



High Pesticide Use in India:

| Dileep Kumar A. D. & Dr. D. Narasimha Reddy | *Health Implications*

Green Revolution in India introduced chemical fertilisers and chemical pesticides. Year-on-year, use of agrochemicals increased with the patronage of governments. Agrochemical usage has become intensive and widespread due to packages of incentives, subsidies, bank loans etc. A few economists are happy that these agrochemicals have increased the agricultural production. Macro-agricultural statistics is full of such data that indicates higher production and productivity.

However, enormous impacts of such usage on agriculture, environment and ecosystems, biodiversity, communities, and socio-economic sector have been documented. Soils have become inert, saline and dead in many places. Available scientific literature discusses inherent potential of pesticides to induce chronic health effects such as cancer and hormonal disorders as well as reproductive and developmental impacts. Human health impacts caused by pesticides a significant concern for a long time. Various diseases

and disorders that have proven scientific link with pesticides are on the rise in India – global situation is also not different.

What are pesticides?

Historically, pesticides were known as economic poisons. Pesticides can be categorized into insecticides, fungicides, herbicides (weedicides) and plant-growth-regulators based on their activity and target groups. Pesticides commercially available in the market generally are formulated products which contain a

certain percentage of actual pesticide known as active ingredients. Pesticides kill the pest by inhibiting or blocking enzymes, neurotransmitters, hormones and secondary messengers in the various organ systems, kill adult pests or prevent growth and development in young ones. In effect, pesticides have the potential to kill not only the pests, but other animals, including humans through air, food and water.

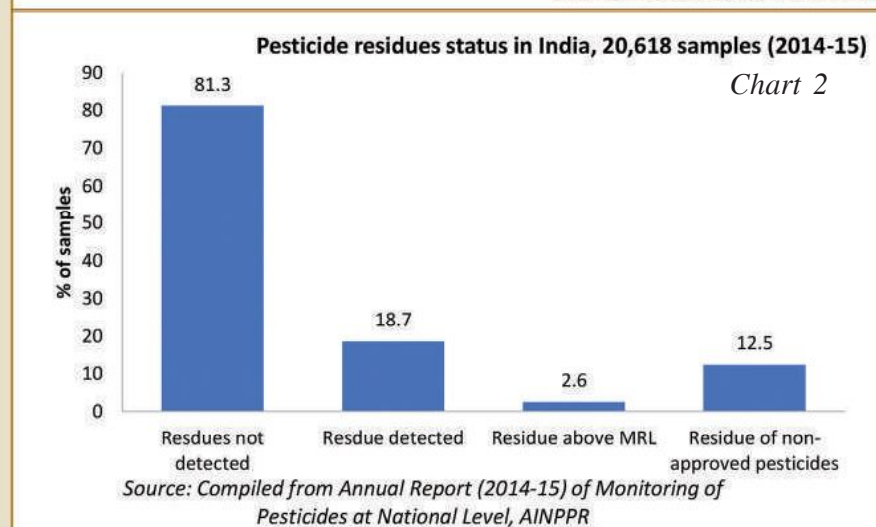
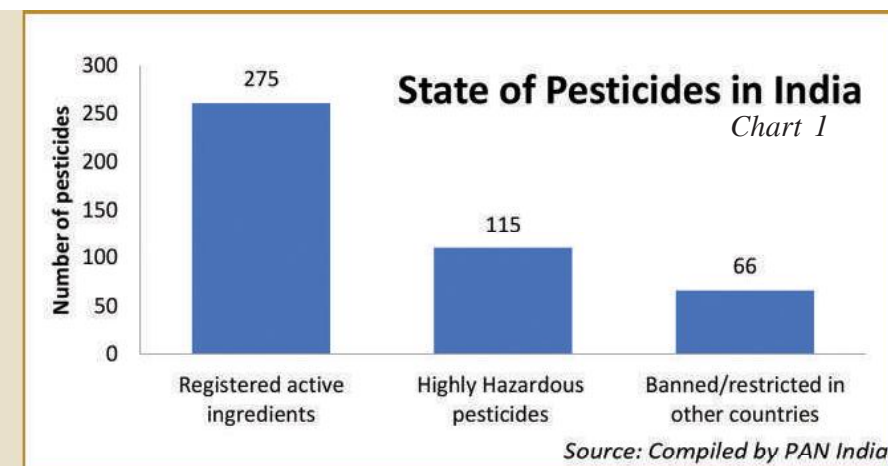
In India, pesticides are registered for agriculture, public health and for use in households. As on 30th October 2016, 275 pesticides were registered for use in India, of which about 255 are chemical poisons. An analysis by PAN India revealed that more than 115 pesticides out of the 275 are highly hazardous. Highly Hazardous Pesticides are those which have the potential to cause severe health implications such as high acute toxicity, long-term toxic effects like cancers, hormone disorders, reproductive and developmental disorders.

Pesticides banned and restricted in India

It is noted that there are 28 pesticides and four pesticide-formulations banned for manufacture, import and use in India, in addition to endosulfan banned in 2011. There are 66 pesticides which are banned or restricted in countries including US and Europe but are permitted for use in India.

Pesticide use in India

The pesticide industry has successfully created a myth



that pesticides are an inevitable requirement in modern production systems, even though food production happened for centuries without pesticides. It is a fact that farmers are not aware of the hazardous effects of pesticides. Thus farmers started using them carelessly, and continue to use still today. Field studies have shown that farmers in India do not use the required protective measures as recommended, affecting their health.

Problem of pesticide residue

Various studies have revealed that in India food, environment and biological systems including blood samples and breast milk

are polluted with pesticides. A recent report published by All India Network Project on Pesticide Residues reveals that pesticide residues were detected in 18.7% of samples, unapproved pesticides were found in 12.5% of samples, and residues above the maximum residue level (MRL) recommended by FSSAI were noted in 2.6% of samples. These samples were collected during 2014-15, which include vegetables, cereals, pulses, egg, fish, meat, spices, tea, milk and surface water collected from market and farm gate. Many samples have been detected with residues of multiple pesticides.

Pesticide-poisoning and health implications

Exposure to pesticides and poisoning is a major problem among farming communities in India. Exposure and poisoning pose risk not only to farmers, but also agricultural workers, women, children, and consumers as well. Among all, pregnant women and children are the most vulnerable groups, when they work with pesticides in the field, working in sprayed fields, moving along or playing near sprayed fields, and through food and drinks contaminated by taking pesticide residues. Pesticides get into the body via oral route, nasal passage, eyes and skin. Persistent exposure to multiple pesticides and cocktails can have much complicated health implications.

Both the active ingredients and some inert ingredients in the pesticide formulation can also cause health effects. Once inside the body, pesticides may cause acute health effects such as headache, itching, burning sensation, nausea, vomiting, and weakness; unconsciousness and death in severe poisoning as well. Lipophilic pesticides get accumulated in certain tissues and organs with more fatty content and cause long-term degenerative effects. Some pesticides mimic critical hormones in the body and cause unintended results. For example, some insecticides like DDT and its metabolic product DDE behave like estrogenic hormones affecting sexual development.

Some pesticides cause long-term health effects including damage and dysfunction in the nervous system, immune system, hormone system, reproductive system, etc. Such impacts can result in diseases and disorders such as behavioural changes, learning disorders, attention deficit hyperactivity disorder (ADHD), autism; incidence of allergies, infectious diseases; impaired body growth, hormone-related diseases and disorders, sexual development and reproduction, reduced sperm counts, infertility, miscarriages, endometriosis; early puberty, abnormal menstrual cycle, early child birth, birth defects; various types of cancers such as brain tumor, blood cancers, lung cancer, breast cancer, ovarian,

Box

Tips to deal with pesticide hazards

- ❖ Eat fresh, organic foods to avoid food-related exposure.
- ❖ Encourage non-chemical farming and support farmer-led local markets- know your food producers.
- ❖ Avoid pesticide use near to human settlements, residential areas, schools, anganwadies, health centres, public spaces, water resources, etc.
- ❖ Avoid use of toxic household pest management products, cleaning liquids, etc.
- ❖ At regulatory level, ban highly hazardous pesticides immediately and phase out all chemical pesticides and adopt agroecological practices.

Ensuring Precautionary Measures in place is the only solution to get rid of exposure to pesticides. Best precautionary option is to avoid use of such products. The chronic diseases and disorders triggered by pesticides/other toxins cannot be cured!!!.



uterine and cervical cancers, prostate cancer, etc. Besides, pesticides can cause severe damages to liver, kidney, lungs, reproductive organs, etc. We are seeing such problems across India.

Category of pesticides	Number of Pesticides in India
Carcinogenic potential	56
Endocrine/hormone disrupting effect	81
Immunotoxic effect	38

Source: Compiled by PAN India

Children are especially vulnerable to the impacts of pesticides as they can affect brain development and cognitive functions, leading to intellectual deficits and mental disorders in children. Other impacts such as attention deficit hyperactivity disorder (ADHD), autism, asthma, obesity, and preterm birth (tuberculosis, cholera, typhoid, and other infectious diseases were the earlier morbidities) can be seen; with profound socio-economic impacts on the society.

Pesticides undermine health and intelligence of children

Children today are sicker than a generation ago. Acute effects are not the only concern with exposure via spray drift. Pesticides have been linked to birth defects, endocrine disruption, cancer, damage to the nervous system, breathing difficulties and adversely impact intellectual and behavioural development.

Children are particularly vulnerable to the harmful effects

of pesticides, particularly in rural areas. Widespread use of pesticides in farming and food production, homes, schools, gardens and public places exposes children to toxic chemicals, and consequently they fall victims to debilitating and life-long health problems. For several reasons, rural children face far greater risks of exposure than adults. Compared to adults, children breathe more air, eat more food and

drink more water per unit of body weight which lead to greater exposure in a pesticide-contaminated environment.

The foetus growing in the womb is also exposed to pesticides through the placenta, if pesticides enter mother's body. This poses higher risk to normal growth and development of the child, and after birth continues to poison the child through breastfeeding. It is also important to note that foetal exposures to pesticides can trigger explosions of certain type of diseases in the adulthood. Early-life exposure can damage their developing brain, nerves and other bodily systems, and disrupt mental and physiological growth, leading to a range of diseases and disorders. Some of the disorders may show up only in adulthood and some can be passed on to successive generations, particularly cancers and changes in the reproductive system.

Scientific evidence shows that even low-level exposure to pesticides – way below what is generally considered safe – in the womb and early childhood

poses a serious threat to children's normal growth and health. PAN Asia and the Pacific (PANAP) has identified 21 pesticides (including glyphosate) as causing severe harm to children, and 18 of them are registered and used in India for many years.

Highly hazardous pesticides that harm children in India

HHPs harming children	Use type
Atrazine	H
Carbaryl	I
Chlorpyrifos	I
Chlorothalonil	F
Cypermethrin	I
DDT	I
Deltamethrin	I
Diazinon	I
Dichlorvos	I
Lambda-cyhalothrin	I
Malathion	I
Mancozeb	F
Methyl parathion	I
Monocrotophos	I
Paraquat	H
Permethrin	I
Propoxur	I
Glyphosate	H

I-Insecticide, F- Fungicide, H-Herbicide

Different sources of pesticide exposure

In addition to the pesticides used in farms, both in pre-and-post-harvest operations, they are also used in public health and household purposes. In public health, pesticides such as DDT and malathion are used for controlling mosquitos. A number of pesticides are also employed in household use. Mosquito repellent coils, electronic vaporizer, sprays

Impacts of pesticides on the brain development of children

#PesticidesFreeWorld



Cases of ADHD is on the rise

A study found a general increase of 11% in cases of ADHD since 2005. However, there was a 175% increase in cases among children between the ages of 3-17 ASSOCHAM (2011)



Brain harming pesticides are widely used

From 2005 to 2009, more than 7163 metric tons of chlorpyrifos, an organophosphate pesticide (OP) was used in India (Directorate of Plant Protection, Quarantine and Storage, Govt of India).



Pesticides are toxic at even low levels

Children who were maternally exposed to OPs have a 5-point drop in IQ scores when the maternal blood levels are elevated from 10 to 75 parts per billion (ppb). 1 ppb = 2 table spoons of sugar in an Olympic sized pool



Routes of exposure

Children are exposed to pesticides in various ways. Pesticides and other chemicals are found in food, water, air, environment, schools and household pesticides



Children in India fare worse

Many cases of severe pesticide - poisoning among children have been reported. In 2013, 23 children died in Bihar after consuming their mid-day meals contaminated by toxic OP, monocrothos which has been banned in many countries



Children are being born pre-polluted

Pesticides, lead and mercury have been found in umbilical cords and in bodies of children in various parts of India



Intelligence impacted by pesticides

80% of children who were exposed to pesticides performed worse in cognitive tasks than children who were less exposed. (A study in 6 cotton plantation states in India, K.Kuruganthi, 2005)



Best to adopt the precautionary principle in regulations

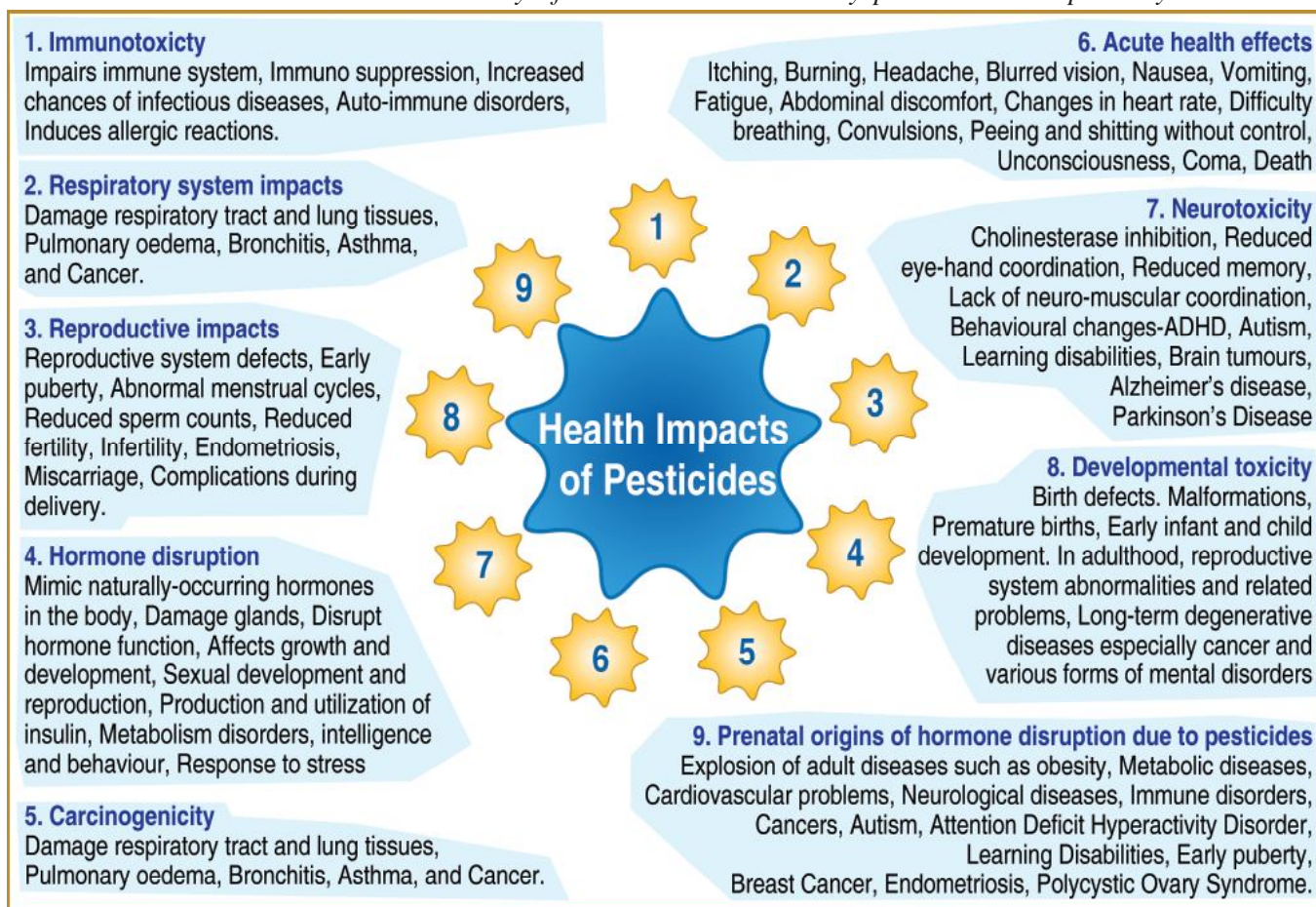
Urge governments and chemical industries to take precautionary measures before introducing chemicals to the market



Alternatives and solutions exist

Children who consumed organic food had less pesticides in their bodies. Keep schools, homes, and the environment toxin-free as much as possible

Information Prepared By :-
PAN India & PAN Asia Pacific (PANAP)
 Blog: <http://panap.net/childrenandpesticide/>
 Facebook: PAN Asia Pacific Twitter: @PANAsiaPacific



used to kill mosquito and cockroaches, etc contain highly hazardous pesticides as the poisonous ingredients in it. Thus pesticides used in agriculture, public health and in household products form sources of exposure to pesticides. This also results in continuous exposure to multiple pesticides in mild doses, but over a period these mild doses can get accumulated in our body and trigger various ill effects. Given these realities, we cannot determine a safe level of exposure for different strata of population – infants, children, adolescents, pregnant and breastfeeding women, etc., and making us to believe that the notion of safe level of exposure or pesticide use is a myth.

Indiscriminate, unsafe and misuse of deadly pesticides in

the past decades have ultimately resulted in polluting the soil, water, air, food and ecosystems. In addition to causing environmental pollution and making our ecosystem a reservoir of hazardous chemicals, researches over the past years have been showing that due to persistence and acute and chronic toxicological capabilities, chemical pesticides have had a profound impact on public health causing communities to bear the burden of a multitude of chronic diseases and disorders (which are not curable as well) making their life miserable. Epidemics of degenerative diseases, stunted growth, developmental and congenital abnormalities, metabolic disorders, etc. can be seen widely. There is no reason

to believe that safe use of pesticides can happen. A global campaign is demanding progressive ban on highly hazardous pesticides and phase out all other pesticides at the earliest. Non-chemical methods of food production and household pest management have to be promoted. We need to build confidence among farming communities to opt for sustainable agriculture. To protect children, PAN India has urged Central and State Governments to impose a buffer zone (where use of pesticides should not be allowed) of at least a kilometre for schools, anganwadis, hospitals, human settlement areas, etc.■

(Pesticide Action Network (PAN) India, www.pan-india.org dilecpnrm@gmail.com)