Sustainable Aviation Fuel (SAF)

> ***Mains**: GS II - Government Policies and Interventions for Development in various sectors and Issues arising out of their Design and Implementation.*
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> *GS III - Infrastructure: Energy, Ports, Roads, Airports, Railways etc.*

Why in news?

Recently, IATA (International Air Transport Association) highlighted that India has a major opportunity to become a global hub for Sustainable Aviation Fuel (SAF) production.

What is Sustainable Aviation Fuel?

- **Sustainable Aviation Fuel –** SAF is a *renewable, low-carbon alternative to conventional jet fuel*, produced from sources like agricultural waste, non-food crops, used cooking oil, algae, and municipal solid waste.
- **Aircraft fuel** – It is chemically similar to fossil jet fuel, making it compatible with existing aircraft engines and refuelling infrastructure.
- It can be used by blending biofuel with conventional jet fuel.
- **Lifecycle emissions** – For SAF it is *upto 80% lower than conventional fuel,* depending on the feedstock and production method, making it central to achieving net-zero targets in aviation.
- **Decarbonisation –** According to the International Air Transport Association (IATA), SAF alone is projected to contribute over **60%** of the aviation industry's carbon reduction targets.

> *The **International Air Transport Association (IATA)** is the global trade association of airlines is established in 1945, headquartered at Montreal, Canada, and it represents around 300 airlines worldwide, accounting for over 80% of global air traffic.*

- Other measures such as operational efficiency, hydrogen, electric aircraft, and carbon offsetting also play a role, but SAF is considered the most impactful and immediately deployable solution.
- **Global SAF ecosystem –** There are over 300 renewable fuel projects announced globally, but only 160 have clear SAF production plans.
- **India's current SAF ecosystem –** India has been exploring SAF for over a decade.
- Several Indian energy companies are developing SAF production capabilities and government has signalled intent to introduce blending targets, but a formal roadmap is

awaited.

What are the opportunities for India to Become a Global SAF Hub?

- **Abundant feedstock availability –** India generates large quantities of biomass, agricultural waste, and ethanol, which can be channelled towards SAF production without compromising food security.
- **Existing refining infrastructure –** India's oil refineries can be upgraded to produce SAF, reducing capital investment requirements compared to greenfield plants.
- **"Make in India for the world" potential –** India can meet domestic SAF demand and export surplus to international airlines operating in the region, creating an economic and strategic opportunity.
- **Estimated production potential –** By 2050, India could produce up to **40 million tonnes** of SAF, significantly contributing to global supply chains.

What are the key challenges that India must address?

- **Lack of clear policy framework –** A comprehensive SAF policy with time-bound blending targets, production incentives, and certification guidelines is urgently needed.
- **Feedstock prioritisation and sustainability –** SAF feedstock selection must avoid competition with food crops and meet strict environmental sustainability standards.
- **Global certification compliance –** SAF produced in India must adhere to international sustainability and emission reduction certification requirements to be globally accepted.
- **Investment in research and development –** India must invest in SAF R&D to diversify production technologies, including pathways like Alcohol-to-Jet, Power-to-Liquid, and others.
- **Global competition –** With the US and Europe rapidly building SAF ecosystems, India must act swiftly to capture market share.

What are the suggested measures?

- **Time-bound blending targets –** The government should finalise ambitious yet achievable SAF blending mandates aligned with global standards like CORSIA.
- **Financial and production incentives –** Production-linked incentives, tax breaks, feedstock subsidies, and concessional financing should be provided to encourage SAF production.
- **Sustainable feedstock aggregation –** A robust supply chain for sustainable feedstock aggregation must be established through farmer incentives and technology support.
- **Technology neutrality and competition –** All SAF production pathways should be encouraged, with market forces determining the most efficient technologies.
- **Public-private collaboration –** Strong partnerships between government, private companies, and research institutions are essential to accelerate SAF ecosystem development.

Reference

[The Indian Express| India to become a sustainable aviation fuel hub]