Agricultural Plastic Pollution

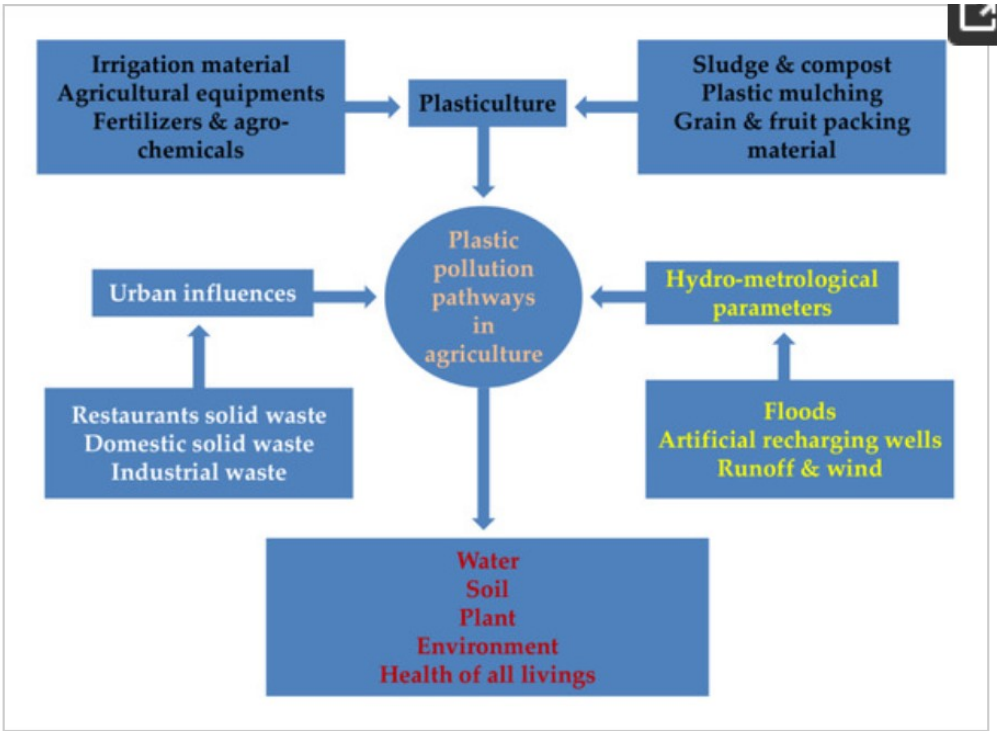
Mains: *GS III – Environment pollution and degradation*

Why in news?

Recently, there has been a considerable increase of plastic sediments in the agricultural soil across Asia.

What is Agricultural plastic pollution?

- **Definition** – Agricultural plastic pollution refers to the *accumulation of plastic materials* in the environment as a result of agricultural practices.
- **Plastic materials** – This includes plastic waste from various sources like *mulch films, irrigation pipes, packaging, and other farming-related items.*



- Asia is estimated to be the largest user of Agri-plastics, constituting almost half of global usage, according to the FAO assessment.

How plastic is used in agriculture?

- **Modern agriculture** – Plastic has become an integral component of agriculture and this use is increasing with the intensity of modern commercial agriculture.
- **Diverse applications** – Plastic is now used in *mulching, seedling trays, micro-*

irrigation, pond liners, polyhouses, food storage, packaging, and transportation.

- **Polyethene film** – It could successfully moderate soil temperature, limit weed growth and prevent moisture loss.
- This method was found to increase cotton, maize and wheat yields by an average of 30% at a relatively low cost.
- Polyethene residue is now increasingly prevalent in treated soils at levels of up to 300 kilograms per hectare.
- Just 1 kg of thin mulching sheets is enough to cover and contaminate as much as 700 square feet of agricultural land.
- **FAO report** – In 2021, the Food and Agriculture Organization (FAO) released a landmark report assessing the use of plastics in agriculture.
- The report calculated that, in 2019, agricultural value chains used *12 MT of plastic products in plant and animal products and 37.3 MT in food packaging.*

What are the impacts of plastic pollution in agriculture?

- **Harms soil health** – The accumulation of plastic waste in agricultural lands harms soil health, leads to reduced soil fertility.
- **Disrupts ecosystems** – It poses a growing challenge to sustainable farming practices.
- **Hinders air circulation** – Plastic fragments can reduce air circulation and negatively impact microbial communities crucial for soil health.
    - ***For example,*** *Research in Karnataka and Maharashtra on microplastics found evidence of the highest microplastic contamination in soil — 87.57 pieces per kg of soil at a dumpsite in Maharashtra.*
- **Adversely affect root biomass** – It affects overall plant growth and can harm soil organisms like earthworms, affecting their feeding and excretion.
- **Inflow into food chain** – Microplastics can be absorbed by plants, potentially entering the food chain and human bodies.

What are the challenges in tackling in plastic pollution?

- **Lack of consideration** – Plastic pollution in agriculture unfortunately lacks the required attention at policy and practice levels and is jeopardising the overall sustainability of farming and ecosystems.
- **Absence of holistic plans** – Farm decisions are dominated by economic productivity of a particular crop season.
- It lacks sufficient holistic, environmental, and long-term perspectives.
- Plastics' increased intensity and spread and lack of systematic disposal and management pose disastrous consequences.
- **Uninformed farmers** – Farming communities are ignorant and uninformed about these consequences.
- **Inadequate attention** – The issue of plastic pollution is overshadowed by urban garbage and pollution of water bodies with no serious action on Agri-plastic.
    - ***For example,*** *some of the recent strategic initiatives like the Maharashtra Plastic Action Roadmap too do not adequately recognise the Agri-plastic issue.*
- **Lack of information** – Knowledge and understanding about the damage caused by Agri-plastic pollution is very recent.

- **Lack of recycle facilities** – There is evidence that most plastics are burned, buried, or landfilled, although record keeping is generally non-existent.
- For instance, only nine 9% of plastics produced worldwide are successfully recycled.
- **Absence of waste management system** – A recent sample study reveals that 90%of Indian villages have no waste management systems while 67% of households prefer to burn plastic waste.

How to tackle agriculture plastic pollution?

- **Informed farm decisions** – There is a need to make the farming community understand the disastrous consequences.
- **Research and development** – Science-based guiding frameworks should be provided for the sustainable use and management of plastics in agriculture.
- **Alternative cost-effective solution** – The Indian Council of Agricultural Research and research centres should engage to develop alternate bio-plastic materials and then incentivise those alternative solutions at the farm level to cope with this transition.
- **Ban on single use plastic** – Putting an immediate stop on the use of single use plastics should be carried out.
- **Promoting circular approach** – It is essential to reduce plastic waste generation through prevention, reduction, reuse, and recycling.

- **Enforcing policy framework** - Policy should check production, use and management of Agri-plastic waste.
- **Appropriate strategy** – A time-bound target-oriented strategy backed by a legally binding framework needs to be in place.
- **Legal enforcement** – The legal framework should hold plastic manufacturers

responsible for the end-of-life management of their products.

- **Village level climate action plan** – The village climate action plan should be integrated with Agri-plastic waste management, adoption of suitable alternatives, and should also be a part of climate-resilient agriculture.
- **Stringent monitoring** – There should be stronger monitoring to penalise irresponsible dangerous practices like burning, burying, or open dumping of plastic waste.
- **Involvement of public** – Community-led initiative for waste management should be incorporated with the village ADP.
- **Adoption of regenerative farming practices** – Practices like conservation agriculture (e.g., cover cropping) that reduce the need for plastic-intensive methods should be adopted.
- **Promotion of sustainable farming practices** – Practices include vermin-composting, bio-mulching, bio-fertilisers, bio-pesticides and soil and moisture conservation should be encouraged.
- These improve soil health, protect soil carbon and regenerate local biodiversity.
- **Guidelines of FAO** - The FAO carried out studies in 2019 and released the Voluntary Code of Conduct on the Sustainable Use and Management of Plastic in Agriculture in October 2024.

Quick facts

Plastic production and Pollution
• **First produced** – The first synthetic plastic was produced in 1907. • By 1950, the world was producing two million tonnes (MT). • **Yearly production** – It now produces over 450 MT annually. • **Plastic pollution** – Every year, 19-23 MT of plastic waste leaks into aquatic ecosystems, polluting lakes, rivers, and seas and 13 MT of plastics accumulate in soil. • Plastic waste is now everywhere, damaging our forests, soil, water, and air. • Microplastics have entered animals, plants, fruits, and even human bodies. • A recent study found a litre of bottled water included about 240,000 tiny pieces of plastics.

Reference

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