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Original article**Golden Seeds of Self-Reliance: India's Edible Oil Revolution**

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Since 2014-15, India's oilseed sector has grown, with a 17.5% increase in cultivation area, 44% in production, and 22% in yield. However, rising demand due to a significant increase in per capita consumption owing to urbanization and dietary changes outpaced production. This led to import dependency of around 57% of total domestic demand, leading to 16.5 MT worth USD 20.56 billion in the oil year 2022-23. India's vegetable oil sector economy is prominent, fourth behind the US, China, and Brazil. Oilseed crops are the second most important determinant of the agricultural economy, next only to cereal. Self-sufficiency in oilseeds achieved during the "Yellow Revolution" (early 1990s) was short-lived. Nine major oilseeds account for 14.3% of the gross cropped area, 12-13% of dietary energy, and 8% of exports. Rajasthan and Madhya Pradesh have the highest production of oilseeds, about 21.42% each of the national production, followed by Gujarat (17.24%) and Maharashtra (15.83%). Together, these four states contribute to 75.63% of the total production in the country. The national average yield of oilseeds is 1.27 t/ha, Tamil Nadu (2.5 t/ha), Gujarat (1.91 t/ha), Haryana (1.94 t/ha), Telangana (1.80 t/ha), Rajasthan (1.46 t/ha) have a higher yield than the national average. On the other hand, states such as West Bengal (1.19 t/ha), Maharashtra (1.18 t/ha), Uttar Pradesh (1.03 t/ha), Madhya Pradesh (0.99 t/ha), Karnataka (0.94 t/ha) have lower yield than the national average. Soybean leads with 34% of the total oilseed production, followed by rapeseed-mustard (31%) and groundnut (27%); more than 92%. The major contributors to domestic edible oil production are rapeseed-mustard oil (45%), groundnut oil (25%) & soybean oil (25%). Edible oils from secondary sources present uneven performance, highlighting a significant gap.

The ICAR-IIOR survey revealed distinct regional preferences in edible oil consumption across India. Mustard oil dominates in India's north (61%) and east (35%) zones, followed by sunflower oil. In the west zone, soybean oil has a slight edge (28%) over mustard (25%) and sunflower (25%). The south zone is dominated by sunflower oil (44%), followed by groundnut oil (29%).

Non-vegetarians consumed an average of 14.2 kg/capita annually, compared to the 12.6 kg/capita for vegetarians. Interestingly, the choice varies between rural and urban.

Mustard oil reigns supreme in rural, with 45% of consumption. In contrast, urban areas favour refined oils (sunflower and soybean oil) with a 47% share. This shift towards refined oils highlights substitutions from traditional options like vanaspati and groundnut oil.

Monthly per capita expenditure (MPCE) on edible oils significantly increased. In rural areas, it went from Rs. 18.2 to Rs. 135.5 from 1999-00 to 2022-23. Similarly, it is from Rs. 26.8 to Rs. 153.1 in urban areas.

India's persistent demand for edible oil reveals a remarkable rise over six decades from a per capita consumption perspective.

Between 1960-61 and 1980-81, **consumption increased 1.2 times** (from 3.2 kg/year to 3.8 kg/year).

- This growth accelerated further, **reaching 2.2 times between** 1980-81 and 2000-01 (from 3.8 kg/ year to 8.2 kg/ year).
- And, **a staggering 2.4 times from 2000-01 to recent times** (8.2 kg/ year to 19.7 kg/year in 2020-21).

The report titled "Pathways and Strategies for Accelerating Growth in Edible Oils Towards the Goal of Atmanirbharta" was released by the NITI Aayog in August 2024. The report highlights that the country's per capita consumption of edible oil has dramatically risen over the past decades, reaching 19.7 kg/year. The report presents a detailed roadmap to address existing challenges, focusing on bridging the demand-supply gap and developing new approaches to attain self-sufficiency. Under a Business-As-Usual (BAU) scenario, the national supply of edible oil is projected to increase to 16 MT by 2030 and 26.7 MT by 2047.

To achieve self-sufficiency in this sector, the report suggests several strategic interventions to bridge the existing gap and ensure long-term sustainability. The proposed strategy is structured across three key pillars: (i) Crop Retention and Diversification, (ii) Horizontal Expansion, and (iii) Vertical Expansion. 'Horizontal Expansion Strategy' aims to strategically increase the area dedicated to cultivating edible oil crops. This strategy seeks to bring more land under cultivation for specific oilseeds. Potential avenues for achieving self-sufficiency include utilising rice fallow lands for high-yielding oilseed crops and highly suitable wastelands for transformation through palm cultivation, promoting crop retention and efficient diversification in the potential regions. This might necessitate a cost-benefit analysis to determine the viability of production compared to the alternative crops. 'Vertical Expansion Strategy' focuses on enhancing the yield of existing oilseed cultivation. This can be achieved through improved farming practices, better-quality seeds, and advanced production technologies.

The strategic interventions offer a vibrant path towards reducing import dependence. By implementing the strategic interventions, the country has the potential to increase domestic edible oil production by 43.5 MT significantly. This substantial increase has the potential to not only bridge the import gap but also position the country on a trajectory toward self-sufficiency in edible oils.

State-Level Engagements for *Atmanirbharta* in Edible Oils

Strategically retaining and diversifying oilseed crops and focusing on areas potentially lost to cereal cultivation could boost the country's edible oil production by 20% in nine states, adding 7.36 MT of oilseed production and reducing import dependence by 2.1 MT.

- Rice fallow areas across the country reveal a promising opportunity for horizontal expansion in oilseed cultivation. Utilizing one-third of the rice fallow area in ten states for oilseed cultivation could increase oilseed production by 3.12 MT and reduce import reliance by 1.03 MT.
- Bridging the yield gap from 12% in castor to 96% in sunflower through widespread adoption of improved technologies and effective management practices, i.e., vertical expansion could increase the country's domestic oilseed production by 17.4 MT. This would reduce edible oil imports by 3.7 MT.
- Palm oil alone, through targeted expansion, can potentially increase a staggering 34.4 MT of edible oil, substantially closing the existing demand-supply gap. The effort should focus on capitalizing on the untapped potential identified by ICAR-IIOPR in the 284 districts, which estimates an additional 2.43 Mha of land across the country for oil palm cultivation. Furthermore, tactically utilizing two-thirds of the highly suitable areas of wastelands located in ICAR-IIOPR identified districts (i.e., 6.18 Mha) presents a significant opportunity for further horizontal expansion.
- Rice bran, offers an estimated potential of 1.9 MT of edible oil, with 0.85 MT currently untapped. Similarly, cottonseed presents a potential for an additional 1.4 MT of edible oil production, contributing to a further 9.7% reduction in the country's edible oil demand-supply gap or import dependence.
- Overall, the proposed strategic interventions could achieve projected edible oil supplies of 36.2 MT and 70.2 MT, by 2030 and 2047 respectively. The potential gain in edible oil production estimated from the proposed strategic interventions combined with the existing production level is anticipated to achieve self-sufficiency with the recent growth trend (CAGR of 3%) in all scenarios except for the most demanding scenario (i.e., Behaviouristic Approach Scenario-II) in the near term. To meet the projected demand by the more immediate target of 2030 under this scenario, a CAGR of 5.2% would be required for the 2021-2030 period, representing a 2.2% increase from the recent growth situation. A more focused, rigorous implementation and intensive approach can achieve this targeted increase.

A significant opportunity exists to enhance productivity in India's edible oil sector, as evidenced by the yield difference between Indian states and global leaders. Crops like soybean, rapeseed, groundnut, sunflower, linseed, cotton, and rice all demonstrate lower yields in India compared to top global producers.