

ENVIRONMENTAL AND HEALTH EFFECTS OF PESTICIDES USE OR A STEP TOWARDS SUSTAINABLE AGRICULTURE: LEGAL POSITION IN INDIA*

Abstract

Agriculture is very much important for the economic growth of a country like India. Agricultural produces depend on various chemical uses like pesticide, fertilizers which contribute to agricultural productivity but also pose potential risks to human health and the environment. To fight this problem the concept of 'Sustainable Agriculture' depending on 'green economy' has come which incorporates the concept of integrated pest management. Integrated Pest Management increases crop production, reduce input cost and environmental pollution by reducing use of chemical pesticides and maintain agro-ecological equilibrium. The Supreme Court is also against the potential risk of pesticide use which is hazardous to health¹. The policy approach to enhance farmers' environmental awareness and development and dissemination of technology to mitigate the environmentally negative impacts of agriculture without loss of its productivity has been taken in India to develop its economy.

KEY WORDS:

Pesticide, Environment, Agriculture, Sustainable

I.CONCEPT OF PESTICIDES:

Pest can be defined as anything that affects the well-beings and economics of humans². Pesticides are used to keep the pest population, which could be in the form of insects, rodents, diseases (including harmful bacteria and viruses), weeds etc. below a threshold level to avoid harm to the crop output³. Pesticides include insecticides, fungicides, herbicides, plant growth-regulators, bird and animal repellents, and rodenticides.

Farmers use pesticides to:

- Protect crops from insects, pests, weeds and fungal diseases during growing,
- Prevent rodents and insects from contaminating foods during storage,
- Safeguard human health, by stopping food crops being contaminated by fungi.

Basically two types of Pesticides are there:

* Ms. Kuhumita Laha, Research Scholar, West Bengal National University of Juridical Sciences, Kolkata.

¹ Ashok (Dr) vs. Union of India, 1997(5) SCC 10

² S. Nagarajan, Role and Limitations of Biopesticides, in Nutan Kaushik (ed.), Biopesticides for Sustainable Agriculture: Prospects and Constrains, Teri Press, Delhi, 2004, P-4.

³ *Supra* note 2.

1. Synthetic or chemical pesticide
2. Bio-pesticide

There are various types of Bio-pesticides⁴:

- a) Microbial pesticides consist of a microorganism like bacterium
- b) Plant-pesticides/Botanical bio-pesticides are pesticidal substances that plants produce from genetic material.
- c) Biochemical pesticides are naturally occurring substances that control pests by nontoxic mechanisms like hormones.

Bio-pesticides basically originate from living systems⁵ including plant and animal wastes⁶ etc. At the end of 1998 there were approximately 175 bio-pesticide active ingredients and 700 products⁷.

II.CONCEPT OF SUSTAINABLE AGRICULTURE:

The concept of Sustainable development has come from the concept of 'Sustainable development'. Sustainable Development can be defined as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs⁸".

In Stockholm Convention, 1972, the term "Sustainable Development" was recognised as a key principle for the development and protection of environment. But the Agenda- 21 of the Rio Declaration, 1992, launched establishing policies and activities towards sustainable development and World Summit on sustainable development (Johannesberg), 2002, enlarged the scope of Sustainable Development in many perspectives.

Sustainable agriculture should involve successful management of agricultural resources that can satisfy human needs while maintaining or enhancing the quality of the environment and conserving natural resources at the same time⁹. Sustainable agriculture also maintains the sustainability tripod¹⁰, i.e., balance between economy, environment and development of society.

Sustainable Agriculture aims at-

- Maintaining and enhancing the quality and productivity of the soil,
- Conserving soil, water (surface and ground water), energy, natural resources, fish and wildlife habitat,
- Protecting the health and safety farmers and consumers,
- Protecting the environment,
- Enhancing the production.

III.NEED FOR SUSTAINABLE AGRICULTURE TO REDUCE PESTICIDE EFFECTS:

⁴ <http://ipmguidelines.org/Home/content/Book2/CH02/default.asp>

⁵ *Supra* note 4.

⁶ *Id.*

⁷ *Supra* note 6.

⁸ World Commission on Environment and Development (*Brundtland Commission 1987*).

⁹ *Supra* note 4, P-1.

¹⁰ Gary W. Vanloon, S. G. Patil and L. B. Hugar, *Agricultural Sustainability: strategies for Assessment*, Sage Publication India Pvt. Ltd., New Delhi, First Publication, 2005, P-39.

There are various ill-effects of synthetic pesticides¹¹.

1. Exposure to pesticides have serious health effects on humans like hormonal imbalances, reproductive systems etc. The world-wide deaths and chronic illnesses due to pesticide poisoning is about 1 million per year¹².
2. Impact through Food Commodities: In India, a study revealed that 50% of the vegetable samples taken from farm gate were found contaminated with various pesticides(0.01-2.23 ppm) of which 16% were above MRL¹³ and harmful to consumers.
3. Pesticides can contaminate air, soil, water (ground as well as surface), turf, and other vegetation. In addition to killing insects or weeds, pesticides can be toxic to a host of other organisms including birds, fish, beneficial insects, and non-target plants which can have effect on soil fertility. It was seen that 58% of drinking water samples drawn from various hand pumps and wells around Bhopal are contaminated with Organo-chlorine pesticides above the EPA standards¹⁴.

To fight these problems sustainable agriculture should be promoted. The sustainable way to agricultural development may be broadly classified into three categories¹⁵.

- a) Integrated Pest Management (IPM),
- b) Low External Input Sustainable Agriculture (LEISA),
- c) Organic Agriculture.

IPM is most commonly advocated and widely adopted among the three. With this bio-pesticides are largely accepted as against chemical pesticides because of various advantages.

Bio-pesticides are-

- inherently less harmful than chemical pesticides.
- more target specific than chemical pesticides.
- effective in small quantities.
- decompose quickly and do not leave problematic residues.

The Integrated Pest Management can be defined as an “economically justified and sustainable system of protection of crops that leads to the maximum agricultural productivity with the least possible negative impacts on the natural environment”¹⁶. IPM is a (i) sustainable approach of management of pest, (ii) by the combination of biological, cultural, mechanical and chemical tools, (iii) in a way to minimize economic, health and Environmental Risks.

IV. INDIAN LAWS AND POLICIES ON PESTICIDE AND SUSTAINABLE AGRICULTURE:

A. INDIAN LAWS

¹¹ Md. Wasim Aktar and M. Paramasivam, Impact of Pesticide Use in Indian Agriculture - Their Benefits and Hazards, available at <http://www.shamskm.com/env/impact-of-pesticide-use-in-Indian-agriculture.html>, last visited 15.11.2011.

¹² Environews Forum, Killer environment, Environ Health Perspect 107: A62-A63, (1999).

¹³ Kole R.K., Banerjee H. and Bhattacharyya A. (2002) Monitoring of pesticide residues in farm gate vegetable samples in west Bengal. Pest. Res. J. 14(1): 77-82.

¹⁴ Kole R.K. and Bagchi M.M. (1995) Pesticide residues in the aquatic environment and their possible ecological hazards. J. Inland Fish. Soc. India. 27(2): 79-89.

¹⁵ Vijesh V. Krishna, N.G. Byju and S. Tamizheniyam, Integrated Pest Management In Indian Agriculture: A Developing Economy Perspective, available at <http://ipmworld.umn.edu/chapters/Krishna.htm>

¹⁶ Integrated Pest Management in India, (JANUARY 2, 2010), available at http://indg.in/agriculture/crop_production_techniques/components-of-integrated-pest-management-ipm, last visited 15.11.2011.

There are various pesticides regulations in India which are as follows:

- The Insecticides Act, 1968 and Rules, 1971
- The Environment (Protection) Act, 1986
- Hazardous Waste (Management & Handling) Rules, 1989
- Water (Prevention & Control of Pollution) Act, 1974
- Air (Prevention & Control of Pollution) Act, 1981
- Prevention of Food Adulteration Act, 1954
- The Destructive Insects and Pests Act, 1914

The Insecticide Act, 1968 defines 'Insecticide' as "*any substance specified in the Schedule; or such other substances (including fungicides and weedicides) as the Central Government may, after consultation with the Board, by notification in the Official Gazette, include in the schedule from time to time; or any preparation containing any one or more of such substances*"¹⁷.

On any case of risk to human health, environmental risk, sale, production of Insecticide, the Central Insecticides Board can advise the central and state Govt¹⁸.

The Registration Committee¹⁹ has many functions:

- To register²⁰ the pesticides including bio-pesticide after satisfying itself regarding efficacy of the pesticide and its safety to human beings, animals and the environment.
- Approval of Labels and leaflets
- Safety concern
- Review of pesticides²¹
- framing guidelines²² for IPM and bio-pesticide usage which is as follows:
 - Survey and monitoring of insect-pests and diseases in pest prone crops.
 - Conservation and augmentation of natural enemies of pests.
 - Production and release of bio-control agents by CIPMCs.
 - Human resource development through Farmers' Field Schools, Season Long Training Programmes, Short Duration Training Programmes including refresher courses.
 - Funding SBCLs.
 - Assistance to private entrepreneurs, NGOs, cooperatives, Self Help Groups, women organizations for opening production units of bio-pesticides.
 - Rodent Pest Management for building capacity.
 - Creating awareness and conducting campaigns.
 - Monitoring Locust Control and Research for emergency situations.
 - Implementation of Insecticides Act, 1968

Under this Act Insecticide Inspectors play an important role²³ and it also contains provisions regarding offences by companies²⁴. The Environment (Protection) Act, 1986, Water

¹⁷ The Insecticide Act, 1968, §3(e).

¹⁸ *Id.*, §4(2).

¹⁹ *Id.*, §5.

²⁰ *Id.*, §9.

²¹ use of 27 pesticides and 4 formulations of 3 other pesticides have been banned, restrictions have been imposed on 7 other pesticides and 18 pesticides have been refused registration.

²² Norms/Guidelines for, "Strengthening and Modernization of Pest Management Approach in India" <http://www.indiaenvironmentportal.org.in/files/smpma21910.pdf>, last visited 15.11.2011.

²³ *Supra* note 19, §20.

(Prevention & Control of Pollution) Act, 1974, Air (Prevention & Control of Pollution) Act, 1981, do not directly deal with pesticide, but under the definitions of hazardous substance²⁵ and environment pollutant²⁶ and pollution²⁷, the pesticide control may come indirectly. The Central Government has made the Plant Quarantine (Regulation of Import into India) Order, 2003 under Section 3(1) of Destructive Insects and Pests Act, 1914 for prevention of importing pests and diseases from other countries into India. In addition, some states have enacted their own pesticide law like the Himachal Pradesh Agricultural, Pests, Diseases and Noxious Weeds Act, 1969 and the Karnataka Agricultural Pests and Diseases Act, 1968 etc.

B. JUDICIAL PRONOUNCEMENT

The Supreme Court has interpreted Article 21 to include the right to live in healthy environment with minimum disturbance of ecological balance and without avoidable hazard to them and to their cattle, house and agricultural land and undue affection of air, water and environment²⁸. The Court said that right to health of worker is an integral facet of meaningful right to life to have not only meaningful existence but also robust health without which the worker would lead life of misery²⁹.

In *Ashok (Dr) Vs. Union of India*³⁰, Supreme Court ordered to Ban on insecticides & chemicals hazardous to health³¹ and advised to take relevant steps to amend the Insecticide Act, 1968 regarding provisions to cancel registered insecticide³². The Court pointed out that co-ordinate effort by ministry is to be taken to implement framed policies³³ as duty of state is to promote health and environment³⁴.

In *Rajesh Rangarajan Vs. M/S. Crop Care Federation of India & Anr.*³⁵, Crop care Federation of India lodged complaint u/s. 120(B), 34, 500, 501 & 502 of the IPC against 11 activists who published a report on pesticide effect titled "The Killing Fields of Warangal" in 2002. But Court quashed the order passed by A.P. High court 13.12.2007 and also directed trial court who has issued non-bailable warrant, not to deal with the matter further as the report was a health report on pesticide exposé for benefit of public, and not for harming anybody.

In *Democratic Youth Federation of India Vs. Union of India & Ors.*³⁶, the Supreme Court passed an interim order to ban export, import, use, sale, manufacture on pesticide endosulfan (off-patent Organochlorine pesticide) directing the statutory authorities to freeze the production licenses on 13.05.2011. This continued upto 30.09.2011 till the Interim Report of the appointed Expert Committee headed by the Director General ICMR and the Agriculture Commissioner was produced. After going into the report, the court gave order to restoration of licenses of the manufactures till the accomplishment of the contract with some directions regarding transport, export, labeling, cautions etc.

C. INDIAN POLICIES

²⁴ *Id.*, §33.

²⁵ The Environment (Protection) Act, 1986, §2(e).

²⁶ *Id.*, §2(c).

²⁷ *Id.*, §2(d).

²⁸ *RLEK Vs. State of Uttar Pradesh and Others*, Supreme Court of India, Judgment of 19 December 1996, AIR 1985 SC 652, 656.

²⁹ *Consumer Education And Research Centre Vs. Union Of India* AIR 1995 SC 922, ¶24.

³⁰ AIR 1997 SC 2298.

³¹ *Id.*, ¶5A.

³² *Id.*, ¶15.

³³ *Id.*, ¶5.

³⁴ *Id.*, ¶5A.

³⁵ Criminal Appeal No. 1305 of 2010, arising out of SLP (CRL.) No. 3700 of 2008, (20.07.2010).

³⁶ Writ Petition (Civil) No. 213 of 2011.

National Agricultural Policy, 2000 seeks to promote technically sound, economically viable, environmentally non-degrading, and socially acceptable use of country's natural resources by controlled use of agro chemicals through integrated nutrients and pest management (INM & IPM) while accepting sustainable agriculture. It states that Government will provide quality inputs for plant protection chemicals, bio-pesticides to farmers.

National Action Programme to Combat Desertification, 2001, aims to control unsustainable agricultural practices like excessive use of pesticides to stop desertification and aims to take long-term preventive measures to maintain water quality from being contaminated by pesticide use.

National Water Policy, 2002, takes sustainable approach to protect environment and society by maintaining water quality, water resource for irrigation and drinking water.

National Environment Policy, 2006, also promotes sustainable agriculture by conservation of environmental resources, Inter and Intra-generational Equity for livelihood security of the poor, integration of environmental concerns in economic and social development, efficiency in environmental resource use and environmental governance to enhance resources for environmental conservation.

National Policy for Farmers, 2007, gives extra importance to green agriculture and organic farming. It prevents sale of substandard pesticides and promotes bio-pesticides. It gives priority for development, introduction and diffusion of environmentally safe, effective pesticides and IPM.

V. COMPARISON OF PESTICIDE LAWS: INDIA AND UK

In UK two fold protection for pesticide exists, i.e., General and Specific policy. General Protection includes limiting reliance on pesticide to the minimum necessary for the effective control of pests compatible with the protection of human health and environment. Specific policy is related to water protection policy where pesticide is regarded as pollutant. Food and Environment Protection Act, 1985 (in compliance to EU directive 90/642) deals with pesticide management. Under this Act, definition of Pesticide³⁷ identify micro-organism³⁸ which are important for plants, safeguard of environment, health, efficient measures for pest control is adopted³⁹, specified provisions to sale, offer, manufacture of pesticide⁴⁰, offences prescribed for contravening the provision of the Act⁴¹ and providing wrong information⁴² and special power to officer⁴³ and secretary of the state of the environment and ministry of Agriculture⁴⁴ in enquiry is given.

Control of Pesticide regulation, 1986 and Plant Protection product regulation 1995 is used for registering pesticides, licensing and information requirements. Pesticide waste is managed under Environment Protection Act, 1990⁴⁵ and Waste Management Licensing Regulations, 1994. Plant Protection product regulation 1995 also provides IPM and Sustainable/Low input farming.

³⁷ Food and Environment Protection Act, 1985, §16(15).

³⁸ EU Directives, 91/414.

³⁹ *Supra* note 39, §16(1).

⁴⁰ *Id.*, §16(3).

⁴¹ *Id.*, §16(12)(a).

⁴² *Id.*, §16(12)(b).

⁴³ *Id.*, §19.

⁴⁴ *Id.*, §19(1B).

⁴⁵ §62.

In contrast, the existing legal provisions in India can be criticized on various grounds⁴⁶:

- restrictive definition of ‘insecticide’ and ‘manufacture’;
- qualification for manufactures, sellers and commercial pest control operators;
- larger representation of experts in the CPB and RC;
- fixation of tolerance limits of pesticides as a pre-condition of their registration;
- suspension or cancellation of registration of pesticides on account of violations of the law, or risk to crops, human beings and environment;
- inadequate penalties and fines;
- safety measures for manufacture, sale, storage, distribution and use of pesticide.

VI. SUGGESTIONS:

After adoption of such law and policies, there is low acceptance of sustainable approach in agriculture in India. Reasons for the low acceptance of IPM⁴⁷ and bio-pesticide are:

- Lack of awareness.
- Lack of skills.
- Lack of faith in IPM.
- IPM practices are difficult and time consuming
- Bio-pesticides may be functionally effective in one part of the country but not in another part as edaphic properties exist.
- Bio-pesticides cannot control several pests at-a-time.
- They are not effective against all types of pests with tremendous variability.
- It kills insects a little more slowly than do conventional pesticides.

Several recommendations may be summarised as follows:

- The technologies that are promoted in any environment should be derived from the potentially profitable livelihood opportunities that exist in that environment and from the needs and constraints of farmers.
- Farmers in all environments need access to appropriate information about markets and technology opportunities.
- Investment in the development of the capacities of farmer organizations.
- More general capacity-development is needed to enable farmers to identify and exploit the technology and market options that are best suited to their situations.
- Investment in increasing the capacity of governments to promote and regulate new technologies.
- Investment to promote education among farmers through farmer field schools.
- Investment in agricultural policy research and policy support.

VII. CONCLUSION:

⁴⁶ *Supra* note 2.

⁴⁷ Ghayur Alam, A Study of Biopesticides and Biofertilisers in Haryana, India; International Institute for Environment and Development (The Sustainable Agriculture and Rural Livelihoods Programme), Gatekeeper Series no.SA-93, 2000, available at <http://pubs.iied.org/pdfs/6348IIED.pdf>, last visited 15.11.2011 .

The increasing cost of plant protection and chemical pesticide make agriculture less profitable and risky. The farmers as well as consumer and the environment are harmed by use of toxic chemicals. In India we need a more environment friendly and economical alternative policy to adopt sustainable agriculture pattern. The Pesticide Management Bill, 2008 is permitted to introduce in Rajya-Sabha. It includes various provisions⁴⁸ regarding bio-pesticides, IPM regulation, definition of pesticide, new offences and punishments, MRL etc. Recently, CBI has filed charge-sheet in 'Dow Pesticide Case'⁴⁹. At last it can be said that the Indian Courts must take comprehensive approach while dealing with this type of cases.



⁴⁸ *Supra* note 2, ¶26-42.

⁴⁹ Rajinder Nagarkoti, CBI files chargesheet in Dow pesticide case, TNN Jun 1, 2011, 02.39am IST, available at http://articles.timesofindia.indiatimes.com/2011-06-01/pollution/29607543_1_cbi-files-chargesheet-dow-chemicals-substandard-pesticides, last visited 15.11.2011.