CONCEPT NOTE

Highly Hazardous Pesticides (HHPs) in Himachal Pradesh

A Public Health, Environmental, and Agrarian Crisis Demanding Urgent Regulatory Action

1. Introduction: A crisis in the fields

Himachal Pradesh is one of India's most intensively farmed hill states. From the apple and other fruit orchards of Shimla and Kullu to the peas fields of Lahaul, the vegetable farms of Solan, and the tea gardens of Kangra, HP's landscape and economy are built on agriculture. This intensive cultivation has come with a profound but largely unacknowledged cost: Himachal Pradesh's farmers are among the most heavily exposed agricultural workers to agrochemicals in India.

It is a state where a silent, preventable crisis unfolds season after season in its fields, hospitals, and homes. The farmer who rises before dawn to spray his apple trees, the agricultural labourer who walks through agricultural fields, the youth and the general public in a moment of distress who reaches for a bottle stored in the household - they are all, in different ways, victims of a class of agrochemicals known as Highly Hazardous Pesticides (HHPs).

The devastation, however, does not end with human health; it extends deep into the fragile Himalayan ecosystem. Heavy monsoon rains wash these persistent toxins down steep gradients directly into mountain streams, contaminating groundwater and poisoning aquatic life. Beneath the surface, these harsh chemicals systematically destroy the native soil microbiome, creating sterile earth, while simultaneously decimating the bee and pollinator populations upon which the entire agricultural system relies and ultimately in the food chain.

What is often dismissed as a mere agricultural input issue is, in reality, a severe public health emergency, an agrarian tragedy, and an ecological disaster. This concept note outlines the urgent, science-driven need to regulate and phase out HHPs in Himachal Pradesh, protecting the lives of its farmers and the future of its environment.

> *"Excessive use of pesticides and urea is one of the main reasons for the rising cancer cases in Himachal."*
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> *— Shri Sukhvinder Singh Sukhu, Chief Minister of Himachal Pradesh, Vidhan Sabha, 2024*

2. The Himachali farmer is the first victim

The first casualty of any Highly Hazardous Pesticide (HHP) is the farmer. In these terrains, toxic blow-back from mountain winds is inevitable, rendering the concept of "safe handling" an operational impossibility.
Farmers face a severe occupational health burden as they are directly exposed to this toxic drift. A landmark study of orchardists in Kullu and Shimla (Kumari & Sharma, 2014) reveals what they now endure as a "normal" workweek:

- **Severe Eye Irritation:** 86% (Kullu); 77.5% (Shimla).
- **Extreme Fatigue:** 81% (Kullu); 77.3% (Shimla).
- **Acute Systemic Toxicity:** Vomiting, dermal lesions, dizziness, and headaches are reported as routine, post-spray realities.

These symptoms are not unusual or accidental events; they are part of their daily lives. Generation after generation of Himachal's farming families have carried the chronic, debilitating burden of pesticide exposure, while the acute crisis of lethal poisonings continues to fill the state's rural clinics and autopsy wards.

The farmer is not merely a statistic, he is the human face of a policy failure. We cannot expect farmers to manage the unmanageable. When a chemical is too toxic to be used safely in local agricultural conditions, the only definitive public health intervention is **regulation at the source**. Phasing out and restricting HHPs is the only way to break this cycle of suffering.

3. A Public Health crisis that state is battling

Cancer: Himachal Pradesh now records the **second-highest cancer incidence in India** after the north-east, with a death rate of **9.5% versus the national 7.7%**. Over 10,000 cancer deaths in 8 years; 32,909 cases recorded across HP's medical colleges. The annual growth rate of cancer cases in Himachal has reached 2.2 per cent, far exceeding the national growth rate of 0.6 per cent. The Chief Minister has publicly attributed this to excessive pesticide use. IGMC oncologists are demanding a regulatory law, noting that **cancerous elements from pesticides are entering HP's groundwater** (Dr. Manish Gupta, IGMC Shimla, 2023). IGMC and HPU are now jointly studying water contamination from pesticides, results of which are expected this year.

Acute poisoning: Pesticides account for roughly **a quarter of all unnatural deaths** in HP. At Dr. RPGMC Kangra, 284 fatal poisoning cases were documented in just 3 years (Mahlawat et al., 2024). 87% of victims are rural; 70% from lower socio-economic backgrounds — almost always farming families. **Over 76% of HP's poisoning cases involve poison consumed at home**.

Self-harm: A fleeting moment of psychological distress too often becomes an irreversible tragedy simply because Highly Hazardous Pesticides (HHPs) are stored inside the home. The high fatality rate of self-harm in the state is directly driven by the unregulated, easy accessibility of these lethal agrochemicals. **Demonstrating the catastrophic scale of this access, forensic records from four southern districts (Shimla, Solan, Sirmaur, Kinnaur) documented a staggering 585 deaths caused directly by agricultural pesticides and phosphine compounds in just five years accounting for over 45% of all fatal poisonings in the region (Sharma et al., 2017).**

Globally and within India, removing HHPs from circulation has reduced overall suicide rates by 30–50% (as seen in South Korea, Sri Lanka, Taiwan, and Kerala). Restricting access to these toxic agents is the single most effective, evidence-backed intervention in suicide prevention.

Paraquat at Himachal Pradesh's Tertiary Hospitals — The Emerging Crisis

Recent data reveals a surge in fatalities driven by the herbicide Paraquat. At Dr. RPGMC Kangra at Tanda, Bansal et al. (2025) documented 55 paraquat poisoning cases, resulting in 41 deaths, a staggering 74.5% mortality rate.

The reason for this devastating death toll is medically grim: **Paraquat has no known antidote.** Ingesting even a single accidental sip (as little as 10ml) is almost universally fatal. The chemical rapidly triggers irreversible pulmonary fibrosis—literally scarring the lungs from the inside out. Victims slowly suffocate over several agonizing days, often remaining fully conscious and alert, while doctors are left entirely helpless to do anything beyond offering palliative care.

Furthermore, these figures represent the burden at just one tertiary care centres. Given Himachal Pradesh's terrain, the actual death toll is significantly higher. Countless patients succumb to suffocation at home, die in transit, or pass away at primary health centres before this horrific poisoning can even be formally recorded.

4. The Quiet poisoning of Himachal Pradesh's Soils, Water and its biodiversity

The devastation caused by HHPs in Himachal Pradesh does not end at the farm boundary. Because the Himalayan ecosystem is deeply interconnected, the heavy application of HHPs triggers a toxic cascade that degrades the state's water, soil, and wildlife.

WATER — HP's Rivers and Groundwater are at risk

The Beas, Sutlej, Ravi, and Chenab rivers all originate in Himachal Pradesh, serving as the lifeblood for hundreds of millions of people downstream. Contamination of these vital watersheds is no longer a hypothetical risk—it is a documented reality.

- The Monsoon Washout: Peak pesticide application coincides directly with the heavy monsoon season. Because of the steep mountain topography, torrential rains aggressively wash toxic chemical loads off terraced farms and directly into local mountain streams (khuds) and natural springs.
- Groundwater and the health issues surge: This toxic runoff is now a primary suspect in HP's escalating health crisis. The state's apex institutions, IGMC Shimla and HPU are currently conducting joint research to quantify how agricultural pesticides are contaminating local drinking water, and whether this is driving the state's health issues to surge (Down To Earth, 2024).

SOIL — The living foundation of HP's agriculture is suffering

Healthy soil is a living ecosystem. A single gram of orchard soil contains billions of microbes essential for fixing nitrogen and sustaining crop yields. HHPs do not just kill the target pests, they systematically sterilise the earth below.

- HP's soils are contaminated, and the chemicals stay for decades. Scientists at Dr. Y S Parmar University of Horticulture and Forestry, Solan, detected residues of endosulfan, HCH, DDT, dicofol and chlorpyrifos in HP apple-orchard soils, including HCH and DDT residues in orchards where these chemicals had not been used for 15 years (Chandel et al., 2017).
- Microbial collapse and the "HHPs trap." Routine drenching of soils with HHPs like chlorpyrifos, carbofuran and paraquat reduces beneficial microbial diversity by 30–60% (global studies). When nitrogen-fixing bacteria like Rhizobium are eradicated, natural soil fertility crashes forcing farmers into a vicious cycle of buying more synthetic fertiliser each year just to maintain baseline yields.

WILDLIFE — A cascade through HP's ecosystems

HHPs are broad-spectrum poisons, they do not distinguish between pests and vital local fauna, actively degrading the state's biodiversity and agricultural economy.

- Pollinator Collapse: Himachal Pradesh's fruit economy is entirely dependent on insect pollination. Monocrotophos and Chlorpyrifos are acutely toxic to bees. The heavy use of these neurotoxins is driving a massive local pollinator collapse and results in a drop in yields.
- Avian Mortality (Birds): Carbofuran is notoriously lethal to avian life. Global ecological studies confirm that ingesting just a single granule of carbofuran is enough to kill a small bird. Raptors and ground-feeding birds native to HP's farmlands are at extreme risk of secondary poisoning.

HHPs do not simply vanish. They drift through the air, accumulate in river sediments, and travel up the local food chain. Through bioaccumulation in fish and lingering residues on local produce, these agricultural poisons eventually complete their cycle-ending up on the plates of Himachal's people.

5. HHPs of Concern in Himachal Pradesh

These five HHPs are confirmed in use across HP's farms — through hospital records, forensic data, and direct conversations with farmers and retailers. This list is indicative, not exhaustive.

Pesticide	Why It Is Highly Hazardous	Global Status
1. PARAQUAT (Herbicide)	No antidote. One sip is lethal. 74.5% mortality in HP (Bansal et al., 2025). Linked to Parkinson's, longer soil half-life.	Banned in 74 countries (China, EU, S. Korea). Syngenta has suspended manufacturing.
2. MONOCROTOPHOS (Insecticide)	WHO Class Ib. Killed 23 children in the Gandaman mid-day meal tragedy (Bihar, 2013). Acute cholinergic toxicity.	Banned in 60+ countries including USA, EU, China, Australia.
3. CHLORPYRIFOS (Insecticide)	Linked to developmental neurotoxicity in children — reduced IQ, autism spectrum risk. Persistent in soil and water. Highly toxic to bees and fish.	Banned in EU (2020), and other countries
4. ZINC PHOSPHIDE (Rodenticide)	Releases phosphine gas in stomach acid. No antidote. Documented as a fatal poison in HP forensic records.	Restricted in many countries; pellets banned for open use in the EU.
5. CARBOFURAN (Insecticide/Nematicide)	WHO Class Ib. Granules look like rice — accidentally consumed by children and birds. A single granule kills a bird.	Banned/restricted in EU, USA, Canada, China, Kenya.

What unites these five: they are extremely hazardous to people, persistent in HP's environment, and either banned or severely restricted in dozens of countries. Each has safer alternatives already registered and available in India. There is no agronomic argument for continuing to expose HP's farmers, consumers and ecosystems to chemicals that the rest of the world has moved away from.

6. What must be done — A call for action

This is not a problem any single doctor, scientist, NGO or department can solve alone. It requires a state-wide, multi-stakeholder conversation that produces a shared evidence base and a shared plan of action.

Immediate Priorities

- **Establish an HP HHPs Surveillance Network** linking IGMC Shimla, AIMS Bilaspur, Dr. RPGMC Kangra, district hospitals, and the State FSLs - to systematically record HHP-related deaths, hospitalisations and chronic exposure.
- **Consolidate and publish** an HP-specific HHP burden report from existing clinical and forensic data.

Regulatory Actions

- **Invoke Sections 27 and 36 of the Insecticides Act (1968)** to allow the HP state government to impose restrictions on the most lethal HHPs — paraquat first — pending central action.
- Petition CIBRC with consolidated HP evidence, requesting review of paraquat, monocrotophos, chlorpyrifos, zinc phosphide and carbofuran registrations and regulations.

- Integrate HHP phase-out into the HP Natural Farming Mission, State Mental Health Policy, and State Cancer Care Strategy — so these efforts reinforce each other.

7. The Policy Pathway: Transition support for farmers

Regulatory action against HHPs must be paired with comprehensive agronomic support to ensure farmers are not left vulnerable. Banning toxic chemicals is only half the solution; providing viable, profitable alternatives is the other. To achieve this, the state must implement a structured transition pathway:

- **Promote Horticultural Diversification:** Strategically incentivise the cultivation of high-value crops that inherently require fewer agrochemicals for their protection. Transitioning suitable zones towards walnut, pecan, persimmon, kiwi, pears, plums, cherries, and mangoes will naturally reduce the state's overall pesticide footprint while maintaining high farmer incomes.
- **Invest in Resilient R&D:** Direct state agricultural universities to accelerate research and development into pest-resistant, climate-resilient crop varieties tailored specifically to Himachal Pradesh's unique microclimates.
- **Scale up IPM and IWM:** Actively promote and subsidize **Integrated Pest Management (IPM)** and **Integrated Weed Management (IWM)**. Replacing blanket chemical spraying with biological controls, mechanical weeders, and ecological pest management must become the baseline standard for HP's extension services.
- **Align with HP's Sustainable Vision:** Synchronize the HHP phase-out with the state's flagship *Prakritik Kheti Khushhal Kisan Yojana (PK3Y)*. Removing HHPs from the ecosystem is not a standalone regulatory hurdle; it is a vital stepping stone to achieving Himachal Pradesh's ultimate vision of becoming a 100% natural, ecologically sound, and sustainable farming state.

8. Conclusion: A unified mandate for health, agriculture, and environment

The Himachali farmer is a vital partner in the state's agricultural economy and must be safeguarded against severe occupational hazards. While agrochemicals were historically introduced to secure crop yields, cumulative epidemiological, ecological, and forensic data from Himachal Pradesh's own medical and scientific institutions now compel an urgent change in course. The evidence is conclusive: HHPs are driving a surge in chronic illness, elevating poisoning mortality, and degrading the soil and riverine ecosystems that sustain the state.

The toxicity of HHPs is so severe that they cannot be used safely under real-world farming conditions, a reality borne out daily in HP's fields. The only scientifically and medically ethical intervention is a strict, state-led ban and phase-out of the most lethal HHPs.

Banning these priority HHPs will not compromise Himachal's agricultural output; rather, it will protect the workforce that generates it. As demonstrated globally and in other Indian states, removing HHPs from circulation causes substantial and sustained reductions in poisoning fatalities without harming crop yields. By replacing these chemicals with resilient horticulture, Integrated Pest Management (IPM), and the state's natural farming initiatives, Himachal Pradesh can secure both farmer livelihoods and ecological health.

With robust scientific consensus and established legal frameworks available under Sections 27 and 36 of the Insecticides Act (1968), the path forward is clear. *Banning Highly Hazardous Pesticides is not a choice between agriculture and the environment. Protecting the health of HP's farmers, the integrity of its soils and waters, and the biodiversity of the state is a single, indivisible mandate.*

Sources & Citations

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