Stubble Burning

For Prelims: Bio-Decomposer, Indian Council of Agricultural Research (ICAR), Stubble Burning, Turbo Happy Seeder (THS) machine.

For Mains: Impacts on Stubble Burning.

Why in News?

Recently, the Delhi government announced that it would spray **Pusa bio-decomposer** free of cost over 5,000 acres of paddy fields in the city as this would **help in controlling stubble burning and air pollution during winter.**

What is Pusa Bio-Decomposer?

- **About:**
  - It is essentially **a fungi-based liquid solution** that can soften hard stubble to the extent that it can be easily mixed with soil in the field to act as compost.
    - The fungi thrive at 30-32 degree Celsius, which is the temperature prevailing when paddy is harvested and wheat is sown.
  - It produce **enzymes to digest cellulose, lignin and pectin in paddy straw.**
  - **It is developed by the** Indian Council of Agricultural Research (ICAR) and named after ICAR's campus at Pusa in Delhi,
  - It rapidly **converts crop residues, animal waste, dung and other waste into organic manure.**
  - It is an inexpensive and effective technology for agricultural waste and crop residue management.
- **Benefits:**
  - The decomposer **improves the fertility and productivity of the soil** as the stubble works as manure and compost for the crops and **lesser fertiliser consumption** is required in the future.
    - The soil loses its richness due to stubble burning and it also destroys the useful bacteria and fungi in the soil, apart from causing harm to the environment.
  - It is an **efficient and effective, cheaper, doable and practical technique** to stop stubble burning.
  - It is an **eco-friendly and environmentally** useful technology and will contribute to achieve **Swachh Bharat Mission.**

What is Stubble Burning?

- **About:**
  - Stubble (parali) burning is a method of removing paddy crop residues from the field to sow

wheat from the last week of September to November, coinciding with the withdrawal of **southwest monsoon.**
    - Stubble burning is a process of setting on fire the straw stubble, left after the harvesting of grains, like paddy, wheat, etc. It is usually required in areas that use the combined harvesting method which leaves crop residue behind.
    - It is a common practice in **October and November across North West India**, but primarily in Punjab, Haryana, and Uttar Pradesh.
- **Effects of Stubble Burning:**
    - **Pollution:**
        - Emits large amounts of **toxic pollutants in the atmosphere which contain harmful gases** like methane (CH_4), Carbon Monoxide (CO), Volatile Organic compounds (VOC) and carcinogenic polycyclic aromatic hydrocarbons.
        - These pollutants disperse in the surroundings, may undergo a physical and chemical transformation and eventually adversely affect human health by causing a **thick blanket of smog.**
    - **Soil Fertility:**
        - Burning husk on the ground **destroys the nutrients in the soil**, making it less fertile.
    - **Heat Penetration:**
        - The heat generated by stubble burning **penetrates into the soil, leading to the loss of moisture** and useful microbes.
- **Alternatives to Stubble Burning:**
    - **In-Situ Treatment of Stubble:** For example, crop residue management by zero-tiller machine and Use of bio-decomposers.
    - **Ex-Situ (off-site) Treatment:** For example, Use of rice straw as cattle fodder.
    - **Use of Technology**- For example **Turbo Happy Seeder (THS) machine**, which can uproot the stubble and also sow seeds in the area cleared. The stubble can then be used as mulch for the field.

What is Other Related Initiative?

- The State Governments of Punjab, National Capital Region (NCR) States and the Government of National Capital Territory of Delhi (GNCTD) have developed **detailed monitorable action plans** based on the framework by the **Commission for Air Quality Management (CAQM)** to tackle the problem of air pollution.

Way Forward

As we know, burning stubble destroys a helpful raw material, pollutes the air, causes respiratory diseases and worsens greenhouse gas emissions. Therefore, the need of the hour is to **make constructive use of stubble as animal feed and further utilise technology** by enabling various alternatives like **Turbo-Happy Seeder Machine and Bio-Decomposer etc.**

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. What is/are the advantage/advantages of zero tillage in agriculture? (2020)

1. Sowing of wheat is possible without burning the residue of previous crop.
2. Without the need for nursery of rice saplings, direct planting of paddy seeds in the wet soil is possible.
3. Carbon sequestration in the soil is possible.

Select the correct answer using the code given below:

(a) 1 and 2 only
(b) 2 and 3 only

(c) 3 only
(d) 1, 2 and 3

Ans: (d)

- **Zero Tillage, also called no-till farming, is a cultivation technique** in which the soil is disturbed only along the slit or in the hole into which the seeds are planted, the reserved detritus from previous crops covers and protects the seedbed.
- As per a study, it has been found that farmers in north India can not only **help reduce air pollution but also improve the productivity of their soil** and earn more profits if they stop burning their crop residue and instead adopt the concept of no-till farming.
- Under zero tillage, the direct seeding of wheat into unploughed soil and with rice residues left behind has proved very beneficial.
    - It saved on water, labour and use of agrochemicals, reduced greenhouse gas emissions, and improved soil health and crop yield and thus benefitted both farmers and the society at large. **Hence, statement 1 is correct.**
- **Direct Seeded Rice (DSR) is a viable option to reduce the unproductive water flows.** DSR refers to the process of establishing a rice crop from seeds sown in the field rather than by transplanting seedlings from the nursery.
    - Conventional rice establishment system requires a substantial amount of water. It has been reported that water up to 5000 litres is used to produce 1 kg of rough rice.
    - However, with increasing shortage of water, dryDSR with minimum or zero tillage further enhances the benefits of this technology by saving labour. **Hence, statement 2 is correct.**
- No tilled soils tend to be cooler than others, partly because a surface layer of plant residues is present. Carbon is sequestered in the soil enhancing its quality, reducing the threat of global warming. **Hence, statement 3 is correct. Therefore, option (d) is the correct answer.**

Mains

Q. Mumbai, Delhi and Kolkata are the three mega cities of the country but the air pollution is much more serious problem in Delhi as compared to the other two. Why is this so? **(2021)**

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