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SYNOPSIS

The petitioner is filing the present writ petition in public interest under Article 32 of the Constitution of India, seeking the enforcement of the right to health of farmers, farmworkers as well as consumers, which has been read by this Hon'ble court to be a fundamental right as part of the right to life under Article 21 of the Constitution.

The Insecticides Act, 1968, was enacted to regulate the use and manufacture of pesticides with a view to prevent risk to human beings or animals, and for matters connected therewith. Within it the Central and the State governments are empowered to prohibit the use and manufacture of pesticides that pose a risk to human beings or vertebrate animals. The Central and State governments have a duty to the farmers and farm workers as citizens of this country to ensure that they are able to live healthy lives in a clean and healthy environment, but rather than ensuring this, it appears that they have turned a blind eye to the health crisis being faced by its citizens, especially those that grow our food. The Central and State governments have apparently ignored reports of a large number of cases of acute poisoning due to pesticides which resulted in deaths, hospitalizations and subsequent ill health, and overwhelming evidence over the last many years that farmers and farm workers have been suffering from severe diseases ranging from abnormally high number of

cancer cases to reproductive disorders to mental illnesses that are attributable to the use of pesticides in farming and their leaching into the soil and groundwater and contaminating our air and food. It is thus apparent that the successive Central and the State governments have defeated the very object of the Act and violated their fundamental right to health under Article 21 of the Constitution.

There are at least 93 Pesticides that are used in India that have been banned by other countries and atleast an additional 6 more that are used in India that have been withdrawn or restricted by other countries. The very minimum that the Central and State governments should have done in response to the overwhelming reports of the adverse effects on farmers and farmworkers was to have banned with immediate effect, those pesticides that have been banned in other countries. Because those pesticides have been banned by other countries on the basis of the grave risks they pose to human beings, and human beings are the same everywhere.

Almost no part of the farming belts of India have been left unscathed by the disastrous effects of pesticides on human health, but certain regions have been hit harder than others. The state of Punjab was made to take the lead in adopting the 'Green Revolution' techniques that

combined the use of chemical fertilizers, chemical pesticides, irrigation and hybrid seeds, and became one of the largest producers of wheat and rice in the country and the largest contributor of wheat and rice in the country to the central pool. But as a large number scientific papers, studies, fact finding reports and newspaper reports appear to show, the last four decades of high agricultural productivity have left the farmers, farmworkers, and residents of the farming areas in a state of great distress, with their environment getting poisoned, their water getting contaminated and their health failing. This crisis has been symbolised by the 'Cancer Train' of Punjab, on which a number of newspaper articles have been written. Similarly Kerala has been hit hard by the tragedy caused by Endosulfan, which is an organochlorine pesticide that had disastrous effects on the health of people living in the vicinities that it was used in and on the environment in the state of Kerala before it was banned in the interim by this Hon'ble Court. In Bihar, Monocrotophos an organophosphate pesticide caused the death of atleast 23 students who had a midday meal contaminated by the pesticide on 16.07.2013 in Saran District. And most recently, in Maharashtra, since July 2017 alone, more than 50 farmers have been killed due to pesticide poisoning while spraying pesticides on their crops, with Yavatmal district being the most severely affected.

Inadequacies and loopholes in the laws regulating pesticides, their ineffective implementation, and the lack of coordination between the different agencies that regulate pesticides have been highlighted in a number of news reports. The lack of regulation came out most starkly when it was reported in September 2017 that nearly a million Indian farmers were planting unapproved herbicide tolerant genetically modified seeds.

According to the National Crime Records Bureau (NCRB), close to 300,000 farmers have committed suicide in the past two decades, averaging more than 46 farmer suicides everyday in India, and now scientific studies have linked pesticide use by farmers to depression and suicidal tendencies. Numerous scientific papers and studies have shown pesticide exposure has increased the risk of several disease like various forms of Cancer, DNA damage, damage to the brain and nervous system, Parkinsons Disease, Birth Defects, Immunological changes, and adverse effects on the physical and mental development of children, in farmers and farmworkers and their families in many states of India including Andhra Pradesh, Madhya Pradesh, Uttar Pradesh, Tamil Nadu, Punjab and Karnantaka. Farmworkers who spray the pesticides, as well as people in the vicinity of the

fields where pesticides are sprayed are routinely poisoned during spraying causing excessive lacrimation, excessive salivation, dizziness, nausea & vomiting, breathlessness, body aches and cramps due to poisoning in the short term and deadly diseases in the long term. It is not just farmers and people living in farming belts that are at a grave risk due to pesticide use, consumers living in and around cities are a grave risk too. Many scientific papers have been written on the risks pesticides pose to consumers, including a recent study in Delhi that showed that many samples of vegetables and fruits sold contained pesticide residues above the maximum residue limit (MRL), despite the fact the MRL's themselves are not scientifically decided and in many cases are more than MRL's set in other countries. From the scientific papers, studies, fact finding reports, and newspaper articles referred to and annexed, the following can be safely submitted:

a) Large parts of the farming belts of India have been polluted and contaminated by pesticides. Unacceptable levels of pesticide residues have been found not only in the groundwater and soils but in the blood, tissues, hair, nails and breast milk of farmers and farmworkers of India.

b) The bioaccumulation of pesticides in the body of the farmers and farmworkers has led to alarmingly high number of cases of reproductive disorders, mental

retardation, and various forms of cancer, reaching almost an epidemic level, in addition to acute poisoning cases that have led to deaths of farmers and farm workers.

c) A large number of cases of acute and chronic poisoning due to pesticides are being reported on an almost daily basis.

It is a well-known fact that farmers have been caught in a vicious cycle of deteriorating health, mounting debt, deteriorating soil health and groundwater quality. Given the failure of the central and state governments to ban pesticides banned in other countries, regulate and restrict the use of pesticides, and the consequential adverse effects of this failure of the health of farmers, farmworkers, and consumers, the petitioners are praying for a ban with immediate effect on all pesticides that have been banned by any other country, ban advertising and unacceptable practices of marketing of pesticides, follow the precautionary principle before registering any pesticide for use or manufacture and to make it mandatory to perform a needs and alternatives assessment before registering any pesticide.

Conversion of farms from inorganic, chemical based agriculture to organic, chemical free agriculture is not only imperative to secure the right to health of farmers, farmworkers and consumers, but has also been shown

to have comparable if not greater productivity. Government studies have shown that productivity of most of the crops is greater in organic farms. It is submitted that in order to bring the farmers out of the vicious cycle they are in, it is necessary to phase out the use of all chemical pesticides. For this is prayed that an expert committee comprising of individuals with unimpeachable integrity be appointed to examine the issue of phasing out all chemical pesticides in a time bound manner while simultaneously promoting organic farming and providing farmers with the necessary knowledge and assistance to be given by the Central and State Governments for the period of time it will take for their farms to convert to chemical pesticide free organic farms.

List of dates

02.06.1968	Insecticides Act. 1968 was brought into force to regulate the import, manufacture, sale, transport, distribution and use of insecticides with a view to prevent risk to human beings or animals, and for matters connected therewith.
23.03.1974	The (Water Prevention and Control of Pollution) Act, 1974,

	enacted, "..to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water.."
23.05.1986	The Environment (Protection) Act, 1986, enacted, "*..to provide for the protection and improvement of environment and for matters connected there with.*". Through the (Water Prevention and Control of Pollution) Act, 1974, The Environment (Protection) Act, 1986, The Environment (Protection) Rules, 1986, and the Hazardous Wastes (Management and Handling) Rules, 1989, the Central and State Governments can give directions to prevent the contamination of the groundwater, streams, and the environment in general by pollutants including pesticides and penalise violations of the norms set by them.

24.08.2006	The Food Safety and Standards Act, 2006, read with The Food Safety and Standards (Contaminants, toxins and Residues) Regulations, 2011, sets the maximum residue limits (“MRL”) of pesticides in articles of food.
24.05.2005	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (‘The Rotterdam Convention’), to which India acceded on 24.05.2005. It is a multilateral treaty to promote shared responsibilities in relation to importation of hazardous chemicals. The convention promotes open exchange of information and calls on exporters of hazardous chemicals to use proper labeling, include directions on safe handling, and inform purchasers of any known

restrictions or bans. Signatory nations can decide whether to allow or ban the importation of chemicals listed in the treaty, and exporting countries are obliged to make sure that producers within their jurisdiction comply.

13.01.2006 Stockholm Convention on Persistent Organic Pollutants ('The Stockholm Convention'), which India ratified on 13.01.2006 and brought into force on13.04.2006. It is an international environmental treaty that aims to eliminate or restrict the production and use of persistent organic pollutants ('POPs'). POPs are organic compounds that are resistant to environmental degradation and because of their persistence, POPs bioaccumulate with potential significant impacts on human health and the environment. A majority of the POPs listed in

	the Stockholm Convention are pesticides.
1968 till Present	Despite the state as well as the central governments having the statutory right to prevent the use and manufacture of pesticides that can, may and are harming the health of citizens, as well as the statutory obligation to protect the health of its citizens from the ill effects of pesticides, successive governments have failed to protect the citizens right to health under Article 21 of the constitution. This is most starkly demonstrated by the fact that the successive governments have even allowed the use and manufacture of at least 99 pesticides that have been banned by other countries on the basis of solid evidence of their adverse health effects. This has led to unimaginable misery, disease, ill health, and death for

	countless farmers and citizens of this country.
July 2017	From July to September 2017, more than 50 farmers in Maharashtra, mostly from Yavatmal district, were killed by pesticide poisoning after spraying them on crops.
30.10.2017	Hence this present Petition.

IN THE SUPREME COURT OF INDIA

CIVIL WRIT ORIGINAL JURISDICTION

CIVIL WRIT PETITION NO. _____OF 2017

IN THE MATTER OF:

1. Kavitha Kuruganti
   33/1 Flat 302,
   Santhome Apartments,
   1st A Cross, Indiranagar 1st Stag,
   Bangalore – 560038
   India ...Petitioner No. 1

2. Dr. Amar Singh Azad
   79 – Doctors Colony
   Bhadson Road
   Patiala
   Punjab – 147001
   India ...Petitioner No. 2

3. V.R. Ananthasayanan
   A 2, Ananti Apartments,
   Alwarpeti,
   Chennai - 600018
   India ...Petitioner No. 3

Versus

1. Union of India
   Through its Secretary,
   Central Insecticides Board
   and Registration Committee ...Respondent No. 1

2. Union of India
   Through its Secretary,
   Department of Chemicals
   and Petrochemicals,
   Ministry of Chemicals
   and Fertilizers ...Respondent No. 2

3. Union of India
   Through its Secretary,
   Department of Agricultural Cooperation
   And Farmers Welfare,
   Ministry of Agriculture
   and Farmers Welfare ...Respondent No. 3

Writ Petition in public interest under Article 32 of the Constitution of India seeking an appropriate writ to prevent all those pesticides from being used in India which have been banned or refused registration in any other country on the ground that they pose serious health hazards to farmers, consumers and all citizens and their continuing use violates the rights of the citizens under Articles 21 of the Constitution of India

To

The Hon'ble Chief Justice

And his companion justices of the Supreme Court of India

Most respectfully showeth:

1. That the petitioner is filing the present writ petition in public interest under article 32 of the Constitution, seeking the enforcement of the right to health of farmers, farmworkers as well as consumers, which has been read by this Hon'ble court to be a fundamental right as part of Article 21 of the Constitution.
2. Pesticides including insecticides, herbicides, fungicides and weedicides are regulated in the country primarily through the Insecticides Act, 1968 ("The Act"). The preamble of the Act states – "*An Act to regulate the import, manufacture, sale, transport, distribution and use of insecticides* ***with a view to prevent risk to human beings or animals, and for matters connected therewith.***" Within the Act, the Central and the State

governments are given certain powers separately and certain powers jointly to implement the provisions of the Act.

3. The Central and State governments have a duty to the farmers and farm workers as citizens of this country to ensure that they are able to live healthy lives in a clean and healthy environment, but rather than ensuring this, it appears that they have turned a blind eye to a large number of cases of acute poisoning due to pesticides which result in deaths, hospitalisations and subsequent ill health, and overwhelming evidence over the last many years that farmers and farm workers have been suffering from severe diseases ranging from abnormally high number of cancer cases to reproductive disorders to mental illnesses that are attributable to the use of pesticides in farming and their leaching into the soil and groundwater and contaminating our air and food. It thus appears that the successive Central and the State governments have defeated the very object of the Act and violated their fundamental right to health under Article 21 of the Constitution.

4. **The Petitioners:**

   a) Petitioner No. 1, Kavitha Kuruganti, has 22 years of experience working on developmental issues, mainly on farm livelihoods, food security and seed sovereignty, democratization of science and

qualification. She is at present taking an active lead role as a National Convener of Alliance for Sustainable and Holistic Agriculture (ASHA, www.kisanswaraj.in), an informal network of more than 400 organisations across 23 states of India that have come together to address the agrarian crisis in India. Kavitha Kuruganti is authorized to file this PIL. Kavitha Kuruganti's annual income is Rs. 5 Lakh (Approx.) (PAN No. : AHGPK7157F). (UID No. 811782600267).

b) Petitioner No. 2, Dr. Amar Singh Azad, retired as Chief Medical Officer in Punjab and had in the past worked in various positions in the Punjab Civil Medical Services in various government hospitals. Dr. Amar Singh Azad's annual income is Rs 8 Lakhs (Approx.) (PAN No. ABJPA4154H) (UID No. 921983807319)

c) Petitioner No. 3, V.R. Ananthasayanan, has been working on sustainable agriculture, healthy food systems and the well being of farmers in Tamil Nadu. He is the convener of the Safe Food Alliance, a large consumer movement focusing on food safety and sustainable farm livelihoods in the state of Tamil Nadu. V.R. Ananthasayanan's annual income is nil. (PAN No. ALLPA0353L)

5. The Petitioners have no personal interest, or private/oblique motive in filling the instant petition. There is no civil, criminal, revenue or any litigation involving the petitioner which has or could have a legal nexus with the issues involved in the PIL.

6. That the petitioners have not filed any other writ petition same or similar to the present writ petition, neither in this Hon'ble Court nor in any other Court or forum across the land.

7. That most of the documents annexed with the present writ petition are in public domain, some of them have been obtained under the RTI Act.

The Case in Brief:

A) A brief history of Pesticides:

8. Synthetic chemistry advanced rapidly in the 1930s and by the early 40s, a range of new pesticides had been developed, including organochlorine insecticides like DDT. In 1937 the first organophosphate compounds were synthesized by a group of German chemists. These very potent compounds were kept secret during World War II and were originally developed as potential chemical warfare agents. However, after the war there was little use of these killer organophosphate compounds so they were re-purposed and sold as insecticides. and many organophosphate insecticides continue to be used today. Herbicides were developed

after WWII in order to increase food production and create possible warfare agents. In 1946, the first commercially available chlorine-based herbicides were marketed to kill broadleaf plants. This class of compounds includes 2,4-D (2,4-Dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid), synthetic auxins (plant hormones) that disrupt plant growth. These herbicides have been extensively utilized in agriculture and to clear roadsides and rights of way. 2,4,5-T was used extensively during the Vietnam War to defoliate jungle plants. During the manufacturing process, 2,4,5-T was often contaminated with the persistent and very toxic dioxin, TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin). Dioxins, like other chlorinated compounds including DDT, bioaccumulate in body fat and persist in the environment for many years (the soil half-life is 10 to 12 years). Dioxins are classified as carcinogens and are also known to affect the reproductive and immune systems.

In India, one of the worst industrial disasters ever, the Bhopal gas disaster and its continuing aftermath, are linked to chemical pesticide production.

B) Legal framework governing use and manufacture of Pesticides In the country:

9. The statement of objects and reasons of the Act makes it clear that the Act came into being in the aftermath of many deaths due to food-poisoning by an

organophosphate pesticide (Parathion) in the months of April-May 1958 in the states of Kerala and Madras. Thereafter cases of food-poisoning were also reported in 1962 in Malda and Dinajpur districts of West Bengal and Assam, respectively, due to contamination of wheat flour with another organophosphate pesticide (Tri-ortho-cresyl phosphate) as a result of which 450 persons were crippled by paralysis. The Inter-Ministerial Committee appointed by the government suggested the enactment of legislation to regulate the manufacture, sale, storage, transport, distribution and use of insecticides including pesticides, herbicides or fungicides in the country. The Act thus came into being in 1968 "*to regulate the import, manufacture, sale, transport, distribution and use of insecticides with a view to prevent risk to human beings or animals, and for matters connected therewith.*" The salient features of the act are:

i) Establishment of a Central Insecticides Board and the setting up of a committee called the 'Registration Committee' for the purpose of granting certificates of registration to persons desiring to import or manufacture insecticides;

ii) Licensing of persons desiring to manufacture, sell or exhibit for sale or distribute any insecticide;

iii) Establishment of a Central Insecticide Laboratory for carrying out certain functions under the Act;

iv) Prohibition of import, manufacture, sale, etc., of insecticides in contravention of the provisions of the Act;

v) Regulation of transport and storage of insecticides so as to prevent cases of accidental contamination of food with insecticides;

vi) Provision for taking immediate action by way of prohibition of sale, distribution or use of any insecticide where it is found that the sale, distribution or use of the insecticide is being done in such a way as to involve risk to human beings or vertebrate animals and where immediate action is necessary.

10. The other laws that regulate pesticides are –

i) The (Water Prevention and Control of Pollution) Act, 1974, enacted, "*..to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water..*"

ii) The Environment (Protection) Act, 1986, enacted, "*..to provide for the protection and improvement of environment and for matters connected there with.*". Through the (Water Prevention and Control of Pollution) Act, 1974, The Environment (Protection) Act, 1986, The Environment (Protection) Rules, 1986, and the Hazardous Wastes (Management and Handling)

Rules, 1989, the Central and State Governments can give directions to prevent the contamination of the groundwater, streams, and the environment in general by pollutants including pesticides and penalise violations of the norms set by them.

iii) The Food Safety and Standards Act, 2006, read with The Food Safety and Standards (Contaminants, toxins and Residues) Regulations, 2011, sets the maximum residue limits ("MRL") of pesticides in articles of food.

11. In addition to the above, India is a party to two international conventions in relation to pesticides:

i) Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade ('The Rotterdam Convention'), to which India acceded on 24.05.2005. It is a multilateral treaty to promote shared responsibilities in relation to importation of hazardous chemicals. The convention promotes open exchange of information and calls on exporters of hazardous chemicals to use proper labeling, include directions on safe handling, and inform purchasers of any known restrictions or bans. Signatory nations can decide whether to allow or ban the importation

of chemicals listed in the treaty, and exporting countries are obliged to make sure that producers within their jurisdiction comply. A copy of the text of the Convention is attached herewith and marked as **Annexure P1(Pages _____to_____.**

ii) Stockholm Convention on Persistent Organic Pollutants ('The Stockholm Convention'), which India ratified on 13.01.2006 and brought into force on13.04.2006. It is an international environmental treaty that aims to eliminate or restrict the production and use of persistent organic pollutants ('POPs'). POPs are organic compounds that are resistant to environmental degradation and because of their persistence, POPs bioaccumulate with potential significant impacts on human health and the environment. A majority of the POPs listed in the Stockholm Convention are pesticides. A copy of the text of the Convention and subsequent amendments is attached herewith and marked as **Annexure P2**. **(Pages_____to_____)**

C. Pesticides banned or unapproved in India and the World:

12. According to a compilation done by Pesticide Action Network ('PAN'), as of April 2017, there are a total of 370 pesticides that have been banned by atleast one or

another country plus an additional 44 pesticides have been refused registration in the EU. Therefore a total of 414 pesticides have been banned or refused registration in atleast one or another country. A copy of the report along with the table is attached herewith and marked as **Annexure P3**. **(Pages_____to_____)**

13. According to the official Central Insecticide Board and Registration Committee ('CIBRC') website, per the latest data on the website, as of 30.06.2017, 279 pesticide molecules were registered for use in India. Per the latest data on the website, as of 20.10.2015, 28 pesticide molecules and 4 pesticide formulations had been banned for manufacture, import and use. In addition, 2 pesticides had been banned for use but allowed to manufacture for export, 8 had been withdrawn provisionally, and 18 refused registration. A copy of the official list of registered pesticide molecules is attached herewith and marked and **Annexure P4. (Pages_____to_____)** and a copy of the official list of bans, refusals and restrictions on pesticides in India is attached herewith and marked and **Annexure P5. (Pages_____to_____)**

14. A Comparison between PAN International's compilation of pesticides banned in one or another country (**Annexure P3**) and the official Indian list of Registered Pesticides (**Annexure P4**), shows that India allows the

use of 93 pesticides that have been banned or refused to be registered in one or another country as per the current information available according to PAN International Compilation or Government of India's own data. This does not include more pesticides which have been withdrawn or restricted, which adds up to 6 more pesticides. These pesticides (banned in one or another country elsewhere or restricted), constitute 99 pesticides. The list of pesticides banned by other countries but still in use in India is annexed herewith and marked as **Annexure P6**. **(Pages_____to_____)**

15. On 08.12.2015, in reply to starred question No. 127 in the Lok Sabha, the Central Government stated that there were 66 pesticides which are banned/restricted in other countries of the world but are permitted use in India. This answer to the Lok Sabha given by the Central Government was factually incorrect as of the date of answering that question, because even as of 20.10.2015 there were at least 93 Pesticides that were used in India that have been banned by other countries and atleast an additional 6 more that were used in India that have been withdrawn or restricted by other countries. Copy of starred question No. 127 in the Lok Sabha, and the answers given by the Central Government on 08.12.2015 is attached herewith and marked as **Annexure P7**. **(Pages_____to_____)** Furthermore the Central

Government also stated that a committee of experts had been constituted under the Chairmanship of Dr. Anupam Verma to review the 66 pesticides. The said committee in its report recommended bans on only 13 of the 66 pesticides, and even those will come into effect only 3-5 years down the line, as has been decided by the registration committee in a special meeting held on 22.12.2015. It is also respectfully submitted that the committee has not given any reason for allowing the use of many pesticides that pose immense risk to human, animal and environmental health. Thereafter, on the basis of the above said report, the Central Government issued a draft order on 15.12.2016, subject to objections that it may receive, by which it has banned the use of 12 pesticides w.e.f 1st January 2018, and a further 6 pesticides w.e.f 1st January 2021. Copy of the minutes of the special meeting of the registration committee held on 22.12.2015 and a copy of the draft order dated 15.12.2016 are attached herewith and marked as **Annexure P8**. **(Pages_____to_____)**

16. It is respectfully submitted that any pesticide banned in another country has been banned because there is evidence of its adverse effects on human health, animal health and the environment in general or there is serious apprehension of such adverse effects. Since human beings are the same everywhere, the possibility of

adverse effects on human health, animal health and the environment in general exists in our country too. Over the last years there have been a number of newspaper reports and scientific studies that have highlighted and documented the adverse effects of pesticides from different parts of the country.

D. Adverse effects of pesticides on human health:

17. Newspaper reports on the adverse effects of pesticides:

a) When India adopted 'Green Revolution' techniques that combined the use of chemical fertilizers, chemical pesticides, irrigation and hybrid seeds, the state of Punjab was made to take the lead and became one of the largest producers of wheat and rice in the country and the largest contributor of wheat and rice in the country to the central pool. But as a large number of newspaper reports appear to show, the last four decades of high agricultural productivity have left the farmers, farmworkers, and residents of the farming areas in a state of great distress, with their environment getting poisoned, their water getting contaminated and their health failing. This crisis has been symbolised by the 'Cancer Train' of Punjab, on which a number of newspaper articles have been written:

i) On 09.03.2008 The Tribune published a report titled 'Cancer belt of Punjab' that documented how the number of cancer patients in the recent

years in the Malwa region of Punjab had grown manifold and that local people feel excessive use of pesticides has contaminated the groundwater. The report documents how over the years a train from Bathinda to Bikaner has come to be known as the 'Cancer Train' because of the number of cancer patients who travelled on this train everyday to get treated in the Rajasthan Government-owned cancer hospital of the medical college at Bikaner, and how the cost of treatment has increased their burden of debt. A copy of the report is attached herewith and marked as **Annexure P9**. **(Pages_____to_____).**

ii) On 11.05.2009 the National Public Radio published a report titled 'In Punjab, Crowding Onto The Cancer Train' that documented how the 'Cancer Train' was routinely carrying atleast 60 cancer patients to Bikaner for treatment while people wondered why there was such an increase in the prevalence of cancer in the farm regions. The report said:

> *"In the Punjab village of Jajjal, farmer Jarnail Singh played a role in spurring university researchers to study whether the Green Revolution has been hurting the public's health.*
> *Singh says he noticed one of the first troubling clues in the late 1980s and early '90s: Peacocks — India's national bird — disappeared from the fields. Over the years, seven people in his family got cancer*

— and three of them died. People in Jajjal and surrounding villages got cancer, too.
Singh says he saw that many fellow farmers were overusing pesticides and not handling the toxic chemicals safely.
Many farmers "get totally covered" by pesticides when they spray them — "in their hair, on their body, in their eyes," he says. "And that got me thinking about, why aren't we really looking at that, how that may affect the farmers?"
Critics say government leaders pushed the Green Revolution before they had safeguards in place to protect the population."

A copy of the report is attached herewith and marked as **Annexure P10**. **(Pages_____to_____)**

iii) On 16.08.2011 The Times of India published a report titled 'A train ride to cancer care' documenting how 70 to 100 cancer patients make their way from Bathinda to Bikaner every night aboard the 'Cancer Train'. The report notes:

"The cancer-affected on this train are small farmers from the southern districts of Punjab: Bathinda, Faridkot, Moga, Muktsar, Ferozepur, Sangrur and Mansa. Known together as the Malwa region, farmers and families here are grappling with cancer and health problems that have crept into their homes through the backdoor as the farmers of India's grain bowl fed the nation.
Dr Manjeet S Jaura, senior oncologist at Faridkot Medical College says he receives a staggering 30 to 35 new cancer cases daily at the year old cancer facility in Faridkot, set up as part of the National Cancer Control Programme. "There is definitely an increased prevalence of cancer in the region," he says.
The lush fields hide a scary tale. Farmers live in a disturbing cesspool of toxicity, a result of excessive and unregulated use of pesticides and chemical fertilizers."

A copy of the report is attached herewith and marked as **Annexure P11**. **(Pages_____to_____).**

iv) On 02.01.2013, The Washington Post Published a story titled "Passengers on India's 'cancer train' share stories of pain and hope" which documented the stories of these cancer patients and reported how the number of patients on the train grew during the preceding 5 years. The report said:

> *"On the train, almost everyone — patients and regular passengers alike — agrees there is little doubt that pesticides are mainly to blame. But they say they cannot afford to stop using them.*
> *"I spray pesticides 10 times in three months on my cotton crop, every week on the vegetables and a couple of times on the wheat crop," said Baldev Singh, a 63-year-old turbaned farmer. "I am told there is a link between pesticides and cancer. But it increases productivity."*
> *Singh's wife, Jasveer, is a cancer patient.*
> *"It is all because of poisoned water and my destiny," she said."*

A copy of the report is attached herewith and marked as **Annexure P12**. **(Pages_____to_____).**

v) On 01.12.2013 The Indian Express published a report titled "Bathinda to Bikaner, aboard 'cancer train' " which documented the stories of the patients aboard the 'Cancer Train' including some whose whole families had succumbed to cancer. A copy of the report is attached herewith

and marked an **Annexure P13**. **(Pages_____to_____).**

vi) On 31.01.2016 The Tribune published a story titled "Heavy rolls the cancer train, still" documents the unabated and increasing number of cancer patients that still board the cancer train. A copy of the report is attached herewith and marked as **Annexure P14**.

b) Endosulfan is an organochlorine pesticide that had disastrous effects on the health of people living in the vicinities that it was used in and on the environment in the state of Kerala before it was banned in the interim by this Hon'ble Court.

i) On 25.10.2009 The Hindu published a report titled 'No end to Endosulfan tragedy' that documents the plight of the people of Kasaragod district of Kerala whose suffered as a result Endosulfan contaminating their water, food and soil. The report observes:

> *"People are still dying from after-effects of the pesticide, while more than 1000 live in utter misery. The health of more than 9000 persons has been impaired by the pesticide used by the State-owned Plantation Corporation of Kerala at its cashew plantations."*

A copy of the report is attached herewith and marked as **Annexure P15**. **(Pages_____to_____).**

ii) On 08.01.2011 The Hindu published an article titled 'Idukki faces grave health risks from pesticides' which documented how the Endosulfan was being liberally used in the cardamom plantations in Idukki district and how pesticide use on plantations and vegetables was posing a threat to the health of locals. The report documents the sharp increase in acute poisoning, chronic poisoning cases, as well as cancers of the intestinal tract, blood, lungs and liver and congenital abnormalities. The report notes:

> *"Dr. K. Anil Pradeep of St. John's Hospital, Kattappana, said that ten to 20 persons had come to him with symptoms of lung cancer during the past one year. There was also high prevalence of liver cancer, oesophagus cancer and intestinal cancer. Those coming into direct contact with pesticides often complained of allergies, asthma and skin problems. Pesticides caused cancer, impotence and congenital deformities after 10 to 20 years of chronic exposure.*
>
> *Dr. R. Mini, paediatrician of the Taluk Hospital at Nedumkandam said that the incidence of congenital anomalies such as cerebral palsy and Down's syndrome were high in the area. Three children in the area had meningomyelocele (spinal cord lesion) with hydrocephalus (enlargement of head owing to accumulation of fluid). There was, however, no proof that it was caused by pesticide. (One of the patients at Balagram near Nedumkandam died recently).*
>
> *These kinds of abnormalities have been noticed in the endosulfan-affected areas of Kasaragod district. According to medscape.com, poisoning is one of the possible reasons for hydrocephalus. Idukki district has eight registered and several unrecognised special schools for mentally*

retarded. The unregistered schools include one run by Kanan Devan Hill Produce Company (formerly Tata Tea Limited). The school at Nedumkantam has 91 pupils while four institutions in Kattappana town, which is the middle of the cardamom reserves, have more than 250 children."

A copy of the report is attached herewith and marked as **Annexure P16 (Pages_____to_____).**

iii) On 23.02.2015 The Hindu Published a report titled 'Endosulfan destroyed biodiversity of Kasaragod villages' which documents how even 4 years after this Hon'ble Court had banned the use of Endosulfan, its adverse effects on the environment still persisted. The report noted:

"A quick survey by Dr. Vijayan and his team indicates that the pesticide hit the plants and animals of the area besides causing endless human sufferings. The area showed a decline in plant diversity between 40 and 70 per cent, particularly for native species, compared to the natural habitat. Fishes were the worst hit."

A copy of the report is attached herewith and marked as **Annexure P17(Pages_____to_____)**.

iv) Most recently, in Maharashtra, since July 2017, more than 50 farmers have been killed by pesticide poisoning while spraying their crops. Yavatmal district within the Vidharbha region of Maharashtra has been most severely affected. BBC published a report dated 05.10.2017 titled 'The Indian farmers falling prey to pesticide' on this most recent episode of farmers being poisoned and killed by pesticides. The said

report is annexed herewith and marked as **Annexure P18 (Pg__ to Pg___)**.

The recent spate of deaths and hospitalisations from occupational pesticide poisonings in Yavatmal region of Maharashtra district are a blatant violation of the Right to Life of poor and desperate agricultural workers. It is reported that around 50 citizens have died so far, and around 800 hospitalised. These numbers could very well be under-reported in a situation which sees enormous lack of coordination between different concerned agencies. At the time that this petition is being filed with this Hon'ble Court, many are still battling for their lives in different hospitals.

It is being rationalised as a phenomenon that is the result of unsafe, indiscriminate and injudicious use of pesticides by farmers and agricultural workers in an approach that blames the victims. This is also reflected in the responses from the state government as a reaction to the unfolding tragedy. However, from a fact finding visit led by one of the petitioners in this case (and her work on other similar instances in the past), it is apparent that in a

situation where deadly poisons cannot be regulated and controlled given our rural socio-economic conditions, the only option to protect the Right to Life guaranteed in our Constitution is to remove such poisons from the scene. This is especially so in a context when these poisons are not needed in agriculture, when post-modern science & technology do exist for non-pesticidal, non-GM approaches to crop protection, which are not being promoted with the farming communities by governments. This is clearly an unscientific outlook to extension that the governments are adopting.

The above-referred fact finding report, to investigate the pesticide poisonings in Yavatmal, came up with the following main findings:

- That because of failed so-called modern technologies of plant protection (both pesticides and GM), farmers are using desperate and deadly mixtures of pesticides and are providing pragmatic reasons for doing so, unaware of the serious hazards waiting in store with such practices.
- That there is an absence of end-use regulation of pesticides in the country, which would be so, given that no effective mechanism is possible to

take up monitoring of pesticide use by each farmer and farm worker, nor is it the primary job of an already-strained agricultural extension system.

- That all plausible reasons provided for the Yavatmal poisonings incidents as almost one-off rare occurrence have been found to be falsifiable. It is noted that such pesticide poisoning of farmers and workers in an occupational context is a recurring phenomenon, both here and elsewhere. However, no data or surveillance systems are maintained by governments.
- That there is no extension advisories related to non-chemical, non-GM plant protection measures are reaching farmers and there is a clear failure of the agriculture research and extension mechanisms on this front.

The (desperate, crisis-laden) socio-economic conditions of our growers and workers, the deadly nature of these pesticides including extremely hazardous and highly hazardous pesticides (as per their acute toxicity whereas there are many chronic impacts too which are not even being debated in the current tragic episode) continued in India with a complete absence of regulatory capabilities to ensure

their proper use, and the well-evolved post-modern S&T of plant protection which do not require farmers to use hazardous technologies, all point to a need to completely remove the said poisons from our food and agricultural systems.

c) Monocrotophos is an organophosphate pesticide that was the cause of the death of atleast 23 students who had a midday meal contaminated by the pesticide on 16.07.2013 in Saran District of Bihar.

i) On 24.07.2013 CBS news published a report titled 'Organophosphate pesticides eyed as cause of India poisonings: How toxic?' which documented how the World Health Organisation ('WHO') had been trying for years to convince India to ban monocrotophos, the pesticide that caused the death of the 23 schoolchildren. The report stated:

> *"The WHO's report flagged health risks in India because the chemical is "widely available," adding monocrotophos has been banned in Australia, Cambodia, China, the European Union, Indonesia, Laos, Philippines, Sri Lanka, Thailand, Vietnam and the United States.*
> *Organophosphate pesticides are a chemical that causes injury when ingested because it inhibits an enzyme called acetylcholinesterase located throughout the central nervous system. Exposure to the chemical, through eating or breathing in gas, can lead to a predictable, so-called "cholinergic syndrome," according to the Centers for Disease Control and Prevention. That can cause symptoms like diarrhea, vomiting, sweating, altered mental status, instability of bodily proceses like blood*

pressure and digestion regulation, and generalized weakness that can become paralysis and stop breathing.
Chemical weapons like nerve agents, such as sarin gas, use concentrated amounts of organophosphates.
"In simple terms it destroys your nerves, and without your nerves your key major organs can't function and death is very rapid," Hamish de Bretton-Gordon, an expert in chemical and biological weapons and the head of U.K. consultancy SecureBio, told CBSNews.com in an email."

A copy of the report is attached herewith and marked as **Annexure P19(Pages_____to_____)**.

ii) On 28.07.2013 The Hindustan Times published an article titled 'Is 'Monocrotophos', a banned pesticide, responsible for mid day meal deaths?' which documented how despite the WHO labelling monocrotophos as a highly hazardous pesticide, the CIBRC was persuaded by manufacturers to allow its use. The report noted:

"According to the minutes, the 2004 meeting conducted by the Central Insecticides Board and Registration Committee, the Indian government body that regulates pesticide use, concluded that: "The data submitted by the industry satisfies the concerns raised...Therefore, there is no need to recommend the ban of this product." "

A copy of the report is attached herewith and marked as **Annexure P20(Pages_____to_____)**.

d) Inadequacies and loopholes in the laws regulating pesticides, their ineffective implementation, and the lack of coordination between the different agencies

that regulate pesticides have been highlighted in a number of news reports.

i) On 14.03.2003 the Centre for Science and Environment (CSE) published a report titled 'Pesticide Industry thriving on legal loopholes' written in the backdrop of the controversy on pesticide residues in packaged water and drinks. The report observed that simply fixing MRL levels for packaged water would be akin to treating the symptom of the problem and not the root cause, which was pesticide residues in the source of the water, which were constantly seeping into the groundwater as well as surface water due to the porosity of laws that govern these toxic chemicals. The report points out that before a pesticide molecule is registered, the applicant is required to get field level tests done, but the whole process is a sham:

> *"Field level data includes details about different crops and pests, dosage of the pesticide, levels of its residues and its persistence. "This kind of information can take years to generate and involves a lot of hard work," points out P D Deshmukh, a former manufacturer of pesticides.*
> *The onus for providing such information is placed on the industry, and the entire process can cost about Rs 50 lakh. "But no one actually follows procedures. Mostly, the industry has its way. Producers can get a molecule registered despite its failing certain tests," says A T Dudani, a Delhi-based pesticides expert.*
> *"To gather data, the industry can either approach government laboratories or private ones which have been approved by*

the authorities," says N G Waghle, ex-vice-president, Pest Control India Limited.
"There is an unholy nexus between private labs and the industry," Waghle informs Down To Earth . "At times, private laboratories don't even bother to collect samples. They are more than willing to toe the industry's line," he adds. "As a result, data which would normally take 2-3 years to generate can be procured by companies within a month," points out Deshmukh. The modus operandi involves backdating correspondence for ordering data.
"If the law is followed, registration would be possible only after the new molecule has undergone rigorous tests. The truth, however, is that pesticide testing in India is a scientific sham," feels Dudani. "And there are agents who facilitate this dubious activity," he adds. cib officials admit that such a racket is thriving, at the same time denying any irregularity in the registration of pesticides."

A copy of the report is attached herewith and marked as **Annexure P21(Pages_____to_____)**.

ii) On 15.03.2007 Down to earth published a report titled 'US fines Dow Chemicals for bribery by Indian subsidiary' which reported on how Dow Chemical Company had been fined $325,000 for bribing an officials of the registration committee of the CIBRC for expediting registration of Dow's pesticides. A copy of the report is attached herewith and marked as **Annexure P22(Pages_____to_____)**.

iii) On 13.06.2015 The Times of India published a report titled 'Pesticide control in India: 3 agencies but no action' that documented that there are three different ministries to control and regulate pesticide use in India, but there is

very little coordination among them. CIBRC functioning under the Union agriculture ministry, approves introduction of new pesticides, FSSAI under Union health and family welfare ministry is responsible for fixing and checking the MRL of pesticides in food crops at the end level, and Agricultural and Processed Food Products Export Development Authority (APEDA), under Union ministry of commerce and Industry, sets the guidelines and standards for certifying organic farms. The report noted:

> *“ "While CIBRC gives approval to pesticides without hesitation, FSSAI's norms on permissible level of pesticides are not supported by any scientific base," said Kavitha Kuruganthi from Alliance for Sustainable and Holistic Agriculture.*
> *India does not just lack a system to manage pesticides in a sound manner, it also allows the sale and usage of highly toxic pesticides banned in several countries. DDT is known for the danger it poses, but India still continues to produce it. Endosulfan was banned only in 2011 after the Supreme Court intervened.*
> *Also, there is no control over sale of pesticides at the retail level. "In India, pesticide dosage depends on how much the farmer can afford. Given the extent of farming, it is impossible for any ministry to regulate pesticide consumption at the end level," said former director at Central Food Technological Research Institute V Prakash.”*

A copy of the report is attached herewith and marked as **Annexure P23(Pages_____to_____)**.

Additionally, it is pertinent to mention that the only guidelines prepared by CIBRC available in

public domain are for registration of pesticides, not use of pesticides. A list of guidelines (available on the CIBRC website) is attached as **Annexure P24(Pages_____to_____)**.

iv) A very recent report of 28.09.2017 published by the Indian Express, titled "Grey Market: When nearly a million Indian farmers plant 'unapproved' GM cotton" showed how there was not even a semblance of regulation in this industry because almost a million farmers in India were being sold unapproved herbicide tolerant, specifically Glyphosate tolerant, genetically modified seeds. The said report is annexed herewith and marked as **Annexure P25 (Pages_____to_____).** This shows that not only are unapproved genetically modified seeds being allowed to be sold, but also the sale of these Glyphosate tolerant seeds is dependent on the farmers spraying more and more Gyphosate, itself a very toxic Pesticide that has been banned in other countries, including Sri Lanka, and most recently it has been decided to be phased out in France. The said report dater 25.10.2017 reporting the phasing out of Glyphosate in France is annexed herewith and marked as **Annexure P26 (Pages_____to_____)**.

e) According to the National Crime Records Bureau (NCRB), close to 300,000 farmers have committed suicide in the past two decades, averaging more than 46 farmer suicides everyday in India. The Central and the State governments have been grappling with this issue for a long time, and now a landmark two-decade-long study conducted by the National Institute of Health, USA, in which more than 84,000 farmers and spouses of farmers were interviewed in the USA has thrown up startling findings which link pesticide use by farmers to depression and suicidal tendencies. On 07.11.2014, the Modern Farmer magazine published an article titled 'Landmark 20-Year Study Finds Pesticides Linked to Depression In Farmers'. The Article observed:

> *"There's a significant correlation between pesticide use and depression, that much is very clear, but not all pesticides. The two types that Kamel says reliably moved the needle on depression are organochlorine insecticides and fumigants, which increase the farmer's risk of depression by a whopping 90% and 80%, respectively. The study lays out the seven specific pesticides, falling generally into one of those two categories, that demonstrated a categorically reliable correlation to increased risk of depression.*
> *These types aren't necessarily uncommon, either; one, called malathion, was used by 67% of the tens of thousands of farmers surveyed. Malathion is banned in Europe, for what that's worth."*

A copy of the report is attached herewith and marked as **Annexure P27(Pages_____to_____)**. It is pertinent to note that Malathion has been recommended for use

by the Registration Committee in its meeting in December, 2015.

18. Scientific papers, studies and fact finding reports on pesticides and their impact on human and environmental health within India:

a) Punjab: Punjab is arguably the state that has been the most severely affected by the use of pesticides. Many scientific studies have been done, and papers written, on the pesticide residues in the water and soil of Punjab and its effects on human and environmental health.

i) In March 2005, CSE published a scientific report titled '*Analysis Of Pesticide Residues In Blood Samples From Villages Of Punjab*' in which blood samples of people living in four different villages in Bathinda and Ropar districts of Punjab were analysed and pesticides were detected in all the blood samples, indicating a regular and widespread exposure to pesticides. The study also cited several other studies that showed that pesticide exposure increased the risk of several disease like various forms of Cancer, DNA damage, damage to the brain and nervous system, Parkinsons Disease, Birth Defects, and Immunological changes. A copy of the health impact and conclusions report is attached herewith and marked as **Annexure P28(Pages_____to_____)**.

ii) On 04.08.2006, Kheti Virasat Mission (KVM) published a fact finding report titled '*Pesticide spray proves disastrous in Salkiana village of Jalandhar*' on an incident that occurred on 21.07.2006 in which residents of Salkiana village in Jalandhar district of Punjab fell ill and had to be hospitalised because a pesticide, Phorate, had been sprayed in adjoining fields. The worst affected were the school children of the Government-run Elementary School. A total of 18 persons were hospitalised for three days after they showed signs of excessive lacrimation, excessive salivation, dizziness, nausea & vomiting, breathlessness, body aches and cramps, all due to poisoning by Phorate. A copy of the report is attached herewith and marked as **Annexure P29(Pages_____to_____)**. It is pertinent to mention that according to the Registration Committee meeting in December, 2015, use of phorate is to be phased out by 2020. The Committee has provided no reason as to why such a toxic pesticide is not being banned with immediate effect.

iii) In March 2008, a thesis titled '*Cancer Deaths in Agricultural Heartland: A Study in Malwa Region of Indian Punjab*' was published by B.P. Singh of International Institute for Geo-Information Science and Earth Observation, Netherlands, which

analysed cancer mortality data for a period of five years from 2002-2006 from 30 randomly selected villages in Malwa region of Punjab. The analysis revealed that there was significant correlation between pesticide residues in soil and water with cancer mortality. The analysis also revealed that cancer mortality is increasing every year. A copy of the conclusion and recommendations of the thesis is attached herewith and marked as **Annexure P30(Pages_____to_____)**.

iv) In April 2013 a Scientific Paper titled '*Effects of Environmental Pesticides on the Health of Rural Communities in the Malwa Region of Punjab, India: A Review*' was published in the Human and Ecological Risk Assessment: An International Journal. The Abstract of the paper noted:

> *"The Malwa region of Punjab, India, is facing an unprecedented crisis of environmental health linked to indiscriminate, excessive, and unsafe use of pesticides, fertilizers, and poor groundwater quality. The region has been described as India's "cancer capital" due to abnormally high number of cancer cases, which have increased 3-fold in the last 10 years. Studies of this region have also highlighted a sharp increase in many other pesticide-related diseases, such as mental retardation and reproductive disorders. The most affected individuals are the agricultural workers who are directly exposed to pesticides. The Malwa region of Punjab, India, is less than 15% of the total area of Punjab (only 0.5% of the total geographical area of India), but it consumes nearly 75% of the*

total pesticides used in Punjab. The high use of pesticides, along with environmental and social factors, is responsible for the high concentration of pesticide residues in the food chain of this region. Moreover, many banned and restricted pesticides are still in use in this region, warranting strict periodical health checkups and other interventions."

The Paper noted:

"In various environmental samples, pesticides have been detected in groundwater, surface water, ambient air, and soil samples. In living systems, the pesticides have been reported in human blood, milk, animal blood, animal milk, tissues of animals, and also in crops, vegetables, and plants. The literature review of pesticides reported by different researchers working in the Malwa region of Punjab is listed in Table 1, which highlights the area and source of samples, pesticides detected, and their concentrations. Nearly 17 different types of pesticide residues have been detected in the region."

The paper further noted:

"The social factors that increase the risk of pesticide contamination are farmers' illiteracy, lack of personal protective equipment, and insufficient knowledge of pesticide hazards. Farmers use pesticides in much higher concentrations than recommended, which is another reason for fast deposition of pesticides in this region. Many banned and restricted pesticides have been detected in the Malwa region as mentioned in Table 1. Also, the pesticides that are restricted for use in agriculture are still being used by farmers."

The paper finally noted:

"The long-time over-use of pesticides appears to be a major cause for prevalence of various diseases in cotton cultivated districts of the Malwa region of Punjab. To safeguard human life from the toxic effects

of pesticides, adequate steps need to be taken."

A copy of the abstract, background and conclusions of the scientific paper is attached herewith and marked as **Annexure P31(Pages_____to_____)**.

v) On 21.11.2013 a scientific paper titled '*Comparing the Metal Concentration in the Hair of Cancer Patients and Healthy People Living in the Malwa Region of Punjab, India*' was published in the Clinical Medicine Insights: Oncology journal. The paper noted:

> *"Breast cancer is widely feared, and studies indicate that excessive use of mineral fertilizers (Tab l e 1) and pesticides has led to water and soil contamination, affecting farming communities. In the Malwa region, cancer mortality is directly correlated with gender and farming (Singh, 2008). The indiscriminate use of pesticides and fertilizers, as well as poor groundwater quality, are considered to be among the main reasons for the high incidence of several diseases in the Malwa belt Farming communities have higher cancer rates."*

The paper analysed hair samples for aluminium (Al), arsenic (As), barium (Ba), cadmium (Cd), manganese (Mn), lead (Pb), strontium (Sr) and uranium (U), and compared the results obtained from the hair of healthy people to those obtained from cancer patients. The paper noted:

> *"Water, soil, and phosphate fertilizers all seem to play a potential role in causing an increased metal burden in Punjabi people living in the Malwa region. The high concentration of several potentially toxic elements as found in the hair reflects a high toxic metal burden. Toxic metals such as Pb or U lead to oxidative stress and DNA damage, thus long-term exposure to multiple toxic elements is a possible cause*

of the Malwa region's rising cancer rate. While all the elements tested are potentially toxic, the present study supports previous research stating that the metals Mn, Pb and U are factors in the development of breast cancer among Punjabi women. Since the metals Al, Mn, Pb and U have carcinogenic or mutagenic potential, the combined effects of these toxins enhances carcinogenicity and mutagenicity. The main concern of this study is the relatively high burden of multiple metals in all test groups, indicating long term exposure of the healthy as well as the cancer patients. Compared to the reference ranges of a so-called healthy Western population, our study groups all show multiple metal exposures in hair tissue. Since all test persons live under the same conditions, the results are not surprising. They are, however, a disturbing fact, because excess long term exposure to multiple toxins cannot and does not support health. Adverse health effects of exposure have been reported for many environmental toxins, but only recently has attention been given to the long term effect of low level exposure. Epidemiologic evidence on the relation between exposure to metals and cancer is receiving increasing concern, and the authors suggest the hypothesis that the healthy group may be affected in years to come, just like family members in the cancer group. Considering the age discrepancy between the healthy group (mean age 25.1) and the cancer group with a mean age of 56.4, the absence of cancer in the healthy group may be a factor of youth and time. It nevertheless cries for preventive measures and immediate action."

A copy of the abstract and conclusions of the scientific paper is attached herewith and marked as **Annexure P32(Pages_____to_____)**.

vi) On 23.09.2014 a follow up paper to the above discussed paper was published in the British Journal of Medicine and Medical Research, titled '*Comparing the Metal Concentration in the Nails of Healthy and Cancer*

Patients Living in the Malwa Region of Punjab, India with a random European group – A Follow up Study'. The paper analysed nail samples for aluminium (Al), arsenic (As), barium (Ba), cadmium (Cd), manganese (Mn), lead (Pb), strontium (Sr) and uranium (U), and compared the results obtained from the hair of healthy people to those obtained from cancer patients. It largely confirmed the findings of the previous paper. The paper noted:

> *"Studies indicate that excessive use of mineral fertilizers and pesticides has led to water and soil contamination, affecting farming communities. In the Malwa region, cancer mortality is directly correlated with gender and farming (Singh, 2008) [2]. The indiscriminate use of pesticides, fertilizers, as well as poor groundwater quality is considered to be among the main reasons for the high incidence of several diseases in the Malwa belt. Farming communities have higher cancer rates [3]. Studies indicate that drinking water, particularly in the Malwa belt, can be a source of heavy metals, including fluoride and pesticides [4,5]."*

A copy of the abstract, introduction and conclusion of the scientific paper is attached herewith and marked as **Annexure P33(Pages_____to_____)**.

b) Andhra Pradesh:

i) In July 2005 a scientific paper titled '*Acute Pesticide Poisoning among Female and Male Cotton Growers in India*' was published in the International Journal of Occupational and Environmental Health. A season-long assessment of acute pesticide poisoning among farmers was conducted in three villages of Warangal

District and Mahabubnagar District of Andhra Pradesh. Fifty female cotton growers reported the adverse effects experienced after exposures to pesticides by themselves and by their male relatives. The study documented the serious consequences of pesticide use for the health of farmers, particularly women field helpers. The paper noted:

> *"The consequences of such indiscriminate use of pesticides have recently become a matter of public concern in India, following the publication of alarming information about the levels of pesticide residues in drinking water and soft drinks. Beside the consumers' risks stands the documented hazard to producers, who are directly exposed to chemical substances. Agricultural labourers and farmers work in a highly unsafe occupational environment. The pesticides used largely belong to WHO categories I and II (Highly Hazardous and Moderately Hazardous)."*

The Paper further noted:

> *"The extent of pesticide poisoning among farmers and workers in developing countries is worrying. In the extreme hot weather of the tropics, protective gear does not seem to be a viable solution to eliminate occupational risks. Educating farmers about the pesticide hazard alone has not achieved significant results. The solution seems to be in the replacement of pesticides with non- or less toxic alternatives. One example of such alternatives can be found in the integrated pest management approach."*

A copy of the introduction and the discussion of the scientific paper is attached herewith and marked as **Annexure P34(Pages_____to_____)**.

ii) In 2005 a study titled 'Killing and Poisoning Pests or Human Beings' was published by Centre for Sustainable

Agriculture (CSA), Secunderabad and Modern Architects for Rural India (MARI), Warangal, which looked at the cases of pesticide poisoning due to inhalation of the toxic fumes of pesticides by sprayers in Warangal, Andhra Pradesh. A copy the relevant parts of the study is attached herewith and marked as **Annexure P35(Pages_____to_____)**.

c) Uttar Pradesh:

i) In August 2010 a scientific paper titled '*A study of neurologic symptoms on exposure to organophosphate pesticides in the children of agricultural workers*' was published in the Indian Journal of Occupational and Environmental Medicine. A detailed cross-sectional health survey among the children from agricultural families in rural areas adjoining Lucknow was carried out to assess the prevalence of chronic neurotoxicity, both Organophosphate-induced chronic neurotoxicity (OPICN) and Organophosphate-induced delayed neuropathy types, on the basis of self-reported neurologic symptoms and clinical examination. The study found that increased neurologic symptom count was associated with chronic exposure to Organophosphate (OP) pesticides thereby confirming previous studies. The paper noted:

> *"Some of the most important clinical neurologic manifestations, such as headache, tremors, dizziness, and paresthesia, maybe attributable to and could be the consequence of the chronic*

effects of most of the OP pesticides on the peripheral and central nervous systems.The pesticide-related neurologic symptoms, both muscarinic and nicotinic observed in this study could be due to the inhibition of RBCs, AChE, as well as plasma BuChE recorded in the study group and reported in earlier studies by the authors. The acute cholinergic syndrome, such as miosis, excessive salivation, seizures, and others, could be due to overstimulation of postsynaptic acetylcholine accumulation resulting from AChE and BuChE inhibition by OP pesticides."

The paper further noted:

"The long-term neurologic symptoms of OPICN resulting from cholinergic toxicity observed in the study population may be attributed to delayed toxicity by the OP pesticides as the breakdown of these chemicals in the body is slow and this results in the storage of pesticides in the body fat. Some of the OPs, such as diazinon and methyl parathion have significant lipid solubility, allowing fat storage with delayed toxicity due to late release. Delayed toxicity may also occur atypically with other OPs, especially dichlorvos, fenthion, and demetonmethyl."

The paper concluded by stating:

"We found that the prevalence of neurologic symptoms among the children of agricultural workers was associated with cumulative exposure (chronic) to OP pesticides used by this study population. These results suggest that self-reported neurologic symptoms involved both central and peripheral nervous systems, resulting from indoor and outdoor environmental exposure to OP pesticides."

A copy of the scientific paper is attached herewith and marked as **Annexure P36(Pages_____to_____)**.

ii) On 25.07.2013 a scientific paper titled '*Adverse Respiratory Health and Hematological Alterations among Agricultural Workers Occupationally Exposed to Organophosphate Pesticides: A Cross-Sectional Study in North India*' was published in the Plos One Journal. A cross sectional study was undertaken among 166 pesticide sprayers working in mango orchards of Lucknow district in North India compared with 77 controls to assess the respiratory illness, lung functions, cholinesterase levels and hematological profile. The Paper noted:

> *"It is concluded from this study that agricultural workers who are occupationally exposed to OP pesticides, showed adverse respiratory health and hematological alterations. The exposure of OP pesticides among them caused various respiratory problems, altered lung functions and hematological abnormalities. Due to unawareness of the hazardous health effects of pesticides among agricultural workers, they followed incorrect work practices without taking any safe and precautionary measures of handling and spraying pesticides, which eventually resulted in exposure of pesticides among them. It is very necessary to monitor health risks associated with pesticide exposure regularly among agricultural workers and make awareness programme with implementation of proper legislations for safe methods of spraying pesticides, so that the adverse health effects among agricultural workers could be minimised."*

A copy of the scientific paper is attached herewith and marked as **Annexure P37(Pages_____to_____)**.

d) <u>Tamil Nadu</u>:

i) In July 2006 a scientific paper titled '*Use of Pesticides and Its Impact on Health of Farmers in South India*' was published in the International Journal of Occupational and Environmental Health. The relationship between extent of pesticide use and signs and symptoms of illnesses due to exposure was assessed in a cross-sectional survey of 631 farmers (537 men and 94 women) in Thanjavur district of the State of Tamil Nadu. The most commonly used pesticides according to the sprayers were Dimethoate (55%), Quinalphos (49.4 %), Endosulfan (48.5%), and Monocrotophos (45.9%). 7.7% of the sprayers used pesticides that are extremely hazardous like phorate. Dimethoate, Quinalphos, and Endosulfan are all in moderately hazardous category (II), while monocrotophos is highly hazardous category (1b). Signs and symptoms with high prevalences were excessive sweating, burning eyes/stinging eyes/itching eyes, fatigue, dizziness, dry/sore throat, and numbness/ muscle weakness/ muscle cramps. The other signs and symptoms were fatigue, dizziness, skin redness/white patches on skin/skin scaling, runny/burning nose, shortness of breath/ cough, excessive salivation, nausea/vomiting, and wheezing. The paper noted:

> *"The use of a wide range of pesticides—mostly in the moderately hazardous and highly hazardous categories—among our study farmers is worrisome. More than 75%*

of these farmers used pesticides in these categories. The Food and Agriculture Organization recommends that WHO categories Ia (extremely hazardous) and Ib (highly hazardous) pesticides should not be used in developing countries.11 It also suggests that class II (moderately hazardous) pesticides be avoided. But the practice of spraying these powerful pesticides continues. Preliminary results of environmental sampling tests done in the study area support this statement. Large chemical industries reinforce the myth by adopting aggressive marketing strategies that more potent pesticides are necessary to prevent crop loss. This scenario has been reported from other countries also."

The study also noted:

"Awareness of the need to use personal protective measures while handling pesticides is needed among farmers in India. Farmers needs to be encouraged to reduce, if not eliminate, the use of pesticides, with the introduction of incentives to help them shift from synthetic pesticides to bio-pesticides and organic farming."

A copy of the scientific paper is attached herewith and marked as **Annexure P38(Pages_____to_____)**.

e) Madhya Pradesh:

i) In June 2012 a scientific paper titled '*Clinico Pathological Effects of Pesticides Exposure on Farm Workers*' was published in the DAV International Journal of Science. Farmers from three villages in Ujjain District of Madhya Pradesh were interviewed for various acute symptoms of poisoning such as nausea, dizziness, chest tightness, eye itchiness, discoloured nails, nails dropping off, sleeplessness, excessive sweating and excessive salivation etc.

mostly in the evening hours while returning home after whole day's spraying. The paper noted:

> *"The health survey of farmers associated with pesticides is presented in Table 1.The maximum intensity of impact was seen in the form of skin rashes and itchiness as the primary route of pesticide exposure is the skin, and not the respiratory system as is commonly believed. Pesticides remain persistent on skin for many months after the last known exposure. Besides, cleaning equipment's, disposing off empty containers, spraying farmers also have to mix pesticides and load them into spray containers, which pose even more serious health risk, since they are handling the concentrated products. Almost all the pesticide sprayers studied did not practice precautionary principles. It shows that 94.4% of farmers interviewed were reported with skin rashes and itchiness, followed by nails dropping off discoloured nails, nausea and eye itchiness , excessive sweating , blurred vision , dizziness , sleeplessness , headache and breathing difficulty. These are various acute health effects of a combination of pesticides which in low level over a long period of time lead to chronic effects such as cancer, reproductive and endocrine disruption, neurological and immune system damages etc. The present study demonstrated a significant decrease in serum cholinesterase (p < 0.001) in pesticide spraying workers"*

A copy of the scientific paper is attached herewith and marked as **Annexure P39(Pages_____to_____)**.

ii) On 15.09.2014 a scientific paper titled '*Adverse Health Effects of Organophosphate Pesticides among Occupationally Exposed Farm Sprayers: A Case Study of Bhopal Madhya Pradesh, India*' was published in the Asian Journal of Biomedical and Pharmaceutical Sciences. The paper studied the

relationship between the extent of pesticide used and signs and symptoms of illnesses due to exposure among spray farmers of Bhopal, Madhya Pradesh India, who sprayed pesticides by themselves and therefore were directly exposed to pesticides were assessed. 105 spray farmers were interviewed using previously designed questionnaires during a cross sectional survey. The 18 months exposed spray farmers reported maximum acute signs and symptoms like burning/stinging of eyes (18.42%), blurred vision (23.68%), skin redness/itching (50%), excessive sweating/shortness of breath (34.2%), dry sore throat (21.05%) and burning of nose (28.9%). The Study noted:

> *"Thus in the present study it is concluded that the maximally duration wise exposed sprayers reported most of the symptoms related to respiratory problems. The prevalence of respiratory symptoms was found higher in the 12 and 18 months exposed farm sprayers. The findings from the present study evidently show that the pesticide exposure in the long term causes acute symptoms via inhalation along with skin or dermal problems. It is accomplished in the present investigation that awareness needs to be created on use of personal protective measures among farmers, while handling pesticides. Farmers needs to be encouraged to reduce, if not eliminate the use of pesticides and should be educated about bio-pesticides and their benefits, with the introduction of incentives to the farmers to help them shift from synthetic pesticides to bio pesticides and organic farming a new revolution can be introduced."*

A copy of the scientific paper is attached herewith and marked as **Annexure P40(Pages_____to_____)**.

f) Kerala:

i) On 26.06.2010 a Paper titled '*Pesticides in Agriculture - A Boon or a Curse? A Case Study of Kerala*' was published in the Economic and Political Weekly. The paper observed:

> *"This paper analyses the pesticide use pattern in agriculture and associated management system in Kerala. The recent declining rate in total consumption of pesticides is not a sign of relief as the use of harmful chemicals is rising. The pesticides used in agriculture include chemicals, which are banned and those suggested for restricted use only. The spray fluid concentration and handling pattern are unscientific. The awareness level is very low, which can be attributed to poor training support. The data management and monitoring system is not efficient. The present level of investment in chemical pest control is higher than the optimum and is not economically justified."*

The paper further noted:

> *"..the micro-level explorations shows the use of chemicals which are banned for sale in Kerala (Endosulfan), banned for use in fruits/vegetables (Monocrotophos) and those permitted for restricted use only (Methyl Parathion, Lindane and Methoxy Ethyl Mercury Chloride). Many of the chemicals are banned/not approved in many other countries and belong to the pan Bad Actor Chemical group (Mancozeb, Carbendazim, Paraquat, Lambda Cyhalothrine, Diuron, Quinalphos). The handling pattern (spray fluid concentration and the use of protective gadgets) was observed to be unscientific. Farmers usually opt for the most toxic chemicals, while the safer substitutes are technically sufficient. Many a time farmers buy the*

chemicals from the dealers based on the advice by fellow farmers or dealers. Apart from this, the agents of pesticide manufacturers /distributors directly approach the farmers and sell the material, which are often non-descript. The monitoring and quality control mechanism by the department of agriculture often fails to be very effective. Most often the sales data is not regularly furnished by the retailers, which is mandatory."

"Awareness regarding the legal status of the chemicals is very low. Most of the farmers and many of the pesticide inspectors are not aware of the status, especially with regard to restricted use of chemicals."

A copy of the scientific paper is attached herewith and marked as **Annexure P41(Pages_____to_____)**.

ii) In August 2011 a scientific paper titled '*Pesticide Application and its Adverse Impact on Health: Evidences from Kerala*' was published in the International Journal of Science and Technology. The paper looked at the results of Endosulfan residues in and around Padre village of Kasaragod district of Kerala, and its effects on human and environmental health. The paper began with the observations:

"Across the world agriculture sector moving faster from food provider to poisoning the environment, which is a major threat to living organisms. Pesticide residues did not spare the precious 'mother's milk'. When Rachel Carson's Silent Spring was published in 1962, many did not believe her revelations on the effect of the dumping of chemicals. Decades later, her findings are similar to the happenings in the India's highly literate state of Kerala. Poor scientific research, ignorance, and a mindless administration dumping poisonous pesticides have all collectively caused irreparable damage to the environment, and generated only paltry

economic gains. Developing countries are now becoming the dumping ground yards for pesticides that have been banned in developed countries. However, use of banned pesticides is common in Indian agriculture, which is claiming precious human lives."

The paper noted:

"The state-owned Plantation Corporation of Kerala (PCK) began dumping pesticides through aerial spraying each year in the 1970's cashew plantations spread over 2,200 hectares in six gram panchayats of Padre village in Kasargod district (Rajendran,2002). This was done during fleshing, flowering and fruiting seasons to combat pests. The continuous application of pesticides contaminated the flora and fauna, the aquatic system underwent tremendous changes, and the local inhabitants suffer from several problems. Initially PCK sprayed endrin and later switched to endosulfan, an organochlorine pesticide, which is effective against a number of pests in cashew, cereals, oilseeds, vegetables, coffee and tea. This exposes people to diseases like skin problems, cancer and lung complications. The severity of the matter came to light only when a new Delhi-based NGO, the Centre for Science and Environment (CSE), tested blood samples from affected villagers, and came out with its shocking findings (Table 1). One of the findings is that each resident of Padre whose blood was tested has endosulfan residues several hundred times the reside limit for water. The tests also revealed that human and cow milk is not spared either."

The paper further noted:

"The Kasargod type of episode of pesticide use will have chain-reactions on human beings and the ecosystem, with many people becoming crippled and mentally retarded. In each household at least one person has been found to suffer from its effects and it is noted that from 1999 to 2001, 156 cases of disorders in just 123 households were recorded by a singly

physician in Padre Village alone (table 2). Cancer cases, at 49, were the most prevalent, followed by psychiatric cases, nine individuals committed suicide as they could not bear the torture. Some locals report that they are unable to bear the expenditure for treatment. Aerial spraying of chemicals does not spare drinking water sources, and the water has become yellowish. The groundwater and storms have been totally affected and are now unfit for domestic consumption and for agriculture. This shows the enormity of the issue on the local biotic and abiotic resources."

The paper concluded with the following observations:

"It is essential to increase the yield levels and production in agriculture. At the same time it should not be compromised with environmental loss and human cost. In the present case it is very clear that the banned pesticide has been used without any precautionary measures. Consequently, the entire biotic and a biotic system has been severely expressed. Local communities are helpless. Proper assessment, rigorous monitoring and environmental implications of synthetic chemicals should be ascertained will before allowing for large scale use. More significantly, the long term implications on the human health and environment need to be studied scientifically for sustainable development."

A copy of the scientific paper is attached herewith and marked as **Annexure P42(Pages_____to_____)**.

g) Karnataka:

i) On 30.07.2011 a scientific paper titled '*Pesticide (Endosulfan) Levels in the Bone Marrow of Children with Hematological Malignancies*' was published in the Journal Indian Pediatrics. The aim of the study was to analyse the bone marrow of children with acute

hematological malignancies for endosulfan. The study was conducted on children aged between 1-15 in Dakshna Kannada district of Karnataka over a period of 18 months from September 2006 to March 2008. Exposure to endosulfan in the environment results in bioaccumulation in humans and other animals, concentrating particularly in fatty tissues. The study found children with hematological malignancy had raised levels of endosulfan in the bone marrow compared to those without. All the children with raised bone marrow endosulfan levels were found to be from areas exposed to the pesticide. A copy of the scientific paper is attached herewith and marked as **Annexure P43(Pages_____to_____)**.

h) A study across 6 states:

In 2005 a scientific paper titled '*Effects of Pesticide Exposure on Developmental Task Performance in Indian Children*' was published by the Children, Youth and Environment Journal. The study was performed in villages in Andhra Pradesh, Karnataka, Punjab, Gujarat, Maharashtra, and Tamil Nadu. The Abstract of the paper notes:

> *"This paper presents the results of an investigation into chronic effects of pesticides on rural children in India. The study assessed the effect of pesticide exposure on the abilities of children to perform developmental tasks. The research subjects were divided into six study groups (high pesticide exposure with multiple*

exposures to multiple compounds), matched with five control groups (minimal pesticide exposure). In all, 1,648 children were individually tested using a rapid assessment tool that measured children's memory, stamina, analytical, motor, and tactile perception abilities through various games and activities. The study controlled for major confounding factors such as socio-economic background, maternal education, schooling, media exposure, and the like. In more than 80 percent of the tasks tested, children heavily exposed to pesticides performed significantly worse than the less-exposed children."

A copy of the abstract and the conclusions of the scientific paper is attached herewith and marked as **Annexure P44(Pages_____to_____)**.

i) Compilation of scientific studies on the Health Effects of Occupational Exposure to Pesticides: In addition to the scientific studies mentioned above, the National Institute of Occupational Health (NIOH) has compiled and published a '*Data Base of Health effects of Occupational Exposure to Pesticides*' comprising of 75 scientific papers that look into the adverse effects of pesticides on farmers, farmworkers and people living in the farming belts. A copy of the compilation is attached herewith and marked as **Annexure P45(Pages_____to_____)**.

19. Scientific Papers on the link between pesticide use and depression, and the link between pesticide use and suicidal ideation Internationally: Worldwide there have been many scientific studies on the adverse effects of pesticides, but one aspect that is very relevant in light of

the fact that nearly 300,000 farmers have committed suicide in India in the past two decades, is the link between pesticide use and depression as well as suicidal ideation.

a) In 1996 a scientific paper titled '*Increased risk of suicide with exposure to pesticides in an intensive agricultural area. A 12-year retrospective study*' was published in the Forensic Science International Journal. The paper analysed suicides from a province in Spain. The papers Abstract noted:

> *"Several reports have suggested that exposure to agricultural pesticides (mainly chronic exposure to organophosphates) produces depression, and depression is a major risk factor for suicide. A retrospective epidemiological study of 251 suicide cases was undertaken to explore the possible relationship between the high suicide rates in an intensive agricultural area, and a specific group of population at risk, namely farmers with chronic exposure to pesticides, who are at risk to develop mood disorders (mainly depression). Our data show that the suicide rate in that area is significantly higher than the suicide rates from other geographic areas with very similar socioeconomic and demographic features. In addition, the mortality from suicide in this population (farmers) does differ significantly from that of the rest of the population."*

A copy of the scientific paper is attached herewith and marked as **Annexure P46(Pages_____to_____)**.

b) On 28.07.2009 a scientific paper titled '*Pesticide exposure and suicidal ideation in rural communities in Zhejiang province, China*' was published in the Bulletin of the World Health Organization Journal. The paper analysed the survey of 9811 rural residents in Zheijang

province to investigate the association between pesticide exposure and suicidal ideation in rural areas of China. The paper found that a potential marker of chronic pesticide exposure was found to be associated with suicidal ideation, which supported findings from previous studies. A copy of the scientific paper is attached herewith and marked as **Annexure P47(Pages_____to_____)**.

c) On 25.08.2010 a study titled '*Symptoms of psychological distress and suicidal ideation among banana workers with a history of poisoning by organophosphate or n-methyl carbamate pesticides*' was published in the Occupational and Environmental Medicine Journal which examined symptoms of psychological distress, including suicidal ideation, among banana workers in Costa Rica previously exposed to a cholinesterase inhibiting pesticide. The cross-sectional study showed a relationship between acute occupational poisoning with organophosphates and psychological distress including suicidal ideation. A copy of the scientific paper is attached herewith and marked as **Annexure P48(Pages_____to_____)**.

d) On 01.09.2014 a scientific paper titled '*Pesticide Exposure and Depression among Male Private Pesticide Applicators in the Agricultural Health Study*' was published in the Environmental Health Perspectives Journal. The study evaluated associations between

pesticide exposure and depression by analyzing data for 10 pesticide classes and 50 specific pesticides used by 21,208 applicators (mostly farmers) in USA enrolled in 1993–1997 who completed a follow-up telephone interview in 2005–2010. The study supports a positive association between pesticide exposure and depression, including associations with several specific pesticides. The study the fumigants aluminum phosphide and ethylene dibromide; the phenoxy herbicide (2,4,5-trichlorophenoxy)acetic acid (2,4,5-T); the organochlorine insecticide dieldrin; and the organophosphate insecticides diazinon, malathion, and parathion—were all positively associated with depression in each case group. A copy of the scientific paper is attached herewith and marked as **Annexure P49(Pages_____to_____)**.

20. Scientific Papers on pesticides and the risks they pose to consumers in India: It is not just farmers and people living in farming belts that are at a grave risk due to pesticide use, consumers living in and around cities are a grave risk too. Many scientific papers have been written on the risks pesticides pose to consumers, the following are but a few:

a) In 2003 a scientific paper titled '*Organochlorine and organophosphorus pesticide residues in breast milk from Bhopal, Madhya Pradesh, India*' was published in The Human and Experimental Toxicology Journal. Samples

of breast milk were collected from Bhopal, Madhya Pradesh, from women (age 19/45 years) belonging to the lower socioeconomic class. None were employed, had any serious illness in the recent past, or were smokers. The object of the study was to assess the status of human exposure to organophosphate and organochlorine pesticides. The results clearly indicated that banned organochlorine pesticides were still the major contaminants of human milk. A copy of the scientific paper is attached herewith and marked as **Annexure P50(Pages_____to_____)**.

b) On 17.05.2008 a scientific paper titled '*Endosulfan and Other Organochlorine Pesticide Residues in Maternal and Cord Blood in North Indian Population*' was published in The Bulletin of Environmental Contamination and Toxicology Journal. Maternal and cord blood samples were collected from pregnant women attending the Gynecology ward/labor room of Guru Teg Bahadur Hospital, Dilshad Garden, Delhi during the period January 2006 to September 2007. The paper noted:

> *"Humans, being at the top of the food chain are most vulnerable to health effects as ingestion of toxic chemicals is several folds higher through the process of biomagnifications."*

The paper further noted:

> *"In conclusion, the results of the present study clearly demonstrate a prenatal uptake of organochlorine compounds and provide more information on the transplacental transfer of endosulfan in Indian population. Although, in this study*

> *we have estimated the levels in healthy women who gave birth to normal weight babies, it has been reported that the body load of these* pesticides may lead to adverse health effects in the infants. Prenatal exposure to these compounds may play a more important adverse role in neurodevelopment in infants than postnatal exposure."*

A copy of the scientific paper is attached herewith and marked as **Annexure P51(Pages_____to_____)**.

c) In July 2011 a scientific paper titled '*Assessment of Organochlorine Pesticide Residues in the Surface Sediments of River Yamuna in Delhi, India*' was published in the Journal of Environmental Protection. The study assessed the concentration levels and distribution patterns of the organochlorine pesticide residues in the surface sediments of river Yamuna in Delhi. Analytical measurements were carried out for twenty organochlorine pesticides (OCPs) in the Pre-monsoon, Monsoon and Post-monsoon seasons, at six different sampling locations along the 22 km stretch of the river Yamuna in Delhi. The results revealed contamination of the surface sediments with several persistent organochlorine pesticides. Endrin aldehyde, Endosulfan sulfate and DDT showed the highest percentage composition of OCP at all the sampling sites in all the three seasons. The study noted:

> *"On the basis of the results obtained, it can be safely concluded that Endosufan sulfate + DDT, Endrin aldehyde, DDD, Endrin and Methoxychlor were found in significant concentrations at all the sites in all the seasons, indicating their wide use."*

A copy of the scientific paper is attached herewith and marked as **Annexure P52(Pages_____to_____)**.

d) On 11.02.2014 a paper titled '*Environment and human exposure to persistent organic pollutants (POPs) in India: A systematic review of recent and historical data*' was published in the Environment International Journal. One startling finding was that the human and environmental contamination by DDT in India had not shown a declining trend even after its use was restricted only for public health purposes, thereby implying that DDT is still being widely used in India. The Abstract of the paper noted:

> *"Persistent organic pollutants (POPs) have been used in a wide range of agricultural and industrial commodities, resulting in vigorous deterioration of environment and human health. A number of studies on the occurrence of POPs confirm their presence in various environmental compartments and human body. In order to deal with this global concern, India has recently prepared the National Implementation Plan (NIP) of the Stockholm Convention. Common beliefs point at India as a hot spot of POP contamination and human exposure; however no systematic analysis was ever performed so far considering all available past data on POP occurrence. This review aims to examine the distribution pattern of POPs in multicompartment environment and human samples, meta-analysis of time trends in exposure levels to environment and humans, and cross country comparison of POP contamination with China. Based on this review, it can be concluded that the Indian environment and human population are highly contaminated by DDTs and HCHs"*

The paper noted:

"• India is unarguably a hotspot of DDT and HCH contamination. Residues in all compartments considered in this study are often exceeding limits established by some international regulatory agencies. This is of course due to the elevated use of pesticidal POPs in agriculture carried out until recent years, and in the case of DDTs still ongoing applications for malaria control.

• No evidence of general decline in DDT and HCH levels in Indian environment (with exclusion of HCHs in surface water) emerged from the meta-analysis of time trends.

• Elevated environmental exposure is reflected by data from human biomonitoring. Basically all available data of DDTs and HCHs in human milk and blood were found to exceed safety limits, while no declining trends were observed after the introduction of regulation on POPs.

• Indian environmental and human contamination by DDTs and HCHs are comparable to those of china, although in China (unlike India) the tendency toward declining environmental contamination is visible, possibly due to earlier substitution and more restrictive measures adopted for pesticidal POPs."

A copy of the scientific paper is attached herewith and marked as **Annexure P53(Pages_____to_____)**.

e) On 12.10.2014 a scientific paper titled '*Health risk assessment of organochlorine pesticide exposure through dietary intake of vegetables grown in the periurban sites of Delhi, India*' was published in the Environmental Science and Pollution Research Journal. The study investigated the levels of organochlorine pesticides (OCPs) in different types of vegetables grown in periurban area of National Capital Region (NCR), India. Vegetable sampling was carried out in winter and summer season of 2012. Most of the OCP residues recorded in vegetable samples exceeded the maximum

residue levels (MRLs) set by international and national regulatory agencies. Health risk assessment suggests that daily dietary OCP exposure via vegetable consumption was higher for children. The hazard quotient (HQ) and lifetime cancer risk (LCR) estimated from dietary exposure of these vegetables were above the acceptable limit and can be considered as a serious concern for Delhi population. A copy of the abstract, introduction and conclusions of the scientific paper is attached herewith and marked as **Annexure P54(Pages_____to_____)**.

f) In January 2015 a scientific paper titled '*Current status of persistent organic pesticides residues in air, water, and soil, and their possible effect on neighboring countries: A comprehensive review of India*' was published in Science of the Total Environment Journal. The Abstract of the paper noted:

> *"Though the use of pesticides has offered significant economic benefits by enhancing the production and yield of food and fibers and the prevention of vector-borne diseases, evidence suggests that their use has adversely affected the health of human populations and the environment. Pesticides have been widely distributed and their traces can be detected in all areas of the environment (air, water and soil). Despite the ban of DDT and HCH in India, they are still in use, both in domestic and agricultural settings. In this comprehensive review, we discuss the production and consumption of persistent organic pesticides, their maximum residual limit (MRL) and the presence of persistent organic pesticides in multicomponent environmental samples (air, water and soil) from India. In order to highlight the global*

distribution of persistent organic pesticides and their impact on neighboring countries and regions, the role of persistent organic pesticides in Indian region is reviewed. Based on a review of research papers and modeling simulations, it can be concluded that India is one of the major contributors of global persistent organic pesticide distribution. This review also considers the health impacts of persistent organic pesticides, the regulatory measures for persistent organic pesticides, and the status of India's commitment towards the elimination of persistent organic pesticides."

A copy of the abstract, introduction and conclusions of the scientific paper is attached herewith and marked as **Annexure P55(Pages_____to_____)**.

g) In addition to the scientific papers mentioned above, in 2012, independent studies which reported pesticide residues from all over India were compiled by the India for Safe Food campaign. A copy of the compilation is attached herewith and marked as **Annexure P56(Pages_____to_____)**. There is fresh concern about the use of herbicides in our agriculture, given the current global debate on herbicides like glyphosate and their carcinogenic potential. the world health organisation had recently classified glyphosate as a probable human carcinogen. It is surprising to note that glyphosate does not feature in the list of pesticides reviewed by the government of India's committees despite a large body of evidence which makes glyphosate safety questionable.

E. <u>Conclusions that can be drawn from the evidence of adverse effects of pesticides</u>:

21. From the abovementioned scientific papers, studies, fact finding reports, and newspaper articles, the following can be safely submitted:

a) Large parts of the farming belts of India have been polluted and contaminated by pesticides. Unacceptable levels of pesticide residues have been found not only in the groundwater and soils but in the blood, tissues, hair, nails and breast milk of farmers and farmworkers of India.

b) The bioaccumulation of pesticides in the body of the farmers and farmworkers has led to alarmingly high number of cases of reproductive disorders, mental retardation, and various forms of cancer, reaching almost an epidemic level, in addition to acute poisoning cases that have led to deaths of farmers and farm workers.

c) Increasing usage of herbicides is a fresh cause of concern, given the potential health and environmental impacts in addition to serious socio-economic implications for poor rural women and their livelihoods in India. Employment opportunities are being snatched away from such women through the use of herbicides. Herbicides like glyphosate and their increased usage has created superweeds and other environmental problems in USA and increased the overall chemical usage in the environment. Use of herbicides is going to increase the residues of

chemicals n our food, especially when accompanied with transgenic technology.

d) A large number of cases of acute and chronic poisoning due to pesticides are being reported on an almost daily basis.

Despite being faced with such a grave threat to human and environmental health, the central and the state governments have not been performing even their basic statutory functions of ensuring that pesticides that have been banned by them do not find their way into the market, or ensuring that pesticides restricted for use are not used for purposes for which they are not allowed, or ensuring that pesticides that have been found to pose a risk to human or animal health are banned, or ensuring food articles do not contain pesticides above MRL's, or that MRLs are fixed in a scientific manner that take diets as the basis. All this can be reasonably inferred from the scientific papers, studies, fact finding reports, and newspaper articles referred to previously:

i) Consumers are at a risk as the food articles including fruits and vegetables have been routinely found to contain pesticides above MRLs or pesticides that have been banned and restricted.

ii) Pesticides that have been banned by India are still found to be contaminating the soil, groundwater and the human body, implying that the bans are not being strictly enforced.

iii) Pesticides that have been restricted for use are being used for purposes for which they are not allowed, implying that the restrictions are not being seriously enforced, or that restrictions have not been meaningfully placed.

22. Given the failure of the central and state governments to ban pesticides banned in other countries, regulate and restrict the use of pesticides, and the consequential adverse effects of this failure of the health of farmers, farmworkers, and consumers, it has become imperative to ban with immediate effect all pesticides that have been banned by any other country, and phase out the use of all pesticides to secure the right to health of farmers, farmworkers, and consumers.

F. Farmers caught in a vicious cycle:

23. It has been seen that once farmers have taken up the method of farming that has been promoted by the central government and most of the state governments for the last five decades, comprising of heavy use of chemical fertilizers, chemical pesticides, hybrid seeds, and monocropping (planting only one type of crop in large continuous areas), the farmers get stuck in a vicious cycle of debt, deteriorating soil health and groundwater quality. The modern varieties of seeds that were developed for the Green Revolution require heavy irrigation and applications of chemicals to be successful. Once a farmer applies these chemicals to the soil, the

soil degrades and is left depleted of essential nutrients. To make up for that loss, the farmer needs to use even more fertilizers to make up for what is lacking. The use of fertilisers and sowing of monocrops is in turn related to pest and disease incidence and the use of pesticides. Additionally, the use of pesticides leads to the creation of pesticide-resistant pests. This vicious cycle leads to the need for more chemicals to keep up with the changing chemistry of pests and pesticides. Further, this treadmill that farmers are caught in is also reflected in the fact that input dealers/pesticide sellers provide inputs on credit and very often are also doubling up as agents who purchase the produce from the farmer. These dealers do not necessarily have the knowledge required for sustainable farming nor the best interests of farmers in mind. The requirement of ever-increasing quantities and prices of pesticides make the farmers depend on these dealers in a vicious cycle from which it is not easy to break out of.

On 14.04.2009 an article titled “India's Farming 'Revolution' Heading For Collapse” published on the National Public Radio website noted the following:

> *“Their comparatively small region, Punjab, grows far more wheat and rice for India than any other region. But now these farmers are running out of groundwater.*
> *They have to buy three times as much fertilizer as they did 30 years ago to grow the same amount of crops. They blitz their crops with pesticides, but insects have become so resistant that they still often destroy large portions of crops.*

> *The state's agriculture "has become unsustainable and nonprofitable," according to a recent report by the Punjab State Council for Science and Technology. Some experts say the decline could happen rapidly, over the next decade or so.*
> *One of the best-known names in India's farming industry puts it in even starker terms. If farmers in Punjab don't dramatically change the way they grow India's food, says G.S. Kalkat, chairman of the Punjab State Farmers Commission, they could trigger a modern Dust Bowl. That American disaster in the 1930s laid waste to millions of acres of farmland and forced hundreds of thousands of people out of their homes."*

A copy of the article is attached herewith and marked as **Annexure P57(Pages_____to_____)**.

24. Banning chemical pesticides is imperative for securing the right to health of farmers, farmworkers, and consumers, but banning pesticides alone may not allow the farmers and farmworkers to break the vicious cycle mentioned in the previous paragraph. Farmers and farmworkers need to be assisted for a period of atleast 3-5 years by the central and the state governments till their farms transition from chemical farming to organic, pesticide free farming. The VNSS mission was set up by the government of Maharashtra in response to the large number farmer suicides occurring in the state. In its report titled 'Integrated Agrarian crisis and Farm Distress Management Plan of VNSS Mission' the following was noted:

> *"The farmers adoption to rain sensitive cash crop in these 14 crisis-driven districts is products of uncontrolled use of fertilizer, pesticide and resulted in serious soil*

health, pest virus epidemic, Deeping of ground water level, spread of complex multiple public health and ecological issues of environmental degradation has been alarming one hence adoption non-chemical environment friendly non-toxic agrarian practices with help of present alternatives of sustainable cultivation practices is basic need of time and delay in its follow up will future aggravate the farm distress, will add fuel in farm suicide issues in coming year and reintroduction of food and pluses crops which require low water and help to restore soil help is must and VNSSM has set up agenda to implement such revival programme in worst hit part of drought affected region."

A copy of the report is attached herewith and marked as **Annexure P58(Pages_____to_____)**.

25. i) Conversion of farms from inorganic, chemical based agriculture to organic, chemical free agriculture is not only imperative to secure the right to health of farmers, farmworkers and consumers, but has also been shown to have comparable if not greater productivity. The Alliance for Sustainable and Holistic Agriculture (ASHA) published a compilation 375 scientific papers in February 2015 titled '*Ecological Agriculture in India – Scientific Evidence on Positive Impacts & Successes*' which looked at the impact of ecological agriculture in India. The compilation refers to the following important findings of Vision 2030, Project Directorate for Farming Systems Research, Modipuram 2011. Indian Council For Agricultural Research, based on the All India Network Project on Organic Farming:

"During 3-4 years of conversion period, crop yields under organic farming were recorded

to be comparable with conventional (chemical) farming in many regions. Some of these crops and their percent improvement in yield are: coarse rice (+2%), garlic (+20.4%), maize (+22.8%), tumeric (+51.5%), fodder crops (+14.4 to 89.9%) and basmati rice (-6%) at Ludhiana; kharif French bean (+19.0%), veg. pea (+62.1%), cabbage (+9.5%), garlic (+7.0%) and kharif cauliflower (-4.6%) at Bajaura; fodder berseem (+6.5%), chickpea (+1.5%), soybean (-2.3%) and mustard (-6.6%) at Raipur; Rice (+12.9%), Wheat (+24.4%), Potato (+7.3%), mustard (+9.6%) and lentil (+2.5%) at Ranchi, groundnut (+6.9%), rabi sorghum (+15.8%), soybean (+9.5%), durum wheat (+32.4%), chilli (+18.8%), cotton (+35.5%), potato (+3.3%), chickpea (+3.2%) and maize (-1.1%) at Dharwad; soybean (+10.7%), isabgol (+11.2%), durum wheat (+1.1%), mustard (+3.1%) and chickpea (+4.2%) at Bhopal; okra (+1.0%), berseem (-0.2%) and veg. pea (+1.8%) at Jabalpur; Dolichos bean (+16.6%) at Karjat; maize (+18.2%), cotton (+38.7%), chilli (+8.2%), brinjal (+14.9%) and sunflower (+29.1%) at Coimbatore; rice (+1.9%) at Pantnagar; fodder sorghum (+32.5%), okra (+11.3%), baby corn (+11.8%) and veg. pea (+2.2%) at Modipuram; and carrot (+5.8%), tomato (+30.6%), rice on raised beds (+7.3%), french bean (+17.7%) and potato (+3.0%) at Umiam.

MAIN FINDINGS OF THE ALL INDIA NETWORK PROJECT ON ORGANIC FARMING (13 LOCATIONS) COORDINATED BY PROJECT DIRECTORATE FOR FARMING SYSTEMS RESEARCH, MODIPURAM:

Okra, turmeric, cotton, carrot, black pepper and cowpea have recorded more than 20% increase in yield under organic nutrient input system compared to inorganic system. The increase in yield of onion, ginger, dolichos bean are in the range of 10-20% while greengram, sunflower and garlic recorded 5 to 10% increase in yield. An increase of up to 5% was observed in maize, soybean, berseem, brinjal, chilli, capsicum, tomato, sorghum and peas across the seasons and locations.

[THESE, THEREFORE, ARE CONSISTENT RESULTS ACROSS LOCATIONS AND SEASONS, FOR 21 OF THE 28 CROPS FOR WHICH RESEARCH IS UNDERTAKEN]
(This is as per a reply received in February 2013, from the Project Directorate, on a Right To Information (RTI) application available on www.kisanswaraj.in)"

A copy of the first few pages of the compilation is attached herewith and marked as **Annexure P59(Pages_____to_____)**.

ii) The state of Sikkim has shown how inorganic chemical based farming can be converted into organic chemical free farming without affecting productivity. On 18.01.2016 it became India's first state to go fully Organic. A news report published on 19.01.2016 in Catchnews noted:

"On 18 January, Sikkim received plaudits for a great achievement - it became India's first state to go fully organic.
It took 10 years for Sikkim to convert 75,000 hectares of farmland into certified organic farms, implementing organic practices. The state now produces 800,000 tonnes of organic produce, accounting for nearly 65% of all of India's 1.24 million tonnes. In all of this, Sikkim has quietly shown that going organic doesn't mean falling productivity.
And this has earned the state applause from every corner - be it farmers on the fields or Prime Minister Narendra Modi.
"All states in the country should follow the example of Sikkim by bringing select areas under organic farming, and helping market the high-value produce," the PM said.
Modi spoke of the recently concluded climate summit in Paris, where the entire world agreed to go back to the basics. "It has been agreed by all nations that we have to change our lifestyle. We cannot exploit nature, and have to go back to basics and live in harmony. Sikkim is a model state for the world because nature is

protected here, and yet, development is not compromised," he said."

A copy of the news report is attached herewith and marked as **Annexure P60(Pages_____to_____)**.

Sikkim's journey to becoming India's first fully organic state started with the following historical declaration in the State Assembly in 2003:

"Hon'ble Members of Legislative Assembly,
I am pleased to announce a long awaited policy initiative of declaring Sikkim as a "Total Organic State" meaning that the use of chemical fertilizers will be gradually done away with. You will appreciate that uncontrolled and haphazard application and use of chemical based inputs is hazardous to the lives of human being including livestock. In this context, I would like to illustrate one related episode from a newspaper featuring a story of birds which consumed affected insects from farm fields in Assam where large quantities of pesticides were being used. The story further talks about how farm rodents that devoured these birds also died and how finally snakes which consumed the infected dead rats also died. The chain of events is not only pathetic and fatal but also disturbs the natural balance between the prey and the predator: a phenomenon which is naturally inevitable in the context of law of nature. One need not look far to support this argument. For instance, Darjeeling hills which boasts of being the World famous tea producer was compelled to revert back to organic farming methods in order to win back the losing demand from overseas in view of the report that Darjeeling tea was being produced using chemical based methods. The Ambotea tea estate in Kurseong is gaining prominence in the teat market because it adopted organic based practices. It is a known fact that people are increasingly getting away from chemical based products. The UK Government banned the use of 11 chemical pesticides in the 1980s as this was considered to be potentially carcinogenic and attributed to the birth deformities and gene mutations. Further it is a universal fact that there is

growing appeal among people being in favour of organic based food commodities which fetch price four to six times higher than chemical based products. In keeping with my Government's concern for preservation of sensitive ecology and environment, our state with an average fertilizer consumption rate of 5.8 kg per ha is the third lowest fertilizer consumption state in the country.

Hon'ble members will agree with me that traditionally our farmers practiced organic farming and hence the possibility of reverting back to this age old practice is not difficult. Against this backdrop, I propose the following policy interventions towards realizing the vision of transforming Sikkim into a "Total Organic State".

We will provide exclusive retail outlets for the organic based food products at the new Lall Bazaar Complex.

A section of curriculum in school text books will be devoted to highlighting the practice and merits of organic farming.

We will make each and every farmer aware of the merits of organic food production and provide them with the latest technologies in this field.

Thank you."

The Sikkim Governments Organic Mission and related progress reports etc. are available on the Sikkim Governments official website for the Organic Mission - http://www.sikkimorganicmission.gov.in/

iii) Elsewhere, like in Indonesia, an overnight ban on numerous pesticides actually turned out to be a positive story for paddy farmers and environment in the country. In a scientific paper dt. 17.04.2015, titled '*The Rise and Demise of Integrated Pest Management in Rice in Indonesia*' by Craig Thorburn, the author narrates the story of Indonesia's 'Green Revolution' that was very

similar to India's, and how it had to be replaced by new organic agricultural techniques.

> *"The cultivation of HYVs over an extensive area increases the new rice's susceptibility to pest infestations. High fertilizer use, close spacing, the dense canopy produced by heavy tillering, creates a favorable situation for the multiplication of certain kinds of pest. This combination of factors, including aggressive promotion of HYV rice varieties as part of a Green Revolution package that included heavy-handed extension by trained experts in conjunction with local officials and the military, massive government subsidies on chemical fertilizers and pesticides, and prophylactic use of insecticides to control rice pests, together created a perfect storm for major outbreaks of insecticide-induced resurgent pest outbreaks, specifically, for a rice brown planthopper plague of unprecedented proportions. President Suharto…immediately drafted a Presidential Instruction that banned 28 broad-spectrum pesticides in 57 formulations, initiated a phasing out of government pesticide subsidies, and mandated integrated pest management (IPM) as the national policy for crop and plant protection. Other features of the instruction included the creation of 1500 new pest observer positions to more than double the number of Directorate of Crop Protection fieldworkers; enforced*

use of resistant rice varieties; enforced introduction of one secondary food crop after two irrigated rice crops in certain regions; and "crash programs" through "commando posts" (POSKO) to deal with pest outbreaks through targeted applications of narrow-spectrum insecticides, if necessary The program piloted a new model called Farmer Field School (FFS), which drew from adult non-formal education concepts, based on the assumption that farmers already possess a wealth of experience and knowledge. The other fundamental concept employed was agro-ecological analysis, examining the entire rice paddy agro-ecosystem and relationships between soil, water and weather conditions, rice plants, insect populations and communities, and management activities, rather than focusing just on individual pest problems Results were immediate and profound: among FFS farmers, insecticide applications reduced from an average of 2.8 sprays per season to less than one, with most farmers not spraying at all… Studies showed that IPM farmers had, on average, slightly higher yields, higher overall returns, and lower economic variance than their non-IPM counterparts"

A copy of the abstract and introduction of the scientific paper is attached herewith and marked as **Annexure P61(Pages_____to_____).**

iv) Similarly, in Andhra Pradesh farmers have shifted to organic agriculture without suffering any reduction in yields, but on the contrary, their profitability has increased. According to a project report dt. 2009 titled '*Ecologically Sound, Economically Viable Community Managed Sustainable Agriculture in Andhra Pradesh, India'* by T. Vijay Kumar, D.V. Raidu, Jayaram Killi, Madhavi Pillai, Parmesh Shah, Vijaysekar Kalavadonda, and Smriti Lakhey,

> *"… an alternative approach to manage agriculture known as community managed sustainable agriculture (CMSA) is being tested and practiced in the state of Andhra Pradesh in India. The CMSA approach replaces the use of chemical pesticides with a combination of physical and biological measures—including eco-friendly biopesticides— and complements it by adopting biological and agronomic soil fertility improvement measures leading to reduced use of chemical fertilizers. This has significantly reduced the cost of cultivation, the need for large amounts of credit, and indebtedness that results. These transformational changes have been achieved without significantly reducing the productivity and yields for the participating farmers. Initial results from CMSA in Andhra Pradesh show a significant net increase in farmers' incomes in addition to significant health and*

ecological benefits. Over 300,000 farmers have adopted CMSA in Andhra Pradesh alone, covering 1.36 million acres of farmland—5.1 per cent of the net cropped area in the state—in just over four years. There is a potential of scaling up this approach to the whole of India as CMSA is showing trends of being economically viable and ecologically friendly. CMSA technologies and practices are a mixture of scientifically proven methods, indigenous knowledge and traditional wisdom and are deployed in a sequence which farmers learn during their training. The first stage of adoption of CMSA is based on the IPM technology practiced in many parts of the world. Farmers undertake pest prevention and management training. They learn the diagnostic skills to observe, document and understand the behavior and life cycles of pests and the role of natural predators. Subsequently the farmers begin replacing chemical pesticides with a combination of physical methods such as pheromone traps and sticker plates, and biological methods such as bio-pesticides like Neem extracts. In the third stage of CMSA, pest management through physical and biological means is complimented by measures to increase soil fertility. Farmers are encouraged to replace the use of conventional fertilizers. This includes use of microbial formulations, intensive use of composting techniques, vermiculture

and use of bio-fertilizers. CMSA practices are scaled up and intensified by replacing conventional fertilizers with vermicompost, tank silt, green manure crops and soil inoculation with Azospirillum and Azotobacter – nitrogen fixing bacteria. Farmers take on inter-cropping or multi-cropping to maintain soil fertility and reduce pest incidence. By the third year of operation farmers replace all chemical fertilizers and pesticides with sustainable technologies and practices.

The yield of principal crops raised through CMSA has been compared to that of conventional agriculture… field staff have also closely monitored 400 farmers' fields in five distrcits to track changes in the yield of paddy crop after they switched over to CMSA. Yield in all cases has remained the same, ranging from 1900kgs to 2200 kgs per acre for paddy and rice. Thus, there are no significant drops in yield for crops raised through CMSA. Over a period of time, these differences are also reduced significantly as soil fertility measures show improvement."

A copy of the executive summary of the report is attached herewith and marked as **Annexure P62(Pages_____to_____).**

G. Precautionary Principle:

26. Pesticides have been shown to have disastrous impacts on human and environmental health, yet every

year, new pesticides are being registered for use in India, most of them from existing molecular classes of pesticides with only slight differences from existing pesticides. It is also a well-known fact that pesticides from a particular molecular class of pesticides have similar adverse effects. For example Organophosphates are a molecular class of pesticides which were originally used as nerve gases in chemical warfare. Both Chlorfenvinphos and Monocrotophos are Organophosphate Pesticides and both are highly toxic to the nervous system, yet Chlorfenvinphos is banned and Monocrotophos is allowed to be used albeit in a restricited manner (It is a well documented fact that restriction on end use of pesticides have failed miserably are basically unimplementable). Another example of such a class are Organochlorines, highly toxic pesticides of which Paraquat Dichloride and Hexachlorobenzene are members. Paraquat Dichloride has been linked to the development of Parkinson's disease and is highly toxic for the liver, and Hexachlorobenzene is also highly toxic to the liver, yet the latter is banned and the former is allowed to be used and manufactured in India. When new pesticide molecule is developed, its adverse effects in the future cannot possibly known beforehand, but when the new pesticide molecule developed is similar to a pesticide molecule that has been known to have adverse effects on human and environmental health,

then the precautionary principle ought to apply and the new pesticide molecule should not be allowed to be used or manufactured. This Hon'ble Court has affirmed the precautionary principle in many cases starting with *Vellore Citizens' Welfare Forum v. Union of India* [(1996) 5 SCC 647], where the precautionary principle was spelt out thus:

> *The "Precautionary Principle" - in the context of the municipal law – means-*
> *(i) Environment measures - by the State Government and the statutory Authorities must anticipate, prevent' and attack the causes of environmental degradation.*
> *(ii) Where there are threats of serious and irreversible damage lack of scientific certainly should not be used as the reason for postponing, measures to prevent environmental depredation.*
> *(iii)The "Onus of proof" is on the actor or the developer/industrial to show that his action is environmentally benign.*

In the context of pesticides the precautionary principle would apply with full force in light of the known adverse effects of pesticides on human and environmental health, and at the very least, new pesticide molecules from molecular classes of pesticides known to have had adverse effects should not be allowed to be used or manufactured in India.

In addition, a needs and alternatives assessment needs to be carried out before registering a pesticide to assess whether there is any need for allowing the use of a particular chemical pesticide and whether a safer, natural alternative exists.

H. <u>This Hon'ble Court's pertinent observations in cases relevant to this issue</u>:

27. This Hon'ble Court in *Dr. Ashok vs Union of India*, [(1997) 5 SCC 10], in judgement dated 02.05.1997, made be following pertinent observations while directing that a committee from the four different Ministries involved in dealing with pesticides should be constituted which should have deliberations atleast once in three months and take suitable measures in future in respect of any other insecticides and chemicals which is found to be hazardous for health:

> *"Scientists studying a cabbage field in United States found 177 different species of insects of which only 5 species were significant pests. The agricultural system is subject to the normal checks and balances of a natural ecosystem. If left alone, pest species are usually dept under control by their enemies. According to an estimate insects at 10 per cent of the food crops in the United states in 1891 and at that time very few pesticides were being used. The pest populations were controlled by insect predators, parasites, and disease. But in the survey of 1970 it was found that the crop losses to insects rose to 13 per cent. The question, however, whether it is on account of chemical sprays or whether farmers would be better off if no pesticides were used at all still remains unanswered.* ***There is no dispute that most chemical pesticides are poisonous to humans as well as to insects****. The organophosphates which have been used extensively in North America since 1973 are much more poisonous than the DDT which was replaced by such organophosphates. Since mid- 1940s many thousands of people have fallen sick or have died from severe pesticide poisoning every year. At present*

more than half of these are children who are exposed to the toxic chemical through carelessness in packing or storage. Most of the others are workers who handle these materials in the factory or on farms. Even workers working in the factory where chemicals are manufactured bring the pesticide dust home on their clothes and they poison the family as well. In July 1975 the Allied chemical Company paid millions in damage suits and the plant was shut down. No amount of compensation paid in cash could make the people healthy again. People can avoid exposure to large doses of insecticides but it is impossible to avoid exposure to contaminants in food, in the air and in drinking water. Scientists in their anxiety to increase the production capacity of the soil and to prevent the food particles from various pests and insects have invented several insecticides which has caused deleterious effect on the human health. The broad spectrum pesticides have serious flaws. They upset ecosystem, poison people and animal and possibly cause cancer. on the basis of continued research in the field several other advance countries whereas in a developing country, like India, no effective measures have been taken so far while examining the affidavits filed in this court by different Ministries of the Government of India to find out what effective steps have been banned in other countries particularly when its deleterious effect on the human health is alarming, One thing is absolutely clear that in this country there has not been much study and research on the harmful effect of several such chemicals and pesticides. There is no coordinated organisation and the lack of coordination between different ministries of the government who deal with different chemicals and pesticides make the people of this country suffer."

This Hon'ble Court further observed:

"But the most dangerous crisis in the present day modern world is that of global atmospheric pollution. The eco system has become imbalanced by uncontrolled use. abuse and misuse of natural resources and manufacture and use of hazardous products and chemicals resulting in

> *endangering the very existence of human race. The excessive use of chemicals and pesticides for optimising agricultural production created alarming danger to health and safety of living beings in general and agriculture workers in particular. The impact of pesticides use on global environment may vary in magnitude and exhibits a variety of behavioural patterns and modes of action. Pesticides affect man's ecosystem and their residues can get into the food chain. The amount of pesticide consumed by people depends on the manner of usage of pesticides particularly on farm crops, storage of the produce and its processing. In most of the developed countries the use of hard pesticides on agricultural crops has been either banned or restricted and other pest control programmes are adopted in order to maintain eco-system. But the developing countries are still using these pesticides without caring for side effects on environment."*

28. This Hon'ble Court in *Democratic Youth Federation of India vs Union of India & Ors.* by an order dated 13.05.2011, banned the use and manufacture of Endosulfan in the interim and directed that a joint committee be appointed to conduct a scientific study on the question whether the use of Endosulfan would cause any serious health hazard to human beings and would cause environmental pollution. This Hon'ble Court observed:

> *"Right to life, guaranteed under Article 21 of the Constitution of India, is the most fundamental of all human rights, and any decision affecting human life, or which may put an individual's life at risk, must call for the most anxious scrutiny."*

This Hon'ble Court further observed:

> *"Till the report is submitted, keeping in mind the various judgments of this Court under Article 21 of the Constitution of India, particularly keeping in mind the precautionary principle, we hereby pass an ad-interim order to immediate ban the production, use and sale of Endosulfan all over India and we further direct the statutory authorities to seize the permit given to the manufacturers of Endosulfan till further orders."*

GROUNDS

A. Because the right to health is a fundamental right as part of Article 21 of the Constitution, and has been so affirmed by a number of decisions of this Hon'ble Court.

B. Because the use of pesticides including herbicides has had alarming adverse effects on the health of farmers and farmworkers of India and pose a grave risk to the health of consumers of India.

C. Because the Central and the State Governments have failed to regulate and restrict the use of pesticides, thereby defeating the purpose of the Act and causing the violation of the right to health of the farmers and farmworkers of India.

D. Because the Central and the State Governments have failed to set MRLs scientifically and also implement the MRLs that have been set for pesticides in food articles and have thereby violated the right to health of consumers of India, in addition to the fact that pesticides used in our farms contaminates water sources of consumers, violating their right to health,.

E. Because the Central and the State Governments have failed to ban the use and the manufacture of pesticides that have been banned by other countries.

F. Because there are at least 93 Pesticides that are used in India that have been banned by other countries and atleast an additional 6 more that are used in India that have been withdrawn or restricted by other countries.

G. Because aggressive and unethical marketing of pesticides is being allowed despite their well documented adverse affects.

H. Because the precautionary principle is not being followed in the process of registration of pesticide molecules for their use and manufacture.

I. Because a need and alternatives assessment is not being done before registration of pesticides to see whether there is any need of the pesticide to be used or manufactured in India, and to see whether less harmful alternatives exist.

J. Because farmers are caught in a vicious cycle of debt, deteriorating soil health and groundwater quality, and the use of pesticides is leading to the creation of pesticide-resistant pests and this vicious cycle leads to the need for more chemicals to keep up with the changing chemistry of pests and pesticides.

K. Because for the right to health of farmers and farmworkers is to be achieved, they shall require assistance from the Central and the State Governments to convert their farms into pesticide free organic farms, and the use of all chemical pesticides will need to be phased out in that period.

L. Because not only is the phasing out of pesticides an imperative to achieve the right to health of farmers, farmworkers and consumers, but it has also been shown in several studies including those conducted by the Government, and also through the successful example of the state of Sikkim, that pesticide free organic farming is as or more productive than chemical pesticide based farming in the longer run.

PRAYERS

In light of the facts and circumstances as stated above, this Hon'ble Court may be pleased to:

a) Issue a writ of Mandamus, or direction, or any other similar order or direction to ban all the pesticides that have been banned by other countries.

b) Issue a writ of Mandamus, or direction, or any other similar order or direction to ban the advertising and unacceptable practices of marketing and promoting pesticides.

c) Issue a writ of Mandamus, or direction, or any other similar order or direction to make it mandatory to follow the precautionary principle before registering any pesticide for use or manufacture.

d) Issue a writ of Mandamus, or direction, or any other similar order or direction to make it mandatory to perform a needs and alternatives assessment before registering any pesticide.

e) Issue a writ of Mandamus, or direction, or any other similar order or direction to appoint an expert committee comprising of individuals of unimpeachable integrity mainly from the field of Organic Agriculture / agro-ecology to examine the issue of making a roadmap for phasing out all chemical pesticides in a time bound manner, preferably within 5 years, and for making recommendations on the assistance to be given by the Central and State Governments to farmers for the period of time it will take for their farms to convert to chemical pesticide free organic farms, as well as for providing the requisite impetus to organic farming in the country, and also, to issue consequent directions to the Central and the State Governments to implement the recommendations of the said expert committee.

FILED BY

Drawn by
Sumant Bhushan, Adv.

DRAWN ON: 29 .10/2017 **PRASHANT BHUSHAN**
FILED ON 30.10/2017 ADVOCATE FOR THE PETITIONER
PLACE: New Delhi