



## **Pesticide Poisonings in Yavatmal District in Maharashtra: Untold Realities**

**Pesticide Action Network (PAN) India**



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### **Pesticide Action Network (PAN) India**

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### **About PAN India**

Pesticide Action Network (PAN) India is a public interest non-profit organisation working to make India a world leader in agro-ecology. This organisation is being developed as a regional centre and works in collaboration with Pesticide Action Network (PAN) International community to eliminate the human and environmental hazards caused by pesticides. This organisation focuses on bringing changes to the way chemical pesticides are used, harming life and the environment. It aims to help farmers reduce dependence on toxic chemicals and to increase the use of sustainable alternatives to chemical pest control, based on scientific knowledge. Primarily, PAN India focuses on generating and sharing knowledge related to chemical pesticides such as farm level actual practice, health and environmental effects, as well as on alternatives to hazardous chemicals. PAN India is committed to support efforts of farming communities to promote ecological agriculture, conserving traditional knowledge and agro biodiversity towards ensuring sustainable food production systems and toxic free living. PAN India supports sustainable options in all human endeavours and living, based on participatory research and sound science, achieving social and environmental justice to replace toxic substances in our society.

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## **Foreword**

Pesticides have been a major source of deaths, and debilitation across India, either through self-poisoning, deliberate or accidental poisoning. Within the easy of reach of the depressed and stressed persons, pesticides have become a causal factor in the loss of numerous lives, of farmers, women, girls, boys and children.

Exposure to pesticides during spraying is another scourge of these killer products that has not received adequate attention from policy makers and medical professionals. We have been tracking many of them, in numbers and individual. However, periodically, India witnesses a major outbreak of pesticide exposure-led deaths. Way back in 2002, our members documented and highlighted such deaths of farmers in Warangal. A fact finding report done by them was discussed in Indian Parliament as well.

Similar deaths were noticed in Yavatmal district of Maharashtra. Here more than 40 deaths and more than 1,000 farmers and farm workers have been hospitalised between September and October months of 2017. The big question on everyone's mind was: What, how and why.

People who do not know much of pesticides would want to know what led to these deaths and poisonings. People, who know about pesticides, including the victims, would want to know why it happened. And, for many readers of print media and viewers of multimedia it is a mere what. However, regulators seem to be scurrying around to find ruse, than reason. Pesticide companies, and their vast marketing network, are looking for avenues to shirk their responsibility, liability and accountability. Humanism seems to be at a premium.

As we delve deeper, this time it is spread geographically much wider in Maharashtra and parts of North Telangana. We do not yet know in other parts of India, where intensive pesticide usage is recorded. It all depends on local activists, and media, which supports them. Otherwise, deaths and impairment of farmers does not get due attention. Quantification is very important, to bring out the magnitude of the problem. Qualitative assessment is required to understand the depth, range and contours of the problem. We hope that this documentation would spur more actions which generate information, awareness and advocacy.

Authenticity of information is very important in such unfortunate conditions. Most often, searching for authentic information can be daunting. With limited resources, we ventured out to do a field assessment on the unfortunate incident of deaths and poisonings of small scale farmers and farm workers happened in Yavatmal due to inhalational and contact exposures to pesticides. This was done with the support of Human Rights Law Network (HRLN). We express our gratitude and love to Adv. Kranthi Chinnappa, Adv. Nihal Singh and Adv. Barun Kumar of HRLN for facilitating and for participating in the field visit and their inputs. We would like to thank Sri. Devanand Pawar of Shetkari Nyayhakk Andolan and his team for help in organising the visit to Yavatmal Medical College Hospital, interaction with poisoned victims, medical professionals, visit to farming households, cotton field, interaction with media persons, etc.

We thank farmers, farm workers, medical professionals, officials in agriculture department, pesticide wholesale dealers, agriculture scientists, etc. for cooperating with our visit and providing necessary information.

With heartfelt condolences to the kin of those who lost life due to deadly, toxic pesticides while working hard to earn their daily bread in cotton field, here we present our findings and a situational analysis...

**C. Jayakumar**  
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**Pesticide Action Network (PAN) India**

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## **Executive Summary**

Yavatmal is a pre-dominantly cotton growing area for decades. However, recent deaths and illness-induced hospitalisation due to toxic pesticides, insecticides and herbicides has caught the farmers and farm workers unawares. Even the most sleepy officials and imbecile pesticide marketing network had to notice this genocide, as someone put it.

This year, unfortunate series of deaths and poisonings among farming community due to pesticide exposures very intensively in Yavatmal, and in other districts once again brought this region into limelight. Several deaths and hundreds of poisonings of farmers and farm workers has been reported from Yavatmal, Nagpur, Chandrapur, Amravati, Buldana, Bhandara and Akola districts, with highest number from Yavatmal. Since July this year, in 2017, small-scale farmers and farm workers were getting hospitalized regularly every day due to various debilitating ailments caused by exposure to pesticides. Reports show that farmers and farm workers who have been spraying pesticides in cotton fields have developed problems such as nausea, vomiting, irritation, eye burns, etc. and were taken to hospitals for treatment.

Reports on these unfortunate incidents of deaths and hospitalisation due to exposure pesticides in the cotton fields spurred us to do a field assessment visit to Yavatmal. This team found that farmers visit hospitals on either side, whenever they get exposed to pesticide sprays, both private and public hospitals.

Organophosphate poisoning results from exposure to organophosphates - chemical compounds found in insecticides and nerve agents. According to the latest report as on 15th October 2017, more than 450 poisoning cases and 23 deaths have reported from Yavatmal Medical College Hospital (YMCH) in the past three months. When we visited the hospital, several patients who suffered pesticide poisoning were admitted in the general ward and four were in ICCU. Most of the farmers suffering from pesticide poisonings are small-scale farmers and farm labor working on daily wages or hired sprayers, who mostly belong to downtrodden, neglected adivasi communities.

Inhalational poisoning cases reach their peak during August and September. An analysis revealed that between July 6th and October 11th, 2017, 450 cases of inhalational poisonings due to exposure to pesticides are reported (by the time we prepare the report, more cases have come in). A junior doctor in the hospital said nausea, vomiting, head ache, sweating, restlessness, loose motions, fasciculation (muscle twitch), respiratory distress, pupil constriction, shivering, etc., were commonly noted among the pesticide poisoning cases.

Despite widespread incidence of pesticide poisoning, there is no standard protocol for best, appropriate and real time treatment. India-wise, referral hospitals in districts where pesticide usage is rampant are inadequately equipped in terms of specialized toxicology services, beds, antidote stocks and other necessary equipment and medicines. Number of pesticide poisoned farmers and farm workers were turned out of the public and private hospitals, without proper, adequate and full care, for lack of beds, antidote stocks, low payment capacities and sheer negligence of medical teams.

While medical personnel are unanimous in claiming that all pesticide poisoning cases are treated symptomatically, no diagnostic tests have been done on any of the poisoning cases. There is no information available on the dosage administered to each of the pesticide poisoning patients.

Vasantrao Naik Government Medical College (VNGMC), at Yavatmal, has bed strength of 584. This is a referral hospital with inadequate, and improper facilities, and responsiveness towards pesticide poisoning cases in the district. Conditions with regard to 12 rural hospitals and 61 primary health centres, in this district, most possibly much worse.

Interestingly, all pesticide poisonings are considered as Medico- legal cases (MLCs). If the procedure of MLC is followed fully, every ‘inhalational poisoning’ should have to be investigated by the police. This is not happening here. Yavatmal hospital categorises all accidental poisoning cases as ‘inhalational poisoning’ cases. This team felt that this could be the first step in administering incorrect therapy to agro-chemical poisoning cases. Our assessment shows that use of different pesticides together and pesticide cocktails are generally not factored in diagnosis and treatment decisions.

Medical fraternity in India considers atropine as a universal antidote, with possible serious implications on treatment methods and patient recovery.

Best treatment for poisoning depends on the availability of appropriate antidote in adequate quantity and at the appropriate time after poisoning. Depending on the poison, delayed use or unavailability of an antidote may lead to severe problems. In some poison cases antidote should be administered within 30 minutes of poison ingestion.

Importantly, there is no rational, scientific and informed medical treatment of affected farmers and farm workers admitted in various hospitals. Farmers and farm workers, who have chronic, persistent health problems due to pesticides exposure and are in need to get medical attention, are being ignored.

Approved pesticides (Insecticides, fungicides and Herbicides) and not approved for cotton have been sold and used in Yavatmal. Names of 16 agro-chemicals have emerged, from our assessment and media reports. A thorough study should be able to link particular pesticides with particular problems of exposure. However, attribution of current widespread poisonings to one or two pesticides is being attempted by regulatory agencies, primarily to channelize discontentment over regulatory performance.

A total of 16 brands of various pesticides are used on cotton. An analysis shows eight insecticides including three combination products, a fungicide and two herbicides belonging to eleven technical grade pesticides are used for cotton. We did not get pesticide consumption data in Yavatmal. Yet, it is evident that farmers are using several brands of different pesticides to manage the pest menace in cotton. Farmers and the victims, the team has interacted, said that often they mix chemicals. Interestingly, Maharashtra also approves mixing of pesticides, as per guideline on a



website. Scientific explanation of such recommendation is lacking. It needs to be examined further. Be that as it may, in this instance, farmers alone cannot be blamed for mixing pesticides since there is a policy guideline to mix and use. It is another matter whether farmers are following this guideline. The principle of mixing has been endorsed, which to our knowledge is not supported by research or regulation.

It has been noted that farmers / farm workers use several different variants of spraying equipments. It includes hand-operated pumps, battery-linked motor sprayers (locally called as Chinese sprayers) and petrol-fuelled motor sprayers. Faulty sprayers have been blamed. However, how exactly they are faulty is not being explained.

It is a reality that farmers and workers handling with pesticides do not use personal protective equipment. The Insecticides Rules has clearly put forth the required protective clothing including respiratory devices to be used while working with pesticides (Rules 39 and 40). Awareness on the use of pesticides, precautionary measures, safety aspects, etc., are not given to workers who work with pesticides. As a result, they are vulnerable to spillage, exposure, misuse, etc.. While spraying, workers can be exposed to pesticides variously; through direct exposure to spillage, spray drift through inhalation and/ or contact via skin. Continuous absorption of pesticides or cocktail of pesticides, through the skin of the worker, results in higher health risk. We were told that often workers get drenched under the motor-operated sprayers, when their concentration is on avoiding snake bites, wading through the thick cotton crop foliage and in other incidental conditions.

Usually cotton is sown during June and application of pesticides including insecticides and weedicides begins after nearly a month. These days farmers start with herbicides. Farmers report varying spraying schedule, some report once in 10 days while some others reports once in 15 days. They are addicted to usage of pesticides, based on crop growth, rather than on observation of pests and assessment of pest levels.

Farmers and farm workers continue to pay, unnecessarily and exorbitantly for various activities in agriculture. Pesticides, insecticides and fungicides are the usual burdensome cost factors. A rough calculation shows that per 1,000 farmers cost of agro-chemicals, including the health costs, is Rs.4.54 crores per season.

In response to this episode, Maharashtra Government has announced financial support of Rs.2 lakhs to kin of the farmers and farm labour who died due to pesticide exposure. It has also issued guidelines on 'do's and don'ts while spraying pesticides, which were in any case available on their website. No effort has been made to bring this information nearer to the farmers and farm workers, even in this crisis period. Yet, most officials, including medical doctors and pesticide marketing network find it easy to blame farmers for not using PPE, consumption of alcohol and indiscriminate spraying practices.

There is a need to appoint a panel of medical specialists, including neurosurgeons, to examine medical treatment given to current pesticide poisoning patients and develop an appropriate treatment procedure for farmers and farm workers admitted in private and public hospitals across Yavatmal district.

Maharashtra should train anganwadi workers and other volunteers in each of the villages in giving first aid to victims of pesticide poisoning. Under Insecticide Act, 1968, specific provision should be brought for compulsory mention of antidote for each licensed pesticide by the manufacturer. No pesticide should be registered without information and commitment by the applicant about the antidote to the particular pesticide.

Pesticide poisoning should be declared as a national tragedy and should be included in the disaster list maintained by the National Disaster Management Authority. A standard medical treatment protocol should be developed at the national level.

The ground reality of multitude of issues related to cotton farming right from seed to pesticide application practices, farming and working conditions, lack of proper access to information, etc., reminds us of the fact that safe use of pesticides is not possible in the given scenario. Though pesticide poisoning was reported in previous years, no sustainable measures have been taken to stop poisonings. It is really a worrisome situation as innocent farmers and farm workers are getting poisoned and dying. It is high time that toxic pesticides are to be banned, at the same time farming communities are to be provided with adequate support both technically and financially to do farming without using chemical pesticides and agrochemical inputs for which several successful model are available in India. Agro-ecological practices have to be encouraged.

In India, pesticides are regulated by various government agencies. The Central Agriculture Ministry regulates manufacture, sales, transport and distribution, export, import and use of pesticides through the Insecticides Act, 1968 and the Insecticides Rules 1971. The Central Insecticides Board is responsible for advising the Central and State governments on technical issues related to manufacture, use and safety of pesticides. Its response to this episode is mute and invisible.

In conclusion, attribution of this genocide to one single causal reason is impossible. It is the circumstances, and the combination of different factors that led to these deaths and poisonings. Importantly, harmful pesticides constitute the core cause that lies at centre of these unfortunate series of human loss, along with apathy, disdain, profiteering motives and corruption. Agro-chemicals, with toxic contents, need to be restricted, and ultimately banned.

## **1.0 Introduction**

Yavatmal, an eastern district in the Vidharbha region of the Western State of Maharashtra in India has been in the news reported by local and national media over the past few weeks. Vidharbha is notoriously known for farm distress and farmer suicides; nearly 14,000 suicides of farmers in its six districts were reported in the last 16 years. This year, unfortunate series of deaths and poisonings among farming community due to pesticide exposures very intensively in Yavatmal, and in other districts once again brought this region into limelight. Vidharbha is largely an agrarian region with cotton, jowar, soyabean and pulses being major crops.

Several deaths and hundreds of poisonings of farmers and farm workers has been reported from Yavatmal, Nagpur, Chandrapur, Amravati, Buldana, Bhandara and Akola districts, with highest number from Yavatmal. Since July this year, in 2017, small-scale farmers and farm workers were getting hospitalized regularly every day due to various debilitating ailments caused by exposure to pesticides. Initially, no one noticed them, or consider it seriously, until 19 deaths were documented. Reports show that farmers and farm workers who have been spraying pesticides in cotton fields have developed problems such as nausea, vomiting, irritation, eye burns, etc. and were taken to hospitals for treatment.

Media reported more than a thousand poisonings and around 50 deaths from Vidharbha region. People mention that similar poisoning incidents were reported in previous years as well with varying intensities.

Reports on these unfortunate incidents of deaths and hospitalisation due to exposure pesticides in the cotton fields spurred us to do a field assessment visit to Yavatmal. A delegation led by PAN India team along with a member of Human Rights Law Network (HRLN) visited Yavatmal, where highest number of deaths and poisonings were reported, and tried to assess the severity and causal relations of such unfortunate incidents.

## **2.0 Methods**

It was a two day visit organized on 13<sup>th</sup> and 14<sup>th</sup> of October 2017. In these two days, this team met local individuals and organisations who brought the issue of poisonings and death into limelight, visited a village, discussed with family members of a farm worker who died in September due to pesticide poisoning, met a couple of farmers and visited cotton fields, visited Yavatmal Medical College Hospital, interacted with poisoned patients, physicians and nurses, an agriculture officer, local journalists and a wholesale dealer of pesticides.

Relevant secondary data were used in the report. As such cases are also being reported in the nearby district of Adilabad in Telangana State, Hospital in this district, and a village also visited along with interacting with medical professionals.

Also, two members of the team did a similar exercise in the neighbouring Adilabad district of Telangana State. There are many similarities between these two districts, as

they share social, economic and cultural relations. This team found that farmers visit hospitals on either side, whenever they get exposed to pesticide sprays, both private and public hospitals.

Information in this report is largely corroborative, but well researched. We did rely on local resources for information. However, we intend to enrich the content with more data and certified information related to different variabilities mentioned in this report. This report tries to link various factors, and not just related to particular incidents or geographical location. This assessment tries to draw the linkages and trends, and trace them to policy and administrative actions.

## **2.1 List of Participants**

1. Dr. D. Narasimha Reddy (Director, PAN India)
2. Dileep Kumar A. D. (Programme Coordinator, PAN India)
3. Adv. Barun Kumar (Lawyer, HRLN)

### **3.0 Main Part of the Report**

According to the latest report as on 15<sup>th</sup> October 2017, more than 450 poisoning cases and 23 deaths have reported from Yavatmal Medical College Hospital (YMCH) in the past three months.

#### **3.1 Pesticide poisoning and death**

When we visited the hospital, several patients who were poisoned by pesticides were admitted in the general ward and four were in ICCU. We could not visit those in the ICU.

We were told that just a week earlier, corridors near the general ward, and pathways between beds were filled with victims and their family attendants. In the case of severely restless victims, there were 3 to 4 family attendants to pin them to the bed or floor. Most of the farmers suffering from pesticide poisonings are small-scale farmers and farm labor working on daily wages or hired sprayers, who mostly belong to downtrodden, neglected adivasi communities. Some observations:

1. Ganesh Bapuram Tekam is a 50 year old farmer who grows cotton in eight acres of land – 3 acres of his own and rest is taken on lease. He is from Dattapur village in Ghatanji taluka in Yavatmal. As a normal practice, he sprays on cotton crop once a week. Besides spraying his own field, he also undertakes hired spraying work in other farmer's field as well. Every week, on an average, he sprays for three days, whole day, about 8 hours. His wife told us that he has been spraying since 10 years and this is the first time he developed such illness. Just before he was taken to the hospital, he sprayed a mixture of two pesticides, named polo and gayathri, on cotton. He was using a manually operated backpack sprayer and was spraying from 10 am to 3 p.m. By evening, he has developed eye irritation and suffered impaired vision. "I was unable to see and felt burning sensation on my eyes and face" he said when asked what happened. He also said that the spray fell back to his face several times due to wind and this year cotton has grown up to a height of nearly six feet. He replied that he had never used personal protection equipment, in response to a question. We could see he has been in the hospital for about a week, and suffers from restlessness, shivering hands. It could be due to atropine, we learned later.

His wife was on the bedside, with another male relative, probably to 'contain' the victim who appeared fidgety and restless. Their children were at home. His wife was on the verge of tears and has no clue about what has happened, and what is happening and what can be the outcome. She seemed to be lot more worried. Both, wife and husband looked famished and the clothes on them were worn out, and were made of cheap polyester.

They apparently did not get any financial support. We learned about the government scheme to provide financial assistance of Rs.2 lakhs to the families wherein a member was killed. However, the surviving victims and their families seem to have been left in the lurch.

2. Vasanta Ramdas is a 30 year old farmer who has suffered from eye burns after spraying pesticides. He belongs to Dongargaon, Wani taluka in Yavatmal. He has 12 acres of cotton field and have been active in cotton farming with spraying activities for about 15 years. Usually cotton is sprayed once in a fortnight, two days continuously to cover the entire 12 acres. He normally sprays in two shifts days, morning 7 to 10.30 am and in the evening from 4 to 6 pm. He developed eye burns and irritation after spraying the pesticides and profex super in combination for two days continuously. "I have been spraying for last 15 years in my cotton field and don't know what happened this time, but I got eye injury", he said. He has also not used protective measures and was using a battery powered sprayer. "Cotton has grown beyond six feet height this year, and don't know why it has happened", he said. He is suffering from shivering hands besides eye injury.

His father was on the bedside, when we were discussing with him. He stayed calm and composed, probably because his son appeared to have become a little more stable. However, the victim was wincing whenever he had to shift himself.

When asked, Ramdas said he would avoid pesticides once he is back. We wondered how much support this government would give him to do safe and healthier farming.

3. We could also see a patient whose arms and legs were tied to the bed and was restless towards a near-violent mode. A nurse said he is also a victim of pesticide poisoning, and the restlessness is the reaction of Atropine, a medicine usually given to organophosphate poisonings. It was really painful to see such sights. We could not prepare ourselves to talk to him.
4. All the victims were men. A list with us has one or two women though. We were wondering what might have been the condition of women, who help their male family members in mixing and spraying. Although we tried asking a few, not much information could be gathered on this.

According to a government website, Shri. Vasantrao Naik Government Medical College (VNGMC), at Yavatmal, has bed strength of 584. With an average of 700 farmers coming to this hospital, in a month, with an 'emergency' problem, this hospital seems to be ill-equipped, despite years of experience with pesticide poisonings. There is a proudly announced availability of Flexible Bronchoscope, Ventilators, modern biochemical and microbiological laboratories. However, ACH testing facilities are not available to monitor serum cholinesterase levels, required to monitor treatment of toxic poisoning. However, the website mentions 'facilities for other modern medical care available in clinical / para clinical departments' whatever that means. It also has Post graduate facilities on Ophthalmology, Otolaryngology, Paediatrics and Forensic Medicine. It is our observation that this hospital has failed to specialise on toxicology, even though patient inflows due to self and accidental poisoning are increasing every year, for the past several years.

This being a referral hospital with such inadequate, and improper facilities, and responsiveness towards pesticide poisoning cases in the district, one can imagine the conditions with regard to 12 rural hospitals and 61 primary health centres, in this district.

Ideally, all PHCs and hospitals in Yavatmal district should have been equipped with on par treatment facilities and antidotes, based on medical history of the operational area.

Literature shows that during the early phases of a toxic chemical emergency, when the exact agrochemical is often unknown, identification of the symptoms and linking them with the cause can be a useful decision-making tool. Experts suggest that symptoms can be assessed easily with experience, such as vital signs, mental status, pupil size, mucous membrane irritation, lung exam for wheezes or rales<sup>1</sup> and skin for burns, moisture, and colour.

Identification of a constellation of signs and symptoms is the first step to diagnose and treat a life-threatening condition (e.g., respiratory arrest). However, at Yavatmal and Adilabad, these vital signs have not been identified, from what little patient records this team did have access to. Some perfunctory, repetitive symptoms were recorded, but not in a format, and definitely not in legible form.

We were informed that cases with life threatening condition are admitted into ICCU and are straight away put onto a ventilator. Once the life-threatening crisis has been averted and time passes, they are rapidly shifted to general wards. Early recognition of respiratory failure resulting in intubation and mechanical ventilation is a life-saving intervention for patients with OP poisoning<sup>2</sup>. At this point, it is important to note that of 40 deaths reported, majority died in ICCU. There is a need to examine the post mortem reports of these deaths and ascertain the cause of deaths. This examination is needed to determine the treatment methods, and their efficacy.

Early diagnosis and appropriate treatment is often life saving. Treatment of OP poisoning consists of intravenous injection of atropine and oximes. It is said that clinical course of OP poisoning may be quite severe and may need intensive care management. However, in Yavatmal and Adilabad districts, probably for lack of beds and various other reasons, poisoning cases are being turned out rapidly and being discharged, without recording anymore specific information from the history or diagnostic test results that will guide additional therapeutic decisions and patient disposition.

Medical literature also mentions that 'route of exposure is a determinant of toxicity'. An agro-chemical's physical state and the route of exposure influences toxicity. Particular agro-chemical's state often determines the route of exposure. It is also known that for many chemicals, the toxic effects occur at the site of absorption. Further, effects of the agro-chemical on the person's body can differ between inhalation exposure and dermal exposure. Inhalation exposure can be life threatening by a degree higher than dermal exposure. Literature also tells us that 'evaluating

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<sup>1</sup> *Rales* are abnormal lung sounds characterized by discontinuous clicking or rattling sounds.

<sup>2</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC37406/>

clinical effects based on the amount of exposure is a basic toxicology principle called dose-response'. Dose depends on the concentration of the chemical and duration (contact time) of the exposure.

However, practically, patients at the hospital came with both exposures, simultaneously. This exposure is not to one chemical but to a cocktail of agro-chemicals. These facts are not recorded at all. There is no assessment or diagnosis of dose, period of exposure at the time of admission.

First, there is no grading system to assess the patients at the time of admission so as to grade the severity of poisoning. Grading can help in prioritising assisted ventilation and admission into intensive care unit. Second, ventilators are boon to patients with respiratory failure due to poisoning. They help in decreasing mortality due to organophosphorus related respiratory failure. However, there are dismally very few ventilators in comparison with the inflow of acute pesticide poisoning cases. One would wonder if there was any review about matching the availability of ventilators with patient inflow.

Despite widespread incidence of pesticide poisoning, rather inhalational poisonings, as coined in Yavatmal, there seems to be no standard protocol for best, appropriate and real time treatment.

### **3.2 Numbers of poisoning and death reported at YMCH**

A junior doctor in the YMCH said that inhalational poisoning cases are usually reported from July every year. Inhalational poisoning cases reach their peak during August and September. His observation is that more number of patients arrived this year.

The team was able to gather a list of poisoning cases reported in the YMCH with the help of local politician. An analysis revealed that between July 6<sup>th</sup> and October 11<sup>th</sup>, 2017, 450 cases of inhalational poisonings due to exposure to pesticides are reported (by the time we prepare the report, more cases have come in). In terms of gender disaggregation, there are 14 female patients, with age ranging from 13 to 55 years. It has been noted that there are three records under the age of 18, with two male and a women victims. It is a matter of serious concern that young girls and boys are also affected. We are not sure how such young girls came to be exposed. To under the circumstances of their poisoning, a detailed research might be of help. There were 436 male victims with age ranging from 17 to 80 years. Eleven victims lost their lives in the period and among them 9 deaths were reported from Intensive Care Unit (ICU) and the remaining two from general wards. Later, the death toll has reached 23 and gone beyond.

### **3.3 Illness and symptoms**

Impaired vision, eye irritation, eye burns, loss of memory, etc., were noted among the victims. A junior doctor in the hospital said nausea, vomiting, head ache, sweating, restlessness, loose motions, fasciculation (muscle twitch), respiratory distress, pupil



constriction, shivering, etc., were commonly noted among the pesticide poisoning cases. In severe cases, respiratory paralysis happens and most of the deaths reported in YMCH are due to respiratory paralysis. But this needs to be corroborated. Post mortem reports need to be examined. Given the propensity of the authorities, and facilities, we feel that these reports may not be helpful. Long back, in 2002, in Warangal, of current Telangana State, in the case of similar exposure, all post-mortem reports noted multiple organ failure. Samples were sent for forensic examination, but we could never get them.

### **3.4 Pesticides reported to have caused poisoning**

After interacting with poisoned victims and also with the Doctors in YMCH, names of some agro-chemicals have emerged. This includes, Polo, profex super, starthene, monocil, Police, etc. are the commonly reported pesticides. However, there could be more. Farmers and farm labour usually do not memorise names of agro-chemicals they use. We suspect they give names that come to their mind. And, these are trade names. We would have to work with local shopkeepers, dealers and manufacturers to link these trade names with the technical names and active ingredients. Names that were mentioned were the pesticides used by the poisoned victim before they fell ill. The doctor reported that polo, profex super, monocil are the major pesticides reported by most of the patients. (A detailed analysis is given later in this report).

Table 1 List of Pesticides	
Pesticide brands	Chemical group
Polo	Thiourea
Profex super	Organophosphate + Pyrethroid
Starcene	Organophosphate
Monocil	Organophosphate
Police	Neonicotinoid + Pyrazole
Gayathri*	-
Tonic*	-

\* could not trace out the technical ingredient

Organophosphate poisoning results from exposure to organophosphates - chemical compounds found in insecticides and nerve agents. Organophosphates cause the inhibition of acetyl cholinesterase which leads to the accumulation of acetylcholine in the body. Organophosphate compounds include: insecticides - Malathion, monocrotophos, parathion, diazinon, fenthion, dichlorvos, chlorpyrifos, ethion and nerve gases - soman, sarin, tabun, VX.

### **3.5 Nature of treatment provided in YMCH**

All the cases of pesticide poisonings are considered as Medico- legal cases (MLCs). This hospital categorises all accidental poisoning cases as 'inhalational poisoning' cases. This team felt that this could be the first step in administering incorrect therapy

to agro-chemical poisoning cases. According to the staff, treatment to inhalational poisoning cases is provided based on the symptoms they show. However, no noting of the symptoms could be seen. All the cases are provisionally diagnosed as inhalational poisoning based on the history narrated to physician along with name of the pesticides used, as mentioned by the patient. Farmers and farm workers usually know trade names at best, and in many cases they utter a random name. Whatever they say, hospital staff do not have knowledge to link trade names to active ingredients of agro-chemicals. **Despite such a huge and critical gap in information, all cases are regarded as organophosphate (OP) poisoning.**

After admission, we were told that levels of serum cholinesterase is tested, as organophosphate poisoning results in lowering levels of cholinesterase in blood. But, we were not shown any such test results. We learned later that these tests are expensive and are not done, routinely.

When asked about the treatment, Doctor said that in almost all the cases, Atropine and PAM (Pralidoxime: 2-pyridine aldoxime methyl chloride) and one (from a broad spectrum) antibiotic is given to the patients. When questioned about the need for an antibiotic, in the absence of any test or assessment of infection, we were told that it is precautionary step. On the other hand, WHO is campaigning against unnecessary antibiotic use. We were told that this is the normal procedure for non-respiratory paralysis conditions. In severe cases, atropine is administered rapidly in close intervals, like in every two hours. If the patient is diagnosed with or developed severe respiratory paralysis, they are immediately moved to the ventilator.

Medical literature shows that there is disagreement on whether oxygenation should precede atropinisation. In this hospital, without reference to such disagreement, it is an open question that whether farmers and farm workers received ventilator support as per requirement.

The Doctor informed that a serum cholinesterase is conducted on admission of inhalational poisoning cases. He shared that the normal range for serum cholinesterase is 4000-11000/IU/L, but among the poisoning cases noted here showed lower values. He also said that the serum cholinesterase test values for most of those who have died in the hospital were less than 1000/IU/L.

The team also happened to see the some documents on treatment of an inhalational poisoning patient admitted in the ICU. The documents revealed the name of the poison was written as organophosphorous compound with the following in brackets Starsene + tonic. The nature of poisoning has been noted as inhalational poisoning. It was noted that he has developed symptoms such as loose motions two days after spraying. He was given atropine and PAM. His serum cholinesterase results showed the values 139/IU/L.

A retired additional director of health, from the nearby district of Adilabad in Telangana stated said that pesticide inhalational and contact poisonings are common during the season when flowering of cotton happens. He has reported that nearly 350 cases of eye injury cases were reported in an eye hospital this year, nearly a half from Yavatmal district and the other half from Adilabad. He agreed that there is no proper treatment protocol for pesticide poisoning cases and usually treatment is provided

based on symptoms. He also admitted, and supported our contention that Doctors are generally not aware of the pesticides used by farmers and there is no proper antidote for each and every pesticide. However, as most poisoning cases involve Organophosphate exposures, atropinisation, administering PAM and antibiotics are normally done, along with providing ventilator assistance if required. In most cases such treatments are focused on merely saving the life of the victims, not on other medical parameters. **Use of different pesticides together and pesticide cocktails are generally not factored in diagnosis and treatment decisions.**

In cases where atropinisation, PAM and antibiotics are not working when he/she is under observation for 24 hours or 48 hours, then only physicians move towards further deeper probe and diagnosis.

Another doctor explained in detail about the implications of organophosphate poisoning as follows. The companies that produce these toxic agrochemicals do not know how to deal with poisoning cases and how to deal with illness related to them. Organophosphates can get into the body either through inhalation or ingestion or through the skin and eyes. Once they reach the body they are distributed and prevent functioning of nervous system. They block signal-transferring process between neurons and between neurons and muscle cells, by inhibiting an enzyme called choline esterase. This results in accumulation of the neurotransmitter – acetylcholine - and cause over stimulation, which prevents normal functioning of nervous system at neuronal junctions and myoneural junctions. Atropinisation and PAM are given to activate the neuron /myoneuron junctions and Taxim is administered to increase urination, to get rid of the poison from body, assuming it clears pesticides in body fluids. In the case of inhalational poisonings, myoneural systems in the lungs are affected and in severe cases it results in respiratory paralysis. Ventilators are provided for such cases to maintain respiration and heart pumping. Along with respiratory paralysis there could be multiple reasons (caused by organophosphate poisoning) leading to death.

## **4.0 Implications of current medical assistance**

First of all, it has been noted that all the cases of poisoning reported here are considered as OP poisonings. Staff at the hospital informed this team that ‘all the pesticide poisonings noted here are OP poisonings and so treatment for OP poisoning is been administered’. However, when asked about how they know that these are OP pesticides, he said they ask the patient or the accompanying attendants about the name of the chemical sprayed in field. He also stated that ‘since OP pesticides are widely used here, they consider all cases as OP poisoning’. When probed about the commonly reported pesticide this year, he said ‘polo’ and it is an OP pesticide. But, the team has found that polo contains the insecticide active ingredient ‘diafenthiuron’. Diafenthiuron is a ‘thiourea’ compound and **not at all an OP**. This fact is alarming, pointing to the way medical professionals dealing with cases of pesticides poisoning. Other pesticides used by farmers just before they developed illness are not factored in properly. This could be due to neglect or lack of awareness, but however it is an unfair practice that could mislead diagnosis and decision on treatments.

Secondly, as the hospital authority treats all inhalational poisonings as OP poisonings, the treatment mainly involves administration of atropine, PAM, and broad spectrum antibiotics. According to the poisoned victims that the team has visited, they were using a mix of certain agrochemical products, which are a combination of organophosphate and pyrethroids. For example, a medical doctor has said that number poisoning cases were due to the pesticide profex super, which is a combination insecticide contains the profenofos OP and cypermethrin (pyrethroid).

Involvement of several brands of different pesticides and their combination would most possibly have entirely different toxicological implications, than is known for organo-phosphates. Therefore, when an ailment arising out of such multitude of chemicals is merely diagnosed as OP poisoning, it most probably leads to incorrect medical advice and treatment. With neglect, work load, there are higher chances of wrong diagnosis and treatment in Yavatmal incidents. It is worth noting here that all agro-chemicals do not have antidotes. Medical fraternity in India considers atropine as a universal antidote, with possible serious implications on treatment methods and patient recovery.

And thirdly, proper monitoring is not being done on the patient’s condition with regard to some important aspects of stability and succour. It seems a one-time is done for serum cholinesterase, at the time of admission in Yavatmal. However, further tests and monitoring are not done on this parameter. Besides, blood and urine analysis are not being done to check the presence of pesticides in these bodily fluids. Atropinisation and or over atropinisation along with PAM and antibiotics could have deleterious effects on bodily functions. And such monitoring is not at all happening.

## 4.1 Antidotes

An antidote is a drug, chelating substance, or a chemical that counteracts (neutralizes) the effects of another drug or a poison<sup>3</sup>.

There are dozens of different antidotes; however, some may only counteract one particular drug, whereas others (such as charcoal) may help reduce the toxicity of numerous drugs. Most antidotes are not 100% effective, and fatalities may still occur even when an antidote has been given. Some examples of antidotes include:

- Acetyl cysteine for acetaminophen poisoning
- Activated charcoal for most poisons
- Atropine for organophosphates and carbamates
- Digoxin immune fab for digoxin toxicity
- Dimercaprol for arsenic, gold, or inorganic mercury poisoning
- Flumazenil for benzodiazepine overdose
- Methylene blue for drug-induced methemoglobinemia
- Naloxone for opioid overdose
- Pralidoxime for poisoning by anti-cholinesterase nerve agents.

### **Box 1: Pesticide Manufacturers responsible for providing antidotes**

The Indian Insecticide Rules 1972 through the Rule 41 has clearly put forth that 'Manufacturers, etc. to keep sufficient quantities of antidotes and first-aid Medicines - The manufacturers and distributors of insecticides and persons who undertake to spray insecticide on a commercial basis (hereafter in these rules referred to as operators) shall keep sufficient stocks of such first-aid tools, equipments, antidotes, injections and medicines as may be required to treat poisoning cases arising from inhalation, skin, contamination, eye contamination and swallowing'.

### 4.2.1 Antidote for the pesticides used in Yavatmal

Antidotes recommended for poisonings, for the pesticides reported in Yavatmal, are provided in the table given below. Among the eleven chemicals antidote has been given for only three, which belongs to organophosphates. For all the other eight chemicals, no antidote exists; symptomatic and supportive cares are suggested for them. Ironically, what the team could see in Yavatmal Medical College Hospital was that all the poisoned victims were treated as OP poisoning cases, administering atropine and PAM along with antibiotics. Implications of combination insecticides were not considered at all.

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<sup>3</sup> <https://www.drugs.com/drug-class/antidotes.html>

Table 2: Antidotes to Pesticides used in Yavatmal

S. No.	Pesticides	Antidote
1	Acephate (OP)	Atropine, possibly in conjunction with PAM*.
2	Copper oxychloride (inorganic copper)	No specific antidote, symptomatic and supportive therapy*.
3	Cypermethrin (pyrethroid)	No specific antidote, symptomatic treatment. If ingested do not induce vomiting or give liquids.*
4	Diafenthiuron (Thiourea)	No specific antidote, supportive and symptomatic treatment <sup>4</sup>
5	Fipronil (Pyrazole)	No specific antidote, supportive and symptomatic treatment <sup>5</sup>
6	Glyphosate (Phosphonoglycine)	No specific antidote, symptomatic and supportive therapy.*
7	Imidacloprid (Neonicotinoid)	No specific antidote, symptomatic and supportive care <sup>6</sup>
8	Monocrotophos (OP)	Atropine, possibly in conjunction with PAM.*
9	Profenofos (OP)	Atropine and Oximes <sup>7</sup>
10	Quizalofop-ethyl (Aryloxyphenoxy propionic acid)	No specific antidote known. Give supportive therapy. Treat symptomatically. <sup>8</sup>
11	Spinosad (Spinocin)	No specific antidote, symptomatic treatments <sup>9</sup>

\* Bureau of Indian Standards. Indian Standard Guide for Handling Cases of Pesticide Poisoning (First revision) 1998. <https://ia801008.us.archive.org/30/items/gov.in.is.4015.1998/is.4015.1998.pdf>

Anticholinesterase poisoning is caused by the unintentional absorption of anticholinesterases typically found in organophosphate pesticides. Following signs or symptoms can be related to a very bad side effect of atropine:

- Signs of an allergic reaction, like rash; hives; itching; red, swollen, blistered, or peeling skin with or without fever; wheezing; tightness in the chest or throat; trouble breathing or talking; unusual hoarseness; or swelling of the mouth, face, lips, tongue, or throat.
- Not able to pass urine or change in how much urine is passed.

<sup>4</sup> Lu, Yuan-qiang, Jiu-kun Jiang, and Wei-dong Huang, "Clinical Features and Treatment in Patients with Acute 2,4-Dinitrophenol Poisoning," *Journal of Zhejiang University Science. B* 12.3 (2011): 189–192. *PMC*. Web. 21 Oct. 2017.

<sup>5</sup> Fipronil Toxnet <https://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+7051>

<sup>6</sup> Mohamed, Fahim et al. "Acute Human Self-Poisoning with Imidacloprid Compound: A Neonicotinoid Insecticide." Ed. Michael B. Gravenor. *PLoS ONE* 4.4 (2009): e5127. *PMC*. Web. 21 Oct. 2017.

<sup>7</sup> Profenofos. Toxnet <https://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+6992>

<sup>8</sup> <https://www.aako.nl/uploads/bestanden/1e051e3f-2989-488c-923a-73f7a0f64a54>

<sup>9</sup> [www.pesticidetruths.com/wp.../04/Label-Spinosad-Insecticide-Domestic-2014-01-29.pdf](http://www.pesticidetruths.com/wp.../04/Label-Spinosad-Insecticide-Domestic-2014-01-29.pdf)

- Fast heartbeat.
- Heartbeat that does not feel normal.
- Very bad dizziness or passing out.
- Trouble breathing, slow breathing, or shallow breathing.
- Feeling confused.
- Change in balance.
- Hallucinations (seeing or hearing things that are not there).
- Feeling very tired or weak.
- Restlessness.
- Shakiness.
- Swelling of belly.
- Change in sex ability.
- Lowered interest in sex.
- Low mood (depression).

Farmers and farm workers in hospital and also those discharged from hospitals continue to report symptoms which are listed above, especially feeling confused, restlessness, shakiness and hallucinations. They believe that it is still the lingering effect of pesticide spraying. This team found that restlessness is very high. Attendants of patients had to hold them or pin them. Patients without attendants were tied to the bed, with arms and legs in a spread-eagled form.

Antidotes are therapeutic agents intended to modify or counteract with the clinical effects of particular toxic substances in the human body<sup>10</sup>. The optimal treatment for poisoning depends on the availability of appropriate antidote in adequate quantity and at the appropriate time after poisoning. Depending on the poison, delayed use or unavailability of an antidote may lead to severe problems like respiratory insufficiency due to organophosphate poisoning, blindness from inadequate treatment of methanol poisoning, renal failure from insufficient treatment of ethylene glycol poisoning, and anoxic brain injury or death from lack of treatment of cyanide poisoning.

In some poison cases antidote should be administered within 30 minutes of poison ingestion. Antidotes which have to be administered in less than 30 minutes include atropine, physostigmine and pralidoxime. Since the timely use of antidotes is life saving in certain poisonings, it is the responsibility of any hospital to maintain sufficient stock of antidotes, especially those where previous cases have been reported and/or located in areas or districts wherein pesticide poisonings are frequently reported.

There is no record, which this team could access to ascertain the atropine dosage, timings and the treatment progress. Cost, stocks and supply of atropine are important factors. In public hospitals, affected farmers and farm workers could still depend on internal supplies, in contrast to private hospitals where the attendants had to pay for all the drugs used. In either case, treatment levels and methods are open for scrutiny. In either case, treatment levels and methods are open for scrutiny. Patients are not aware of over dosage, or under dosage of treatment drugs. They do not have records

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<sup>10</sup> Nagaraju K, Brinda and Gopal BK, Antidote Banks: Need of the Day in Indian Scenario, Journal Punjab Acad Forensic Med Toxicol 2013;13(2)

or medical knowledge and access to any third party to assess and verify the quality of treatment they are receiving.

## **5.0 Farming practices**

### **5.1 Seeds**

Most of the cotton grown in the area has been Bt-cotton for many years. Different Bt-cotton hybrids are available, marketed by different seed companies including Monsanto and Indian firms, but there is no information as to which agency or institution is monitoring their suitability, efficacy, and quality. In the absence of any designated agency to inform farmers whether these seeds are properly tested and monitored, they continue to rely on dealers and marketing agents. It has been reported that this time farmers have grown Bollgard – III hybrids, also known as Roundup Ready Flex (RRF), which is an herbicide tolerant hybrid. It is also reported that this RRF has made its entry illegally. Though the Bt-cotton hybrids are brought in (and that through illegal means) claiming to reduce pesticide use, what the reality have been showing over the past years that the pest attack have been on increase and farmers have to resort to huge use of pesticides to tackle the problem.

### **5.2 Unusual growth**

It has been reported in the media that this year the cotton crop has grown to a height of nearly six feet and sometimes beyond six, which is unusual. Victims with whom the team had interacted also reported the same. On the way to Manoli village, the team saw that cotton plant in some of the fields has grown to an unusual height of six feet. There are a few taller plants too. Given the fact that usually cotton grows to a height of nearly four feet, the actual reason behind the unusual growth of cotton plants these years is not understood. However, it has been explained that better rain, use of plenty of growth hormones and fertilizers could have resulted in such increased growth and foliage. However, this unusual height of cotton plants is also blamed for exposure to pesticides as the spray got released from the sprayer is at the height of those who spray.

### **5.3 Pesticide use**

A list of pesticides used in cotton fields have prepared based on the inputs obtained from the interaction with farmers and poisoned victims in the hospital. Uses of a number of pesticides have reported. A total of 16 brands of various pesticides are used in cotton. As this list has been prepared by inputs from only a few farmers, it is likely that there may be more other chemicals are also being used. An analysis shows eight insecticides including three combination products, a fungicide and two herbicides belonging eleven technical grade pesticides are used for cotton. Thiourea, organophosphate, pyrethroid and neonicotinoid in combination with organophosphate, etc. were the major chemical groups.



Table 3. List of pesticides reported used in cotton

S. No	Brand name	Manufacturer	Active ingredient	Chemical group
1	Polo	Syngenta	Diafenthiuron 50%W/W	Thiourea
2	Pager	Dhanuka Agri Tech	Diafenthiuron 50%WP	Thiourea
3	Profex super	Nagarjuna Agri Chem	Profenofos 40% + Cypermethrin 4% EC	Organophosphate + pyrethroid
4	Monocil	Insecticides India	Monocrotophos	Organophosphate
5	Stick	Gharda chemicals	Diafenthiuron 50%WP	Thiourea
6	Monophos	BSH Agritech	Monocrotophos 36% SL	Organophosphate
7	Monostar	Swal / United Phosphorous Limited (UPL)	Monocrotophos 36% SL	Organophosphate
8	Police	Gharda chemicals	Imidacloprid 40% + Fipronil 40%	Neonicotinoid + Pyrazole
9	Celcron	Excel crop care	Profenofos 50% EC	Organophosphate
10	Blue copper	Syngenta	Copper oxychloride	Copper compound
11	Tracer	Dow	Spinosad 44.03% w/w	Spinosyn
12	Glycel	Excel crop care	Glyphosate 41% SL	Phosphonoglycine
13	Impool	M/S Nissan Chemical Industries Japan, Imported by Dhanuka Agri Tech, Marketed by Godrej Arovet	Quizalofop-ethyl 5% EC	Aryloxyphenoxy propionic acid
14	Lancer gold	UPL	acephate 50% + imidacloprid 1.8% SP	Organophosphate + Neonicotinoid
15	Starthene	Swal Corporation	Acephate 75% SP	Organophosphate
16	Starthene Power	Swal Corporation	Acephate 50%+ Imidacloprid 1.8% SP	Organophosphate + Neonicotinoid

Table 4: Chemical group wise distribution of pesticides

S No	Chemical group	Number of brands
1	Organophosphate	4
2	Organophosphate + Pyrethroid	1
3	Organophosphate + Neonicotinoid	2
4	Thiourea	3
5	Copper compound	1
6	Spinosyn	1

7	Aryloxyphenoxy propionic acid	1
8	Phosphonoglycine	1
9	Neonicotinoid + Pyrazole	1

## 6.0 Quantity of Insecticides used in Cotton in India

We did not get pesticide consumption data in Yavatmal. However, Maharashtra State level data shows that in 2015-16, it was 11,665 metric tonnes. It is more than the consumption of 11,239 in 2014-15 and 10,969 in 2013-14. There is a steady increase in pesticide consumption, despite claims to the contrary by agrochemical-GM seed company lobbies. One can notice the big jump in consumption in 2012-13. This rise in consumption continues every year, in the last seven years, except a dip in 2010-11 from the previous year.

Table 5: Pesticide consumption in Maharashtra

S. No.	Year	Technical Grade Pesticides (metric tonnes)
1.	2009-10	8,276
2.	2010-11	7,324
3.	2011-12	7,926
4.	2012-13	10,563
5.	2013-14	10,969
6.	2014-15	11,239
7.	2015-16	11,665

As per website, 28 October, 2016

### Quantity of insecticides used in cotton in India

Dr. K R. Kranthi, former director of Central Institute for Cotton Research did an analysis of insecticide usage in Cotton in India from 2005 to 2013. He wrote in a 2014 article, “introduction of Bt cotton in India in 2002 led to a significant decline in the insecticide usage on cotton from 1.0 to 1.2 kg/ha (prior to 2002) to 0.5 kg/ha by 2006. But, increased infestation of whiteflies in North India and whiteflies, thrips and leaf hoppers across the country necessitated intensive application of insecticides in the subsequent years, especially during 2013 and 2014. The rapid introduction of more than 1000 new cotton hybrids after 2006 and the increase in the area of hybrid cotton from about 45% in 2006 to 95% in 2013 quite possibly led to increased infestation of sap-sucking insect pests and the concomitant insecticide usage to 11,598 M tonnes (0.9 kg/ha) by 2013”.

We were informed that polo, which was cited extensively in this episode of deaths and poisonings in Yavatmal is being used on whitefly. It is clear that the cycle of poison recommended and nurtured for modern agricultural growth is inextricably linked to pesticides and GM seeds.

**Table 6: Quantity of insecticides used in cotton in India (in metric tonnes)**

Year	Sucking pests	Bollworms	Other pests	Total insecticides on cotton	Total area in lakh ha	Bt area lakh ha	Bt area %
1995	2965	5748	487	9200	90.68	-	-
1996	3643	5920	492	10054	91.71	-	-
1997	3621	6973	361	10955	88.08	-	-
1998	3857	7930	418	12205	91.12	-	-
1999	4487	7522	320	12329	85.28	-	-
2000	3716	6647	625	10988	81.48	-	-
2001	3312	9410	454	13176	85.93	-	-
2002	2110	4470	283	6863	78	0.294	0.38
2003	2909	6599	537	10045	77.85	0.931	1.2
2004	2735	6454	178	9367	89.2	4.985	5.59
2005	2688	2923	302	5914	88.17	10.15	11.51
2006	2374	1874	375	4623	91.73	34.61	37.73
2007	3805	1201	536	5543	94.39	63.34	67.1
2008	3877	652	528	5057	94.06	76	80.8
2009	5816	500	410	6726	101.5	83	81.76
2010	7270	249	366	7885	111.4	101.2	91.54
2011	6372	222	234	6828	121.9	112	91.87
2012	6872	178	184	7234	115.5	108.9	94.23
2013	11366	121	111	11598	119.8	114.6	95.66

Source: Dr K. R. Kranthi, Cotton Production Systems - Need for a Change in India. Cotton Statistics & News. Cotton Association of India. 16th December, 2014.

## **7.0 Hazard Status of pesticides as per PAN<sup>11</sup> and WHO<sup>12</sup>**

An analysis of hazard status of the above mentioned pesticides has been done based on PAN International list of highly hazardous pesticides (HHPs) and the WHO recommended classification of pesticides based on hazards. It showed that nine out of the eleven active ingredients are HHPs as per PAN list. With the WHO classification one pesticide – monocrotophos – belongs to the Class Ib, highly hazardous category; seven belongs to Class II, moderately hazardous category; and the remaining three belongs to Class III slightly hazardous category.

Table 7: Hazard status of pesticides

<b>S. no</b>	<b>Active ingredient</b>	<b>PAN Status (2016)</b>	<b>WHO class (2009)</b>
1	Acephate	Highly Hazardous	Moderately Hazardous (Class II)
2	Copper oxychloride	-	Moderately Hazardous (Class II)
3	Cypermethrin	Highly Hazardous	Moderately Hazardous (Class II)
4	Diafenthiuron	Highly Hazardous	Slightly Hazardous (Class III)
5	Fipronil	Highly Hazardous	Moderately Hazardous (Class II)
6	Glyphosate	Highly Hazardous	Slightly Hazardous (Class III)
7	Imidacloprid	Highly Hazardous	Moderately Hazardous (Class II)
8	Monocrotophos	Highly Hazardous	Highly Hazardous (Class Ib)
9	Profenofos	Highly Hazardous	Moderately Hazardous (Class II)
10	Quizalofop-ethyl	-	Moderately Hazardous (Class II)
11	Spinosad	Highly Hazardous	Slightly Hazardous (Class III)

<sup>11</sup> As per Pesticide Action Network's list of Highly Hazardous Pesticides, December 2016

<sup>12</sup> World Health Organization, recommended classification of pesticides by hazard, 2009

**Box 2: Approval for the pesticides reported during field visit**

An analysis revealed that both the pesticides (Insecticides, fungicides and Herbicides) approved and not approved for cotton have been sold and used in Yavatmal. Among the eleven active ingredient pesticides reported from Yavatmal during the field visit, two of them were not approved by Central Insecticides Board and Registration Committee (CIB&RC) for use on cotton in India. Non-approved pesticides include a fungicide named copper oxychloride and the highly debated carcinogenic herbicide, Glyphosate. All the remaining nine were approved for use in cotton, as per the documents of CIB&RC. Whether these pesticides are used exactly for the specified pests need to be investigated. There may be a number of other pesticides which are used in cotton as well and their status of approved usage has to be investigated. A Entomologist informed us that he finds new names in pesticide shops everytime he visits them. Usage of unapproved of pesticides has to be probed to reveal a clear picture.

Table 8: Pesticides and approval for Cotton		
S. no	Active ingredient	Approved for cotton*
1	Acephate	Jassids, Boll Worms, Whiteflies
2	Copper oxychloride	Not approved
3	Cypermethrin	Spotted bollworm, American bollworm Pink bollworm, Jassids, Thrips
4	Diafenthiuron	Whiteflies, Aphids, Thrips, Jassids
5	Fipronil	Aphid, Jassids, Thrips, White fly, Boll worms
6	Glyphosate	Not approved
7	Imidacloprid	Aphid, Whitefly, Jassids, Thrips
8	Monocrotophos	Bollworms, Aphid, Leaf Hopper, Grey weevil, Thrips, White fly
9	Profenofos	Bollworm, Jassids, Aphids, Thrips, Whiteflies
10	Quizalofop-ethyl	<i>Echinochloa crusgalli</i> , <i>Echinochloa colonum</i> , <i>Dinebra retroflexa</i> , <i>Digiteria marginata</i>
11	Spinosad	American bollworm

\* Approved uses of Insecticides, fungicides and Herbicides as per CIB&RC, Directorate of Plant Protection, Quarantine & Storage, Department of Agriculture & Cooperation, Ministry of Agriculture government of India, as on 30<sup>th</sup> June 2016.

## **8.0 Spraying practices**

### **8.1 Different brands are mixed and sprayed**

It became evident that farmers are using several brands of different pesticides to manage the pest menace in cotton. Use a single chemical for a spray on crop is rare, almost non-existent. In general, and as a habit, they mix different brands together along with some adhesives. The farmers and the victims, the team has interacted, said that often they mix chemicals. One of the patients admitted in the hospital said he has sprayed polo and *gayathri* (actual chemical name has not obtained) together. Another patient reported he was using profex super and polo, and another reported starthene and *tonic* (actual chemical name has not traced out). It is now known that this mixing of different chemicals are being done mainly based on the advise from pesticide retailers and peer farmers or workers.

The logic of pesticide spray based on days of planting is unscientific as there is no monitoring of pest population. Scientific use of pesticide is when there is population of pest that impacts the economic threshold and not unwanted sprays based on predetermined days. Several studies pointed out these sprays actually cause pest resistance to pesticides and imbalance of pest populations and the minor pests or unknown insects becomes major problems. Loss of pollinators also cause drop in production, especially in the case of pollinator dependent crops.

**Interestingly, Maharashtra also approves mixing of pesticides, as per guideline on a website. There is a table of 10 insecticides, which proposes to be mixed, and not to be mixed, within each of them. We are not sure how scientific and legal this is. These guidelines suggest that the mixture should be used immediately, without much delay, lest it may lose its potency.**

### **8.2 Spraying equipment**

It has been noted that farmers / farm workers use several different variants of spraying equipments. Manually operated backpack sprayers were in common use, however recently battery powered and petrol powered sprayers are widely in use as more area can be covered if such sprayers are used. Farmers called the battery operated sprayers as Chinese sprayers. As they are powered either by rechargeable battery or petrol-fuelled motors, spraying can be done without interruptions on the go. These sprayers have nozzles that can pump out the mixture as fine particles of mist. This mist gets easily blown by the breeze, most possibly drenching the sprayer with pesticide mixture.

Secondary data based on media reports shows the so called Chinese sprayers are blamed for the poisoning incidents, however from the ground it has been reported that both manually and battery / petrol operated sprayers have been in use by those farmers and workers who developed illness after spraying.

### **8.3 Use of safety measures and personal protective equipments (PPE)**

It is a reality that farmers and workers handling with pesticides do not use personal protective equipment's or safety measures in India as what has been said in the Indian Insecticides Rules 39 and 40; and no exception in Yavatmal. Poisoned victims in the hospital and farmers in the field reported that they do not use any specific equipment's or safety measures apart from the casual work clothing. They do not even use full sleeve shirt or pants as it causes suffocation while working in the hot sun.

The Insecticides Rules has clearly put forth the required protective clothing including respiratory devices to be used while working with pesticides (Rules 39 and 40). Though Rule 42 mandates that manufacturers and distributors to arrange training for observing safety precautions and handling protective equipments, this does not seem to be happening. When reminded about PPE, farmers replied that nobody told them about the precautions to be followed and what kind of protective measures to be taken while working with pesticides. They never availed training on use of pesticides, do not know the required PPEs, where they can be bought and how to use them. Further, they do not know whether such PPEs can be used while working in hot sun or if they are suitable in the agro climatic zone or cause any discomfort. Awareness on the use of pesticides, information such as precautionary measures, safety aspects, etc., are not given to workers who work with pesticides – often makes them vulnerable to spillage, exposure, misuse, etc. Workers are unaware of handling exposure/spillage/emergency situations that requires medical assistance.

**“pesticides whose handling and application require the use of personal protective equipment that is uncomfortable, expensive or not readily available should be avoided, especially in the case of small-scale users and farm workers in hot climates”**

*- Article 3.6, International Code of Conduct on Pesticides Management*

**From the field visits, it was clearly understood that the ambient temperature during day time was high and therefore it makes the working condition unsuitable to wear personal protective equipments (PPE). Therefore, the pesticides that require use of PPE should not be used in such hot climates. Which means, sale and use of all such pesticides should not have been allowed.**

While spraying, workers can be exposed to pesticides, through direct exposure to spillage, spray drift through inhalation and contact via skin. As there are no facilities for taking a bath/wash after the spray or during the spray if exposure happens, the occupational exposure continues even after working because of the spray drift or spillage remain on their body until they take bath/wash after reaching house. It causes continued absorption of pesticides or cocktail of pesticides through the skin of the worker, results in higher health risk.

When asked about protective gear, a wholesale dealer of pesticides in Yavatmal said ‘we just do the selling of agrochemicals only and PPEs are not sold’. He further added that they do not know where such equipment is available. He further stated that “I have been selling pesticides for about 40 years and it is the responsibility of government to make available protective equipments to farmers and workers, not ours”.



### **Box 3**

#### **Provisions regarding protective measures as put forth by the Indian Insecticide Rules 1971\***

##### **Rule 39. Protective clothing**

- (1) Persons handling insecticides during its manufacture, formulation, transport, distribution or application, shall be adequately protected with appropriate clothing.
- (2) The protective clothing shall be used wherever necessary, in conjunction with respiratory devices as laid down in rule 40.
- (3) The protective clothing shall be made of materials, which prevent or resist the penetration of any form of insecticides formulations. The materials shall also be washable so that the toxic elements may be removed after each use.
- (4) A complete suit of protective clothing shall consist of the following dresses, namely:
  - (a) Protective outer garment / overalls / hood / hat;
  - (b) Rubber gloves or such other protective gloves extending half way up to the fore-arm, made of materials impermeable to liquids;
  - (c) Dust-proof goggles
  - (d) Boots

##### **Rule 40. Respiratory devices:**

For preventing inhalation of toxic dusts, vapours or gases the workers shall use any of the following types of respirators or gas-masks suitable for the purpose, namely:

- a. Chemical cartridge respirator
- b. Supplied air respirator
- c. Demand flow, type respirator
- d. Full face or half face gas masks with canister

In no case shall the concentrates of insecticides in the air where the insecticides are mixed exceed the maximum permissible values.

##### **Rule 41. Manufacturers, etc. to keep sufficient quantities of antidotes and first-aid medicines:**

The manufacturers and distributors of insecticides and persons who undertakes to spray insecticide on a commercial basis (hereafter in these rules referred to as operators) shall keep sufficient stocks of such first-aid tools, equipments, antidotes, injections and medicines as may be required to treat poisoning cases arising from inhalation, skin, contamination, eye contamination and swallowing.

##### **Rule 42. Training of Workers:**

The manufacturers and distributors of insecticides and operators shall arrange for suitable training in observing safety precautions and handling safety equipment provided to them.

\*Source: [http://cibrc.nic.in/insecticides\\_rules.htm](http://cibrc.nic.in/insecticides_rules.htm);  
[http://www.mahaagri.gov.in/ActsandRules/Insecticide\\_Rules\\_1971.html#39](http://www.mahaagri.gov.in/ActsandRules/Insecticide_Rules_1971.html#39)

## **8.4 Working condition and spraying time**

Usually cotton sown during June and application of pesticides including insecticides and weedicides begins after nearly a month. Farmers report varying spraying schedule, some report once in 10 days while some others reports once in 15 days. Spraying becomes peak during the flowering stage, usually during the month of August and September. Usually the spraying starts from around 8 'O clock in the morning and continues till evening 5 or 6. A farm worker said that they usually follow this schedule. A small-scale farmer suffering from poisoning illness said that he sprays in morning 7 to 10.30 and then takes brake until 4 in the evening, and again starts spraying and continues till 6. However, most of the workers do the spraying whole the day, in hot sun nearly six to eight hours.

The ambient temperature is further gets aggravated by high humidity as well. Suffocation caused by this condition tempts them to not to use a full sleeve shirt or pants. During the peak spraying season workers spray continuously for three to four day, and sometimes even more. And as they move on spraying they do not consider wind direction (it is true that this would not be possible always) therefore they have to spray against the wind and get exposed. A tight schedule and demands to get the spraying completed within a stipulated time force them to have little rest and have to take food and water without getting a whole body wash or properly washing hands and face. All these conditions result in higher exposure and absorption through sweating skin.

**Alcoholism is also blamed:** the habit of drinking alcohol by workers and framers is also reported to have blamed for aggravating the poisoning and the ill effects.

## **9.0 Cost Burden**

Farmers and farm workers continue to pay for various activities. Pesticides were, and even now, continue to be a major component of farm expenditure. Irrespective of the crop, investment on crop production continues to rise across all crops. Pesticides, insecticides and fungicides were the usual cost factors. To this, in recent years, herbicides and specialized pesticide spraying services have been added. With farm wages increasing for perfectly acceptable reasons, farmers in order reduce the labour costs, opt for herbicides. Also to ease the chore of spraying, dedicated spraying labour persons emerged. A range of sprayers have also come into play to the ease the business of spraying, given growth in the number of sprays per crop season.

Bt cotton was introduced in India with a major argument that it will directly tackled bollworm, without any need for agrochemicals. The question about the other pests and insects, which in any case require agrochemicals was largely ignored. After almost 12 years, with the return of pink bollworm and virulent pest attacks aided by weather patterns, dependence on agrochemicals increased multi-fold in the last few years.

In the belief that efficacy of agrochemicals would increase with mixing of chemicals, farmers have now become fairly habituated to spraying a cocktail of chemicals,

instead of any approved chemical. This habit has been nurtured and promoted by pesticide distribution networks, and has not been discouraged by the agricultural extension network. Thus, active ingredients, specific crop recommendations, and other ‘weak’ controls became redundant, in the face of such usage. This has developed its own cost implications. A farmer, who should have used ‘one’ agrochemical is now using two to four chemicals at a time, simultaneously.

No authoritative information is available on what is the outcome of such ‘mixing’ of chemicals with different active ingredients, in terms of toxicity, efficacy, molecular composition and compound structure.

A rough estimate of the costs is given below:

Table 9: Cost Burden on Farmers			
S. No.	Cost factor	Per unit cost	Per 1,000 farmers
1.	Agro-chemicals	Rs.15,000 per acre	Rs.1,50,00,000
2.	Spraying labour costs	Rs.300 per spray	Rs.30,00,000
3.	Health costs	Rs.30,000	Rs.3,00,00,000
4.	GM seeds	Rs.800 per packet	Rs.24,00,000
Total			Rs.4.54 crores

Assumptions: Only one acre per farmer was taken. However, costs multiply with the number of acres. A total 10 sprays were assumed per acre. An average of health costs per farmer was taken. It may vary as per the persons, and their treatment choices. Seeds have estimated at 3 packets per acre.

These are conservative estimates. Costs on the farmers and farm labour can multiple many folds, depending on the health complications and other specific scenarios.

## **10.0 Pesticide poisonings – A medico legal case**

A medico legal case is where a person is injured or harmed in any way and needs medical attention for it<sup>13</sup>. Poisoning is classified as a medico legal case, in addition to burn injuries, vehicular accidents, suspected homicide/murder, sexual assault and criminal abortion. A medical autopsy has to be ordered under all the above circumstances, including hospital deaths.

In all these cases, it is the legal duty of the treating doctor to report it to the nearest police station immediately after completing primary lifesaving medical care. This is in accordance with Section 39 of Criminal Procedure Code of India.

The Medico Legal Case is defined<sup>14</sup> as “any case of injury or ailment where the attending Doctor after history taking and clinical examination, considers that investigations by law enforcement agencies are warranted to ascertain circumstances and fix responsibility regarding the said injury or ailment according to the law”.

The commandments to be followed by all the doctors in cases of suicidal, homicidal and accidental poisoning includes both medical and medico legal duties<sup>15</sup>. Medical duties include:

1. Diagnosis of suspected poisoning
2. Treatment of suspected poisoning
3. Secrecy
4. Timely referral

Medico legal duties include:

1. Collection of evidence
2. Preservation of evidence
3. Legal case register

This team was informed by the staff at Yavatmal Medical College Hospital that all inhalational poisoning cases are automatically slotted as medico-legal cases. While this is being said, we could not get any documentation or information on further steps that are taken in medico-legal cases. Medico-legal duties have not been performed. Police are not involved. It would be important to complete all procedures related to medico-legal cases, and not leave it categorising them.

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<sup>13</sup> <http://www.thehealthsite.com/diseases-conditions/medico-legal-cases-top-facts-you-should-know/>

<sup>14</sup> <https://indiankanoon.org/docfragment/58942485/?formInput=medico%20legal%20cases>

<sup>15</sup> P. Manoj Kumar, Kulkarni Siddhanand S, Pali Neeraj Kumar, Hingmire N. S, Duties and Laws related to Medical Practitioners in case of Poisoning: A Peer Review, International Ayurvedic Medical Journal, IAMJ: Volume 2; Issue 4; July-August, 2014

## **11.0 Government Response**

Government of Maharashtra has responded, after media reports and some lobbying with the District Collector, by Sri. Devanand Pawar, leader of Shetkari Nyay Hakk Andolan, by appointing a panel of officials to enquire into the entire episode.

It has also announced financial support of Rs.2 lakhs to kin of the farmers and farm labour who died due to pesticide exposure. It has also issued guidelines on 'do's and don'ts while spraying pesticides. Due to pressure from various quarters, 9 FIRs (First Information Reports) have been filed against pesticide selling shops, known euphemistically as krishi kendras. This team could not get copies of these FIRs to examine the contents and the nature of charges. FIRs constitute first step in taking legal action against culprits. We were told that atleast one FIR mentions a pesticide company. This needs to be confirmed.

Meanwhile, there is an underlying tension between different Departments, including agriculture, health, revenue and Zilla Parishad. There is quite game of blame apportioning being played at. In general, atmosphere in the administration is not about genuine horror and concern about the ongoing human tragedy, but one of management and obfuscation. Most officials, including medical doctors, and pesticide distribution network find it easy to blame farmers for not using PPE, consumption of alcohol and indiscriminate spraying practices.

Agricultural extension network has fairly good structure, but poor performance. A Pest Scout is supposed to make pest surveillance of soybean, cotton, pigeon pea & chickpea crops of the pre-defined area according the guideline issued by state steering committee. This Scout will observe pest & diseases in the area of 12,000 ha. and report of pest surveillance. He/ She will submit report of pest surveillance on NIC Mobile App & Website daily from Monday to Friday. We were told that a crop protection advisory would be pasted at the village panchayat office. We could not find such advisory in one panchayat office we visited. In fact, village sarpanch should get all such communications on agro-chemical usage, but this position does not figure in pesticide regulatory procedures.

### **11.1 Regulatory Issues**

It is apparent that there is no regulation on pricing, quality and quantity of agro-chemical business in Yavatmal, as elsewhere in India. In the face of tragedy, sales have been stopped, and shops have reportedly returned or hid stocks at their outlets. Although reports have come in about stopping of spraying in the district entirely, peripheral and remote area spraying seems to be going on. With more farmers coming to hospitals every day, it means either spraying has not stopped or there is delayed impact of pesticide exposure on the health of pesticide sprayers.

Regulatory authorities, belonging to agricultural department and Zilla Parishad offices, do not seem to have a clue on how to respond, except to save their 'skins'. They did not perform their role in earlier spraying spells, and definitely are restricted to their offices when it has stopped completely, putting standing cotton crop under jeopardy.

With stoppage of spraying or crop protection measures, standing cotton crop, especially cotton bolls are vulnerable to pest attacks. This becomes more serious in the case of farmers who died, with no one to attend to their crops, both owned and leased. Also, with the death of farm workers, in those villages, dearth of 'specialised' labour is likely to hit crop protection.

Agricultural department officials have brought into the discussion about the role of plant growth regulators and their indiscriminate use. There is an attribution of the growth of cotton plant to unusual heights to the usage of these biopesticides. Since biopesticides do not get covered under current laws, these officials feel they are helpless in regulating them.

Pesticide producer has to obtain registration certificate from the Central Pesticide Board and the Registration Committee, which is made by the law for the respective pesticide. For this, registration data related to relevant pesticides research at the field level, toxicity of pesticides, crop and environmental impacts have to be presented.

After obtaining the registration certificate, the producer has to get the product license in the Maharashtra state. While issuing new product licenses, a joint check of the relevant product is checked by the committee. In this joint investigation committee, representatives of the Labour Department, Industry Department, Maharashtra State Pollution Board, Industrial Health Department, are present with the Agriculture Department.

Maharashtra government website says that in the List of Insecticides Act, 1968, there are 870 pesticides in the Schedule, out of which 272 insecticides have been registered with the Central insecticides Board and Registration Committee. Registration of 12 insecticides of 12 organic pesticides is registered with the committee.

It also says there are 172 pesticides manufacturers in the Maharashtra state<sup>16</sup>, and 190 pesticide producers from outside the State sell pesticides here. Thus, total number of manufacturers is 251. Out of the 161 producers, 46 growers produce organic pesticides. Out of them 10 are government biological insecticides laboratories, 1 Agriculture University, 4 Krishi Vigyan Kendras, one Mahabeej, 16 production units in the public sector and the remaining 30 organic pesticides manufacturers are active in private sector.

One can see that there is no dearth of human resources to control the quality of pesticides in Maharashtra: 35 Licensing Officers, 9 Apollo Officers, 4 Pesticide Testing Laboratories, 34 Poisoning Reporting Authority, 1131 Quality Control Inspectors, 395 Firing Squad are working in the Maharashtra State. Their performance needs to be explored, in the background of this tragedy in Yavatmal and other districts.

In India, there are 68 State Pesticide Testing Laboratories for the quality control of pesticides. Among them, four laboratories in Maharashtra are located at Pune, Aurangabad, Amravati and Thane. "Jurisdiction of each laboratory is whole State however for the sake of convenience districts are allotted to each lab on routine basis.

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<sup>16</sup><http://mahaagri.gov.in/level2PdfDisp.aspx?Id=15&subid=4&sub2id=1&FileName=InsctMfg.pdf.pdf>

Any Insecticide Inspector can send sample to any laboratory. All laboratories are well equipped (ex. HPLC, GLC, FTIR, UV-Spectrophotometer, Flash Point Apparatus etc) and analyses the sample registered by CIB. All laboratories work as per the provisions of Insecticide Act 1968 and Insecticide Rules 1971. Quality control laboratories are equipped not only to analyze the active ingredients of pesticides but also to conduct the tests required to check compliance with all physical and chemical properties, including impurities as specified in the specifications:

Table 10: Pesticide testing facility and status in Maharashtra					
Sr. No.	Name and Address of Laboratory	Phone No Annual	Capacity	Districts allotted Remark	Accreditation
1	Chemist, Insecticide Testing Laboratory, Krishi Bhavan, Shivajinagar, Pune-5	020-25510300 <a href="mailto:Itlpune5@gmail.com">Itlpune5@gmail.com</a>	2350	Pune, Ahmednagar, Solapur, Sindhudurg, Kolhapur, Sangli, Satara, Latur, Osmanabad, Nanded, Parbhani, Jalgoan District.	NABL Accredited
2	Chemist, Insecticide Testing Laboratory, Wagle Estate, Sector No.16, Thane	022-25821137 <a href="mailto:itlthane@gmail.com">itlthane@gmail.com</a>	1390	Thane, Raigad, Ratnagiri, Nashik, Dhule, Nandurbar	NABL Accredited
3	Chemist, Insecticide Testing Laboratory, Shahanoormiya, Dargah Road, Jyotinagar Aurangabad 431005.	0240-2334851 <a href="mailto:Deelip.jadhav@gmail.com">Deelip.jadhav@gmail.com</a>	1230	Aurangabad, Jalna, Beed, Hingoli, Buldhana, Akola, Washim.	NABL Accredited
4	Chemist, Insecticide Testing Laboratory, Agri. Engg. Workshop Campus, Tapovan Road, Camp, Amaravati	0721-2662102 <a href="mailto:chemistitlamr@yahoo.co.uk">chemistitlamr@yahoo.co.uk</a>	1230	Amravati, Yavatmal, Nagpur, Wardha, Bhandara, Chandrapur, Gondia, Gadchiroli.	NABL Accreditation in process.
	Total		6200		

Despite such sampling, and declaration of non-standard products, farmers and farm workers are not aware of these results. This information is not available for normal people. Therefore, they are not aware of which brands are commonly detected as substandard or non-standard products, and so they cannot choose the options.

Table 11: Samples Analysed in previous 5 years						
Sr. No.	Year	Capacity (No.)	Received (No.)	Analysed (No.)	Non- Standard (No.)	Non- Standard (%)
1	2012-2013	5600	6286	5827	393	6.74
2	2013-2014	5600	6566	6030	282	4.68
3	2014-2015	5600	6101	5745	316	5.51
4	2015-2016	5600	6444	6089	407	6.68
5	2016-2017	5600	6312	6063	283	3.93

It needs to be properly investigated that whether all the pesticide distributors and retailers in Yavatmal and in the remaining Vidharbha region have had a valid license and other related documents to distribute and sell pesticides. It also needs to be probed in detail that they have licenses to sell all the various brands of insecticides, fungicides, herbicides, and plant growth regulators that they have been selling. Proper legal action has to be taken if anyone found guilty, including the implementing officers in agriculture department or any concerned department.



## **12.0 Causes in media**

Media was rather slow in picking up the issue, initially. But quickly it caught the attention of national media. Various stories have been written, on print and digital media. News Channels also covered the problem and the episode. A list of causes discussed by many in the news stories and news channels were listed by an associate<sup>17</sup>, which are:

- Banned BT Seed/Grey market Seeds
- Powerful sprayer
- Unusual height of cotton plants/Angle of spraying
- Long/hours of continuous spraying/exposure to chemicals
- No protective gear available - access/awareness/affordability
- No compliance for protective gear - ignorance/indifference
- Individual consumption of Alcohol+Tobacco mix at work inhibiting mental facilities
- Toxic chemicals (insecticides)
- Spurious chemicals (insecticides + plant growth regulators)/No regulation of plant growth regulators
- Non-prescribed spraying of chemicals combos (insecticides and/or plant growth regulators)
- Non-adherence to selling and advice use guidelines by Krishi Seva Kendras/Dealers
- No timely medical intervention
- Inadequacy at PHC's (Primary Health Centres)
- Lack of facilities to deal with such numbers at the lone city public hospital
- No specific medical intervention available for specific chemical inhalation (for trade name POLO insecticide)
- Lack of incident reporting through administration
- Escalation of incident reporting/response through administration
- Lack of effective agriculture extension institutions within the district

A particular new story was bizarre in suggesting that the deaths were because of drugs, alcohol and tobacco consumption. A keen observer, and media acolyte in Yavatmal, commented that media is being used to change the narrative and to bail out the real culprits for this tragedy, especially the officials and pesticide dealers.

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<sup>17</sup> Ananth Krishna

### **13.0 Major findings**

What caused the deaths and widespread poisoning is a question on everyone's mind? This question assumes significance for those sections of Indian society who consider pesticide spraying in a business as usual scenario. These sections include farmers and farm workers themselves. Members of this team were also asked what could be the causal factor. Attribution of a single factor to this avoidable human and ecological tragedy would look rather churlish.

It was a moment to happen, with all the factors playing at various degrees of levels.

1. Every year, hundreds of farmers and farm workers access quacks, clinics, individual Doctors, private and public hospitals for pesticide poisoning in Yavatmal district in Maharashtra and Adilabad district in Telangana.
2. There is no rational, scientific and informed medical treatment of affected farmers and farm workers admitted in various hospitals.
3. Farmers and farm workers, who have chronic, persistent health problems due to pesticides exposure and are in need to get medical attention, are being ignored.
4. Medical fraternity in India considers atropine as a universal antidote, with possible serious implications on treatment methods and patient recovery.
5. Relief for families wherein deaths have been reported were the target of government compensation which is a welcome measure. However, families wherein individuals exposed to hazardous pesticides and are suffering from various ailments including nausea, hyperactivity disorder, loose motion, eye burns, etc., did not get any relief.
6. There seems to be no assessment of why cotton plants randomly have grown beyond the average height. Farmers have reported plants growing to six or seven feet. There seems to be a link between genetically modified seed, impact of hazardous pesticides and the presence of foreign genes in cottonseed DNA.
7. Dense planting of cotton and presence of unauthorized 'Roundup Ready Flex' Seeds in Yavatmal district needs to be assessed.
8. There is a huge neglect, bordering on disdain, towards the misery faced by the farmers among medical fraternity, regulatory agency officials and agricultural department. There seems to be no rule of law.
9. No efforts can be seen to fix corporate accountability, of agrochemical companies and private medical practitioners.

## 14.0 Violation of national laws

Inhalational poisoning and death of small scale farmers and farm workers via breathing and contact mode while spraying pesticides in cotton fields clearly highlights gross violation of Insecticides Act, 1968, and the Insecticide Rules 1971.

The Insecticides Act, 1968 was brought in to “regulate import, manufacture, sale, transport and distribution and use of insecticide, with a view to prevent risk to human beings or animals and the matters connected therewith”. However, the unfortunate and unavoidable mishap as seen in Yavatmal and other districts in Vidharbha region points us to the fact that the Insecticide Act itself has failed to ‘prevent risk to human beings’. This year nearly 40 deaths and hundreds of poisonings in Yavatmal and several such incidents across India in various districts have been reported so far, and several such instances have been noted in the previous years as well.

It has been noted that manufacturers have violated the Insecticide Rules 1971. First of all, Rule 19 sub rule 7 is found to have violated as some of the pesticides containers found in the field (eg. pager of Dhanuka agri tech) does not have information in Marathi, the local language in the area. The Rule 19 (7) states “the label and leaflets to be affixed or attached to the package containing insecticides shall be printed in Hindi, English and in one or two regional languages in use in the areas where the said packages are likely to be stocked, sold or distributed”. Labels of all other pesticides has to be examined and proper legal action has to be taken against the companies of they are not complied with the legal requirements. The Rules with regard to

### **Box 4**

#### **The Plantations Labour (Amendment) Act, 2010 requires**

##### **18 A. Safety:**

(1) In every plantation, effective arrangements shall be made by the employer to provide for the safety of workers in connection with the use, handling, storage and transport of insecticides, chemicals and toxic substances.

(4) Every employer shall ensure that every worker in plantation employed for handling, mixing, blending and applying insecticides, chemicals and toxic substances, is trained about the hazards involved in different operations in which he is engaged, the various safety measures and safe work practices to be adopted in emergencies arising from spillage of such insecticides chemicals and toxic substances and such other matters as may be prescribed by the State Government.

**The International Labour Organisation’s Convention 184 on occupational health and safety in agriculture requires** governments to ensure that there are preventive and protective measures for the use of chemicals and handling of chemical waste at the level of the undertaking covering:

- the preparation, handling, application, storage and transportation of chemicals;
- agricultural activities leading to the dispersion of chemicals;
- the maintenance, repair and cleaning of equipment and containers for chemicals; and
- the disposal of empty containers and the treatment and disposal of chemical waste and obsolete chemicals.

provisions of protective clothing, equipment and other facilities are also found to have violated. The following Rules are violated: 37 on medical examination of workers, 38 on first aid measures (Rule 38 states that “workers should be educated regarding the effects of poisoning and the first aid treatment to be given; and in all cases of poisoning first-aid treatment shall always be given before the physician is called”), 39 on protective clothing and equipments, 40 on respiratory devices, 41 on antidote and first aid measures, and 42 on training for workers (Rule 42 states “manufacturers and distributors of insecticides and operators shall arrange for suitable training in observing safety precautions and handling safety equipment provided to them”).

The Plantation Labour (Amendment) Act 2010 should have been made applicable to cotton sector as well, as it has several provisions to ensure safe work place and safety of the workers.

#### **14.1 Violation of International Code of Conduct on Pesticides Management**

In addition to the national laws *The International Code of Conduct on Pesticides Management* is also violated. Government of India and the pesticide industry has ratified *The International Code of Conduct on Pesticides Management*. This Code of Conduct, brought in jointly by Food and Agriculture Organization and World Health Organization provide guidelines on the practices and uses of pesticide application, access to information and awareness on pesticides and risk, provision of safety measures and personal protective equipment, etc.

Both industry and government are in violation of several article provisions of the *Code of Conduct* with regard to the unfortunate incidents in Yavatmal and other districts. Non-adherence to provisions of Article 3 and 5 of the *Code of Conduct*, among others are noted.

**Regarding the provision of personal protective equipments, Article 3.6 says pesticides whose handling and application require the use of personal protective equipment that is uncomfortable, expensive or not readily available should be avoided, especially in the case of small-scale users and farm workers in hot climates.**

**Article 5.3 states Government and industry should** cooperate in further reducing risks by: 5.3.1 promoting the use of personal protective equipment which is suitable for the tasks to be carried out, appropriate to the prevailing climatic conditions and affordable.

Other article provisions which shows non adherence are given below:

##### **5.1 Government should:**

**5.1.3** Carry out health surveillance programmes of those who are occupationally exposed to pesticides and investigate, as well as document, poisoning cases;

**5.1.4** Provide guidance and instructions to health workers, physicians and hospital staff on the diagnosis and treatment of suspected pesticide poisoning as well as on the prevention of exposure and poisoning, and the reporting and recording of incidences;

**5.1.5** Establish national or regional poisoning information and control centres at

strategic locations to provide immediate guidance on first aid and medical treatment, accessible at all times

**5.2 Even where a control scheme is in operation, pesticide industry should:**

**5.2.2** Provide poison-control centres and medical practitioners with information about pesticide hazards, toxicity of active ingredients and co-formulants and on suitable treatment of pesticide poisoning;

**5.2.5** Halt sale and recall products as soon as possible when handling or use pose an unacceptable risk under any use directions or restrictions and notify the government.

## **15.0 Discussion**

A significant number of poisonings require immediate care, appropriate and adequate antidote. Referral hospitals in districts where pesticide usage is rampant are inadequately equipped in terms of specialized toxicology services, beds, antidote stocks and other necessary equipment and medicines. Number of pesticide poisoned farmers and farm workers were turned out of the public and private hospitals, without proper, adequate and full care, for lack of beds, antidote stocks, low payment capacities and sheer negligence of medical teams.

Farmers and family members attending on them were not aware of their physical conditions and medication status. Most of them are not informed about the diagnosis made on them and the drugs they were taking at the hospital. Many did not ask, believing in Doctors. Neither were they informed by the medical staff. Because patients are highly variable in their backgrounds, medical staff cannot assume that they alone can make the best decision for their patients. Doctors are yet to realize that affected farmers and their attendants have a role to play in the diagnosis and treatment of their illness. Without the patients' knowledge in the process of care in the ward, it poses the risk of the patient continuing the medication appropriately after discharge. The patient cannot even make any informed judgement about improvement in her/ his health status.

There are communication barriers in every step within the treatment process. While medical personnel are unanimous in claiming that all pesticide poisoning cases are treated symptomatically. However, no diagnostic tests have been done on any of the poisoning cases. Even though ACH levels are mentioned as indicators, this team was informed that it was expensive process and not available in District referral hospitals. There is no information available on the dosage administered to each of the pesticide poisoning patients.

## **16.0 Suggestions**

1. Appoint a panel of medical specialists, including neurosurgeons, to examine medical treatment given to current pesticide poisoning patients and develop an appropriate treatment procedure for farmers and farm workers admitted in private and public hospitals across Yavatmal district. Since most cases, people mentioned problems of eye burn, hyperactivity, respiratory paralysis and nervous breakdown. Services of highly qualified, committed specialists have to be drafted for the purpose of complete medical rehabilitation. Special diet program for these patients is also a requirement, we feel. In this regard, Endosulfan Victim Rehabilitation programme in Kerala by the State government can be adopted.
2. From this unfortunate episode, it would be good and helpful if a complete treatment protocol can be developed for all exposure and poisoning cases to hazardous pesticides.
3. Medical fraternity in Yavatmal district, both in public and private spheres, including doctors and nurses and ward staffs, should be educated and trained on the whole gamut of hazardous pesticides and the required responsive action these people can take. This can be an emergency management plan at various levels including public health centres, reference hospitals, outpatient blocks, and ICUs.
4. Farm families, which have witnessed deaths and are dealing with hospitalization of their main members, are likely to have neglected their farms which have standing crops that are ready for harvesting. It would be helpful if the Panchayats can be involved in taking care of these fields with the help of other willing farmers so that these families do not suffer economic losses. The relief and rehabilitation measures of the government should include support in this regard as well.
5. District administration of Yavatmal should write to appropriate agencies of Government of India to urgently bring in pesticide regulation act with the following provisions:
  - I. Full scale and comprehensive compensation to farmers who are affected by hazardous pesticides.
  - II. Severe punishment for pesticide manufacturers and distribution network for neglecting safe usage procedures, which can be re-defined again.
  - III. Compulsory registration and renewal system for pesticide production and distribution by the central insecticides board based on proper field trial data.
6. There should be a review of all pesticides based on the toxicity and usage practices, within the framework of international Code of Conduct on pesticides management and chemical conventions.
7. Compulsory filing of information on a fortnightly basis of pesticide production, storage and sales by the pesticide manufacturers and dealers with

the district administration including agriculture department, revenue and pollution control board. This information should be made available on public domains.

8. Farm workers should be properly trained both for spraying and for using personal protective equipments.
9. Encouraging of agro-chemical spraying without PPE is a criminal negligence. Negligence by Agricultural Department and traders in not providing PPE to workers and farmers has to be considered as criminal offence of causing damage with full knowledge of the fact that it is toxic to spray such pesticides.
10. Unapproved usage of Glyphosate and other pesticides has to be severely restricted, and possibly banned in this district, and across India to prevent any mishaps.
11. Water, soil and plant samples should be collected from villages where deaths of poisoning have been reported, to ascertain the extent of pollution by pesticides in these villages.
12. Indian Council for Medical Research to undertake a comprehensive health survey in Yavatmal, which can help in establishing baselines, suggest measures and prevent further medical emergencies.
13. Undertake agro-ecology measures and projects that avoid usage of hazardous pesticides, as being done in Kerala and Andhra Pradesh.
14. A combined evidence based literature analysis and consensus guidelines for stocking of antidotes has to be conducted in India, by Indian Council for Medical Research and other relevant government institutions.
15. A study has to be done, with the aim of finding out the occurrence of medication errors and the occurrence of risk factors for medication errors in the inpatient setting of the hospitals in districts where pesticide poisonings have been reported. This study should focus on doctors, nurses and pharmacists<sup>8</sup>, even while referring patients' charts and treatment records.
16. Every farmer and farm worker who is exposed to insecticides, chemicals and toxic substances shall be medically examined periodically, in such manner as may be prescribed, by the State Government. Each of them has to be compensated appropriately.
17. Every Public Health Centre, in their operational area, should maintain health record of every person who is exposed to agrochemicals which are used, handled, stored or transported in the area, and every such person shall have access to such record.
18. Maharashtra should update its records, notifications and circulars on agro-chemicals, and enable their access to wider sections of the State, and not

confined to website publication. This information should include hospitalization, treatment, licensing, sampling, ban, etc...

19. It should ban monocrotophos and other agrochemicals found in the recent tragedy, on its own in the State, and recommend the same to government of India.
20. State of Maharashtra, and other States, can ban or restrict harmful and toxic pesticides when it finds their harmful impact on farmers and farm workers, using various other Acts and Constitutional provisions. They need to realise that the obsolete Insecticide Act is meant to promote pesticides use and not to protect people or environment. Hence, the State government should not restrict themselves to application of Indian Insecticide Act.
21. Maharashtra should train anganwadi workers and other volunteers in each of the villages in giving first aid to victims of pesticide poisoning. Anti-dote stocks should be made available in all the Public Health Centres.
22. Under Insecticide Act, 1968, specific provision should be brought for compulsory mention of antidote for each licensed pesticide by the manufacturer. No pesticide should be registered without information and commitment by the applicant about the antidote to the particular pesticide.
23. Pesticide poisoning should be declared a national tragedy and should be included in the disaster list maintained by the National Disaster Management Authority.
24. A standard medical treatment protocol should be developed at the national level. And, this protocol has to be listed under Insecticide Act. Any violation has to be punished.
25. A new Pesticide Regulation Act has to be brought by integrating accountability, transparency and participation into all the steps and measures that arise from the regulation of the Act.



## **17.0 Conclusion**

The ground reality of multitude of issues related to cotton farming right from seed to pesticide application practices, farming and working conditions, lack of proper access to information, etc. reminds the fact that safe use of pesticides is not possible in the given scenario. Though pesticide poisoning was reported in previous years, little measures have been employed to stop poisonings. It is really a worrisome situation as innocent farmers and farm workers are getting poisoned and dying. Ultimately, the constitutional right granted by Article 21 – right to life; and right to dignity and safe working conditions are being violated. While a blame game is noted among the various players involved – agriculture department, health department, pesticides and seed manufacturers, pesticide sellers, etc. – it is the manufacturers, both Indian companies and multinational giants and their supply chain are really reaping the profit at the cost of life and health of downtrodden communities under the silence and inaction of government. It is high time that toxic pesticides are to be banned, at the same time farming communities are to be provided with adequate support both technically and financially to do farming without using chemical pesticides and agrochemical inputs for which several successful model are available in India.

## Annexure 1

### **Yavatmal – Basic Features and Health Infrastructure<sup>18</sup>**

Yavatmal is considered as tribal district of Maharashtra, lies in the eastern part of the state and belongs to Vidarbha region. The district has 17 Tehsils with 2155 villages. According to 2011 Census, the district has a total population of 27,72,348 accounting for 2.5 percent of the total population of the State. The decadal growth rate of the district during 2001-2011 was 12.9 percent which was much lower (15.99 percent) than the decadal growth rate of the state as a whole. The density of population is 204 per sq km. The sex ratio of the population (number of females per 1,000 males) in the district according to 2011 census is 947, which is higher (925) than that of the State and child sex ratio (0-6 years) is much higher (915) than that of state (883). Nearly two-fifths (39.6 percent) of the total population of the district lives in urban areas and nearly three-fifths of the females aged 7 years and above are literates.

#### **1. Health Infrastructure:**

In all, there are 435 SCs, 63 PHCs, 14 CHCs, 3 sub divisional hospitals and a district hospital attached to a medical college. Of them, 234 SCs (54 percent) and 57 PHCs (90 percent) are functioning government building and remaining are functioning in private buildings. However, all CHCs, SDHs and DH are functioning in government building. Besides this, there are 167 private nursing homes and of them 69 are providing obstetric care services.

#### **2. Human Resources**

Of the 229 medical officers posts sanctioned in the district, 156 are in position. Further, there are 103 medical officers appointed on contractual basis mostly for RBSK programme. Severe shortage of specialists like gynaecologists, paediatricians and anaesthetists is observed in the district especially in CHCs. For instance, of the 14 specialists posts sanctioned in CHCs, only 4 are in position and remaining are vacant. The PHCs of the district are also reeling with shortage of medical officers. Of the sanctioned, more than one-third (37 percent) posts of medical officers are vacant.

With respect to paramedical posts, of the sanctioned nearly half of posts are in position and also there are 357 PMWs who are on contractual basis and mostly working in SCs as second ANM. Due to shortage of specialists, walk-in interviews are being conducted through paper advertisement and the selection committee consisting of CEO, DHO and CS would select the candidates. However, to ensure their retention, working hours and working days has been relaxed.

District Hospital attached to the Medical College is providing services of surgery (except cardiac, neurosurgery and kidney transplantation) gynaecology, paediatric,

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<sup>18</sup> R.V.Deshpande, H.R.Channakki, Quarterly Monitoring of Programme Implementation Plan (PIP), Yavatmal District, Maharashtra State (For Q1&Q2, April-September, 2013), Report prepared for the MOHFW, Government of India, New Delhi.

medicines, family planning, ENT, radiology, pathology, dialysis, blood bank, ICTC, PPTCT, RTI/STI and ARSH services.

CHC has almost all equipments except semi auto analyser and reagents and testing kits. However, essential equipments such as radiant warmer, suction apparatus, ILR freezer, functional centrifuge and semi auto analyser were are not available at PHC.

With respect to drugs and supplies, computerised inventory management of drugs is not in place in all the facilities visited. The EDLs are not displayed in any of the facilities, supply of IFA tablets/syrup, oral contraceptives and EC pills is lacking in CHC.

Ayush services are not available at district hospital but are available at CHCs and SDHs. Of the 12 MOs of Ayush at CHC, two are post graduates-one each in ayurveda and homeopathy and services for unani, sidda and yoga are not in place in the district. At SDH, along with ayurveda and homeopathy, unani services are also available. At the visited CHC, both ayurvedic and homeopathy services were available at one room and sufficient drugs are available. It is found that on average 35-40 OPDs are taking place per day. At PHC, of the two medical officers, one MO belongs to Ayurvedic system is in place.

## **Annexure II**

### **Pesticide regulation in India**

**Legal framework of pesticide use in India:** In India pesticides are regulated by various government agencies. The Central Agriculture Ministry regulates manufacture, sales, transport and distribution, export, import and use of pesticides through the Insecticides Act, 1968 and the Insecticides Rules 1971. In effect, pesticide regulation is governed by two different bodies namely the Central Insecticides Board and Registration Committee (CIB & RC, under the Ministry of Agriculture) and the Food Safety and Standards Authority of India (FSSAI, under the Ministry of Family welfare). The Central Insecticides Board is responsible for advising the Central and State governments on technical issues related to manufacture, use and safety of pesticides. In addition, CIB&RC recommends uses of various types of pesticides depending on their toxicity and suitability, the shelf life of pesticides and a minimum gap between the pesticide application and harvest of crops (waiting period). The Registration Committee (RC), is responsible for registering pesticides after verifying the claims of the manufacturers or importers or formulators related to the efficacy and safety of concerned pesticides. The approval of the use of pesticides is also given by the Registration Committee for specific crop-pest combinations.

**Pesticide licensing In India :** In India, all pesticides have to undergo the registration process with the Central Insecticides Board & Registration Committee (CIB&RC) before they can be made available for use or sale. Following the granting of registration, the manufacturers as well the retailers have to get licenses from the licensing authority to run their businesses. Retailers are required to get a license to sell, stock, or exhibit for sale or distribute any pesticide, and it needs to be renewed regularly. Applications are to be forwarded to the licensing officer, the Principal Agriculture Officer of the area, with relevant documents and prescribed fees. Along with, the applicant is required to file a certificate from the principal (the Principal Certificate<sup>19</sup>) whom he represents or desires to represent. This certificate is issued by the principal (importer or manufacturer), shall be addressed to the licensing officer of the concerned area and shall contain full particulars of the principal, including name and address, Principal Certificate number, details of pesticide manufacturing licences specific to manufacturing units with name and address of licensing authority, list of products they have licenses for (with common name, trademark and registration number), full name and address of the person proposed to be authorised (the applicant) either for wholesale or for retail. It should also contain the details of the sources (name of source and address, licence number and validity) from which the authorised person (applicant) would obtain the products mentioned. The principal certificate has to be obtained from each manufacturer whom the applicant wants to represent or whose product he wants to sell. After verification the licence is granted or renewed by the licensing authority.

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<sup>19</sup> "principal" means the importer or manufacturer of insecticides

### Annexure III Photos from field



-Photos: Barun Kumar, HRLN





A farm worker ready to spray in field  
-Photo: Barun Kumar, HRLN



A cotton farmer with his pesticide stock



Label of Pager shows that label info has not provided in Marathi, widely used language in Maharashtra.



## Syngentas's polo that reportedly caused the mishap



Field visit- Manoli village  
-Photos: Dileep Kumar, PAN India





Cotton in field – height has grown up to about six feet. Photo-Dileep Kumar, PAN India



Battery operated Sprayer  
Photo: Dileep Kumar, PAN India







## **Annexure V** List of deaths

From July to September, 2017, reported in Yavatmal Medical College Hospital

INHALATIONAL POISONING PATIENT DEATHS									
Svngmc Yavatmal									
From July 2017 To Sept 2017									
Sr No.	NAME	AGE	SE X	MRD	ADDRESS	DIAGNOSIS	DATE OF ADMISSION	DATE OF DEATH	OUTCOME
1	Dashrath Rama Chavhan	50	M	835905	Maygaon Ps Darwaha Yavatmal	Inhational Poisoning	6/8/17	24/8/17	Expired
2	Devidas Ramaji Madavi	52	M	832604	Polyacha Maroti Ps Kalamb	Inhational Poisoning	7/8/17	31/8/17	Expired
3	Kailas Vitthal Pendor	35	M	840471	Nimani Zari Zamnai Ps Patan	Inhational Poisoning	17/8/17	6/9/17	Expired
4	Ayub Mohhamad Sheikh	30	M	843351	Dehani Kalgaon	Inhational Poisoning	25/8/17	4/9/17	Expired
5	Dipak Shyamrao Madavi	30	M	843882	Shedushoni PS Arni	Inhational Poisoning	27/8/17	31/8/17	Expired
6	Anil Shivrani Chavhan	24	M	850809	Ward No1 Kalamb	Inhational Poisoning	11/9/17	12/9/17	Expired
7	Ramesh Yeranna Chirawar	45	M	850919	Ghatanji	Inhational Poisoning	12/9/17	13/9/17	Expired
8	Bandu Chandrabahn Sonule	40	M	223755	Ghatanji Yti	Inhational Poisoning	21/9/17	23/9/17	Expired
9	Ravi Dhanu Rathod	35	M	856911	Ubegaon	Inhational Poisoning	24/9/17	26/9/17	Expired
10	Gajanan Namdev Fulmali	48	M	855710	Sawargaon Kalamb	Inhational Poisoning	21/9/17	1/10/17	Expired
11	Vilas Dadarao Tekam	28	M	707334	Varna PS Ralegaon, Yavatmal	Inhational Poisoning	21/09/2017	3/10/2017	Expired

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