NEXT IAS

DAILY EDITORIAL ANALYSIS

TOPIC

India's ethanol conundrum

INDIA'S ETHANOL CONUNDRUM

In context

- The future of India's renewables strategy hangs on a delicate food-fuel trade-off.

Ethanol Blending

- Ethanol can be mixed with **gasoline** to form different blends.
  - Once blended, the ethanol **cannot be separated** from the petrol.
- As the ethanol molecule contains oxygen, it **allows the engine to more completely combust the fuel**, resulting in fewer emissions and thereby reducing the occurrence of environmental pollution.
- Since ethanol is produced from plants that harness the power of the sun, **ethanol is also considered a renewable fuel**.
  - It has a **higher octane number** than gasoline, hence improving the petrol octane number.

India's National Biofuel Policy

- **Aim:**
  - The policy is aimed at reducing dependence on imports by encouraging fuel blending.
- **Key elements:** With **bioethanol, biodiesel** and **bio-CNG** in focus, its key parts include
  - **Ethanol Blending Programme (EBP)**,
  - Production of **second-generation ethanol** (derived from forest and agricultural residues),
  - Increasing capacity for production of **fuel additives**, **R&D in feedstock**, which is the starting material for ethanol production.
  - **Financial incentives** for achieving these goals.
- **Ethanol Blending Petrol (EBP) programme:**
  - The Centre promotes the Ethanol Blending Petrol (EBP) programme with the aim of
    - Enhancing energy security,
    - Reducing import dependency on fuel,
    - Saving foreign exchange,
    - Addressing environmental issues and
    - Giving a boost to agriculture.
- **Accomplishments:**
  - The 'National Policy on Biofuels' notified by the government in 2018 envisaged an **indicative target of 20% ethanol blending in petrol** by 2030.
    - In 2014 only 1.5 per cent ethanol was blended in petrol in India.
  - Given the **encouraging performance** and **various interventions** made by the government since 2014, **the 20% target was advanced to 2025-26.**
  - The ethanol-blended petrol (EBP) programme has been **a significant accomplishment** of the current government.
    - The all-India average blending of ethanol with petrol has risen from 1.6% in 2013-14 to 11.8% in 2022-23.

Current scenario of Ethanol Blending in India

- **About:**
  - As more than 100 countries at COP28 in Dubai pledged the tripling of global renewable energy capacity by 2030, India faces a tightrope walk with regard to its ethanol blending target.
- **Ethanol production from sugarcane:**

- While **ethanol blended petrol (EBP)** increased **from 1.6% in 2013-14** to **11.8% in 2022-23**, the 20% target by 2025 has run into trouble
- The major reasons being **low sugar stocks in 2022-23** and the **impending shortfall in sugarcane production** this year.

- **Transition to grains-based ethanol:**
  - The government is **looking at a major transition** towards grains-based ethanol for meeting the target.
  - The recent authorisation of the National Agricultural Cooperative Marketing Federation of India (NAFED) and the National Cooperative Consumers' Federation of India (NCCF) to **procure maize (corn)** for supplying ethanol distilleries indicates emphasis on this transition and will **boost an organised maize-feed supply chain** for ethanol.
  - This, however, risks creating more challenges for the economy.

Issues & challenges

- **Connection with crude prices:**
  - The two major feedstock for ethanol production are sugarcane (Brazil) and corn (the U.S.).
    - Ethanol production in both these countries **boomed from 2000** when **crude oil prices started rising** and **remained above a certain threshold** for a decade.
  - At low crude prices, ethanol blending is **not competitive**; it is a slow process driven by heavy subsidies.
- **Food-fuel conflict:**
  - A crucial difference between the use of sugarcane and corn for producing ethanol is the **degree of food-fuel conflict that emerges**.
  - In the case of sugarcane, ethanol is produced by **processing the molasses (C-heavy/B-heavy)** and constitutes **minimal trade-off with the sugar output**.
    - The B-heavy molasses path produces less sugar compared to the C-heavy one, but both produce sugar and ethanol simultaneously from sugarcane.
  - But using corn for producing ethanol directly reduces its use as food or livestock feed.
  - It not only diverts grain to fuel use, but also links food prices directly with crude oil prices through the demand side.
- **Role in 2006-14 global food crisis:**
  - Though only 5-7% of the world's corn output was used for ethanol production at the peak of the **U.S.'s corn-based ethanol programme**, the price effect was widespread and remained the **most important contributor** to the 2006-14 global food crisis.
  - More importantly, the high corn prices were **quickly transmitted to other grain markets** as soft grains, such as wheat/barley, started getting redirected into the livestock industry as corn substitutes.
  - This was primarily due to the relatively easy substitutability in grain use across **food, feed, and fuel**.
- **Potential challenge to Indian grain markets:**
  - According to government estimates, to meet the EBP target by 2025, India needs 16.5 million tonnes of grains annually.
  - This is a **sufficiently high quantity** to trigger a **short-run price spiral** in grain markets.
- **Challenge with sugarcane based ethanol production:**
  - Unlike in the U.S., sugarcane is the more obvious choice for tropical countries **such as Brazil or India** where **cane yields are higher**.
  - More land under water-intensive sugarcane cultivation can displace food production as well as degrade water tables, but these can be regulated by appropriate land-use policies.

Way ahead

- The future of India's renewables strategy hangs on a delicate food-fuel trade-off; and a choice between intensifying hunger and reducing fossil fuel use.

- On the one hand, the **government can reconsider its EBP target** and stagger it **to contain the contradictions**.
- On the other hand, we need more investment in public infrastructure, urban design **to contain the fuel demand** for automobiles, and in renewables such as solar power.

- To counter the most genuine fear of loss of food security, India **may also shift Focus to next-generation Biofuels** like:
  - Grasses and algae;
  - Cellulosic material such as bagasse, farm and forestry residue, etc.

DAILY MAINS QUESTION

The future of India's renewables strategy hangs on a delicate food-fuel trade-off. Examine. What should be the immediate, intermediate and long-term approach with regard to India's ethanol blending programme?.