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HOUSEHOLD FOOD CONSUMPTION AND SUSTAINABLE CONSUMPTION PATTERNS: AN ENGEL CURVE ANALYSIS OF URBAN MUMBAI

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ABSTRACT

The global development policy has taken a significant issue in sustainable consumption, with a particular focus on the United Nations Sustainable Development Goals (SDGs). SDG 12: Responsible Consumption and Production focuses on responsible utilization of resources, sustainable consumption and minimization of food losses. Food consumption behaviour of households is therefore vital in the formulation of policies that can be sustainable and equitable. In this paper, the determinants of household food spending on urban households in Mumbai are studied in the period between 2022 and 2025 using the Engel curve analysis and regression models and dwells down to the implication on the sustainable consumption patterns.

The socio-economic variables studied in the research are household-level, such as income, age structure, gender structure, occupation, education, and household size. The key determinants of food expenditure are identified with the help of the multiple regression analysis, and the relationship between income and food consumption is examined with the help of the Engel curve estimation. The regression models show decent explanatory power with the R 2 of 0.352 to 0.418, which implies that a significant part of the food expenditure variation is attributed to income and demographic factors.

The results indicate that the most predictable and statistically significant predictor of food spending in all years is the household income. The estimation of the Engel curves proves that there is a positive correlation existing between food spending and income which shows that food is a normal good. Nonetheless, the decreasing marginal spending on food as income rises indicated in the concave form of the curves is in line with the Law of Engel. The response to income in the year 2023 is the best, indicating the recovery of consumption after the pandemic, and the balance expenditures in the 20242025 year.

In terms of sustainability, the research points out that demographic characteristics which include household size, education, and gender balance are factors that impact more on consumption behaviour, as time goes by. These are socio-economic determinants that play a vital role in the development of responsible consumption and allocation of resources at the household level. The results are relevant to SDG-12 as they illustrate how the city food consumption patterns are influenced by income dynamics and demographic peculiarities. The findings are valuable to policymakers who want to facilitate sustainable consumption, enhance food security and come up with welfare schemes that can compel responsible household expenditure habits within urban economies.

Keywords: Sustainable Consumption, Engel Curve, Food Spending, SDG 12, Household Consumption.

INTRODUCTION

Sustainable development demands equitable economic development, social welfare and proper usage of resources. Under the United Nations sustainable development goals, SDG 12 is aimed at guaranteeing sustainable consumption and production patterns, which involve enhancing resource efficiency, food waste minimisation and responsible consumer behaviour.

Food consumption has been one of the most critical aspects of household expenditure and it is important in ensuring sustainability in consumption. Households in cities especially the fast-growing urban economies also exhibit various consumption behaviours depending on the income, demographic features and socio-economic status. Learning about these consumption patterns is critical when formulating policies that would promote sustainable consumption and effective use of resources.

Mumbai being one of the major urban economic centres in India gives a valuable case study to the study of household consumption behaviour. The rapid urbanization, income inequality and the transformation of labour market structures affect the manner in which households divide income to spend on food. During the aftermath of the pandemic, consumption has acquired new adjustments concerning the recovery of the economy, changes in employment and population trends.

Within the framework of SDG 12, the characterization of household food spending would be an interesting exercise to understand how income increase and socio-economic attributes can affect consumption choices. This type of analysis assists in determining whether the increase in the levels of incomes results in responsible and sustainable patterns of consumption or structural inequalities determine consumption behaviour.

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OBJECTIVES OF THE STUDY

- To test socio-economic factors that determine household food consumption in urban Mumbai.
- To determine food expenditure determinants with the help of regression analysis.
- To approximate Engel curves in order to know the relationship between income and food consumption.
- To measure the relationship between the consumption patterns and sustainable consumption objectives under SDG 12.

REVIEW OF LITERATURE

Household consumption behaviour is a subject that has been well researched in the economic literature due to the fact that it gives information about welfare, income distribution, and allocation of resources. Over the last few years, sustainability-related and socio-economic resilience-related perspectives have become an increasingly important part of the household expenditure analysis. More specifically, food spending has always been one of the most significant measures of household welfare and consumption behaviour. This relationship is explained by the classical economic theory according to which the level of food expenditure with the income rises, but the ratio of income to food spending decreases with the income growth (Engel, 1857). The relationship still remains supported by the current empirical research that is conducted on consumption patterns among various income groups and geographical locations.

According to recent research, household income is the most important determinant of consumption expenditure. The rising income enables households to spend more on necessities like food and slowly change their consumption pattern to more diversified products, including food of a higher quality and non-food items (Ivanova et al., 2020). But the current studies stress that the behaviour of consumption cannot be attributed solely to the income. Other socio-economic and demographic factors, including household size, education, and occupation, gendered households, and age structure are also significant in terms of consumption decisions (Vermeir and Verbeke, 2019).

As a part of sustainability, the household consumption patterns are becoming studied in the context of Sustainable Development Goal (SDG) 12: Responsible Consumption and Production. According to the research on sustainable consumption, the concept of responsible food consumption implies effective use of resources, minimization of food waste, and knowledgeable food consumption (United Nations, 2023). Education and income stability are usually cited as key motives of sustainable consumption behaviour since it determines the awareness of consumers and their decisions to buy.

Research has been conducted recently on regional differences in household spending patterns and the socio-economic contexts on consumption within the Indian context. Some scholars have pointed out that food spending is one of the most important determinants by the household income, family size, and occupation among other factors, especially in urban settings where income inequality and employment arrangements are major factors of consumption behaviour (Jackson, 2017).

Several recent additions to this area have been by Nandini Jagannarayan and colleagues who have looked at household consumption behaviour in different districts of Maharashtra based on Consumer Pyramid Household Survey (CPHS). In the study, Jagannarayan and Prasuna (2024) evaluated the effect of socio-economic factors on food expenditure patterns: income, age group, education, and household size in Maharashtra. According to their results, income and household size always appear to be important predictors of consumption expenditure whereas education and occupation affect consumption decisions in certain situations.

More studies conducted by Jagannarayan (2024) observed the behaviour of household consumption with regard to the COVID-19 outbreak and observed that economic shocks had a strong impact on the expenditure priorities. The households boosted their expenditures on necessities like food and healthcare as well as cutting down the unnecessary expenses. These results bring out the adaptive characteristic of household consumption choices in times of economic shocks.

In another study (Jagannarayan and Prasuna, 2024) concerning women-led households, there were gender dynamics in consumption patterns especially when there is uncertainty in the economy. The female-headed households were characterized by more careful budgeting and emphasis on the food spending which made them secure the household food supply throughout the pandemic period.

Notwithstanding the accumulating literature, there are sections of literature that seem to have gaps. Numerous research efforts give a lot of priority on the income effects and little to demographic and socio-economic factors that influence consumption choices. In addition, there are minimal studies that combine the classical

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consumption theory with sustainability models like SDG-12. The solution to these gaps will involve empirical analysis incorporating dynamics of income, determinants which are demographic and the perspectives of sustainability in the study of household consumption behaviour.

RESEARCH GAPS

- The majority of the research studies only concentrate on income as the key determinant of food spending, and pay little attention to demographic characteristics of age, gender, education, occupation, and household size.
- Very few empirical work on consumption patterns at a city level has been conducted on the rapid urbanisation of cities such as Mumbai.
- Little literature examines the changes in consumption behaviour following the pandemic over a long time span.
- Current studies seldom combine the analysis of Engel curves and sustainability models (SDG-12), like SDG-12 (Responsible Consumption and Production).

HYPOTHESES TESTED

H1: There exists a substantial influence of total household income on household food expenditure.

H2: The age structure of households has a significant impact on household expenditure on food.

H3: Gender household structure is a significant factor of spending on food by households.

H4: There is a considerable influence of occupational status of households on food expenditure.

H5: The level of education of the households is a significant factor in determining food expenditure.

H6: Household size is one of the key factors that influence household food spending.

H7: Income, age, gender, occupation, education, and household size as independent variables together impact significantly on household food expenditure.

Multiple linear regression analysis was employed to test these hypotheses in which food expenditure was considered to be the dependent variable, whereas, the socio-economic characteristics of households formed the independent variables.

RESEARCH METHODOLOGY

The research design of the study is quantitative because of the need to investigate the socio-economic determinants of household food expenditure by urban households in Mumbai between the years 2022-2025. The data on which the analysis will be done is secondary household data collected through the Consumer Pyramids Household Survey (CPHS) published by the Centre of monitoring Indian Economy (CMIE). CPHS is a national representative panel data which gives precise information on the income of households, demographics and expenditure pattern in India.

A dependent variable in the research is the adjusted household food expenditure whereas the independent variables consist of total household income and demographic factors in the form of age composition, gender structure, occupation group, education level and household size. The socio-economic features of households are analyzed with the help of descriptive statistics. Thereafter, the multiple linear regression (Ordinary Least Squares) is used to determine the significant determinants of food expenditure.

Besides, estimation of the Engel curve in quadratic functional form is used in the analysis of the relationship between income and food consumption. ANOVA, coefficient estimates, and R 2 statistics are used to determine the model significance, in respect to being able to understand urban household consumption behaviour relative to sustainable consumption patterns.

RESULTS

Household Socio-Economic Characteristics.

The descriptive statistics and the regression analysis will help to gain valuable insights on the socio-economic determinants of household food consumption among urban households in Mumbai in 2022-25. These findings indicate that income dynamics, demographic structure and socio-economic characteristics lead to consumption patterns. These results can be especially applied to Sustainable Development Goal (SDG) 12, which focuses on the responsible consumption of resources and their effective use.

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Table 1 Age Group Distribution

Age Group	2022	2023	2024	2025
Dominant Grown-ups	312 (63.16%)	466 (63.49%)	427 (59.22%)	479 (61.65%)
Balanced Households	105 (21.26%)	157 (21.39%)	204 (28.29%)	208 (26.77%)
Dominant Younger Members	22 (4.45%)	29 (3.95%)	77 (10.68%)	76 (9.78%)
Dominant Seniors	55 (11.13%)	82 (11.17%)	13 (1.80%)	14 (1.80%)
Total Households	**494**	**734**	**721**	**777**

Source: Author's Data Analysis

Table 1 shows the age distribution of households such that the majority of the sample in the study is in the form of households headed by grown-ups. Over 59 percent of households in every given year fall in this category implying that the sample is composed of (mostly) economically active households. The second-largest category of houses is balanced households; meanwhile, smaller proportions are represented by households that are dominated by younger members and seniors. The prevalence of labour force households means that there is a reasonably stable source of revenues and foreseeable consumption patterns. Sustainability wise, the constant household income allows us to plan the consumption more efficiently, as well as to use the available resources in a more responsible manner, which corresponds to SDG-12 goals.

Table 2 Gender Group Distribution

Gender Group	2022	2023	2024	2025
Male Dominant	175 (35.43%)	252 (34.33%)	261 (36.20%)	319 (41.06%)
Balanced	193 (39.07%)	264 (35.97%)	228 (31.62%)	226 (29.09%)
Female Dominant	76 (15.38%)	134 (18.26%)	206 (28.57%)	210 (27.03%)
Exclusively Female or Male	50 (10.12%)	84 (11.44%)	26 (3.61%)	22 (2.83%)
Total	**494**	**734**	**721**	**777**

Source: Author's Data Analysis

According to Table 2, gender composition of the households indicates a progressive rise in male dominated houses between 35.43 percent in the year 2022 and 41.06 percent in the year 2025. Domestications were also soaring between 2022 and 2024 and eventually stabilized in 2025 as far as females dominated households were concerned. Homes that were balanced were not very volatile over the course of the study. The gender structure may affect the consumption expenditure in the household. Past research indicates that women tend to give preference to food security and expenditures on welfare issues at household levels. In turn, the more active participation of females in house decision-making can lead to responsible consumer behavior and better distribution of resources that promote sustainable consumption trends.

Table 3 Occupation Group Distribution

Occupation Group	2022	2023	2024	2025
White-collar Professionals	256 (51.82%)	440 (59.95%)	423 (58.67%)	438 (56.37%)
Self-employed / Entrepreneurs	91 (18.42%)	132 (17.98%)	193 (26.77%)	268 (34.49%)
Blue-collar Workers	41 (8.30%)	41 (5.59%)	82 (11.37%)	47 (6.05%)
Miscellaneous / Others	106 (21.46%)	121 (16.49%)	23 (3.19%)	24 (3.09%)

Source: Author's Data Analysis

Table 3 provides the occupational makeup of households. The largest occupational group over all years is the white-collar professionals since they constitute over half of the households. Nonetheless, the rate of self-employed households grew considerably in comparison with 18.42 percent in 2022 to 34.49 percent in 2025. The trend is indicative of more general structural changes in urban labour markets, such as the growth of entrepreneurial and gig-economy jobs. Occupational stability is also significant in influencing the consumption behaviour because households that are occupied and have stable employers are in better positions to stay in patterns of consumption and manage their resources effectively.

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Table 4 Education Group Distribution

Education Group	2022	2023	2024	2025
Highly Educated	215 (43.52%)	271 (36.92%)	323 (44.80%)	389 (50.06%)
Moderately Educated	237 (47.98%)	379 (51.63%)	307 (42.58%)	295 (37.97%)
Educationally Homogeneous	42 (8.50%)	84 (11.44%)	91 (12.62%)	93 (11.97%)

Source: Author's Data Analysis

Table 4 shows the educational attainment of households by showing a consistent rise in the number of highly educated households over the years of study. The proportion of well-educated households grew up to 50.06 percent in 2025 as compared to 43.52 percent in 2022. Education is also well known as one of the major determinants of consumption behaviour. The human capital theory presupposes that the levels of education increase income potential and raise awareness of nutrition, health, and the use of sustainable resources. Therefore, higher levels of education can encourage more responsible consumption habits, especially relating to the food preferences and waste minimization.

Table 5 Household Size Distribution

Household Size	2022	2023	2024	2025
Small Households	315 (63.77%)	473 (64.44%)	296 (41.05%)	327 (42.08%)
Medium Households	163 (33.00%)	251 (34.20%)	368 (51.04%)	387 (49.81%)
Large Households	16 (3.24%)	10 (1.36%)	57 (7.91%)	63 (8.11%)

Source: Author's Data Analysis

A household size distribution as in Table 5 indicates that small households were predominant in the sample in the years 2022 and 2023, although medium-sized households increased in the years 2024 and 2025. The size of the household is another major factor that determines food consumption since big families need more supplies of basic products. Nevertheless, economies of scale in consumption can also be advantageous to larger households in case food consumption is managed appropriately.

Table 6 Regression Model Summary

Year	R	R^2	Adjusted R^2	Model Significance
2022	0.593	0.352	0.333	Significant (p = 0.000)
2023	0.646	0.418	0.407	Significant (p = 0.000)
2024	0.620	0.384	0.372	Significant (p = 0.000)
2025	0 .592	0.351	0.339	Significant (p = 0.000)

Source: Author's Data Analysis

Food Expenditure Determinants.

As seen in Table 6, the regression models show that all the models with the p-values of less than 0.05 are significant across the years. The value of the coefficient of determination (R 2) lies between 0.352 and 0.418 indicating a moderate explanatory power. These findings display that the influence of income and socio-economic variables on household food spending is very eminent. Nevertheless, consumption patterns can also be affected by behavioural aspects including eating tastes and cultural orientations.

Table 7 Consolidated Coefficients Summary (Food Expenditure – Mumbai 2022–2025)

Variables	2022 B (p)	2023 B (p)	2024 B (p)	2025 B (p)	Interpretation
Constant	5195.48 (0.000)	8116.59 (0.000)	10940 (0.000)	10260 (0.000)	Baseline expenditure level
Total Income	0.0406 (0.000)*	0.1081 (0.000)*	0.0502 (0.000)*	0.0166 (0.000)*	Strong positive effect across all years
Age: Balanced Households	-548.01 (0.107)	-539.86 (0.315)	-2.38 (0.998)	1415.15 (0.004)*	Significant only in 2025
Age: Dominant Younger Members	21.75 (0.918)	-660.16 (0.036)*	-269.53 (0.667)	1200.06 (0.001)*	Significant in 2023 & 2025
Age: Dominant Seniors	130.00 (0.698)	-1221.33 (0.016)*	-5359.09 (0.005)*	-448.49 (0.665)	Significant in 2023 & 2024

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Occupation: Self-employed	-864.99 (0.000)*	-1803.54 (0.000)*	2265.74 (0.003)*	-72.19 (0.893)	Mixed influence across years
Occupation: Blue-collar	-196.50 (0.451)	-1771.93 (0.000)*	2948.15 (0.000)*	-819.43 (0.135)	Significant in 2023 & 2024
Occupation: Miscellaneous	-134.46 (0.646)	-2266.61 (0.000)*	4328.22 (0.004)*	-887.20 (0.326)	Significant in 2023 & 2024
Gender: Balanced	557.52 (0.005)*	962.85 (0.001)*	1018.40 (0.098)	852.09 (0.013)*	Significant in 2022, 2023, 2025
Gender: Female Dominant	229.66 (0.127)	531.04 (0.031)*	723.91 (0.205)	628.17 (0.046)*	Significant in 2023 & 2025
Gender: Exclusively Female/Male	-348.55 (0.120)	-620.37 (0.065)	-3409.93 (0.007)*	1189.43 (0.125)	Significant only in 2024
Size: Small Households	527.96 (0.006)*	1468.50 (0.000)*	323.03 (0.558)	3463.53 (0.000)*	Strong influence in most years
Size: Large Households	2001.21 (0.000)*	3912.89 (0.000)*	1761.48 (0.052)	7983.44 (0.000)*	Highly significant
Education: Moderately Educated	-31.28 (0.827)	288.69 (0.189)	-2604.66 (0.000)*	-401.22 (0.163)	Significant only in 2024
Education: Educationally Homogeneous	-329.89 (0.189)	381.63 (0.268)	-5512.26 (0.000)*	-393.75 (0.385)	Significant only in 2024

Source: Author's Data Analysis * Significant at **p < 0.05**

The coefficient estimates presented in Table 7 indicate that total household income is the most consistent and significantly relevant instrument of food spending. The positive coefficients of income verify that, there is an increment of food expenditure with the increase in income. This observation confirms the law of Engel which says that as much as consumption of food rises with income, the ratio of income spending to food also tends to fall with income.

Table 8 Hypotheses Results

Hypothesis	Relationship Tested	Statistical Evidence	Decision
H1	Total household income → Food expenditure	Income coefficient positive and significant in all years ($p < 0.05$)	**Supported**
H2	Age composition → Food expenditure	Some age group categories significant in specific years	**Partially Supported**
H3	Gender composition → Food expenditure	Balanced and female-dominant households significant in certain years	**Partially Supported**
H4	Occupational status → Food expenditure	Self-employed and blue-collar categories significant in some years	**Partially Supported**
H5	Educational attainment → Food expenditure	Education variables significant mainly in 2024	**Partially Supported**
H6	Household size → Food expenditure	Small and large households show significant positive effects	**Supported**
H7	Socio-economic factors jointly → Food expenditure	Overall regression models significant ($p < 0.05$), $R^2 = 0.352–0.418$	**Supported**

Source: Author's Data Analysis

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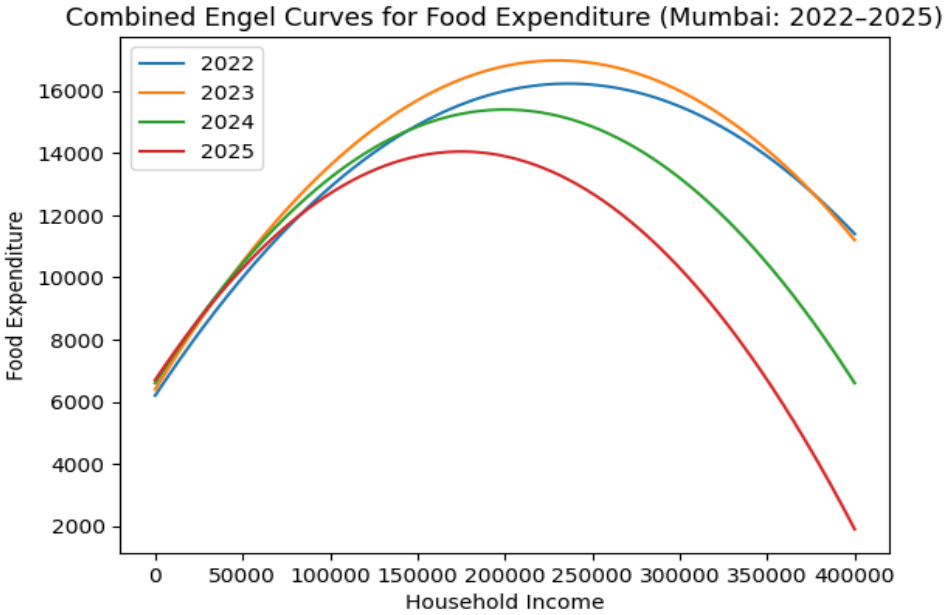
Figure 1 Engel Curve Estimates



Source: Author's Data Analysis

1. **Upward slope at lower income levels:** Food expenditure increases as household income rises, confirming that food is a normal good.
2. **Curvature of the Engel curve:** Each curve bends downward at higher income levels, showing diminishing marginal expenditure on food.
3. **Year-wise comparison**

- 2023 curve lies highest, suggesting stronger income responsiveness after the pandemic recovery.
- 2024 stabilizes, indicating normalization of consumption patterns.
- 2025 curve flattens earlier, implying that higher-income households allocate proportionally less income to food.

This relationship is further established by estimates of the Engel curve which show that the curve is up-sloping with a declining marginal expenditure as income increases. This trend shows that the middle and high-income families are slowly moving towards the consumption mode of greater diversity and quality. Sustainability wise, these changes can sustain responsible consumption behaviors through advocating on balanced diets and efficient use of resources.

The number of people in the household also comes out as a significant factor of food spending, and larger households have a high level of consumption. Consumption behaviour is also determined by gender composition and age structure, which depict the involvement of household demographics in the decision-making process of expenditure.

Sustainable Consumption Implications.
In general the findings indicate that the consumption pattern of households in urban Mumbai is largely a factor of income but more so of demographic characteristics. It is important to know these determinants so that it is possible to formulate policies that lead to sustainable consumption patterns. Within the framework of SDG-12, to increase the sustainability of urban consumption behaviour, it is possible to enhance the stability of income, level of education, and responsible use of household resources.

Discussion and Implications (SDG-12)

Contribution to SDG 12
The results show some significant associations between income changes in households and sustainable consumption behavior. Growth in income will enhance food consumption, but decreasing marginal expenditure implies that households tend to eventually shift towards diversified consumption patterns.

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Practical Implications

1. Demographic aspects of the household size and gender make-up should be included in urban food policy.
2. The government welfare programs may encourage nutritionally balanced and sustainable consumption among the low-income families.
3. Awareness on responsible consumption and food management can be enhanced through education programs.

Salient Contribution of the research

The given work is related to the literature on household consumption since it incorporates Engel curve analysis along with socio-economic determinants of food spending in an urban Indian setting. The current study causes contrast to the majority of the past studies that provide rather limited attention to the income effects, the current study allows evaluating the demographic/ socio-economic variables, including age structure, gender structure, occupation, education, and household size. The other characteristic of the study is that the authors use multi-year data (2022-2025) in an attempt to measure the alterations in consumption behaviour in the post-pandemic revival. In addition, the work associates food consumption in the household with Sustainable Development Goal 12 (Responsible Consumption and Production) with a sustainability-related thinking that is not widely considered in the conventional consumption analysis. The combined strategy will provide more in-depth information about urban consumption and sustainable resource utilization.

Theoretical Implications

The work is an economic contribution as it combines the analysis of the Engel curves with the frameworks of sustainable consumption to show how classical consumption theories could be utilized to shape the current sustainability objectives.

CONCLUSION

The results of the given research prove that income and socio-economic factors primarily affect the household food spending in urban Mumbai. The regression outputs support the fact that income is the strongest predictor of what one consumes in terms of food and the other factors that determine expenditure behaviour include household size, gender composition and education. Analysis of the Engel curve also reveals that there is positive, albeit concave, relationship between income and food expenditure which affirms the Law of Engel that food expenditure rises as income rises, but at a diminishing rate. With the increase in income in households, the percentage of income spent on food is steadily declining which means that people are shifting to diversifying consumption trends. The implications of these results on Sustainable Development Goal 12 (Responsible Consumption and Production) are significant because the notion of responsibility in consumption requires proper allocation of available resources and making informed choices on households. Knowledge of the socio-economic determinants of food expenditure hence offers useful information to the promotion of sustainable consumption and enhancing the efficiency of resources in urban economies.

The paper indicates that the consumption of household food in urban Mumbai is mainly income dependent but it is also becoming demographic and socio-economic in nature. The analysis of the Engel curve proves that food is a normal good whose marginal spending decreases as income increases.

In terms of sustainability, the results indicate that economic capacity and family structure inform the responsible consumption trends. These lessons can be useful in the context of SDG 12, which aims at ensuring sustainable consumption and efficient utilization of resources.

REFERENCES

Addai, I. (2022). Estimating household food budget shares and testing Engel's law. *African Journal of Social Issues, 25*(1), 45–58. https://doi.org/10.4314/ajosi.v25i1.3

Aguilar-López, A. (2020). Estimation of Engel curves for household expenditure on food at home and away from home. *Agricultural and Applied Economics Association Annual Meeting Proceedings*. https://doi.org/10.22004/ag.econ.303847

Basu, S., Vellakkal, S., Agrawal, S., Stuckler, D., Popkin, B., & Ebrahim, S. (2014). Averting obesity and type 2 diabetes in India through sugar-sweetened beverage taxation: An economic-epidemiologic modeling study. *PLoS Medicine, 11*(1), e1001582. https://doi.org/10.1371/journal.pmed.1001582

Chen, M. (2022). Engel's law in China: New evidence from provincial data. *Review of Development Economics, 26*(3), 1640–1662. https://doi.org/10.1111/rode.12887

Cupák, A., Pokrivčák, J., & Rizov, M. (2014). Food demand and consumption patterns in the new EU member states: The case of Slovakia. *Agricultural Economics – Czech, 60*(8), 339–350. https://doi.org/10.17221/118/2013-AGRICECON

Dawoud, S. D. (2014). Econometric analysis of the changes in food consumption expenditure patterns in Egypt. *Journal of Development and Agricultural Economics, 6*(1), 1–11. https://doi.org/10.5897/JDAE2013.0495

Engel, E. (1857). *Die Produktions- und Konsumptionsverhältnisse des Königreichs Sachsen*. Dresden: C. Heinrich.

Gong, X., Van Soest, A., & Zhang, P. (2000). Sexual bias and household consumption: A semiparametric analysis of Engel curves in rural China. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.249300

Herrmann, R., & Burzig, J. (2012). Food expenditure patterns of the generation 50+: An Engel-curve analysis for Germany. *Journal of Economics and Statistics, 232*(3), 325–344. https://doi.org/10.1515/jbnst-2012-0306

Hošková, E., & Zentková, I. (2024). Engel expenditure curves for households in the Slovak Republic and income elasticity of expenditure. *LIMEN Conference Proceedings*. https://doi.org/10.31410/LIMEN.S.P.2023.173

Islam, M. T., Rahman, M., & Ahmed, S. (2025). The crowding-out effect of out-of-pocket health expenditure on household consumption: Evidence from Bangladesh. *BMC Public Health*. https://doi.org/10.1186/s12889-025-XXXXX

Ivanova, D., Stadler, K., Steen-Olsen, K., Wood, R., Vita, G., Tukker, A., & Hertwich, E. (2020). Environmental impact assessment of household consumption. *Journal of Industrial Ecology, 24*(3), 526–538. https://doi.org/10.1111/jiec.12931

Jagannarayan, N. (2026). Sustainable leisure consumption patterns in urban Mumbai (2022–2025). *Asian Basic and Applied Research Journal, 8*(1), 24–36.

Jagannarayan, N., & Asha, P. (2025). Consumption income analysis: Rural–urban disparities across six districts in Maharashtra, India. *Working paper*.

Jagannarayan, N., & Prasuna, A. (2023). Meta-analysis of household consumption patterns in Maharashtra: Pre- and post-COVID-19 trends. *International Journal of Business Insights and Transformation, 17*(1), 2–10.

Kharisma, B., & Nugroho, A. (2024). Assessment of household food consumption patterns and socio-economic determinants during the COVID-19 pandemic. *Cogent Economics & Finance, 12*(1). https://doi.org/10.1080/23322039.2024.2409419

Madudová, E., & Chovancová, M. (2023). Measuring household consumption expenditure and the impact of household size. *Economies, 12*(1), 9. https://doi.org/10.3390/economies12010009

Pradhan, H. K. (2012). *Patterns of consumption expenditure in rural households: A case study of select villages of Sundargarh district of Odisha* (Doctoral dissertation). Sambalpur University, India.

Rentas, A. K., Penggunaan, C., Rumah, I., Pendekatan, S., Untuk, T. L., Faktor, M., Individu, K., & Mien, T. S. (2019). A cross-sectional household analysis of consumption patterns: An indirect approach to identify the possible factors of personal bankruptcy.

Seale, J. L., Bai, J., Wahl, T. I., & Lohmar, B. (2012). Household Engel curve analysis for food in Beijing, China. *China Agricultural Economic Review, 4*(4), 427–439. https://doi.org/10.1108/17561371211284836

Sethi, N., & Pradhan, H. (2012). Patterns of consumption expenditure in rural households of Western Odisha, India: An Engel ratio analysis. *OIDA International Journal of Sustainable Development, 5*(4), 107–120.

Temursho, U., Mandel, A., & Sinha, P. (2025). Projection of household-level consumption expenditures under macroeconomic and demographic changes. *Energy Policy*. https://doi.org/10.1016/j.enpol.2024.114059