JUST AGRICULTURE
multidisciplinary e-Newsletter

Ethanol The Alternative Fuel for Bharat and Create Boom in Agriculture Sector

Mandala Raja
B.sc (Agriculture and Rural Development) Andhra Loyola college (Autonomous) Vijayawada-520008, Affiliated to Krishna University Machilipatnam (A.P), India

ARTICLE ID: 21

Introduction:

Bharat's energy consumption is increasing day by day due to expanding economy, a growing population, urbanization, advancements in lifestyles, and increased spending power. Currently, Bharat imports 85% of its oil requirements. Domestic biofuels present a strategic opportunity for the government since they minimize reliance on imported fossil fuels. Under the Ethanol Blended Petrol (EBP) Program, the game-changing National Policy on Biofuels-2018 sets an approximate objective of 20% ethanol blending under the Ethanol Blended Petrol (EBP) Programme by 2030. The current average amount of ethanol blending in the country is 5% (2019-20). The Ministry of Petroleum plans to attain 10% ethanol blending levels in the Ethanol Supply Year (ESY) - 2021-22, which begins in April 2022, as a result of multiple initiatives on the ethanol supply side. This step along with achieving E20 targets around Bharat.

What is ethanol?

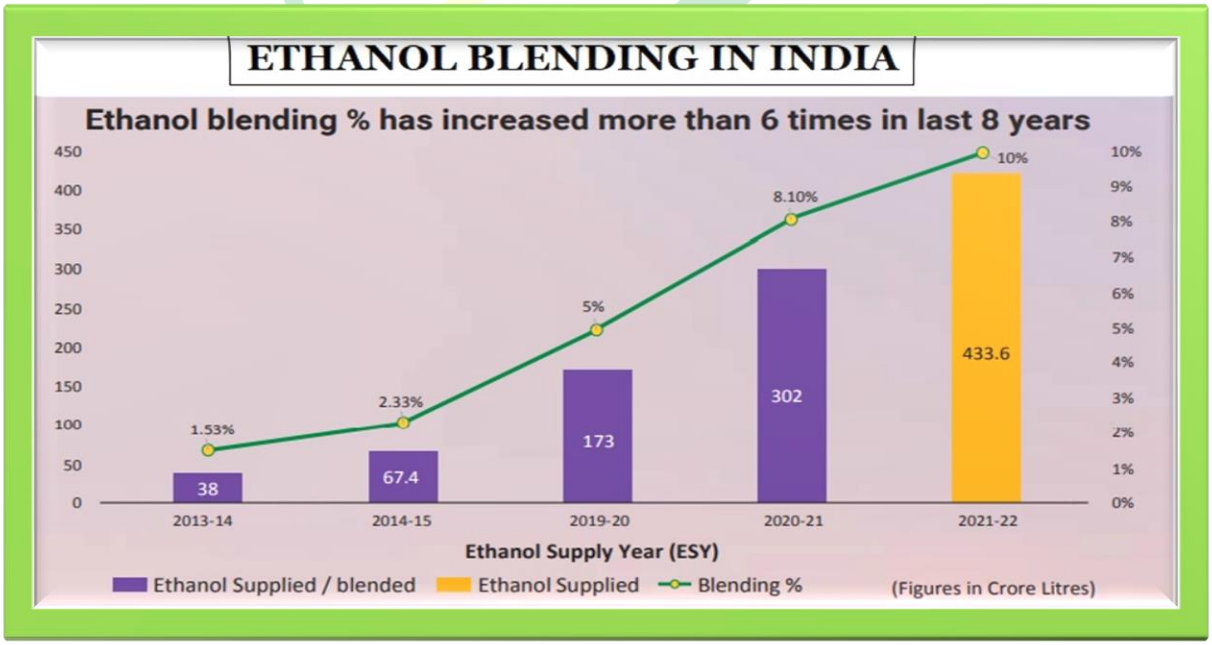
Ethanol (commonly known as ethyl alcohol or alcohol) is an organic molecule having the chemical formula C2H5OH. Ethanol is used in the portable sector, as well as the chemical and pharmaceutical industries. Ethanol demand is primarily influenced by blending rules, fuel availability, compatible vehicles, and infrastructure requirements.

JUST AGRICULTURE
multidisciplinary e-Newsletter

Production: It can be made by fermenting sugars with yeast, a process similar to that used to make alcohol. It can also be generated chemically, for as via hydration of ethylene.

What is the Ethanol Blending Program (EBP)?

- The EBP is a project launched by the Bharat government to promote the use of ethanol, a renewable and environmentally beneficial fuel, in petrol. The program intends to reduce fuel imports from other nations, conserve foreign exchange, and boost value addition in the sugar business.
- Ethanol is mostly made from molasses, a byproduct of the sugar industry; however, additional raw materials such as sugarcane juice, sugar, sugar syrup, and damaged food grains can be employed.
- Because to effective government initiatives, ethanol supply to OMCs grew by more than 13 times in ESY 2022-23 compared to ESY 2013-14.
- The blending percentage has also risen from 1.53% in ESY 2013-14 to the objective of 12% in ESY 2022-23.
- The aim of 10% ethanol blending established in the 'Roadmap for Ethanol Blending in India 2020-25' for Ethanol Supply Year (ESY) 2021-22 has already been met, and Public Sector Oil Marketing Companies (OMCs) have begun selling E20 (20% ethanol blended) petrol across the country. Furthermore, the National Policy on Biofuels - 2018 aims to blend 20% ethanol into petrol by ESY 2025-26.



JUST AGRICULTURE
multidisciplinary e-Newsletter

Significance of ethanol blending in fuels:

1. Reducing Fossil Fuel Dependence: Bharat imports the majority of its oil, leaving it exposed to global market volatility and geopolitical threats. Using ethanol, India can reduce its reliance on oil imports while increasing its energy independence.
2. According to a study conducted by the Indian Institute of Science in Bangalore, mixing ethanol with petrol can lower carbon monoxide emissions by 30-50% and hydrocarbon emissions by 20%.). Results Bharat can enhance its air quality while also meeting its climate targets.
3. Farmer Support: Agricultural inputs such as sugarcane or corn are required for ethanol manufacturing. By employing ethanol, India can generate new demand for these crops, increasing farmer and rural community income and livelihoods.
4. Improving Energy Security: Ethanol is a domestic and diverse source of energy that can help India lessen its reliance on a single, foreign source of energy. By adopting ethanol, Bharat can improve its energy security and resilience.
5. Economic Benefits: Ethanol blending can boost the expansion of the ethanol industry, resulting in additional jobs, investments, and innovations. It can also help India build a more sustainable and modern energy infrastructure.
6. They may boost employment, Make in India, Swachh Bharat, double farmers' incomes, and turn waste into wealth.
7. To give a boost to the agriculture sector and to reduce environmental pollution.

Nodal Agency For Ethanol Production:

The Department of Food and Public Distribution (DFPD) is in charge of promoting the country's fuel grade ethanol distilleries. The government has approved ethanol production/procurement from sugarcane-based raw materials such as C & B heavy molasses, sugarcane juice / sugar / sugar syrup, leftover rice with Food Corporation of India (FCI), and maize. The recent authorization 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 emphasizes this transition and will help to establish an organized maize-feed supply chain for ethanol production. The raw material conversion efficiency is tabulated below.

JUST AGRICULTURE
multidisciplinary e-Newsletter

Feedstock cost and ethanol yield

Feedstock	Cost / MT of the feedstock (Rs.)	Quantity of ethanol per MT of feedstock	Ex-mill Ethanol Price (Rs./litre)
Sugarcane juice / Sugar / Sugar syrup	2850 (Price of sugarcane at 10% sugar recovery)	70 litre per ton of sugarcane	62.65
B Molasses	13,500	300 litre	57.61
C Molasses	7123	225 litre	45.69
Damaged Food Grains (Broken Rice)	16,000	400 litre	51.55
Rice available with FCI	20,000	450 litre	56.87
Maize	15,000	380 litre	51.55

#The rates vary from region to region and also in accordance with demand/supply or quality.

Limitations of Water Intensity for Ethanol Production:

1. To achieve the 2025 aim of E20 Ethanol Blending in fuel, a study was done to identify prospective sources of ethanol production based on water use.
2. Sugarcane is a highly water-intensive crop. A tonne of sugarcane yields 100 kg of sugar and 70 Liters of ethanol. Sugarcane cultivation takes 1600-2100 Liters of water per kg of sugar. As a result, 3000 Liters of water are required to produce one litre of sugar-based ethanol. Sugarcane and paddy use over 70% of the country's irrigation water. To conserve water, consider shifting some sugarcane areas to less water-intensive crops by offering incentives to growers.

Encouraging use of water saving crops to produce ethanol:

1. Based on the preceding research, sweet sorghum has significant benefits over sugarcane, rice and maize as a feedstock for biofuel production. It uses only half the water needed to grow maize and one-eighth the water needed to cultivate sugarcane. According to ICRISAT sources, sweet sorghum has a production cost that is only one-fifth that of sugarcane.

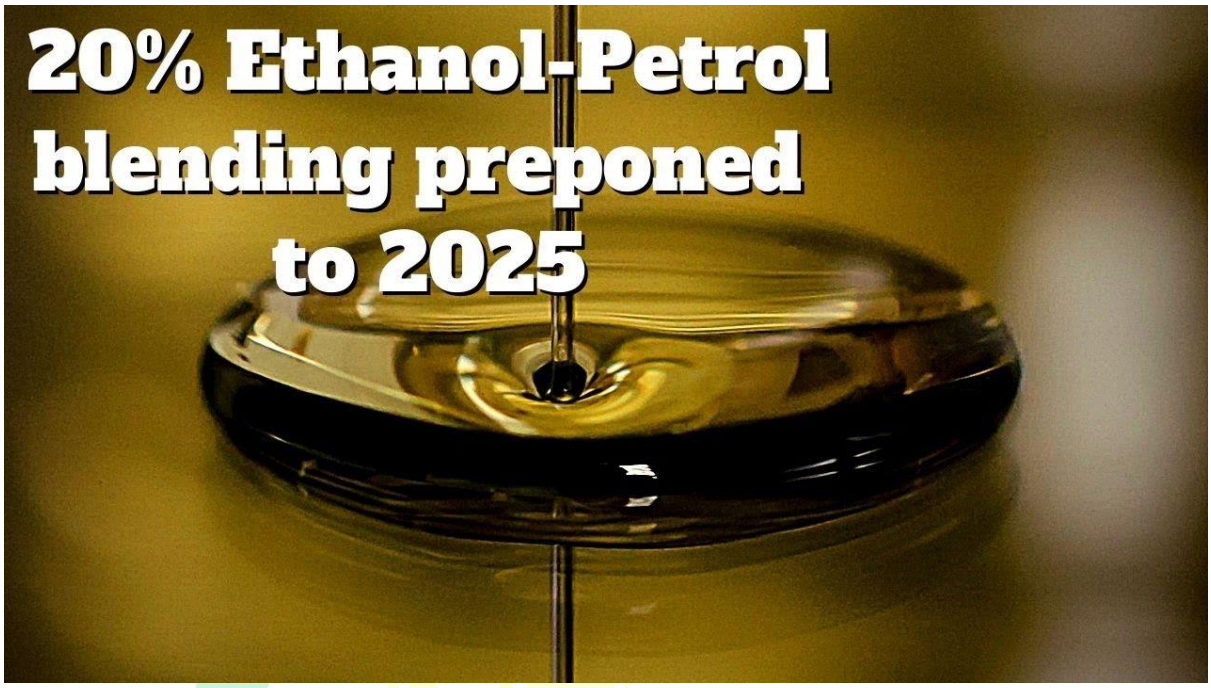
JUST AGRICULTURE
multidisciplinary e-Newsletter

2. Maize is the least water-intensive crop for producing ethanol after sweet sorghum. To full fill the 2025 targets for ethanol production to encourage the water saving crops.

Steps taken by the government to increase ethanol blending.

1. To promote public awareness and education, create campaigns. Educate consumers on the benefits of ethanol blending, clarify myths about its effects on automobiles, and promote its use.
2. Transparency and Labelling: Make sure that ethanol blended fuels are clearly labelled at gas stations so that customers may make an informed choice.
3. Tax relief: E10 and E20 blends are taxed less than unblended petrol, making them more cost-competitive for customers. In comparison to petrol, ethanol has lower excise duty and GST rates.
4. Interest Subvention Scheme**:** In order to increase the country's ethanol production capacity and meet the blending targets established by the EBP Programme, the government has announced a number of ethanol interest subvention schemes ranging from July 2018 to April 2022. Under these ethanol interest subsidy schemes, the government is assisting entrepreneurs in establishing new distilleries (molasses-based, grain-based, and dual-feed based) around the country. The Central Government would bear an interest subvention of 6% per year or 50% of the rate of interest charged by banks/financial institutions, whichever is lower, on loans to be given by banks/financial institutions for five years, including a one-year moratorium.

JUST AGRICULTURE
multidisciplinary e-Newsletter



Reference

Roadmap for ethanol blending in India (2020-25) Niti Aayog | Ministry of Petroleum and Natural Gas Report of the Expert Committee June (2021).