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TODAY'S IMPORTANT CURRENT AFFAIRS

UPSC PRELIMS

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TODAY'S DROPS OF NEWS:

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ENVIRONMENT	What has been the impact of ethanol blending?
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ENVIRONMENT

In news: What has been the impact of ethanol blending?

Ethanol: Ethanol, also known as ethyl alcohol, is a **biofuel** produced from various sources such as **sugarcane**, corn, rice, wheat, and biomass.

Molasses, a **byproduct of sugar manufacture, are** generally the main source of production of ethanol (anhydrous alcohol) and rectified spirit. Molasses can be categorised into following:

- **A Molasses (First Molasses):** An intermediate **by-product** from initial sugar crystal extraction, containing 80-85% dry matter (DM).
- **B Molasses (Second Molasses):** Similar DM content as A molasses but with less sugar and no spontaneous crystallization.
- **C Molasses (Final Molasses, Blackstrap Molasses, Treacle):** The **end by-product of sugar processing**, containing significant amounts of sucrose (about 32 to 42%). It does not crystallize and is used as a commercial feed ingredient in liquid or dried form.
- Ethanol is **99.9% pure alcohol** that can be blended with petrol to **create a cleaner fuel alternative.**

Types of ethanol production based on generation:

Ethanol production is broadly categorized into three generations based on the feedstock used: first-generation, second-generation, and third-generation.

1. First-generation ethanol utilizes sugars and starches like sugarcane, corn, and wheat.

2. Second-generation ethanol employs lignocellulosic biomass like agricultural residues and wood.

3. Third-generation ethanol focuses on algae and other biomass with high oil content.

- India's ethanol production is primarily focused on first-generation (1G) and second-generation (2G) technologies.
- India is actively promoting 2G ethanol production to diversify its feedstock and enhance the sustainability of its ethanol blending program, as the reliance on food crops for ethanol production raises concerns about food security.
- The **National Agricultural Cooperative Marketing Federation of India Ltd (NAFED)** and the **National Cooperative Consumers' Federation of India Ltd (NCCF)** are procuring maize to promote its use in ethanol production.

Properties of Ethanol:

- Ethanol is a **clear, colorless liquid** with a characteristic wine-like odor and pungent taste.
- It is **fully soluble in water** and most organic solvents.
- In its pure form, it has a boiling point of 78.37 degrees Celsius and a melting point of -114.14 degrees Celsius.
- Ethanol is a **combustible material** and has a lower combustion temperature than gasoline, making it a cleaner-burning alternative.

Challenges in Ethanol Production:

- **Feed-stock Availability**: Dependence on sugarcane and grains risks affecting food security.
- **Water-Intensive Crops:** Sugarcane and rice require high water usage, raising sustainability concerns.
- **Infrastructure Gaps:** Limited ethanol storage and blending infrastructure in many states.
- **Logistics & Transportation:** Interstate ethanol movement faces regulatory hurdles.
- **Economic Viability:** High production costs and fluctuating raw material prices impact profitability.

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