Organomercury compounds. Apart from this, the Government of Nepal proactively also banned other pesticides, which have similar characteristics of POPs such as BHC, Linden, Phosphidamine, and organomercury fungicides. At present, the most common pesticides used in the agricultural and public health sector are organophosphates and synthetic pyrethroids and only Endosulfan (Thiodan) from organochlorines. According to the estimate made by the Plant Protection Directorate (PPD) of DOA/Ministry of Agriculture and Cooperatives (MOAC), pesticides equivalent to 55.8 million tons of active ingredients (a.i.) are consumed annually in Nepal. The national average of pesticide consumption in Nepal is 142 gm/ha only. This shows that Nepal does not use as much pesticide as many other countries in South Asia.¹⁹ Moreover, the consumption of pesticides in terms of commercial formulation per unit area is only 142g/ha.²⁰ On an ecological basis, the highest average percentage of land using pesticides is the Terai (12%), followed by the hills (4.9%) and finally the mountains (0.7%), mostly on crops like rice, maize, wheat, potato and vegetables.²¹ The use of pesticides is higher in areas which have greater access to market. In terms of crops pesticides use, it is most intensive on high value crops such as vegetables and cotton²² and on cash crops such as sugarcane, paddy, potato and vegetables.²³

Based on the latest data from Pesticide Registration and Management Division under Plant Protection Directorate (PPD) of the MOAC/GON, the annual import of pesticides during 2002 was almost 117591.10 kgs of a.i and 176372.81 a.i. in 2003 with a value of NRs 183.535 million and 123.158 million respectively.²⁴ However, in comparison to other countries in the Asia-Pacific region, the use of chemical pesticides in Nepal is comparatively small.

B Production of POP Pesticides

The first pesticide production factory in Nepal, known as Nepal Pesticides and Chemical Industries Pvt. Ltd (NEPCIL), was established in 1977 at Bahardurganj, Kapilvastu to produce and formulate some of the major pesticides such as Gammexene, Methyl Parathion and zinc phosphide. However, the business of the production of NEPCIL suffered a downturn when AIC stopped buying the pesticides in 1995, and this resulted in the closure of this factory. At the same time the gradual and wide use of pesticides gave rise to the concept of privatisation of a

¹⁹ Implementation of the Stockholm Convention on POPs, *Enabling Activities in Nepal, Proceedings of Inception Workshop* (2004) Ministry of Environment, Science and Technology.

²⁰ Dahal, above n 13, 4.

²¹ Vidya Bir Singh Kansakar, Narendra Raj Khanal and Motilal Ghimire, *Use of insecticides in Nepal* (2002) Central Department of Geography, Tribhuvan University, Kathmandu, Nepal.

²² Jay R Adhikari, 'Agriculture pesticides in developing countries' (2004) 6(4) *Journal of Issue of Environment*.

²³ Kansakar et al, above n 21.

²⁴ NIP, above n 17, 5.

number of pesticides importers, dealers and resellers throughout the country. As a result of which private pesticide formulation factories as Nepal Krishi Rasayan Product, Pashupati Agrochemicals Nepal, Jai Kisan Seed Center began to produce and distribute pesticides.²⁵

The two divisions of the National Agricultural Research Center²⁶ officially tested insecticide and fungicides and made recommendations to the AIC via the informal Pesticide Committee.²⁷ AIC is the nationwide importer and distributor system of pesticides through Sajha Cooperatives throughout the country.²⁸

At present, there are four industries, namely: Kisan Agrochemicals, Nepal Krishi Rasayan Products, Pashupati Agro Chem, and Nepal Pesticides and Chemicals that have been registered to produce and formulate pesticides.

C Import and Distribution of POP-related Pesticides

Altogether, 4195.85 tons of DDT, 3243.26 tons of Malathion, 139.998 litres of actellic, 98.23 tons of ficon and 8.61 tons of icon were imported for public health use from 1976 to 1992 by the Department of Health, GON.²⁹ The development of private pesticides dealerships began in 1995 and resulted in the formulation of a network of private wholesalers and sellers in most districts with the exception of the remote and less profitable agricultural areas.

Similarly, CDB and NMEP were also involved to procure pesticides directly from foreign distributors. The *Pesticide Act 1991 (P Act)* and *Pesticide Regulations 1994 (P Regulations)*³⁰ regulate the import, manufacture, sales, transport, and use of pesticides. The Act has managed the pesticide inspectors to inspect the premises of each reseller, wholesaler, importer, and formulator. According to the *P Regulations*, the importer must report on the type and quantity of the pesticides imported during the given fiscal year within the first three months of the following fiscal year. However, due to the lack of effective implementation, exact quantification of the imported pesticides, imported but unused as well as that stock, which could be on the verge of date expiration, has not been done. Since June 2000, PPD has taken all the responsibilities to regulate pesticide related activities and does not allow import of any hazardous pesticides. Nepal has also banned import of organochlorine (except Endosulfan) and organo-mercuric compounds. Despite having government legislation and efforts to check the illegal import and distribution of POP related chemicals, these chemicals are still being used by the farmers.

²⁵ Dahal, above n 13, 4.

²⁶ Nepal Agriculture Research Council, Entomology and Plant Pathology, Kathmandu Nepal.

²⁷ Dahal, above n 13, 4.

²⁸ Sajha Cooperative is a government body.

²⁹ *Enabling Activities in Nepal, Proceedings of Inception Workshop*, above n 19, 6.

³⁰ *Pesticide Act 1991 (P Act) and Pesticide Regulations 1994 (P Regulations)*.

Mostly the chemical pesticides are being imported from India followed by USA, Japan, Indonesia, France, UK and China. However, most of the suppliers come from Indian companies including sole distributors for the main international manufacturers.³¹ Presently pesticides are now being purchased and distributed not only by the concerned government agencies but also by numerous private dealers.

D Illegal Trade of POP Pesticides

Nepal is a small country wedged between Asian giants India and China. The country shares a border with India (up to 1200 km)³² in the east, south, and west, and with China in the north. The agricultural occupation around the northern border is livestock-based and use of pesticides is scant. On the other side, agriculture is the main occupation around the east, west and southern part where a number of problems relating to illegal activities of pesticides are found. For many years, a lot of small importers and formulators have started their business at India along the Nepal border to supply pesticides to both the countries which give rise to enough possibilities for illegal activities around the border area adjoining with India. Under the provisions of the *Rotterdam Convention on Prior Informed Consent (Rotterdam Convention)*³³, pesticide importing/exporting countries are obliged to control the illegal transboundary movement of pesticides, however, it is not well established along these border areas. As a result of which it has become quite feasible to get pesticides at a cheap price for the Nepalese farmers at the border area. In the absence of quality standard assessment of these pesticides, many are sold with poor packaging, incomplete labelling and also by adulterating. Moreover, private dealers have been charged with selling date expired pesticides after changing the labels.³⁴ However, the fines are not adequate³⁵ and have made difficulties in the proper monitoring of hazardous toxic chemicals in Nepal.

E Outdated or Obsolete Pesticides

Obsolete pesticides are stockpiled pesticides that can no longer be used for their intended purpose or any other purpose and therefore require disposal.³⁶ Major steps and efforts to clean up expired POP pesticides have taken place in many countries. The Government of Nepal in the last 40 years has periodically received sizable donations of pesticides from western countries' major chemical companies as a measure to increase food production and combat insect-vectored human diseases.³⁷

³¹ *Enabling Activities in Nepal, Proceedings of Inception Workshop*, above n 19, 6.

³² NIP, above n 17, 5.

³³ *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*, opened for signature 10 September 1998, [2004] ATS 22 (entered into force 24 February 2004).

³⁴ Dhruva N Manandhar and Sanjaya Bista, 'Status of POP and PIC Related Pesticides in Nepal' (2002) Entomology Division, NARC, Khumaltar, Nepal.

³⁵ *P Act* s 15.

³⁶ Martinez, above n 4, 2.

³⁷ Ram C Sah, *Obsolete pesticides stockpiles in Nepal and its environmental impacts* (2002) Forum for Protection of Public Interest, Katmandu Nepal.

For various reasons, large tonnages of these pesticides acquisitions were not used in a timely manner and have since accumulated in government warehouses scattered throughout the country. During 2001 and 2002, a major effort to clear out the contaminated stockpiles of obsolete pesticides in Nepal was spearheaded by Greenpeace. Most of the pesticides were found to be in decomposing original packaging. Seven locations in Nepal were found to contain over 70 metric tons of obsolete pesticides, including Dieldrin, DDT, and other contaminants. Local residents had complained of headaches and nausea. At present, 74.5151 metric tons of pesticides stock is stored at warehouse/stores spread over at 25 locations whereas huge stocks of the stored pesticides have yet to be identified, but are suspected to contain Endosulfan, synthetic pyrethroids, Dimethoate and other toxins.³⁸ In many cases, pesticides are stored in inadequate facilities, including warehouses located in populated areas adjacent to dwellings, schools and livestock. Lack of designated storage and disposal sites pose an immediate threat to the human health and environment. However, the entire process, from acceptance of pesticides through storage and disposal, lacked any coordination and consultation between government agencies, technical experts, environmentalists and farmers.

III NATIONAL LEGISLATION AND ENFORCEMENT

The management framework for POP pesticides management in Nepal is mainly composed of two systems. The first is government institutional framework for the regulation and enforcement of pesticides in Nepal such as Ministries, local environmental protection bodies, health department, agricultural department, and other departments, with responsibility for enforcing the acts; and the second consists of the legal system, including acts and regulations. There are various laws within the competence of various ministries as well as strategies, programs and projects for the purpose of reducing POP pesticides pollution and to comply with the obligations of international instruments.

A Institutional Framework for the Regulation and Enforcement of Pesticides in Nepal

Nepal is committed to improve and enhance its institutional framework to cope with new challenges emerging to provide safe management and regulation of POP-related pesticides within the country. There is a regulatory and institutional infrastructure established for the management of pesticides in Nepal which covers all usage and exploitation aspects of pesticides. The Government of Nepal has established the Ministry of Environment, Science and Technology (MOEST) and the Ministry of Agricultural Cooperatives (MOAC) which deals directly with the pesticides. However, the Ministry of Industry, Commerce and Supplies (MOICS), the Ministry of Water Resources (MOWR), the Ministry of Health and Population (MOHP), the Ministry of Local development (MOLD) and the Ministry of Finance (MOF) are other ministries responsible for all the issues related with pesticides and

³⁸

Ibid.

protection of environment and health.³⁹ All these administrative bodies are responsible for organising and overseeing pertinent institutes, companies and individuals to comply with these national statutes, criteria and international treaties.

The MOAC is the main governing body responsible for regulating pesticides in the country and is also the owner of obsolete pesticides stored in different warehouses. It motivates farmers to adopt improved practices and technologies and increase the awareness of farmers, extension workers, researchers and policy makers about laws, rules and regulations, policies and programmes implemented. Moreover, MOAC forms policy and legislation regarding the pesticides. Similarly, the Quarantine Officers under the MOAC are posted at border points for the control of food, pesticides and plant material import and export.⁴⁰

The MOEST, on the other hand formulates, and enforces the rules and regulations on environmental issues, especially for the protection of the environment through control and compliance monitoring. The main objective is to promote environmentally sustainable economic development of the country through identifying a new technology through the development and promotion of research activities in the field of environment, science and technology.⁴¹

The regulation of trade, export and import of goods including POP pesticide is overseen by the Department of Custom under the MOF. This department empowers Officers to seize all pesticides imported without license from the Registrar of Pesticides.

Similarly, MOHP is also responsible for regulating the import and use of pesticides in vector control and formulates regulations and guidelines for the control of hazardous wastes through the Health Care Waste Management for effective delivery of curative services, disease prevention, health promotional activities and establishment of a primary health care system at an international standard under the government's official health policies.⁴²

However, there are many others – government and non-government bodies, private sector representatives, and NGOs - involved in the pesticides management in Nepal.⁴³ The following Section gives the brief description of some of these organisations which are involved in management of pesticides in Nepal.

1 Nepal Agricultural Research Council (NARC)

NARC was established in 1991 with the institutional facilities of the National Agricultural Research and Services Centre (NARSC) which had been working as a

³⁹ NIP, above n 17, 5.

⁴⁰ Government of Nepal, Ministry of Agricultural Cooperatives, Nepal.

⁴¹ Government of Nepal, Ministry of Environment, Science and Technology, Nepal.

⁴² Government of Nepal, Ministry of Health and Population, Nepal.

⁴³ NIP, above n 17, 5.

principle agricultural research organization in Nepal since 1985 under the Department of Agriculture, Ministry of Agriculture. It conducts high level studies and researches on various aspects of agriculture and assists Government of Nepal in the formulation of agricultural policies and strategies.

2 Plant Protection Directorate (PPD)

PPD under the MOAC is responsible for controlling plant protection materials. It is divided into several sections responsible for quarantine, pest identification laboratories, stored product pests, implementation of Integrated Pest Management (IPM) programs, and pesticides regulation. The Plant Protection Officers are stationed in each district and provide technical support to the users.

3 Pesticide Board

The Pesticide Board was established by the Pesticide Act which defines its function, duties, and power. The main responsibility of the Pesticide board is to advise the government in the formulation of national policy regarding pesticides, maintain coordination between private and governmental sectors in the production and distribution of pesticides, encourage private sector investment in the pesticide industry, regulation or control the quality of pesticides produced by the industry operated under private or government sectors, and set standards for pesticides quality.

4 Pesticide Registration Office (PRO)

The PRO, which was established in 1994 and is headed by a Pesticide Registrar, is responsible for pesticide registration and evaluation of proposals to license new formulating plants. It trains Pesticide Inspectors who are the main enforcement agents for the regulations and report to the PRO. Moreover, PRO offices are also empowered to issue licences (for two years) for pesticide importers.⁴⁴

5 Pesticide Sub-Committee

In 1994, the passage of the *P Regulations* resulted in the establishment of technical and legal sub-committees. The technical sub-committee is responsible for reviewing the technical information on pesticides that are to be registered and advising the committee of its recommendations whereas the legal sub-committee is charged with reviewing the legal status of pesticide regulations.

⁴⁴ Pesticides importers are supposed to obtain one license for each chemical imported as per the *P Act* and *P Regulations*.

6 District Level Pesticide Management Coordination Committee

A district-level pesticide management coordination committee is formed at district level under the chairmanship of the District Agriculture Development Officer (DADO). The main duty and responsibility of this committee is to coordinate high-quality pesticide management in line with the *P Act* and *P Regulations*, and to coordinate the implementation of the policy and decisions made by the pesticide committee, sub-committee and pesticide registration office.

7 Private Pesticides Dealerships

Private sector involvement in pesticides dates back to 1994-1995. The majority of private pesticide dealerships are concentrated in Terai and Kathmandu Valley where most vegetables and fruits are grown. The involvement of pesticides dealers in the pesticides sector had gave birth to the Pesticides Association of Nepal, which is responsible for providing training on the proper use of pesticides.

The Federation of Nepal Chamber of Commerce and Industries (FNCCI) is the major umbrella body representing the private sector of the business and entrepreneurs in Nepal which has an Environmental Division to look into environmental issues. It is a well established and strong force lobbying on behalf of industrialists.

8 Pesticide Association of Nepal (PAN)

PAN was established by the pesticides private dealers. The main aim of PAN is to monitor the proper use of pesticides. Its main responsibilities are to promote the proper use of pesticides, facilitate the coordination between farmers, sellers, and industries, give feedback and suggestions to the government in formulation of acts and regulations, enhance the cooperation among the retailers, and carry out studies on pesticide sales and distribution, import and export and production etc. to achieve a balance between pesticide production, distribution and use.

9 NGOs

Besides private sector participation in pesticide management in Nepal, there are some NGOs like the Nepal Forum of Environmental Journalists (NEFEJ), Environment and Public Health Organization (ENPHO), Save the Environment Foundation (SEF) and other organisations involved in disseminating information and raising awareness about chemicals hazardous to the general public.

III LEGAL FRAMEWORK FOR THE REGULATION OF PESTICIDES

There are comprehensive legislative frameworks to regulate the production, use, importation and registration of pesticides in Nepal.^{45;46} Acts and regulations dealing especially with pesticide issues include the *Environmental Protection Act* and *Environmental Protection Regulation (1997)* for the protection of living or non-living things from the adverse impact of pesticides. Legal provisions on environmental management are very new in Nepal. The formulation of environmental standards and extended rules and regulations for enforcement and necessary institutional setting is gradually progressing.

The following Section reviews a select number of relevant laws, statutes, and regulation for the importation, handling, use and disposal and management of POP pesticides:

A Pesticide Act 1991

The *P Act* is the principal legislation for the control of pesticides in Nepal. The passage of the Act in 1991 and the Regulations in 1994 is considerably late in comparison with other South Asian countries (SAC). The objective of legislation on the formulation, importation and use of pesticides is to ensure and enable the society to obtain the benefits from their use with minimal adverse effects to humans and other non-target organisms. All pesticides are registered and regulated under the Pesticides Act and the Pesticides Rules. The Act authorises the establishment of a Pesticide Committee (Article 3) and PRO (Article 7). The *P Act* is mandated to:

- a. Register pesticides by issuing certificates;
- b. Ascertain the criteria for effective, rational, and appropriate use of pesticides;
- c. Gazette registered pesticides; and
- d. Issue a license for persons who formulate, import, or distribute pesticides; and
- e. Appoint Pesticide Inspectors.

B Pesticide Regulations 1994

The *P Regulations* elaborate on the *P Act*. They require the applicant for registration of a pesticide to provide pesticide-related information, which includes among other, samples of labels and containers for each formulation and packaging size. The *P Regulations* also prohibit the sale of any pesticides that is imported for scientific or research purposes. It is specified in the Regulations that any person

⁴⁵ *Enabling Activities in Nepal, Proceedings of Inception Workshop*, above n 19, 6.

⁴⁶ NIP, above n 17, 5.

who wishes to sell or formulate a pesticide or to be a chemical applicator must obtain a license from the prescribed agencies formed as per Article 7 of the *P Act*.

The *P Regulations* were enacted with the purpose of regulating the import, export, production, distribution and use of pesticides that are to be used to kill pests, harmful seeds, plants, trees, animals and birds. At present numerous subsidiary instruments under the Act and Regulations are being enforced in areas such as registration, certification, prohibited pesticides, licensing for sale and storage for sale, highly toxic pesticides, pesticide inspector, and fine and punishment imposition.

1 *Registration and Certification*

Section 9 of the Act requires registering the pesticides in the PRO and obtaining a certificate thereof in order to import, export, produce, use or sell and buy the pesticides. This requires the applicant to submit an application with necessary technical and other information related to pesticides to the PRO.⁴⁷ However, the PRO may deny, with reason, registering any pesticide if the applicant fails to prove the utility of such pesticide or if the PRO believes that the use of such pesticides is likely to have adverse effect on human beings, animals, birds or environment.⁴⁸ On the other hand, the applicant who receives denial notice of the registration has right to file a petition before the Pesticides Board and, the decision made by the Board will be final.

Further, reg 6 of the *P Regulations* empowers the Pesticides Board to cancel the registration of pesticides or suspend the registration of any pesticides for any specific period of time, while publishing in the Gazette, if the board realises that the continual use of the pesticide that is registered is proved to be ineffective or the use of such pesticide is likely to have detrimental effects on human beings, animals, birds or the environment.

Similarly, the Act stipulates that it is the duty of the person, institution, or body who has obtained a license to import the pesticides to furnish relevant particulars of the pesticides imported within one fiscal year to the PRO, specifying the quantity and price thereof in a form prescribed by the Board within three months from the end of each fiscal year. In cases where the applicant fails to produce the documents of the import, the Board may cancel registration of such pesticides on the recommendation of the PRO.⁴⁹

2 *Registered and Prohibited Pesticides*

⁴⁷ *P Regulations* reg 3.

⁴⁸ *P Regulations* reg 5.

⁴⁹ *P Regulations* reg 7.

The Government of Nepal has registered 207 types of insecticides, 71 types of fungicides, 22 types of herbicides, 2 types of acaricides, 8 types of rodenticides and 2 types of others pesticides (PPD, 2002) pursuant to s 9 of the Act and reg 3 of the Regulations. There are 12 main types of pesticides which are prohibited under this provision. They are Chlordane, DDT, Dieldrin, Endrin, Aldrin, Heptachlor, Mirex, Toxaphene, BHC, Lindane, Phosphamidon and organo-mercury compounds (PPD, 2002).

3 License

According to reg 12 of the Regulations, any person, who formulates sells or uses the notified pesticides in a commercial way have to obtain a license from the Pesticide Board. For this, the Board requires the applicant to comply with all the specified requirements and standards. Further, entrepreneurs are required to obtain a license for the purpose of spraying pesticides.⁵⁰

Besides these provisions, regs 14, 15 and 16 have provisions with respect to obtaining licences to manufacture pesticides, renewal of licenses, and cancellation of licenses in cases where a license holder is found guilty respectively.

4 Pesticide Inspectors

Section 13 of the *P Act* provides for a Pesticide Inspector and empowers the Pesticide Inspector to enter into, in the course of performing his duty, any building, land, vehicle, aircraft, factory, commercial centre, storage, shed etc. at any time with the purpose of investigating or inspecting any documents or records.⁵¹ In the course of investigation if it is found that the pesticides are sold or imported in contravention of the provisions of the Act and the Regulations, the Inspector may take the pesticides in question into his custody.

5 Punishment

Section 15 of the *P Act* provides for a fine for breach of any of the provisions of the Act and Regulations. The punishment involves a fine of up to 2000 rupees as well as seizure of the pesticide in the case of importing, exporting, producing, using or selling and buying of the pesticide without registering and obtaining a license. Similarly, a fine up to 5000 rupees will be imposed as punishment for importing, exporting, producing, using or selling and buying of such pesticides that are not notified in the Gazette, and for formulating, selling and buying or using the pesticide in a commercial way without license from the board. Those pesticides will also be taken into custody by the government.

Among the other laws enacted to control other aspects of pesticides are:

⁵⁰ *P Regulations* reg 13.

⁵¹ *P Regulations* reg 7.

*C Environment Protection Act 1997 and Environment Protection
Regulations 1997*

The *EP Act* and *EP Regulations* were established by the MOEST and are its the major achievement. According to the *EP Regulations* reg 3, sched 1 and 2, sub-section I (Agriculture Sector), registered manufacturers of pesticides related to specified activities in a prescribed scale are required to carry out an Initial Environmental Examination (IEE) and Environmental Impact Assessments (EIA). This provision also requires an IEE for importation (1 to 10 tons), storage, sale, distribution, use and disposal of pesticides (100kg to 1 ton) and use of pesticides (100 kg to 1 ton) in a single area. However, the provision of IEE and EIA based on the quantity as threshold limit has to be amended. The threshold limit for the IEE or EIA should not be the quantity of toxic substance; it should be its toxicity according to the World Health Organization's classification. So far with the annual importation of more than 156 Mt of pesticides, not a single IEE and EIA has been conducted.⁵²

IV GOVERNMENT POLICIES AND PROGRAMS FOR POP PESTICIDE QUALITY
STANDARDS AND MANAGEMENT

The government of Nepal has initiated several efforts and programs as well as policies to ensure the effective management and quality control of POP pesticides in the country. For this purpose, the following strategies⁵³ are being implemented in the country:

- a. Banning of POP for agriculture and public health in April 2001;
- b. Promotion of IPM and environment friendly or safer pesticides;
- c. Provision of targeted training courses in chemical safety and risk management;
- d. Monitoring and surveillance programs;
- e. Review of legislation; and
- f. Prevention of illegal transborder movement of chemicals.

Implementing the abovementioned policies should strengthen the national capacity and enhance knowledge and understanding among decision-makers, managers, industry and the public at large on POP pesticides.

V INTERNATIONAL COMMITMENTS AND OBLIGATIONS

⁵² Sah, above n 37, 11.

⁵³ NIP, above n 17, 5.

The international community has called for actions to reduce and eliminate production, use and release of POPs through the adoption of various conventions. Nepal is also committed to upholding international standards by reducing and eliminating POP pesticides within the country and is obliged to implement a number of international laws and conventions. At present, Nepal is party to 17 international conventions and is a signatory of five conventions. This shows Nepal's commitment to participating in international endeavours to address global environmental issues with a view to protecting global environment and sustainable development.

The following Section sets out the international conventions related to POP pesticides which Nepal is obliged to adopt.

A The Stockholm Convention on Persistent Organic Pollutants 2001

The *Stockholm Convention on Persistent Organic Pollutants (Stockholm Convention)*⁵⁴ is a new United Nations treaty to protect human health and the environment from persistent organic pollutants. The Convention prescribes the conditions to be fulfilled by the Parties in order to ban production, use, import and export of POP chemicals on global level. These include highly toxic dioxins, PCBs, and pesticides such as DDT. This Convention came into force on May 17, 2004 and now has 152 signatories, and 155 parties. The *Stockholm Convention* provides subscribing parties with basic objectives, principles and elements for use in developing comprehensive programs and control regimes with respect to persistent organic pollutants or 'POP pesticides'.

Nepal showed its commitment to this Convention by signing the treaty on 5th April 2002. As a party, one of Nepal's first obligations is the compilation of an initial inventory and the formulation of a National Implementation Plan (NIP) for the proper management and eventual elimination of POPs and ensure healthy environment in the country. To this end, Nepal prepared a baseline inventory of POPs during 2004-2005.⁵⁵

B Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989

The *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention)*,⁵⁶ adopted by the diplomatic conference in Basel in 1989, was developed under the auspices of the UNEP. It

⁵⁴ *Stockholm Convention on Persistent Organic Pollutants*, opened for signature 22 May 2001, [2004] ATS 23 (entered into force 17 May 2004).

⁵⁵ NIP, above n 17, 5.

⁵⁶ *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*, opened for signature 22 March 1989, 1673 UNTS 126 (entered into force 5 May 1992).

came into force in May 1992. The Convention's aim is to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes and to ensure their environmentally sound management as closely as possible to the source of generation, and to assist least developed countries (LDCs) in environmentally sound management of the hazardous and other wastes they generate.

As of 22 May 2006, the *Basel Convention* has 170 Parties.⁵⁷ Nepal ratified the *Basel Convention* on 15 of August 1996. The provisions of the Convention have been fully implemented in Nepal since 13 of January 1997.⁵⁸

C Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade 1998

The *Rotterdam Convention*⁵⁹ aims to provide an efficient method for exchanging information on a small number of banned or severely restricted industrial chemicals and pesticides between participating countries. The Convention entered into force on 24 February 2004 with 73 signatories and 120 parties at present. FAO and UNEP jointly perform the secretariat functions for this Convention.

The Convention includes 39 hazardous chemicals of which, 24 are pesticides, 11 are industrial chemicals and the other four are severely hazardous pesticide formulations. The Convention applies to banned or severely restricted chemicals and to extremely hazardous pesticide formulations. Nepal has also started the process for the signature to this Convention as a commitment toward the international efforts in minimising the risk from hazardous chemicals and pesticides. However, Nepal has not yet signed the PIC Procedures as well as International Forum of Chemical Safety (IFCS).

Apart from these, the London guidelines for the exchange of information on chemicals in international trade also have to be followed by Nepal.⁶⁰

VI STATUS OF NATIONAL IMPLEMENTATION PLAN (NIP)

The *Stockholm Convention* seeks to reduce and eliminate 12 chemicals which include Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene, PCBs. The Convention also seeks for State Parties to take measures and formulate necessary plans to reduce the production and use of POP

⁵⁷ *Basel Convention*, above n 59, 26.

⁵⁸ NIP, above n 17, 5.

⁵⁹ *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*, opened for signature 10 September 1998, [2004] ATS 22 (entered into force 24 February 2004).

⁶⁰ *Enabling Activities in Nepal, Proceedings of Inception Workshop*, above n 19, 6.

pesticides. In this context, Article 7 of the Stockholm Convention requires that each Party must develop, and endeavor to put into practice, a National Implementation Plan setting out how it will implement its obligations under the Convention which must be transmitted to the Conference of the Parties within two years of the date on which the Convention entered into force for that Party.

As a Party to the Stockholm Convention, Nepal has developed NIP within the framework of the project 'Enabling Activities to Facilitate Early Action on the Implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in Nepal' under the financial assistance of the Global Environment Facility (GEF) in partnership with the United Nations Industrial Development Organization (UNIDO) and the UNEP. The main objective of the Project was to ensure timely preparation for the government of Nepal for the implementation of the Stockholm Convention requirements regarding reduction/elimination of use and release of POP pesticides into the environment. To comply with the Convention Nepal will:⁶¹

- Develop a national system for the environmentally sound management of chemicals, including legislation and provision for implementation and enforcement.
- Develop the database of the POP chemicals in Nepal regarding export, import, production, use and stockpiles.
- Assess the mechanism for eliminating the production and accidental release of POPs to the environment.
- Identify provision of a control system on the import of POP chemicals and improvement of the knowledge and capability of human resources,
- Develop proposal for adoption of alternative technologies and disposal plan.

These strategies set out the broad strategic and policy frameworks under which governments will make decisions cooperatively and take actions to pursue ecologically sustainable development in Nepal. MOEST is the lead agency for the implementation of POPs National Implementation Plan in coordination with concerned governmental agencies mainly with the Department of Agriculture, District Agriculture Development Offices, Agricultural Input Company (AIC), Nepal Agriculture Research Council (NARC), Cotton Development Board (CDB), National Seed Company (NSC), Municipalities, Local NGOs, farmers, Agrovets, etc. As a focal point for the *Stockholm Convention*, MOEST's POPs Enabling Activities Project has recently completed an inventory of POP chemicals and has developed the NIP.⁶²

VII CONCLUSION AND RECOMMENDATIONS

⁶¹ NIP, above n 17, 5.

⁶² NIP, above n 17, 5.

Pesticides have unfortunately become an indispensable part of the Nepalese farming system. Commercial farming practices in recent years have led to excessive use of them, and the increase in growing of high-value crops such as vegetables has also resulted in the increase use of pesticides. Farmers have very little knowledge of pesticides and the pesticide regulations have not been enforced properly. This means that it is time to call for public awareness of this problem to be raised.

Since 2001, Nepal has banned all the POP pesticides such as DDT, Aldrin, Dieldrin, Endrin, Chlordane, Heptachlor, Toxaphene and Mirex. However, due to transboundary movement and illegal importation, some of the banned pesticides are still found in local markets. There is only little or no information on such illegal movements regarding the name and quantities of chemical pesticides sold.

The institutional frameworks on management of POP pesticides in general are still in their embryonic stage. The government has developed infrastructure and has formulated the *P Act* and the *P Regulations* as well as different policies regarding the chemical pesticides management. The introduction of a pesticides inspector, market monitoring, a Board and district-level pesticides management coordination committee and the publication of a list of approved and banned pesticides are some of the positive steps taken. However, the lack of comprehensive information and effective management of production, consumption, import, export, trade, stockpile and disposal impedes proper implementation of the POPs program. Momentum is needed towards adequate policy formulation and to ensure transparency with regard to registration of pesticides and its effective implementation.

The monitoring mechanisms in the country are weak. Banned POP pesticides continue to be used. Further, there is very limited monitoring, incomplete management framework, lack of safe disposal and remediation infrastructure of expired pesticides, and lack of public participation awareness.

In conclusion, it can be said that the continued use of POPs and their impacts on humans and environment, their effective management, and need for a constructive role played by the government are all issues that demand urgent attention. More efficient policies based on objective and measurable criteria are needed if the country is to improve its management of POPs. Finally there is an absolute need to strengthen the supervision mechanisms for POP pesticides management. The major problems related to the management of POP-related pesticides are due to following factors:

- Open and porous border with neighboring countries;
- Lack of well equipped laboratory facilities for the assessment of quality and residue of toxic chemicals;
- Limited skilled manpower for effective implementation of the act and rules; and
- Lack of education and awareness, and ignorance of people regarding safe

use of chemicals.

In order to overcome the problems observed as above, the following recommendations are proposed:

- Create mass awareness on toxic effects of POP-related pesticides to human health and environment through media, communication;
- Provide training to the farmers, distributors, retailers;
- An effective monitoring mechanism should be established along the border to stop illegal import, sale and use of POP pesticides;
- The Pesticide Act and Regulations should be effectively implemented to prevent the illegal importation and use of these products;
- High fines and long term imprisonment sentences should be imposed to those involved in illegal pesticides trade;
- Immediate attention should be given for the disposal of expired date pesticides; and
- Effective institutional mechanism should be set-up to manage the obsolete POP pesticides within the country. For this the existing legislation and institutional framework need to be strengthened to address the issue of packaging/ repackaging and proper storage and handling of obsolete POP pesticides.

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