Indian Economy · GS - III

Ethanol blending in petrol is an important component of India's strategy to enhance energy security and promote agricultural diversification. Critically examine the economic and environmental opportunities and challenges associated with the expansion of the E20 programme.

EXAM YEAR	PAPER	SUBJECT
DAILY PRACTICE 19/11/2026	GS - III	Indian Economy

MARKS	WORD LIMIT
15	~250 words

Answer Hint

Energy security, crude oil import dependence, agricultural diversification, sugarcane economy, crop residue utilisation, food-versus-fuel debate, vehicle compatibility, lifecycle emissions, water consumption, pricing and policy safeguards.

Model Answer

Introduction

India's E20 programme aims to blend 20% ethanol with petrol. It seeks to reduce dependence on imported crude oil, strengthen domestic biofuel production and create additional markets for agricultural produce.

Opportunities

1. **Energy security:** Domestic ethanol production can reduce petroleum import dependence and exposure to global oil price fluctuations.
2. **Agricultural income:** It creates additional demand for sugarcane, maize and other feedstocks, potentially improving farmers' income.

3. **Environmental benefits:** Ethanol can reduce certain tailpipe emissions, while lifecycle benefits depend on feedstock cultivation and production methods.
4. **Waste utilisation:** Second-generation ethanol offers opportunities to convert agricultural residues into useful fuel.
5. **Rural economy:** Bio-refineries can generate employment and strengthen rural industrial infrastructure.

Challenges

1. **Food-versus-fuel concerns:** Diversion of food grains towards fuel production may create pressure on food security.
2. **Water intensity:** Sugarcane-based ethanol can increase pressure on groundwater in water-stressed regions.
3. **Vehicle compatibility:** Older vehicles may experience material compatibility or performance-related concerns with higher ethanol blends.
4. **Environmental trade-offs:** Fertiliser use, land-use change and processing emissions can reduce lifecycle benefits.
5. **Supply-chain constraints:** Feedstock availability, storage and distribution infrastructure require investment.

Way Forward

India should diversify feedstocks, promote second-generation biofuels, ensure transparent fuel standards and encourage vehicle compatibility testing. Water-efficient crops and region-specific procurement policies are equally important.

Conclusion

E20 can contribute to energy transition and rural economic development, but its success depends on balancing energy security with food security, environmental sustainability and consumer interests.

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