



Environmental Concerns Regarding Ethanol Blended Petrol

For Prelims: [Ethanol Blended Petrol \(EBP\) programme](#), [Net Zero 2070](#), [Krishna](#), 3G Ethanol Production, [Pradhan Mantri JI-VAN Yojana](#)

For Mains: Environmental Impact of Biofuels, Sustainable Development & Ethanol Production

[Source: TH](#)

Why in News?

The [Ethanol Blended Petrol \(EBP\) programme](#) is facing strong opposition in Andhra Pradesh (AP).

- Environmentalists and farmers are raising concerns over **environmental pollution** and excessive **water consumption** by ethanol factories.

What is Ethanol Blended Petrol Programme?

- **About:** The **EBP Programme** began with **pilot projects in 2001**. It was launched by the **Ministry of Petroleum and Natural Gas in 2003**, with **5% Ethanol (C₂H₅OH) blending** and extended nationwide (except Andaman & Nicobar, Lakshadweep) by **2019**, allowing **up to 10% blending**.
 - The EBP Programme now **targets 20% ethanol blending in petrol by 2025-26** (advanced from 2030 under the [National Policy on Biofuels-2018 \(amended in 2022\)](#)). As of 2024, the blend percentage stood at **15%**.
- **Objective:** EBP aims to reduce **carbon emissions, fuel imports**, and **increase farmer income**.
 - Support **India's energy diversification**, enhancing resilience to global oil supply disruptions.
 - Help **India achieve its Net Zero 2070 commitment** under the Paris Agreement.
 - EBP Programme follows the "**Waste to Wealth**" approach, supporting [Swachh Bharat Mission \(SBM\)](#) and [Make in India](#).
- **Key Milestones:** Ethanol production capacity reached around **1,600 crore litres** as of September, 2024.
 - By cutting crude oil imports, the EBP Programme **saved Rs. 1,06,072 crore in foreign exchange**.
 - EBP has reduced **CO₂ emissions by 544 lakh metric tons** and substituted **181 lakh metric tons of crude oil**.
 - The programme had a significant **economic impact**, with Oil Marketing Companies disbursing Rs. 1,45,930 crore to distillers and Rs. 87,558 crore to farmers.

Note: Ethanol is a biofuel primarily produced from "**first generation**" (**1G**) sources like sugarcane molasses, juice, wheat, and rice, while "**second generation**" (**2G**) sources include agricultural residues like rice straw, wheat straw, bagasse, and corn stover.

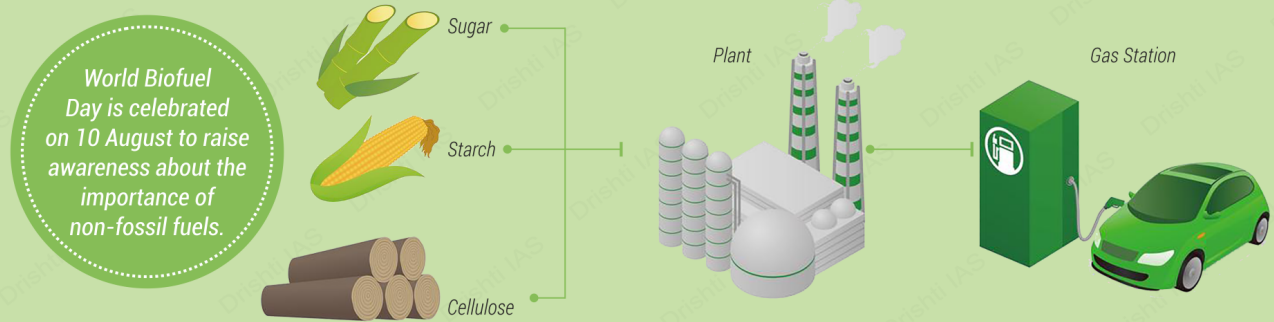
ETHANOL AS A FUEL

About Ethanol

- One of the principal biofuels
- Also called ethyl alcohol (C₂H₅OH)

Produced

- Naturally by fermentation of sugar (or corn, rice etc)
- By petrochemical processes (ethylene hydration)



Ethanol Blending

Blending ethanol with petrol to burn less fossil fuel while running vehicles.

Blending Target

- 20% ethanol blending in petrol (E20) by 2025

Currently, ethanol makes up 10% of the petrol used in vehicles.

Significance

- Reduce oil imports
- Equivalent efficiency at a lower cost than petrol
- Burns completely and cleaner than petrol
- Ethanol produced from farm residue to boost farmers' income

Challenges in Success

- High land requirement for sugarcane (+ consequent food prices issue)
- High water requirement of biofuel crops

Related Initiatives

- Roadmap for Ethanol Blending in India (Report by NITI Aayog) (2021)
- E100 Pilot Project (Network for production and distribution of ethanol) (2021)
- Pradhan Mantri **JI-VAN** Yojana (to boost 2G ethanol projects) (2019)
- The National Policy on Biofuels (2018)

What are the Environmental Concerns Regarding EBP?

- Pollution vs. Emission Reduction:** Achieving 20% ethanol blending target by **2025** requires around **1,000 crore litres** of ethanol, with planned production expansion to **1,700 crore litres**. Increased production may lead to **greater emissions** affecting **air, water, and soil quality**.
- Water Scarcity:** Ethanol production is highly **water-intensive**, with grain-based factories requiring **8-12 litres of water per litre of ethanol**. Sugarcane and molasses-based production contribute to high water consumption, deforestation, and industrial waste.
 - Distilleries generate **vinasse, a pollutant-rich wastewater** that can contaminate water bodies and deplete oxygen if untreated.
 - Factories near rivers like the **Krishna** are diverting water meant for agriculture and drinking. Farmers fear depletion of **water resources**, affecting **crop production**.

- **Industrial Pollution: Ethanol distilleries fall under the "red category"** of industries (Pollution Index core 60 and above) due to their high pollution potential.
 - Hazardous chemicals such as **acetaldehyde, formaldehyde, and acrolein** are emitted, increasing risks of respiratory diseases and cancer.
 - In AP, many ethanol factories received environmental clearances without public hearings or proper emission assessments, often located near human settlements.

Way Forward

- **Promoting 3G Ethanol:** Scaling up **3G ethanol production** (produced by algae from wastewater, sewage or seawater) under the [Pradhan Mantri JI-VAN Yojana](#) can reduce environmental impact by using microalgae instead of food crops, offering a sustainable **alternative to 1G and 2G methods** without straining food or freshwater resources.
- **Environmental Regulations:** Enforce **Mandatory pollution control measures** (such as **effluent treatment plants**) and reinstate public hearings for environmental clearances to address community concerns.
 - Ethanol factories should be required to use **recycled or treated wastewater** instead of groundwater.
- **Incentivizing Green Technologies:** Provide **subsidies for pollution control equipment** like [Wind Augmentation and Air Purifying Unit \(WAYU\)](#) making it more affordable for ethanol manufacturers.
 - **Research and development (R&D) in low-emission ethanol production** can help minimize environmental damage.

Drishti Mains Question:

Ethanol production is seen as an eco-friendly alternative to fossil fuels. Critically examine the environmental challenges associated with ethanol production in India.

UPSC Civil Services Examination, Previous Year Questions (PYQ)

Q. Given below are the names of four energy crops. Which one of them can be cultivated for ethanol? (2010)

- (a) Jatropha
- (b) Maize
- (c) Pongamia
- (d) Sunflower

Ans: (b)

Q. According to India's National Policy on Biofuels, which of the following can be used as raw materials for the production of biofuels? (2020)

1. Cassava
2. Damaged wheat grains
3. Groundnut seeds
4. Horse gram
5. Rotten potatoes
6. Sugar beet

Select the correct answer using the code given below:

- (a) 1, 2, 5 and 6 only
- (b) 1, 3, 4 and 6 only
- (c) 2, 3, 4 and 5 only
- (d) 1, 2, 3, 4, 5 and 6

Ans: (a)

PDF Reference URL: <https://www.drishtiias.com/printpdf/environmental-concerns-regarding-ethanol-blended-petrol>

