HIGHLY HAZARDOUS PESTICIDES

DAUSA, RAJASTHAN SITUATION REPORT

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About the country

Worldwide, India is the seventh-largest country due to its diverse geographical area with landscapes ranging from snow-capped mountain ranges to deserts, plains, hills, and plateaus.

More than 58% of India's population depends on agriculture, which is the primary source of livelihood. Gross Value Added (GVA) by agriculture, forestry, and fishing was estimated at Rs. 19.48 trillion (US$ 276.37 billion) for the Fiscal Year 2020 (FY20). The growth in GVA in agriculture and allied sectors was 4% in FY20. The GVA growth of agriculture, forestry, and fishing is estimated to 3% for the second quarter of FY21.[1]

During the 2019-2020 crop year, food grain production was estimated to reach a record 295.67 million tons (Mt). In 2020-21, the Government of India set the target for food grain production at 298 Mt. India is among the 15 leading exporters of agricultural products in the world. Agricultural export from India reached US$ 38.54 billion in FY19 and US$ 35.09 billion in FY20. The total agricultural export was US$ 10.40 billion between April and October 2020.
The organic food segment in India is expected to grow at a Compound Annual Growth Rate (CAGR) of 10% during 2015-25 and is estimated to reach Rs. 75,000 crores (US$ 10.73 billion) by 2025 from Rs. 2,700 crores (US$ 386.32 million) in 2015.

Pesticide Scenario in the Country

India is one of the most dynamic generic pesticide manufacturers globally and is the fourth largest pesticide manufacturer after China, United States of America, and Japan.[2] The production of pesticides started in India in 1952 with the establishment of a plant for Benzene hexachloride (BHC) production near Calcutta. India is now the second-largest manufacturer of pesticides in Asia after China and ranks twelfth globally.[3] According to a Pesticide Action Network (PAN) report, from 2014-15 to 2017-18, pesticide use grew by 13.07 percent across the country. In 2017-18, 69,282 tons of pesticides (chemical and biopesticides combined) were used in India. It was a sharp increase from the 61,273 tons used in 2014-15 and 16 percent higher than the amount of pesticides used in 2015-16. In 2018-2019, around 60,201 tons of pesticides were used, according to provisional data, but the actual amount used could be much larger (as the data from PAN does not show pesticide use from four northeast states and union territories).[4]

In India, there are currently 293 insecticides/pesticides registered under section 9 (3) of the Insecticides Act, 1968, for use in the country as of 01.03.2021, and a total of 55 pesticides which are banned, refused registration, or with restricted use (Annexure 1, Table 3). A detailed list of the insecticides/pesticides registered under section 9 (3) of the Insecticides Act, 1968, for use in the country as of 01.03.2021 is available on the website of the Directorate of Plant

[1] https://www.ibef.org/industry/agriculture-india.aspx
[2] http://news.agropages.com/News/NewsDetail---27801.htm
[3] Mathur SC. Future of Indian pesticides industry in next millennium. *Pesticide Information.* 1999;24(4):9–23.
[4] Pesticide consumption across the country grew by 13.07 per cent between 2014-15 and 2017-18, according to the report by PAN

Protection, Quarantine & Storage.[5] India recently proposed the ban of 27 additional pesticides (Annexure 1, Table 2).

Prior to August 2018, around 18 Class I pesticides were allowed in India; of which a few were extensively used and accounted for about 30% of the total amount of pesticides used in India. These are also already banned for use in several other countries. In August 2018, the Ministry of Agriculture and Farmers' Welfare (MoAFW) banned 18 pesticides, three years after the recommendations of the Anupam Varma Committee. The Anupam Varma committee was constituted in 2013 to review the use of neonicotinoid pesticides in India, but in the same year, the mandate of the expert committee was extended to include the 66 pesticides banned or restricted in other countries but still registered for use in India.[6] A list of these 66 pesticides is presented in annexure II (table 6.). Out of these, 21% (14 of 66) are on a list of HHPs compiled by PAN International, called the List of Highly Hazardous Pesticides (PAN List of HHPs), published in March 2021.

About Rajasthan

With its diverse agroclimatic conditions, Rajasthan is richly endowed with the cultivation of a variety of crops and a strong animal husbandry sector. Agriculture in Rajasthan continues to be the backbone of the state's economy, with agriculture and allied sectors contributing 25.56% of the state's total GDP in 2019–20.[7] The total geographical area of Rajasthan is 34.2 million hectares, and the forested area is 2.651 million hectares. The cultivable area is 25.633 million hectares (74.9% of total geographical area), and the net sown area is 17.096 million hectares (66.7% of the cultivable area). The gross cropped area is 21.664 million hectares, and the area sown more than once is 5.11 million hectares with a cropping intensity of 124.5%. The net irrigated area is 5.239 million hectares (By canals - 25.08%, by tube wells - 72.7%, and by other means – 2.22%). The gross irrigated area is 8.09 million hectares, and the percentage of the net irrigated sown area is 30.6%. The total sum of the landholdings is 5.819 million hectares out of which 1.849 million (31.78%) hectares belong to marginal farmers, 1.2 million (20.79%) hectares to small farmers, and 2.76 million (47.43%) to farmers who hold land larger than 2 hectares.[8]

Rajasthan has two principal crop seasons, called Rabi and Kharif. The Rabi crops are winter crops, which are sown in October or November and harvested in March or April. The principal Rabi crops are barley, wheat, gram, pulses, and oilseeds. The main oilseeds are rapeseed and mustard. The Kharif crops are the crops that are grown in the summer season and are sown in June or July. These crops are harvested in September or October and include bajra,

[5]http://ppqs.gov.in/sites/default/files/pesticides_and_formulations_registered_for_use_in_the_country_under_the_insecticides_act_1968_as_on_01.01.2021.pdf

[6] https://pan-india.org/tag/anupamvarma-commitee-report/

[7]https://www.rajras.in/rajasthan/economy/agriculture/#:~:text=Rajasthan%2C%20with%20its%20diverse%20agro,total%20GSDP%20in%202019%2D20.

[8]https://farmech.dac.gov.in/FarmerGuide/RJ/index1.html#:~:text=The%20total%20number%20of%20land,hold%20land%20above%202%20hectare.&text=(e)%20Cropping%20Pattern%3A,seasons%20i.e.Rabi%20and%20Kharif.

pulses, jowar, maize, and groundnut. The highly irrigated regions that receive abundant water supply are utilized to cultivate improved high-yielding varieties of rice. Some places of Rajasthan that have black soil nurture the growth of major cash crops like cotton. In some regions, tobacco is also grown.[9]

About Pesticides and Highly Hazardous Pesticides (HHPs)

Pesticides are inherently hazardous, and among them, a relatively small number of Highly Hazardous Pesticides (HHPs) cause disproportionate harm to the environment and human health, including presenting severe environmental hazards, as well as highly acute, and chronic toxicity. According to The Food and Agriculture Organization (FAO) and the World Health Organization (WHO) code of conduct (FAO and WHO, 2013) and the Guidelines on Highly Hazardous Pesticides (FAO and WHO, 2016), HHPs are defined as follows:

The pesticides that are acknowledged to present particularly high levels of acute or chronic hazards to health or environment according to internationally accepted classification systems such as WHO or Global Harmonized System (GHS) or their listing in relevant binding international agreements or conventions. In addition, pesticides that appear to cause severe or irreversible harm to health or the environment under conditions of use in a country may be considered to be and treated as highly hazardous".[10]

In India, the government recently proposed a ban of 27 pesticides (Annexure 1, Table 4), out of which 22 (Table 1) are highly hazardous pesticides included in the Pesticide Action Network (PAN) International List of Highly Hazardous Pesticides published in March 2021.[11] Some of them were observed being in use when the field study for the present report was conducted.

Table 1. List of the Highly Hazardous Pesticides in India also included in the PAN International list of HHPs (March 2021).

Acephate	2,4-D	Methomyl
Benfuracarb	Deltamethrin	Monocrotophos
Butachlor	Dimethoate	Oxyfluorfen
Captan	Dinocap	Pendimethalin
Carbendazim	Diuron	Quinalphos
Carbofuran	Malathion	Thiodicarb
Chlorpyrifos	Mancozeb	Thiophanate-methyl
		Ziram

[9]https://farmech.dac.gov.in/FarmerGuide/RJ/index1.html#:~:text=The%20total%20number%20of%20land,hold%20land%20above%202%20hectare.&text=(e)%20Cropping%20Pattern%3A,seasons%20i.e.Rabi%20and%20Kharif.

[10] https://www.unep.org/explore-topics/chemicals-waste/what-we-do/emerging-issues/highly-hazardous-pesticides-hhps#:~:text=%E2%80%9CHighly%20Hazardous%20Pesticides%20means%20pesticides,listing%20in%20relevant%20binding%20international

[11] http://pan-international.org/wp-content/uploads/PAN_HHP_List.pdf

Environmental Impacts

Pesticides may protect the crops from harmful pests, but they are also a serious risk to the environment. Excessive use of pesticides may lead to the destruction of biodiversity. Many animals, birds, and aquatic organisms (such as zooplankton and phytoplankton) are in danger because of the widespread pesticide use. Thus, pesticides are now the main concern for the sustainability of the environment and global stability.

Pesticide uses in Rajasthan

In Rajasthan, an average pesticide consumption of 9.9 metric tons per lakh hectare (100,000 hectares) in 2015-16 was reported by the Ministry of Agriculture & Farmers' Welfare, in its 2019 report.[12] A recent study conducted by Sucheta Yadav and Subroto Dutta in 2019 observed the presence of *Monocrotophos,* followed by *Acephate*, *Chlorpyrifos,* and *Profenofos* in cotton crops in Tijara Tehsil, in Alwar, Rajasthan.[13] All of them are on the list of banned pesticides for the country. Similarly, in an earlier study, Aldrin was observed in the Dausa district of Rajasthan, even though it is completely banned in the whole country. That study was conducted jointly by Gramin Vikas Evam Paryavaran Sanstha (GVEPS) and Toxics Link in 2018 and the information was documented in a country situation report.[14] Similarly, some highly hazardous pesticides were also recently observed in Dausa and other parts of Rajasthan during the study, field visits, and interaction conducted (with the farmers) for the present report.

It was observed that deaths related to pesticide poisoning are common in India. As per information by the National Crimes Records Bureau, there were 7,365 cases of poisoning due to accidental intake of insecticides/pesticides reported in 2014, out of which 5,915 resulted in death. In 2015, 7,060 deaths were reported out of a total of 7,672 cases. Currently, there are enough well-proven, successful alternative agroecological methods of pest management, such as integrated pest management without using any chemical pesticides, both in India and globally. Therefore, such alternatives must be mainstreamed and further promoted among farmers. Integrated pest management (IPM) is the combination of biological, cultural, and chemical practices, which helps to control insect pests in agricultural production. The technique uses natural predators or parasites to control pests. If the farmer cannot control the pest with this method, only a few selected pesticides could be kept to be used as backup only.[15]

There is limited data available in the public domain on the uses and health impacts of pesticides in Rajasthan; therefore, this project's objective was to conduct an awareness-raising and training program for the farmers based in Dausa, Rajasthan.

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[12] https://factly.in/data-here-are-the-states-that-consume-the-most-chemical-pesticide-for-agriculture/

[13] Sucheta Yadav and Subroto Dutta, Evaluation of Organophosphorus Pesticide Residue in Cotton of Tijara Tehsil, Alwar, Rajasthan, Nature Environment and Pollution Technology Vol. 18 no 4 pp. 1455-1458 2019

[14] https://ipen.org/sites/default/files/documents/POPs%20Country%20Situation%20report.pdf

[15] https://www.farmbiosecurity.com.au/what-is-integrated-pest-management/#:~:text=Integrated%20pest%20management%20(IPM)%20combines,be%20controlled%20by%20natural%20means.

Objectives of the study

- To understand the overall situation concerning highly hazardous pesticides in the Dausa district of Rajasthan, India.
- To collect facts about highly hazardous pesticides in the region – their use, trade, available alternatives, etc.
- To create awareness among the stakeholders and end-users about the health and environmental impacts of HHPs.
- Raise the awareness about HHPs through providing information materials.
- Develop and circulate Information Education Communication (IEC) materials.
- Conduct an awareness-raising program and campaign on HHPs.

Field Study

To understand the overall situation of highly hazardous pesticides in the Dausa district of Rajasthan, India, and collect facts about their use, trade, and alternatives, etc., the organization Gramin Vikas Evam Paryavaran Sanstha conducted a field study and survey in 2020-2021 among the farmers in the Dausa district of Rajasthan, India, and visited some farms to observe the use of different pesticides on the ground.

During the visits, it was observed that some highly hazardous pesticides are in use by the farmers. Photographs taken during the field visits are presented below. It can be clearly observed that HHPs are very commonly available for use in the Dausa district. The ~~decision~~details on some of these HHPs (which were observed in the Dausa district) is presented in figure 2.

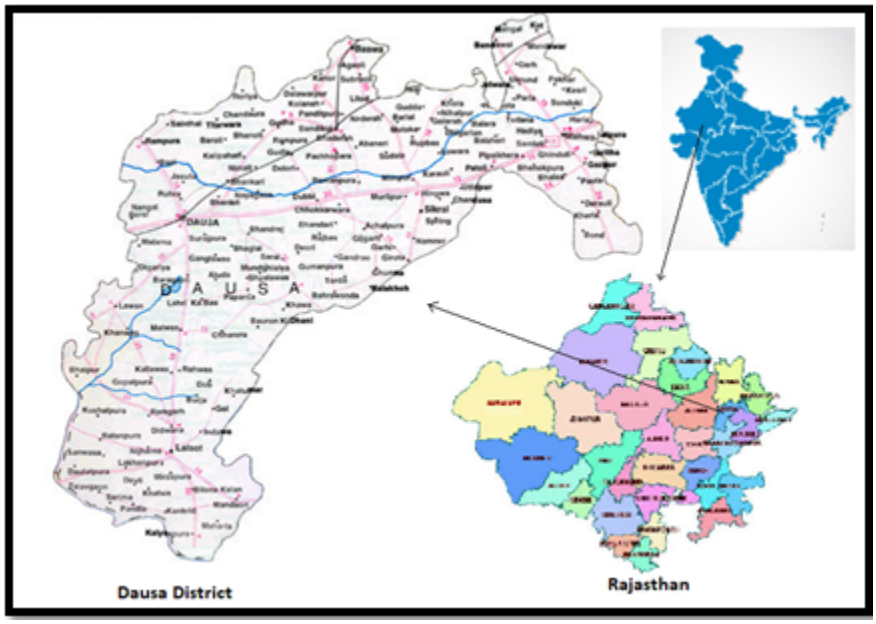


Figure 1 Map of the Dausa District

Main findings of the field study

In the field study, relevant information was collected from farmers and shopkeepers from the Dausa district of Rajasthan. The findings are as follows:

Discussions with farmers

Purpose and Activities	Results
- Meeting and discussion with individual farmers and farmer groups (a total of 10 group meetings were conducted) - In the Dausa district, a total of 10 meetings in 10 different villages were organized in which both male (157) and female (103) farmers participated - Using a questionnaire, 10 farmers were interviewed - Information was collected from the farmers about their pesticide usage.	- The discussion was focused on individual farming as well as group farming and pesticide use - The farmers said they usually ask for some powerful pesticide (HHP) for pest management, but they don't know its exact name. - Some farmers keep the empty packets for reference if they found the results to be good.
Gather information about stores/trades selling pesticides	Farmers said that they buy the pesticide from the nearest large town, block headquarter, Bandikui, Lalsot, Sikray, Muhawa etc.,
When purchasing pesticides, do the shopkeepers provide bills/cash receipts?	No bills or cash receipts were provided. Shopkeepers would suggest some relevant pesticides to the farmers, and some farmers were also aware about the labeling of them. They would see their local brand name, such as ***Jamindar, Taz, Kuber Domark*** etc., or a renowned name such as ***Endosulfan Aldrin*** previously etc., and would often check the packing, but many farmers would also prefer to buy the pesticides suggested by the shopkeepers. The shopkeepers also provide bags, animal fodder seed kits, etc.
Investigate the use of personal protection equipment (PPE) during spraying activities	Farmers do not use PPE kits, as that practice is not widespread and the kits are not easily available, but some farmers prefer to use a towel as a mask during spraying. There are no training programs provided by government agencies on the proper uses of pesticides, etc.

Discussions with shopkeepers

Purpose and Activities	Results
A few shops selling pesticides were visited to discuss the issue with the shopkeepers.	- Shopkeepers claimed they do not sell any banned pesticides. - However, pesticides with other local brand names are being sold, such as Kuber, Saaf, Domark, Takaf, Profex etc.

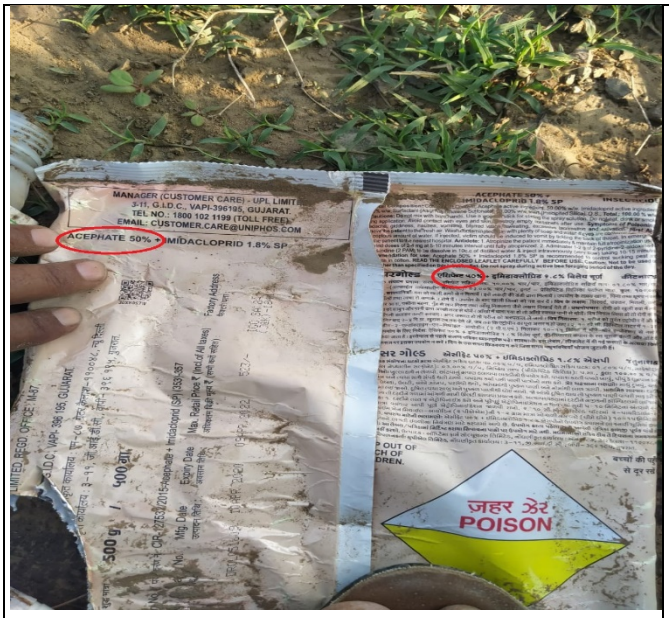
	(which contents showed that they are on the list of banned pesticides). Please see table 2.
Discussion with the farmers as they were making purchases from these shops. - To understand from the farmers since when have they been using pesticides? - Since when have they been purchasing the pesticide, and from where were they purchasing it earlier? - What is the composition of the pesticide?	Many farmers are not aware whether the pesticide they have purchased is banned or not. - Farmers are using pesticides since more than 30 years back. - They have been purchasing the pesticides over the last 30 years from nearby places and local markets. - Farmers are not able to tell the composition of the pesticides.
IEC preparation and distribution - For the purpose of raising the farmers' awareness, IEC materials were prepared.	- The IEC materials were distributed among more than 3,000 farmers. - The IEC materials helped in creating greater awareness among the farmers.
Awareness-raising program - Field visits and farmer meetings organized to provide information about HHPs.	- Very few (approximately 2%) farmers knew about the pesticides banned in India. - Furthermore, some farmers asked for safer pesticides for their use.

Following below are our findings from farmer meetings, shopkeeper meetings, and community meetings

Table 2 Banned pesticides available for sale under different names

Banned Pesticide	Local Name
1. Chlorpyrifos	Clobomx, Perse, Ataborn
2. Mancozeb	ZEBMS 45, SAAF, Avancer
3. Thiophanate	Methy, Roko
4. Carbendazim+Mancozeb	Kuber

The following photos show some pesticides observed during the field visits. They are highly hazardous in nature and are on the list of proposed bans prepared by the Government of India in 2020.



Acephate

Carbendazim and Mancozeb

Thiophanate Methyl

Mancozeb

Figure 2 HPPs available to the farmers in the Dausa district.

Observation during the field visits

There are different marks/symbols on the labels of pesticide packages that indicate the harmfulness of the pesticides (see below), but farmers do not always see this and simply purchase the products anyway.

- **Red – Sabse jyada khatarnak (Extremely toxic)**
- **Yellow – isse kam khatarnak (Highly toxic)**
- **Blue – khatarnak (Moderately toxic)**
- **Green – kam khatarnak (Slightly toxic)**

Impacts of pesticides

On farmers health

- The farmers said that due to the use of pesticides, there is more illness observed compared to earlier. A study conducted in India has documented symptoms such as dry/sore throat, headaches, runny/burning nose, dizziness and shortness of breath, vomiting, and coughing, as well as skin and eye problems occurring as a result of pesticide exposure.[16]
- While preparing the pesticide solution or during the spraying of it, the pesticide enters the body through inhalation.
- Due to pesticide spraying, farmers commonly observed irritation and swelling of the eyes, headaches, vomiting, some allergic reactions, and occasionally even unconsciousness.
- Fodder also gets sprayed with some pesticides and as a result, pesticide residues have been found in the milk of the animals eating it.[17],[18]
- While spraying pesticides, farmers most often do not use any personal protective gear (such as gloves, masks, goggles, aprons, etc.). This further exposes their bodies to the harmful pesticides that they are using.
- Sometimes, farmers clean the nozzle of the spray pump with their mouths to remove impurities, like chew tobacco or smoke. This is undoubtedly harmful to their health as well.

On environmental and animal health

- Some farmers do not dispose of the used pesticide packaging properly. They leave the empty cans, packages, tubes, etc., lying in the field, which affects the local birds, sometimes even causing their death.
- Pesticides can reach the surface water through runoff from treated plants and soil. Surface water and drinking water has been reported to demonstrate presence of pesticides in earlier studies.[19]

[16] https://www.semanticscholar.org/paper/Analysis-of-Pesticide-Residues-on-Crops-with-Health-Sharma-Dutta/40e2ff02a882c0040ad2c74882e650ac32f5b154

[17] John, P. J., Bakore, N. & Bhatnagar, P. Assessment of organochlorine pesticide residue levels in dairy milk and bufalo milk from Jaipur City, Rajasthan, India. Environ. Int. 26, 231–236, https://doi.org/10.1016/S0160-4120(00)00111-2 (2001).

[18] Choudhary, Sanjay & Raheja, Nitin & Yadav, Sushil & Sharma, Amit & Yamini, Nitin & Raheja, Sushil & Yadav, M & Kamboj, Amit & Sharma,. (2018). A review: Pesticide residue: Cause of many animal health problems. Journal Of Entomology And Zoology Studies. 6.

[19] http://www.ijsrd.com/articles/IJSRDV5I31119.pdf

- Pesticides may impact wildlife via secondary exposure or through indirect effects to the animal or its habitat.[20]
- Pesticides may also have a negative impact on worms, which interferes with vermicompost activity.[21]

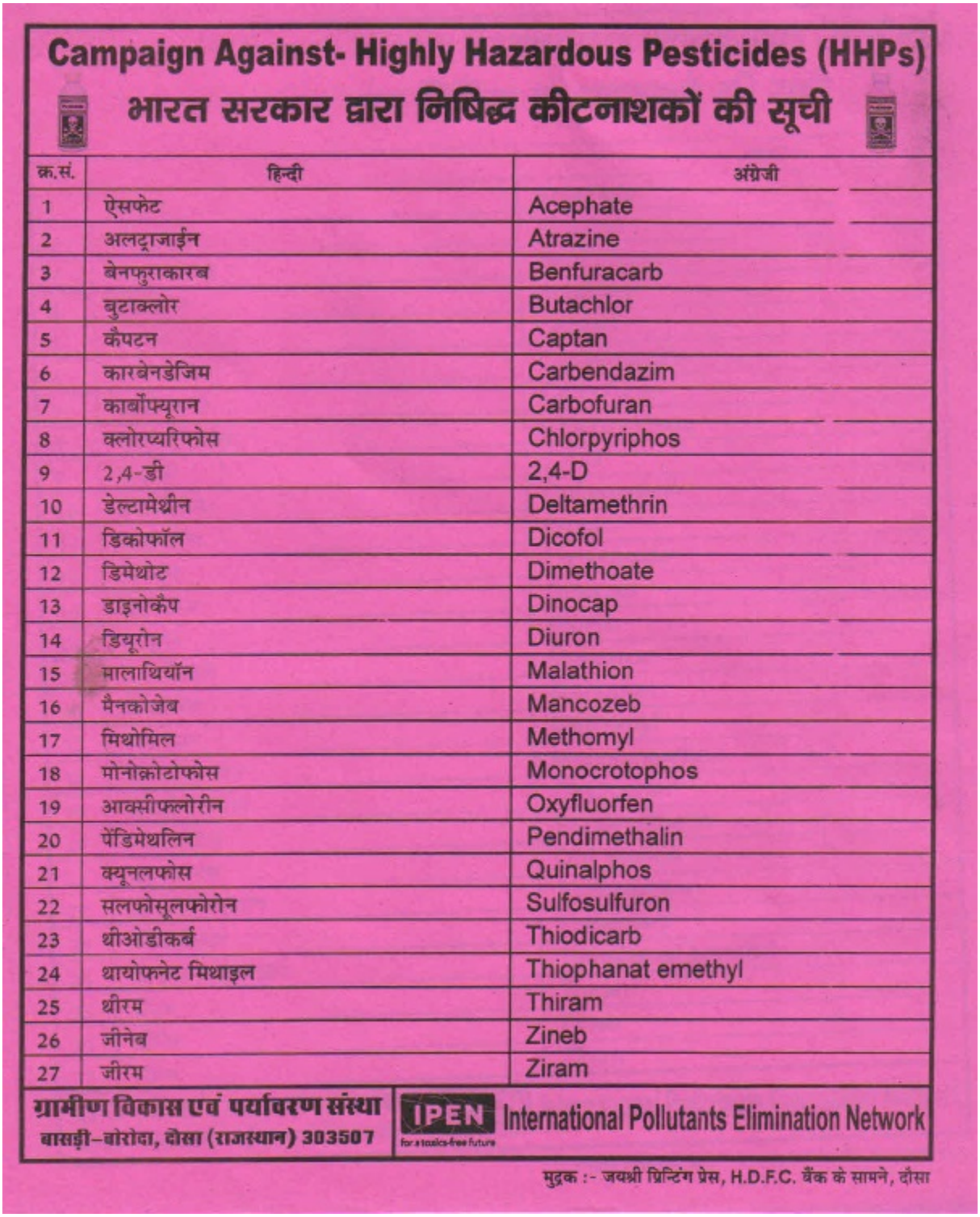
Awareness-raising Program

In the above context, Gramin Vikas Evam Paryavaran Sanstha (GVEPS) conducted 10 different awareness-raising activities in 10 different villages in Dausa, Rajasthan.

Preparation of IEC material

The IEC materials contain information on the List of HHPs (Figure 3) and materials prepared in Hindi on organic fertilizers, vermicompost, and conventional practices as alternatives to the use of highly hazardous pesticides. These materials were prepared with the help of available information gathered from various sources. The IEC materials were prepared by Mr. Harishankar Sharma, Mr. Damodar, Mr. Ramawatar Sharma, and Mr. Kailash Meena.

[20] http://www.aelsindia.com/Vol1august_2013/4.pdf
[21] https://www.uok.ac.in/notifications/(6)%20ANAMIKA-KHANDELWAL-ZOOLOGY.pdf



Campaign Against- Highly Hazardous Pesticides (HHPs)

भारत सरकार द्वारा निषिद्ध कीटनाशकों की सूची

क्र.सं.	हिन्दी	अंग्रेजी
1	ऐसफेट	Acephate
2	अलट्राजाईन	Atrazine
3	बेनफुराकारब	Benfuracarb
4	बुटाक्लोर	Butachlor
5	कैपटन	Captan
6	कारबेनडेजिम	Carbendazim
7	कार्बोफ्यूरान	Carbofuran
8	क्लोरप्यरिफोस	Chlorpyriphos
9	2,4-डी	2,4-D
10	डेल्टामेथ्रीन	Deltamethrin
11	डिकोफॉल	Dicofol
12	डिमेथोट	Dimethoate
13	डाइनोकैप	Dinocap
14	डियूरोन	Diuron
15	मालाथियॉन	Malathion
16	मैनकोजेब	Mancozeb
17	मिथोमिल	Methomyl
18	मोनोक्रोटोफोस	Monocrotophos
19	आक्सीफ्लोरीन	Oxyfluorfen
20	पेंडिमेथलिन	Pendimethalin
21	क्यूनलफोस	Quinalphos
22	सलफोसूलफोरोन	Sulfosulfuron
23	थीओडीकर्ब	Thiodicarb
24	थायोफनेट मिथाइल	Thiophanat emethyl
25	थीरम	Thiram
26	जीनेब	Zineb
27	जीरम	Ziram

ग्रामीण विकास एवं पर्यावरण संस्था
बासड़ी–बोरोदा, दौसा (राजस्थान) 303507

IPEN International Pollutants Elimination Network
for a toxics-free future

मुद्रक :- जयश्री प्रिन्टिंग प्रेस, H.D.F.C. बैंक के सामने, दौसा

Figure 2 List of the 27 HHPs (recently proposed for a ban) used as information material

Farmer meetings on the harmful effects of HHPs

To further circulate the IEC materials and spread awareness on pesticide use and its hazards, GVEPS conducted more than 20 different meetings at different places in the Dausa district of Rajasthan (fig. 3 and fig. 4). General information on the harmful effects of synthetic pesticides was shared during the meetings, as many of the attending farmers were using those insecticides without being aware of the proper methods to use and dispose of the pesticides/insecticides and were therefore exposing themselves to their harmful health impacts.[22,23] These meetings were interactive and the organizers answered all the queries raised by the farmers during the meetings. Following are some images taken during the meetings.

Figure 3 Meeting with farmer group 1

[22] https://www.researchgate.net/publication/330164497_Environmental_Risk_of_Pesticides
[23] https://www.yorku.ca/bunchmj/ICEH/proceedings/Rajendran_S_ICEH_papers_353to373.pdf

Figure 4 Meeting with farmer group 2

Farmer meeting on alternative to pesticides

In continuation to the awareness-raising meeting, some more meetings were conducted focusing on the alternatives to chemical-based pesticides and the benefits of using the alternatives instead. Further, some farmers were also taken to the field to showcase the preparation of a vermicompost (figure 5), which is a safer option for improving soil fertility and managing pests. Famers were also made aware about safer kinds of pesticides, such as neem oil-based products for managing pests (figure 7).

Figure 5 Meeting with a farmer group on alternatives, including a field experiment

Press Coverage

The local newspaper called “Dausa Gajat” on 28th January 2021 covered the awareness-raising program conducted by Gramin Vikas Evam Paryavaran Sanstha (GVEPS) at Dausa, Rajasthan (see figure 7). However, more research is required on this issue to bring the information even more into the public domain.

आइपीइन दिल्ली के सौजन्य से जैविक प्रशिक्षण का आयोजन

दौसा। ग्राम उदावाला ग्राम पंचायत रामपुरा में ग्रामीण विकास एवं पर्यावरण संस्था एवं स्पार संस्था के संयुक्त तत्वाधान में। P E N दिल्ली के सौजन्य से जैविक प्रशिक्षण का आयोजन किया गया जिसमें 25 कृषकों ने भाग लिया। संस्था सचिव श्री हरिओम शर्मा ने जैविक खेती पर प्रशिक्षण दिया जिसमें खेती में हो रहे अत्यधिक खतरनाक कीटनाशकों के दुष्परिणाम के बारे में जानकारी दी गई तथा किसानों को जैविक कीटनाशक बनाने के बारे में बताया गया। संस्था के कार्यकर्ता श्री कैलाश चंद शर्मा ने किसानों को जैविक खाद बनाने की जानकारी दी जैसे जीवामृत वेस्ट डी कंपोजर वर्मी कंपोस्ट खाद बनाकर किसान धीरे–धीरे यूरिया डीएपी बंद कर सकते हैं और जैविक खेती अपना सकते हैं।

Figure 6 Coverage in the local newspaper

Challenges

- Lack of information on HHPs available in the public domain.
- Convincing farmers to take precautions during the use of HHPs.
- Explaining the terminology in the local language.
- Limited number of alternatives to tackle maximum amounts of pests and diseases.

Recommendations

- More awareness-raising is required to educate farmers on how to avoid the use of banned HHPs.
- The government need issue a list of banned HHPs in local languages, to make sure the farmers are able to understand it.
- The government need to set up testing laboratories to assess pesticides in crops at the local level.
- The government need arrange training activities for the farmers on the proper use of pesticides.
- The government need ensure proper labelling of pesticides, and enforce mislabeling.
- Strict monitoring by government agencies on the availability of banned pesticides.
- Imposing of fines on the traders procuring and selling banned pesticides.
- Providing training on the usage of PPE kits to reduce occupational exposure.

Annexure I

List of pesticides which are banned, refused registration and restricted in use: (as on 01.01.2021)

Table 3 List of the pesticides/formulations banned in India[24]

	Pesticides banned for manufacture, import and use.	
A	1	Alachlor (vide S.O. 3951 (E), dated 8th August, 2018)
	2	Aldicarb (vide S.O. 682 (E), dated 17th July, 2001)
	3	Aldrin
	4	Benzene Hexachloride
	5	Benomyl (vide S.O 3951 (E), dated 8th August, 2018)
	6	Calcium Cyanide
	7	Carbaryl (vide S.O 3951 (E), dated 8th August, 2018)
	8	Chlorbenzilate (vide S.O. 682 (E), dated 17th July, 2001)
	9	Chlordane
	10	Chlorofenvinphos
	11	Copper Acetoarsenite
	12	Diazinon (vide S.O 3951 (E), dated 8th August, 2018)
	13	Dibromochloropropane (DBCP) (vide S.O. 569 (E), dated 25th July 1989)
	14	Dichlorvos (vide S.O. 3951 (E), dated 8th August, 2018)
	15	Dieldrin (vide S.O. 682 (E), dated 17th July 2001)
	16	Endosulfan (vide ad-Interim order of the Supreme Court of India in the Writ Petition (Civil) No. 213 of 2011, dated 13th May, 2011 and finally disposed of dated 10th January, 2017)
	17	Endrin
	18	Ethyl Mercury Chloride
	19	Ethyl Parathion
	20	Ethylene Dibromide (EDB) (vide S.O. 682 (E), dated 17th July 2001)
	21	Fenarimol (vide S.O 3951 (E), dated 8th August, 2018)
	22	Fenthion (vide S.O 3951 (E), dated 8th August, 2018)
	23	Heptachlor
	24	Lindane (Gamma-HCH)
	25	Linuron (vide S.O 3951 (E), dated 8th August, 2018)
	26	Maleic Hydrazide (vide S.O. 682 (E), dated 17th July 2001)

[24]http://ppqs.gov.in/sites/default/files/list_of_pesticides_which_are_bannedrefused_registration_and_restricted_in_use_as_on_01.01.2021.pdf

	27	Menazon
	28	Methoxy Ethyl Mercury Chloride (vide S.O 3951 (E), dated 8th August, 2018)
	29	Methyl Parathion (vide S.O 3951 (E), dated 8th August, 2018)
	30	Metoxuron
	31	Nitrofen
	32	Paraquat Dimethyl Sulphate
	33	Pentachloro Nitrobenzene (PCNB) (vide S.O. 569 (E), dated 25th July 1989)
	34	Pentachlorophenol
	35	Phenyl Mercury Acetate
	36	Phorate (vide S.O. 3951 (E), dated 8th August, 2018)
	37	Phosphamidon (vide S.O. 3951 (E), dated 8th August, 2018)
	38	Sodium Cyanide (banned for insecticidal purposes only, vide S.O 3951 (E), dated 8th August, 2018)*
	39	Sodium Methane Arsonate
	40	Tetradifon
	41	Thiometon (vide S.O. 3951 (E), dated 8th August, 2018)
	42	Toxaphene (Camphechlor) (vide S.O. 569 (E), dated 25th July 1989)
	43	Triazophos (vide S.O. 3951 (E), dated 8th August, 2018)
	44	Tridemorph (vide S.O. 3951 (E), dated 8th August, 2018)
	45	Trichloroacetic acid (TCA) (vide S.O. 682 (E), dated 17th July 2001)
	46	Trichlorfon (vide S.O. 3951 (E), dated 8th August, 2018)
	Pesticide formulations banned for import, manufacture and use	
B	1	Carbofuron 50% SP (vide S.O. 678 (E), dated 17th July 2001)
	2	Methomyl 12.5% L
	3	Methomyl 24% formulation
	4	Phosphamidon 85% SL
	Pesticide / Pesticide formulations banned for use but continuing to be manufactured for export	
C	1	Captafol 80% Powder (vide S.O. 679 (E), dated 17th July 2001)
	2	Dichlorvos (vide S.O. 1196 (E), dated 20th March 2020)
	3	Nicotin Sulfate (vide S.O. 325 (E), dated 11th May 1992)
	4	Phorate (vide S.O. 1196 (E), dated 20th March 2020)
	5	Triazophos (vide S.O. 1196 (E), dated 20th March 2020)
	Pesticides withdrawn (Withdrawal may become inoperative as soon as required complete data as per the guidelines is generated and submitted by the pesticides industry to the government and accepted by the Registration Committee. (S.O. 915 (E), dated 15th June 2006)	
D	1	Dalapon
	2	Ferbam

	3	Formothion
	4	Nickel Chloride
	5	Paradichlorobenzene (PDCB)
	6	Simazine
	7	Sirmate (S.O. 2485 (E), dated 24th September 2014)
	8	Warfarin (vide S.O. 915 (E), dated 15th June 2006)

* Regulation to be continued in the extant manner for non-insecticidal uses.

Table 4 Pesticides refused for registration

SN	Name of pesticide
1.	2,4,5-T
2.	Ammonium Sulphamate
3.	Azinphos Ethyl
4.	Azinphos Methyl
5.	Binapacryl
6.	Calcium Arsenate
7.	Carbophenothion
8.	Chinomethionate (Morestan)
9.	Dicrotophos
10.	EPN
11.	Fentin Acetate
12.	Fentin Hydroxide
13.	Lead Arsenate
14.	Leptophos (Phosvel)
15.	Mephosfolan
16.	Mevinphos (Phosdrin)
17.	Thiodemeton / Disulfoton
18.	Vamidothion

Table 5 List of prohibited insecticides in India as per the gazette notification of the Ministry of Agriculture and Farmers' Welfare

SN	Name of insecticide	SN	Name of insecticide	SN	Name of insecticide
1	Acephate	10	Deltamethrin	19	Oxyfluorfen
2	Atrazine	11	Dicofol	20	Pendimethalin
3	Benfuracarb	12	Dimethoate	21	Quinalphos
4	Butachlor	13	Dinocap	22	Sulfosulfuron
5	Captan	14	Diuron	23	Thiodicarb
6	Carbendazim	15	Malathion	24	Thiophanate methyl
7	Carbofuran	16	Mancozeb	25	Thiram

8	Chlorpyriphos	17	Methomyl	26	Zineb
9	2,4-D	18	Monocrotophos	27	Ziram

Annexure II

Table 6 List of the pesticides mentioned in the expert committee (under the chairmanship of Dr Anupam Verma)[25]. The yellow highlighted ones are HHPs

SN	Pesticides recommended to be continued	Remark
1.	Aluminium phosphide	
2.	Bifenthrin	
3.	Carbosulfan	
4.	Chlorfenapyr	
5.	Chlorothaonil	
6.	Dazomet	HHP
7.	Diflubenzuron	HHP
8.	Ethofenprox	HHP
9.	Fenpropathrin	
10.	Iprodione	
11.	Kasugamycin	HHP
12.	Meiquat chloride	HHP
13.	Metaldehyde	HHP
14.	Paraquat dichloride	
15.	Pretilachlor	HHP
16.	Propargite	HHP
17.	Propineb	
18.	Zinc phosphide	
	Pesticides recommended to be continued, but to be reviewed in 2018 after completion of the recommended studies	
19.	Acephate	
20.	Atrazine	HHP
21.	Benfuracarb	
22.	Butachlor	
23.	Captan	
24.	Carbendazim	
25.	Carbofuran	
26.	Chlorpyriphos	
27.	Deltramethrin	

[25] http://ppqs.gov.in/sites/default/files/volume-i_1.pdf

28.	Dicofol	
29.	Dimethoate	
30.	Dinocap	
31.	Diuron	
32.	2,4-D	
33.	Malathion	
34.	Mancozeb	
35.	Methomyl	
36.	Monochrotophos	
37.	Oxyfluorfen	
38.	Pendimethalin	
39.	Quinalphos	
40.	Sulfosulfuron	
41.	Thiodicarb	
42.	Thiophanate methyl	
43.	Thiram	
44.	Zineb	
45.	Ziram	
	Pesticides recommended to be phased out by 2020	
46.	Alachlor	
47.	Dichlorvos	
48.	Phorate	
49.	Phosphamidon	
50.	Triazophos	
51.	Trichlorfon	
	Pesticides already banned for use in agriculture	
52.	Fenitrothion	
	Pesticides recommended to be completely banned	
53.	Benomyl	
54.	Carbaryl	
55.	DDT	
56.	Diazinon	
57.	Fenarimol	HHP
58.	Fenthion	
59.	Linuron	
60.	MEMC	HHP
61.	Methyl Parathion	HHP
62.	Sodium Cyanide	

63.	Thiometon	
64.	Tridemorph	
65.	Trifluralin	
	Pesticide not reviewed being under consideration of the Supreme Court	
66.	Endosulfan	

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