Role of Ethanol Blending in Energy Security and Rural Economy

Why in news?

The ethanol blending programme will revolutionize India's rural economy and strengthen energy security.

What is ethanol blending programme?

- **Ethanol blending programme (EBP)** – It is an initiative of Union Government that *aims to increase the proportion of ethanol in petrol*.
- The program promotes the blending of ethanol derived from sugarcane, maize and other agricultural feedstock with petrol.
- **Objective** – To reduce the reliance on *fossil fuel imports* and *decrease greenhouse gas emissions.*
- **Target** – To achieve *20% ethanol blending petrol by 2025-26*.
- This target was previously set for 2030, but it is changed to 2025 in 2022.
- As of 2024, India achieved a *13.8% ethanol blend*.
- **Framework for EBP** – ***National Biofuel Policy, 2009*** *provides framework for implementation* of EBP.
- **National Biofuel Policy –** It was *launched in 2009* and is part of India's effort to achieve carbon neutrality by 2070.
- It proposed a *non-mandatory target of 20%* blending of both biodiesel and bioethanol by 2017.
- The policy is revised in 2018 to achieve 20% bioethanol blending and 5% biodiesel blending by 2030.

To know more about ethanol blending click here

About Ethanol
• Ethanol is a *Colorless, combustible, and volatile liquid organic* substance having the *chemical formula* C_2H_5OH. • Ethanol is one of the primary biofuels, *naturally produced* through the fermentation of sugars by yeasts or through petrochemical processes like ethylene hydration. • It is widely used not only as an alternative fuel source but also in various industries as a chemical solvent and in the synthesis of organic compounds. • Ethanol also has *medical applications* as an antiseptic and disinfectant, adding to its versatile uses. • Ethanol, as a domestically produced biofuel, more environmentally friendly, sustainable and contributing to a cleaner energy landscape.

What is the role of ethanol blending in energy security?

- **Reduces crude oil import** – India is the *world's second-largest importer of crude oil*, and is highly dependent on foreign sources to meet its energy needs.
- This Programme address this issue by gradually substituting imported petrol with ethanol, a domestically produced biofuel.
- **Reduce in exchequer of Indian forex** – Through increased ethanol blending, India has reduced crude oil imports, saved foreign exchange, and promoted energy self-sufficiency.
- In last decade, through EBP India has saved 1.06 crore rupees in foreign exchange.
- **Reduces external vulnerability** – By achieving self-sustainability in energy needs India will have more stable economic environment and sustainable growth.
- Reduce dependency on global oil markets and shield India from ***price volatility*** in the global energy sector.
- **Addresses energy demand** – Ethanol full-fills the energy needs of India's growing energy demands, due to expanding population, increasing urbanization, and evolving lifestyles.
- **Sustainable energy** – Ethanol can reduce emissions by 88–108% compared to petrol.
- Around 98% of the fuel used in the road transportation sector comes from fossil fuels, while only 2% is met by biofuels like ethanol.
- India reduced CO_2 emissions by an estimated 544 lakh metric tons through ethanol blending to meet its climate goals.

Sustainable Aviation Fuel (SATAT) Promotes compressed biogas production as a cleaner fuel alternative in aviation sector.

How ethanol blending can boost the rural economy?

- **Rural industrialization** – The establishment of distilleries and processing plants can lead to *rural industrialization*.
- **Meet local energy needs** – This approach not only bolsters the economy but also enhances energy security by promoting *local production of fuels.*
- **Increase farmers income** – Government offers *incentives to ethanol producers* which contributes to the *doubling of farmer income* and insulating farmers from traditional market volatility.
- By creating a *steady demand for sugarcane, maize, and other feedstock*, the program provides farmers with a reliable income source.
- **Waste-to-wealth –** Production of ethanol using agricultural waste and unused resource to *reduce environmental impact and promote circular economy.*
    - For example, molasses from sugar production and bagasse (a fibrous residue of sugarcane) are used in ethanol and power generation.
- **GOBARdhan** – Encourages the use of *bio-waste in energy production.*
- GOBARdhan with EBP fuels ethanol blending by promoting other biofuels.
- **Employment creation** – Expansion of ethanol infrastructure has created employment opportunities in rural areas, from production facilities to transportation and distribution networks.

- **Improve rural livelihood** – These economic benefits further strengthen rural livelihoods and promotes sustainable economic development.

What lies ahead?

- Support long-term biofuel growth by advancements in second-generation (2G) and third-generation (3G) biofuels.
- Use of non-food feedstocks like agricultural residues and algae, these technologies reduce competition between food and fuel.
- Address significant concern regarding the balance between food security and energy needs.
- Ensure that ethanol production continues sustainably, without compromising food supply.
- Aim for higher blending goals like E85 and E100, bringing economic prosperity, environmental benefits, and rural rejuvenation.

Quick facts
• **Flex-fuel vehicle (FFV) or E85** – FFV is a car with internal combustion engines that can run on gasoline or a blend of gasoline and ethanol. • A blend of gasoline is usually has 85% ethanol and 15% gasoline and it can also run on unleaded gasoline. • *FFVs can store both fuels* in the same tank. • Sensors in the FFV system automatically adjust for the fuel composition.

Reference

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