Biofuel - Lessons from Brazil

What is the issue?

- The government recently announced an ambitious plan to roll out vehicles running on 20% ethanol blended petrol by 2025, against the current level of blending of 5-6%.
- Achieving this target needs a paradigm shift in production and distribution of ethanol, the lessons for which could be taken from Brazil.

Why is Brazil notable in this regard?

- Brazil is one country that has successfully integrated biofuels into its fuel economy.
- It has efficiently leveraged its traditions and dominance in sugarcane production into a biofuel economy without compromising food security.
- Biofuels are also central to Brazil's low carbon emission strategy.

How did it achieve this?

- To mitigate high dependence on oil imports, Brazil turned to its traditional sugarcane to revolutionise its fuel economy.
- Brazil aimed for a higher productivity and sugar-ethanol balance.
- This led Brazil to revolutionise its biomass production for ethanol and develop a new variety of sugarcane.
- This is popularly known as '**energy cane'**, which is low on sucrose but high on biomass.
- With productivity up to 350 tonnes of biomass per ha, against 80 tonnes per ha of traditional sugarcane, it offered a perfect balance.
- Brazil thus took up ethanol production without compromising sugar production.
- This enabled it to gradually augment its production and blend.
- With a mandatory blending of 27% ethanol with gasoline, in 2019 alone Brazil saved about 0.5 million barrels per day of gasoline with a savings of $13 billion in imports.
- 78% of Brazilian automobiles today run on 27% of ethanol blend.
- High biomass productivity of energy-cane is the biological factor that contributes to the high positive lifecycle energy balance of ethanol produced from it.

- It thus comes with a resultant positive balance of greenhouse gases emission.
- The residual cane-waste (Bagasse) also become commercially valuable for power generation and other commercial uses.
- So, it has been possible to transform energy-cane production into a multiproduct enterprise in Brazil.

What is the significance?

- Energy cane is promising on drier and lower fertility soils, not suitable for conventional cultivation.
- Initially, economic, and strategic security reasons drove Brazil's ethanol production from sugarcane.
- But later it was realised that Brazil's was the most successful renewable energy programme from biomass.
- This especially came with the opening of the debate on the planet's environmental sustainability.
- Use of fossil fuels is one of the major sources of Co2 and other GHG emission globally.
- Brazilian sugarcane ethanol is designated as an 'advanced biofuel' due to its 61% reduction of total life cycle GHG emissions.

How will it help with emission reduction?

- Fossil fuels consumed world-over produce an estimated 4.5 billion tonnes of Co2 every year.
- But only a fraction of it is replenished to the earth in fossil-carbon cycle.
- However, Co2 is a non-toxic gaseous fertiliser.
- If its production and consumption can be rebalanced, it can be beneficially used in the carbon cycle to produce non-toxic biofuel.
- Plant based biofuel seems to have an edge over all other sources of biofuels.
- This is because plants consume Co2 from the atmosphere and give back oxygen to the atmosphere.
- Plant based biofuel thus works as a Co2-O2 pump or a Co2 battery in liquid form through carbon fixation.
- Specific crops grown in large areas consume Co2 from the atmosphere and the crop can be used to produce low Co2 emitting biofuels.
- This is even better than the electric vehicles which do not reduce GHG but only geographically displaces the emission, unless using renewable energy.
- Experience from Brazil shows that GHG emission is the lowest from hybrid ethanol.
- With this, Brazil has proved that harmonious coexistence between biofuels and traditional fuels is possible to mitigate the factors that harm the

environment.

What steps has India taken?

- Apart from the environmental issues, India's import dependence for fuel economy is alarming.
- To note, 85% of India's crude oil requirement is imported.
- To address these twin problems, some serious attempts have been made in the last few years to scale up biofuel production and blending.
- The National Biofuel Policy, 2018 has brought in certain revolutionary changes in the biofuel production philosophy of the country.
- It envisages augmentation of ethanol production through the traditional sugarcane route.
- Also, it has allowed production of alcohol from certain other sugary feedstock.
- These include sugar beet, sweet sorghum, and starchy feedstock like corn, cassava, damaged food grains, rotten potatoes, etc.
- It has also opened the production of second-generation ethanol from cellulosic agri-residues.
- E.g. rice and wheat straw, corncobs, cotton stalk, bagasse and municipal solid waste, etc
- These are welcome steps, but it may not be enough to achieve the twin objectives.

What more can be done?

- Achieving the objectives requires a paradigm shift and mainstreaming biofuel policy and implementation.
- It is also time to utilise the experiences from Brazil.
- India can thus seriously consider the mass production of high yielding feedstock such as energy cane using modern agri-technologies.
- It can, in turn, create a new bioeconomy for the country, while addressing the environmental concerns.
- This has the potential to change the overall outlook of sugar-ethanol production in India.
- Moreover, high volume of bio-residue, i.e. bagasse, press mud, agri-feedstock produced in this process can supplement the 2G ethanol and Compressed Biogas programmes.
- As per certain estimates, energy cane produced in one hectare has a potential to yield about 18,000 litres of ethanol with right mix of 1G and 2G programmes.
- Right mix of plant based 1G ethanol and agri-residue based 2G ethanol has the potential to enable the country to achieve the target of 20% ethanol

blend in petrol earlier than targeted.

- However, any such programme must be independent of traditional fuel price benchmarking and will need a mandatory blending regime to be successful.

Source: BusinessLine

