Water Hyacinth Helps Detect Herbicide Pollution

Why in News

Researchers have used **invasive plant water hyacinth** to produce **carbon nanoparticles** which can be used for **detecting** a commonly used **herbicide — pretilachlor.**

- The nanoparticles were found to be **selective and sensitive** for the **detection of the herbicide.**

Key Points //

- **Carbon Dots:**
  - The water hyacinth without chlorophyll is powdered and heated at 150-degree Celsius to **convert it to carbon dots**.
  - When a nanoparticle is less **than 10 nanometre** it is known as a **dot or nanodot.**
- **Working Principle:**
  - The **carbon dots** gives a **green fluorescence** under **UltraViolet (UV) light,** due to the presence of **oxygen functional groups** on the surface of the dot.
  - The fluorescence intensity of carbon dot **increases** in the **presence** of the **herbicide.**
    - The electron transfer between the dot and the herbicide enables the fluorescence enhancement.
    - The carbon dot is **extremely sensitive** to **pretilachlor** and could detect even very small quantity of it.
- **Advantages:**
  - The detection of herbicides through carbon dots is a **commercially viable option** compared to the currently available sensors in the market as the raw material i.e. water hyacinth is readily available.
  - It will help to convert waste material like the water hyacinth to produce useful technology.

Water Hyacinth

- Water hyacinth is a free-floating aquatic plant native to **South America.** It is considered as an **invasive alien species.**
- Single plant of water Hyacinth is capable of duplicating itself every **nine** days.
- It is also referred to as the **terror of Bengal** given its effect on the local ecology and lives of the people.
- It has an effect on irrigation, hydroelectric generation and navigation.
- It also leads to a drastic reduction in fish production, aquatic crops and an increase in diseases caused by mosquitoes.

Source: TH