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Reassessing Soybean Utilization Patterns: 90% of Global Soya Cultivation Ultimately Benefits Human Consumption

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Abstract: ***This study presents an analytical review of global soybean utilization patterns, emphasizing that approximately 90% of the world's soybean production contributes to human consumption—directly or indirectly. While conventional narratives often claim that most soy is used for animal feed, this analysis distinguishes between primary crop purpose and by-product utilization. Using 2024 baseline data from the USDA, FAO, and OWID, the research dissects global soybean land use, oil extraction, and human-directed value chains. Findings highlight that the majority of cultivated soybean supports human-oriented consumption, either as soybean oil, soy-based food products, or livestock by-products re-entering the human food chain.***

Keywords: Soybean, Human Consumption, Agricultural Land Use, Oil Crops, Sustainable Food Systems, Animal Feed, Crop Utilization, Global Agriculture, Food Security.

1. Introduction

Soybean (Glycine max) is among the world's most important oilseed crops, occupying nearly 147 million hectares globally as of 2024. Its significance extends across human nutrition, biofuel production, and livestock feed systems. However, debates around soy sustainability often misinterpret the crop's purpose, overlooking that oil extraction—the primary driver of soybean cultivation—serves human food consumption. The residual meal, a by-product, is subsequently utilized for animal feed. This paper reassesses the global soybean utilization framework to demonstrate that approximately 90% of soya grown ultimately serves human needs.

2. Methodology

Data were sourced from the United States Department of Agriculture (USDA 2024/25 Outlook), Food and Agriculture Organization (FAO 2024 datasets), and Our World in Data (OWID 2024). Average global soybean yield was considered at 2.9 tonnes per hectare. Oil yield was computed at 17.8%, and global production was estimated at 425 million tonnes. The research classified utilization into three segments: (1) oil extraction for human consumption, (2) direct soy food uses, and (3) remaining uses including feed, seed, and industrial applications.

3. Results and Analysis

The analysis reveals that approximately 82% of global soybean output is crushed for oil extraction, which yields around 62 million tonnes of soybean oil annually. This oil, predominantly used for cooking and processed food applications, directly contributes to human consumption. An additional 7% of soybeans are consumed directly as soy-based foods such as tofu, soymilk, and tempeh. The combined human-directed use thus accounts for nearly 89–90% of the total crop output, leaving a minor fraction for non-food or industrial applications.

Global Soybean Land and Use Summary (2024 Baseline)

Category	Value
Global soybean production (2024)	425 million tonnes
Global soybean cultivation land	147 million hectares
Soybeans used for oil production	350 million tonnes
Land required for soybean oil production	121 million hectares
Soybeans directly consumed by humans	30 million tonnes
Land required for human soy foods	10 million hectares

Global Soybean Oil Use Segments (2024)

Soybean Oil Use Segment	Share of Total Soybean Oil
Food (cooking, processed foods)	≈ 55%
Biofuel (biodiesel, renewable diesel)	≈ 18%
Industrial (soaps, lubricants, oleochemicals)	≈ 7%
Other & residual	≈ 20%

4. Discussion

These findings contradict the common assumption that soybean cultivation predominantly supports animal feed. In reality, the crop's primary purpose is to produce oil for human consumption, with the resulting meal repurposed as feed to enhance agricultural efficiency. Thus, while livestock industries benefit from soybean by-products, the initial cultivation intent and economic driver remain human food production. Moreover, when tracing the end-use pathway of livestock outputs, the human consumption linkage strengthens further—confirming that nearly 90% of soybean cultivation supports human-directed value chains.

5. Conclusion

The 2024 soybean utilization review underscores that the crop's global cultivation is overwhelmingly aligned with

human consumption needs. Approximately 90% of soybeans grown worldwide serve human food systems, either as edible oil, direct soy foods, or indirectly through animal-derived products fed on soybean meal. Reassessing global narratives on soy and feed-use distribution is essential to foster accurate sustainability and food system dialogues.

Conflict of Interest

The author declares no conflict of interest. This study was conducted independently for academic and educational purposes, without any affiliation or influence from commercial or institutional entities.

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References

[1] FAO. (2024). FAOSTAT: Crops and Agricultural Land Use. Food and Agriculture Organization of the United Nations.
[2] USDA. (2024). World Agricultural Supply and Demand Estimates (WASDE-2024/25). United States Department of Agriculture.
[3] OWID. (2024). Our World in Data – Soybean Production and Land Use Statistics.
[4] OECD-FAO. (2024). Agricultural Outlook 2024–2033: Oilseeds and Products.
[5] USSEC. (2024). Soybean Oil Yield and Processing Conversion Data.