

Eco Marks and Green Marketing Behaviour: A Secondary Data Analysis of Sustainable Consumption and Consumer Behaviour in India

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Abstract

Environmental sustainability has increasingly become an important consideration in consumption, product choice and marketing communication in India. The introduction of the Ecomark framework, strengthened regulation against greenwashing, expansion of energy-efficiency labelling and growing policy emphasis on sustainable lifestyles have created an institutional environment in which environmental information can influence consumer behaviour. Against this background, the present study examines the relationship between sustainable consumption conditions, environmental awareness and consumer behaviour through secondary data from official Indian sources. The study draws primarily upon the Household Consumption Expenditure Survey 2023–24 of the Ministry of Statistics and Programme Implementation and the Residential Energy Consumption Patterns and Appliance Ownership in India survey of the Bureau of Energy Efficiency and CLASP. The HCES data provide comparable rural and urban monthly per capita consumption expenditure across all 36 States and Union Territories, while the BEE–CLASP survey provides evidence on household appliance ownership, electricity end-use patterns, energy-efficiency awareness and purchase considerations. Two research objectives and two corresponding hypotheses guide the empirical analysis. Descriptive statistics, paired-samples t-test, Pearson correlation and Spearman rank correlation are applied to the State/UT-level HCES observations. The paired analysis indicates a statistically significant difference between rural and urban MPCE, with urban MPCE exceeding rural MPCE by an average of approximately ₹2,433.56. The paired-samples t-test produces $t = 14.627$ with 35 degrees of freedom and $p < .001$. Pearson correlation between rural and urban MPCE is .871, while Spearman rank correlation is .846, both statistically significant at $p < .001$. The results demonstrate a strong and consistent association between rural and urban consumption expenditure across States and Union Territories, while the BEE evidence demonstrates that environmental awareness does not automatically translate into energy-efficient purchasing behaviour. The study concludes that Ecomark and related green-marketing mechanisms can be more effective when credible environmental information is combined with affordability, transparent standards, consumer awareness and behavioural incentives.

Keywords Ecomark, green marketing, sustainable consumption, consumer behaviour, environmental awareness, energy efficiency, MPCE, household consumption, greenwashing, India.

1. Introduction

Environmental sustainability has moved from being primarily a concern of environmental policy to becoming an increasingly important dimension of consumption, product development and marketing behaviour. Consumers today encounter environmental claims relating to energy efficiency, recyclable materials, resource conservation, lower emissions, sustainable production and responsible consumption in an expanding range of products and services. Such claims have the potential to influence consumer preferences, but their effectiveness depends substantially upon the credibility, accessibility and comparability of the information supplied to consumers. In this context, eco-labels and environmental certification systems can reduce information asymmetry between producers and consumers by providing an identifiable indication that a product satisfies specified environmental criteria. The Government of India has strengthened this institutional framework through the Ecomark Rules, 2024, while the Department of Consumer Affairs has separately introduced guidelines addressing the prevention and regulation of greenwashing and misleading environmental claims. These developments indicate that environmental marketing in India is increasingly being connected with standardisation, verification and consumer protection rather than being treated merely as a promotional strategy.

The relationship between environmental information and consumer behaviour, however, cannot be understood solely from the existence of an eco-label. Consumer decisions are embedded in broader economic and social conditions. Household purchasing capacity, expenditure patterns, access to electricity, appliance ownership, energy prices, awareness of efficiency benefits and perceived product value can all affect the extent to which environmental attributes enter the purchase decision. The Household Consumption Expenditure Survey 2023–24 provides an important national statistical basis for examining these economic conditions. Its State/Union Territory estimates show substantial variation in monthly per capita consumption expenditure across India and reveal a systematic difference between rural and urban consumption levels. At the same time, the Residential

Energy Consumption Patterns and Appliance Ownership in India survey conducted by the Bureau of Energy Efficiency in collaboration with CLASP provides evidence on actual household ownership and energy-related behaviour. The survey of 4,321 households across 20 States and major climatic zones indicates widespread ownership of LED lamps and fans, but comparatively lower penetration of appliances such as air conditioners and washing machines. It also shows that energy-efficiency awareness and energy-saving behaviour are not identical phenomena.

The present study therefore examines green marketing behaviour within the broader context of sustainable consumption rather than treating eco marks as an isolated communication device. The empirical analysis combines two complementary dimensions of secondary evidence. First, HCES data are used to examine rural and urban consumption expenditure patterns through a State/Union Territory-level paired dataset. Second, BEE–CLASP evidence is used descriptively to examine household appliance ownership, electricity end-use distribution, energy-efficiency awareness, energy-saving practices and purchase priorities. The statistical component of the study is restricted to observations that are directly available in the official source table. The All-India aggregate is not treated as an additional State/UT observation because doing so would duplicate aggregate information within an inferential dataset. The resulting analysis provides an empirically grounded assessment of the economic and behavioural conditions within which eco marks and green marketing initiatives operate in India.

2. Conceptual and Policy Framework

Green marketing refers to the development, positioning and communication of products and services in relation to environmental considerations. Its scope extends beyond advertising and includes product design, production processes, packaging, distribution, pricing and information provided to consumers. An environmental claim can influence purchasing behaviour only when consumers perceive it as relevant, understandable and credible. Eco marks provide one institutional mechanism for improving credibility by linking an environmental claim to defined criteria and an assessment framework. In India, the Ecomark Rules, 2024 establish a formal framework for identifying products that meet prescribed environmental criteria alongside applicable quality requirements. The framework is particularly important because consumers generally cannot independently verify the environmental performance of products at the point of purchase. A recognised mark can therefore function as an information signal, although its behavioural impact depends upon awareness, trust and the relative importance consumers attach to environmental attributes compared with price, durability, brand reputation and other purchase considerations.

The policy environment surrounding green marketing has simultaneously developed through consumer-protection measures. The Department of Consumer Affairs issued the Guidelines for Prevention and Regulation of Greenwashing or Misleading Environmental Claims, 2024. These guidelines are relevant to sustainable consumption because environmental marketing can create misleading impressions if claims are vague, incomplete, unsupported or presented without adequate qualification. The regulatory emphasis on truthful environmental communication strengthens the information value of legitimate eco marks by distinguishing verifiable environmental attributes from unsupported promotional statements. The role of the Bureau of Indian Standards is also relevant because standardisation and conformity assessment contribute to the credibility of product information in the marketplace. In combination, these measures suggest that India's green-marketing framework is increasingly moving towards an information architecture based upon standards, verification and consumer protection.

The conceptual relationship between eco marks and consumer behaviour may be represented through three connected stages. The first is information availability, in which environmental attributes become visible to the consumer through labels, certification, product information and marketing communication. The second is information evaluation, in which consumers assess the environmental claim alongside price, durability, brand reputation, convenience and perceived product performance. The third is behavioural response, which may include purchase, product preference, energy-efficient use, continued adoption or recommendation. Household consumption conditions influence all three stages. A consumer with greater purchasing capacity may have more opportunity to consider environmental characteristics, whereas affordability constraints may result in price dominating the decision. Consequently, eco marks should be understood as one element within a broader sustainable-consumption ecosystem rather than as an independent determinant of consumer behaviour.

The Mission LiFE framework of NITI Aayog further reinforces the behavioural dimension of sustainability by emphasising changes in everyday consumption and lifestyle practices. Energy-efficient appliances, responsible resource use and reduced waste are relevant examples of behaviour through which household consumption

can generate environmental consequences. The BEE–CLASP household survey provides empirical evidence that helps connect this policy framework with actual consumer behaviour. It demonstrates that adoption of some efficient technologies can become widespread while conscious consideration of efficiency at the point of purchase remains limited. This distinction is important for green marketing research because the existence of environmentally preferable products does not necessarily imply that consumers consciously choose them for environmental reasons. Effective green marketing therefore requires not merely the availability of environmentally superior products but also credible information, affordability, consumer awareness and behavioural reinforcement.

3. Review of Secondary Evidence

The available official evidence indicates that sustainable consumption in India is shaped by both economic capacity and behavioural factors. The HCES 2023–24 shows that the average monthly per capita consumption expenditure is ₹4,122 in rural India and ₹6,996 in urban India in the without-imputation series. The difference is not restricted to total expenditure; the composition of consumption also varies considerably between rural and urban households. Food accounts for 47.04 percent of rural MPCE compared with 39.68 percent of urban MPCE, while non-food expenditure accounts for 52.96 percent and 60.32 percent respectively. Several expenditure categories with direct or indirect relevance to sustainable consumption, including conveyance, education, consumer services, rent and durable goods, show substantial urban-rural differences. These patterns demonstrate that consumer choices are embedded in different expenditure structures and levels of purchasing capacity.

The HCES evidence is particularly relevant to the analysis of green marketing because durable goods and energy-related consumption require household expenditure capacity and access to markets. Urban households record substantially higher expenditure on durable goods, rent and several consumer services than rural households. At the same time, higher expenditure does not automatically indicate more sustainable consumption. Rather, it provides an economic context in which consumers may have greater access to differentiated products, including energy-efficient appliances and environmentally certified products. The relationship therefore remains behavioural and contextual rather than mechanical. Eco marks may provide information about environmental performance, but price, utility and durability continue to influence purchase decisions.

The BEE–CLASP survey provides a complementary behavioural perspective. The survey covered 4,321 households across 20 States and major climatic zones. LED lamps were reported in 100 percent of surveyed households and fans in 99 percent, while television ownership was 55 percent, washing-machine ownership 22 percent and air-conditioner ownership 13 percent. Electricity use was distributed across thermal comfort, kitchen, other uses and lighting, with thermal comfort accounting for 40 percent, kitchen appliances 28 percent, other uses 21 percent and lighting 11 percent. The findings are important because they demonstrate that household electricity demand is closely connected with appliance ownership and usage, especially cooling-related equipment. As incomes and thermal-comfort requirements change, the environmental consequences of household consumption depend increasingly upon the efficiency of appliances selected and used by households.

The same survey provides particularly relevant evidence regarding the gap between awareness and behaviour. Sixty-five percent of respondents reported awareness of the benefits of energy-efficient appliances. The survey's energy-efficiency practice measure reported 78 percent use of LED lights, 15 percent powering off appliances when not in use, 5 percent regular maintenance of appliances and 2 percent always selecting energy-efficient appliances from the market. The figures demonstrate that different forms of environmental behaviour occur at markedly different frequencies. Widespread LED use does not necessarily mean that environmental efficiency is a dominant conscious criterion in all purchase decisions. Indeed, the report states that only 2 percent actively considered energy efficiency when purchasing lighting solutions. This distinction strengthens the argument that awareness, actual behaviour and purchase motivation should not be treated as interchangeable concepts.

4. Research Objectives

The study is guided by the following two research objectives:

1. To examine the pattern and rural-urban difference in monthly per capita consumption expenditure across States and Union Territories of India using the HCES 2023–24 State/UT dataset.

2. To examine the association between rural and urban monthly per capita consumption expenditure across States and Union Territories and interpret its implications for sustainable consumption and green marketing behaviour.

5. Research Hypotheses

The following null hypotheses are formulated in accordance with the research objectives:

H₀₁: There is no statistically significant difference between rural and urban monthly per capita consumption expenditure across the States and Union Territories of India.

H₀₂: There is no statistically significant association between rural and urban monthly per capita consumption expenditure across the States and Union Territories of India.

The first hypothesis is tested through a paired-samples t-test because rural and urban MPCE values are observed as matched pairs within the same State or Union Territory. The second hypothesis is examined through Pearson correlation, supported by Spearman rank correlation as a non-parametric robustness measure.

6. Data Sources

The study is based entirely on secondary data obtained from official government institutions and an official government-hosted household survey report. The principal source for household consumption expenditure is the Household Consumption Expenditure Survey 2023–24 published by the Ministry of Statistics and Programme Implementation. The study uses Statement 4 for item-group expenditure and Statement 7 for State/UT-level rural and urban MPCE. The State/UT analysis uses the series reported without imputation of specified free welfare items. This distinction is important because the HCES report separately presents an imputation-based series. The without-imputation series reports all-India MPCE of ₹4,122 for rural India and ₹6,996 for urban India and is the series used consistently in the present analysis.

The second major source is the Bureau of Energy Efficiency and CLASP report titled Residential Energy Consumption Patterns and Appliance Ownership in India: Insights From a 2024 Household Survey. The report is available through the official BEE website and is based on 4,321 surveyed households across 20 States and major climatic zones. The survey provides descriptive evidence on appliance ownership, household electricity use, energy-efficiency awareness, energy-saving practices and purchase priorities. These data are used for descriptive interpretation rather than being combined with HCES observations for inferential testing. This distinction preserves the original sampling and measurement framework of each source.

Additional policy and institutional sources include the Ministry of Environment, Forest and Climate Change's Ecomark Rules, 2024 and Annual Report 2024–25, the Department of Consumer Affairs' 2024 Greenwashing Guidelines, the Bureau of Indian Standards' consumer information, the Ministry of Statistics and Programme Implementation's EnviStats India publications, and NITI Aayog's Mission LiFE material. These sources establish the policy and conceptual environment in which eco marks, environmental claims and sustainable consumption operate.

Table 1. All-India Monthly Per Capita Consumption Expenditure by Major Item Groups, 2023–24

Item Group	Rural MPCE (₹)	Urban MPCE (₹)	Rural Share (%)	Urban Share (%)
Cereals & cereal substitutes	206	263	4.99	3.76
Pulses & products	84	98	2.04	1.40
Sugar & salt	37	40	0.89	0.57
Milk & milk products	348	503	8.44	7.19
Vegetables	248	288	6.03	4.12
Fruits	158	271	3.85	3.87
Egg, fish & meat	203	249	4.92	3.56
Edible oil	114	127	2.77	1.82
Spices	135	161	3.27	2.30
Beverages, refreshments & processed food	406	776	9.84	11.09
Food total	1,939	2,776	47.04	39.68
Pan, tobacco & intoxicants	158	166	3.84	2.37

Fuel & light	252	391	6.11	5.59
Education	133	418	3.24	5.97
Medical	282	409	6.83	5.85
Conveyance	313	592	7.59	8.46
Consumer services excluding conveyance	217	400	5.25	5.72
Miscellaneous goods & entertainment	256	484	6.22	6.92
Rent	23	460	0.56	6.58
Taxes & cesses	9	23	0.21	0.33
Clothing, bedding & footwear	273	396	6.63	5.66
Durable goods	267	481	6.48	6.87
Non-food total	2,183	4,220	52.96	60.32
All items	4,122	6,996	100.00	100.00

Source: Ministry of Statistics and Programme Implementation, Household Consumption Expenditure Survey 2023–24, Statement 4, without imputation.

Table 2. Household Appliance Ownership in the BEE–CLASP Survey

Appliance	Household Penetration (%)
LED lamps	100
Fans	99
Television	55
Washing machine	22
Air conditioner	13
Air cooler	11
Geyser	11
Induction cooktop	4
Microwave	4

Source: Bureau of Energy Efficiency/CLASP, Residential Energy Consumption Patterns and Appliance Ownership in India: Insights From a 2024 Household Survey, Figure 1.

Table 3. Average Annual Electricity Consumption per Surveyed Household

Category	Annual Electricity Consumption (kWh)
Overall	1,805
Rural	1,486
Urban	1,937
Composite climate	1,918
Hot & Dry climate	1,986
Temperate climate	1,272
Warm & Humid climate	1,665

Source: Bureau of Energy Efficiency/CLASP, Residential Energy Consumption Patterns and Appliance Ownership in India: Insights From a 2024 Household Survey, climate-zone analysis.

Table 4. Household Electricity Consumption by End-Use Category

End-use Category	Share of Electricity Use (%)
Thermal comfort	40
Kitchen	28
Other	21
Lighting	11

Total 100

Source: Bureau of Energy Efficiency/CLASP, 2024 Household Survey, Figure 2.

Table 5. Thermal-Comfort Appliance Ownership by Socioeconomic Class

Appliance	Lower (%)	Middle (%)	Upper (%)
Air conditioner	4	43	53
Air cooler	18	53	29
Table fan	24	55	21
Ceiling fan	18	55	27

Source: Bureau of Energy Efficiency/CLASP household survey, Figure 17.

Table 6. Kitchen Appliance Ownership by Socioeconomic Class

Appliance	Lower (%)	Middle (%)	Upper (%)
Refrigerator	8	53	39
Mixer/grinder	3	46	51
Induction cooktop	4	49	47

Source: Bureau of Energy Efficiency/CLASP household survey, Figure 23.

Table 7. Other Appliance Ownership by Socioeconomic Class

Appliance	Lower (%)	Middle (%)	Upper (%)
Washing machine	12	46	42
Water pump	21	55	24
Iron	12	51	37
Television	16	52	32

Source: Bureau of Energy Efficiency/CLASP household survey, Figure 26.

Table 8. Energy-Efficiency Awareness and Practices

Indicator	Percentage (%)
Aware of benefits of energy-efficient appliances	65
Use LED lights	78
Power off appliances when not in use	15
Regular maintenance of appliances	5
Always select energy-efficient appliances from the market	2

Source: Bureau of Energy Efficiency/CLASP, 2024 Household Survey, Figures 28 and 29.

Table 9. Factors Influencing New Appliance Purchase Decisions

Purchase Consideration	Percentage (%)
Energy savings	61
Durable/long lasting	54
Appliance cost	49
Warranty period	40
Popular/well-known brand	38
Discount schemes	32
After-sales service	14
Retailer's advice	8
Online reviews	2

Source: Bureau of Energy Efficiency/CLASP household survey, Figure 30.

Table 10. Ownership of Star-Rated Air Conditioners

Star Rating	Share (%)
5-star	33
4-star	18
3-star	40
2-star	4
1-star	5
Not star rated	Approximately 0.2

Source: Bureau of Energy Efficiency/CLASP household survey.

7. Statistical Methodology and Tools

The statistical analysis is based on the State/Union Territory values reported in Statement 7 of the HCES 2023–24. There are 36 State/UT observations, each providing a rural MPCE and a corresponding urban MPCE. The All-India aggregate is excluded from inferential analysis because it is a national aggregate rather than an additional State/UT observation. This produces a matched dataset in which each State/UT contributes one rural value and one urban value. The paired structure of the data determines the appropriate statistical procedure for examining the rural-urban difference. The analysis first derives descriptive statistics for rural and urban MPCE and for the paired difference. A paired-samples t-test is then used to determine whether the mean difference between rural and urban MPCE is statistically significant.

The paired-samples t-test is appropriate because the two observations being compared belong to the same State/UT. The test evaluates whether the mean of the within-State/UT differences differs significantly from zero. The analysis uses the difference defined as urban MPCE minus rural MPCE. The resulting mean difference, standard deviation, t statistic, degrees of freedom and significance level are reported. A 95 percent confidence interval is also calculated to provide an estimate of the range within which the mean paired difference lies. Cohen's d is reported as a standardised measure of the magnitude of the paired difference.

Pearson's product-moment correlation coefficient is used to examine the linear association between rural and urban MPCE. Pearson correlation is appropriate for evaluating whether States/UTs with relatively higher rural MPCE also tend to have relatively higher urban MPCE. The coefficient of determination, r^2 , is also reported as a descriptive indication of the proportion of variance shared linearly within the paired dataset. Spearman's rank correlation is additionally calculated as a robustness measure because it evaluates the consistency of the rank ordering of States/UTs without requiring the same linear assumptions as Pearson correlation. The statistical tests are evaluated at the conventional 5 percent significance level.

The BEE–CLASP data are treated as descriptive secondary evidence because the published report presents survey distributions rather than a complete micro-level dataset suitable for independent inferential testing. The BEE findings are therefore not merged with the HCES State/UT observations and are not used to construct synthetic observations. Their purpose is to illuminate household energy-use patterns, environmental awareness and purchase behaviour alongside the statistically tested HCES evidence.

8. Statistical Analysis of Rural-Urban Consumption Expenditure

The State/UT data demonstrate considerable variation in monthly per capita consumption expenditure across India. Rural MPCE ranges from ₹2,739 in Chhattisgarh to ₹9,377 in Sikkim, while urban MPCE ranges from ₹4,927 in Chhattisgarh to ₹13,927 in Sikkim. Other relatively high rural values are observed in Chandigarh, Goa, Puducherry and Delhi, while relatively high urban values occur in Chandigarh, Sikkim, Andaman and Nicobar Islands and Arunachal Pradesh. Uttar Pradesh records rural MPCE of ₹3,481 and urban MPCE of ₹5,395. The variation confirms that consumption capacity differs considerably across States and Union Territories. Such variation is important for sustainable consumption research because the capacity to purchase differentiated products, including energy-efficient or environmentally certified products, is embedded within broader expenditure conditions.

Table 11. State/Union Territory-wise MPCE, 2023–24

State/UT	Rural MPCE (₹)	Urban MPCE (₹)
Andhra Pradesh	5,327	7,182
Arunachal Pradesh	5,995	9,832
Assam	3,793	6,794

Bihar	3,670	5,080
Chhattisgarh	2,739	4,927
Delhi	7,400	8,534
Goa	8,048	9,726
Gujarat	4,116	7,175
Haryana	5,377	8,428
Himachal Pradesh	5,825	9,223
Jharkhand	2,946	5,393
Karnataka	4,903	8,076
Kerala	6,611	7,783
Madhya Pradesh	3,441	5,538
Maharashtra	4,145	7,363
Manipur	4,531	5,945
Meghalaya	3,852	7,839
Mizoram	5,963	8,709
Nagaland	5,155	8,022
Odisha	3,357	5,825
Punjab	5,817	7,359
Rajasthan	4,510	6,574
Sikkim	9,377	13,927
Tamil Nadu	5,701	8,165
Telangana	5,435	8,978
Tripura	6,259	8,034
Uttar Pradesh	3,481	5,395
Uttarakhand	5,003	7,486
West Bengal	3,620	5,775
Andaman & Nicobar Islands	7,771	10,453
Chandigarh	8,857	13,425
Dadra & Nagar Haveli and Daman & Diu	4,311	6,837
Jammu & Kashmir	4,774	6,327
Ladakh	5,010	7,533
Lakshadweep	6,350	6,377
Puducherry	7,598	8,637
All-India	4,122	6,996

Source: Ministry of Statistics and Programme Implementation, Household Consumption Expenditure Survey 2023–24, Statement 7, without imputation.

Table 12. Descriptive Statistics of State/UT MPCE

Statistic	Rural MPCE (₹)	Urban MPCE (₹)	Urban – Rural Difference (₹)
N	36	36	36
Mean	5,307.44	7,741.00	2,433.56
Standard deviation of paired difference	—	—	998.21
Minimum	2,739	4,927	—
Maximum	9,377	13,927	—

Source: Author's calculation from HCES 2023–24 Statement 7.

The descriptive results indicate that the mean rural MPCE across the 36 State/UT observations is ₹5,307.44, whereas the corresponding mean urban MPCE is ₹7,741.00. The mean paired difference is therefore ₹2,433.56, indicating that urban MPCE is higher than rural MPCE across the State/UT dataset. The size of the difference is economically meaningful because it represents almost one-half of the mean rural MPCE. The variation between States and Union Territories is also substantial, demonstrating that the rural-urban difference does not occur against a uniform national consumption background. The evidence therefore supports the importance of examining consumption capacity when interpreting consumer adoption of products whose environmental attributes may carry an additional price or require higher initial expenditure.

Table 13. Paired-Samples t-Test of Rural and Urban MPCE

Measure	Result
Mean paired difference, Urban – Rural	₹2,433.56
Standard deviation of difference	₹998.21
t statistic	14.627
Degrees of freedom	35
p-value	< .001
95% confidence interval	₹2,095.81 to ₹2,771.30
Cohen's d	2.438

Source: Author's calculation from HCES 2023–24 Statement 7.

The paired-samples t-test produces a t statistic of 14.627 with 35 degrees of freedom and a p-value below .001. The null hypothesis of no mean rural-urban difference is therefore rejected at the 5 percent significance level. The 95 percent confidence interval for the mean paired difference extends from approximately ₹2,095.81 to ₹2,771.30. The confidence interval does not include zero, reinforcing the conclusion that the difference between rural and urban MPCE is statistically significant within the State/UT dataset. Cohen's d of 2.438 indicates a very large standardised paired difference. The result should be interpreted as evidence of a substantial systematic difference in reported rural and urban consumption expenditure rather than as evidence that urbanisation itself causes the difference.

The finding has implications for green marketing because environmental preferences are expressed within different economic contexts. A consumer's ability to consider a higher-priced energy-efficient appliance, certified product or environmentally preferable alternative can be affected by available household resources. The expenditure gap observed across the State/UT dataset does not imply that rural consumers lack environmental preferences. Instead, it indicates that affordability and purchasing capacity form an important part of the environment in which sustainable consumption decisions are made. Consequently, green marketing strategies that depend exclusively upon consumer willingness to pay may reach households unevenly. Eco marks can provide information and credibility, but the market response to that information will also depend upon product price, expected savings, durability and perceived utility.

9. Statistical Analysis of the Association Between Rural and Urban MPCE

The second component of the statistical analysis examines whether State/UTs with comparatively high rural MPCE also tend to have comparatively high urban MPCE. Pearson's correlation coefficient for the 36 State/UT pairs is .871 and is statistically significant at $p < .001$. This represents a strong positive linear association. The corresponding coefficient of determination is approximately 0.759, indicating that about 75.9 percent of the variance is shared linearly within this paired dataset. This statistic should not be interpreted as evidence that rural consumption expenditure causes urban consumption expenditure. Rather, it indicates that the two measures tend to move together across the State/UT observations.

Table 14. Correlation Analysis of Rural and Urban MPCE

Correlation Measure	Coefficient	Significance
Pearson correlation	.871	$p < .001$
Pearson r^2	.759	—
Spearman rank correlation	.846	$p < .001$
Number of State/UT pairs	36	—

Source: Author's calculation from HCES 2023–24 Statement 7.

The Spearman rank correlation is .846 and is also statistically significant at $p < .001$. The close agreement between the Pearson and Spearman coefficients strengthens the conclusion that the positive association is not dependent solely upon a particular linear specification. States and Union Territories with higher rural MPCE generally occupy higher positions in the urban MPCE distribution as well. The finding is relevant to sustainable consumption because it indicates that broader State/UT economic conditions are reflected across both rural and urban consumption environments. However, the strength of association should not obscure the existence of substantial absolute differences between rural and urban MPCE. A State may have relatively high values in both sectors while still displaying a sizeable rural-urban expenditure gap.

The statistical evidence therefore provides support for the second hypothesis. The probability associated with both Pearson and Spearman correlation is below the conventional significance threshold. H_02 is consequently rejected. The evidence indicates a strong and statistically significant association between rural and urban MPCE across the 36 State/UT observations. The result complements the paired t-test: the first analysis establishes a systematic level difference between the two consumption distributions, while the second demonstrates that their cross-State/UT movements are strongly related. Together, the two results provide a more complete picture of the consumption environment in which sustainable and environmentally informed purchasing behaviour occurs.

Table 15. Summary of Hypothesis Testing

Hypothesis	Statistical Test	Result	Decision
H_01 : No significant difference between rural and urban MPCE	Paired-samples t-test	$t = 14.627$, $df = 35$, $p < .001$	Reject H_01
H_02 : No significant association between rural and urban MPCE	Pearson correlation, supported by Spearman correlation	$r = .871$, $p < .001$; $p = .846$, $p < .001$	Reject H_02

Source: Author's analysis of HCES 2023–24 State/UT data.

10. Integrated Findings and Discussion

The combined evidence produces two important conclusions about the relationship between consumption capacity and sustainable consumer behaviour. First, the HCES analysis establishes that rural and urban consumption expenditure differ substantially across India, with urban MPCE consistently higher in the State/UT dataset. Second, the strong Pearson and Spearman correlations indicate that the two expenditure measures are nevertheless closely associated across States and Union Territories. This suggests that economic conditions affecting consumption are interconnected across rural and urban settings within States. The findings provide an important economic background for understanding green marketing because environmental product attributes are evaluated within household budgets and broader consumption structures. Eco marks can make environmental characteristics more visible and credible, but their behavioural impact is likely to depend upon whether the product remains economically accessible to consumers.

The BEE–CLASP findings add an important behavioural dimension to this economic evidence. The survey shows near-universal LED ownership and very high fan ownership, demonstrating that energy-efficient or relatively efficient technologies can achieve widespread adoption. Yet the same survey reports that only a small proportion of households consistently apply certain energy-saving practices or consciously select energy-efficient appliances in the marketplace. The contrast between 65 percent awareness of energy-efficiency benefits and only 2 percent reporting that they always select energy-efficient appliances from the market is particularly significant. It demonstrates that awareness is a necessary but insufficient condition for behavioural transformation. Green marketing therefore cannot depend exclusively upon communicating environmental benefits. The consumer must also perceive the product as affordable, useful, durable and trustworthy.

The purchase-priority evidence reinforces this interpretation. Energy savings were identified as a consideration by 61 percent of respondents, while durability or long life was identified by 54 percent and appliance cost by 49 percent. Warranty, brand reputation and discount schemes also had substantial shares. These results demonstrate that consumers evaluate multiple product attributes simultaneously. An environmental claim may strengthen the value proposition when it is associated with measurable energy savings, lower operating cost and longer product life. This creates an opportunity for green marketing to connect environmental performance with tangible consumer benefits rather than presenting sustainability as a purely moral or

abstract attribute. Eco marks can provide credibility to the environmental component of the value proposition, while energy-efficiency labels can communicate measurable performance.

The findings also have implications for the design of environmental labelling policy. An eco mark is more likely to influence behaviour when consumers understand what the mark signifies and when competing environmental claims can be distinguished from unsupported claims. The Greenwashing Guidelines are therefore complementary to the Ecomark framework. The former strengthens the credibility of environmental communication by addressing misleading claims, while the latter provides an institutional basis for identifying qualifying products. Together they can reduce consumer uncertainty. The effectiveness of this framework, however, will ultimately depend upon consumer awareness, recognition and trust, as well as the extent to which certified products remain commercially accessible.

The State/UT expenditure results further suggest that a differentiated approach to sustainable consumption may be appropriate. Higher-income or higher-expenditure environments may offer greater opportunities for adoption of relatively expensive efficient technologies, whereas affordability constraints may be more important in lower-expenditure environments. This does not imply that environmental marketing should be restricted to high-income consumers. Instead, it indicates that the design of sustainable products should incorporate affordability and lifetime economic value. If an energy-efficient appliance requires a higher initial purchase price but produces measurable savings over its operating life, green marketing can communicate both environmental and economic benefits. Such communication may be more persuasive than an environmental claim without a clear consumer benefit.

The evidence also highlights the distinction between consumption expenditure and sustainable consumption. Higher MPCE does not automatically mean environmentally responsible consumption. It may increase the capacity to purchase efficient products, but it can also increase the consumption of energy-intensive goods and services. The BEE findings concerning thermal comfort are illustrative. Forty percent of surveyed household electricity use is associated with thermal comfort, while air-conditioner ownership is 13 percent. Rising household expenditure and improved purchasing capacity can therefore create both opportunities and challenges. Greater affordability can facilitate adoption of efficient appliances, but it can also increase demand for cooling services. Green marketing and environmental labelling must consequently operate alongside efficiency standards and broader energy policy.

11. Implications, Limitations and Future Research

The findings have implications for marketers, consumers and policymakers. For marketers, credible environmental attributes can become a meaningful component of product positioning when supported by recognised standards and measurable performance information. Environmental claims should be connected with product characteristics that consumers already value, such as durability, energy savings, operating-cost reduction and reliability. For policymakers, strengthening recognition of Ecomark and improving consumer understanding of environmental labels can increase the informational value of certification. Greenwashing regulation is equally important because misleading environmental claims can reduce consumer trust not only in individual brands but also in environmental labelling systems more generally. For consumers, improved access to reliable environmental information can make it easier to compare products on both environmental and economic dimensions.

The evidence also suggests that sustainable consumption policies should address affordability and behavioural conversion simultaneously. Awareness campaigns can communicate the environmental benefits of efficient products, but behavioural change requires consumers to perceive practical value. The BEE–CLASP finding that 65 percent of respondents were aware of energy-efficiency benefits while only 2 percent always selected energy-efficient appliances illustrates the gap between knowledge and purchase behaviour. Information campaigns should therefore be complemented by transparent labels, accessible product comparisons, financial incentives where appropriate and communication of lifecycle savings. Such measures can make environmental attributes more actionable at the point of purchase.

The study has certain limitations arising from the nature of secondary data. The HCES State/UT dataset provides aggregate expenditure observations rather than individual-level consumer records. Consequently, the statistical relationships reported in the study describe associations among State/UT observations and should not be interpreted as individual-level behavioural relationships. The BEE–CLASP survey provides valuable household-level descriptive evidence, but the published findings used here are aggregate survey distributions rather than a complete publicly available micro-level dataset. The BEE and HCES sources are therefore analysed separately rather than being statistically merged. In addition, the statistical analysis does not directly measure

consumer response to the Ecomark label because the official sources do not provide a common individual-level Ecomark adoption dataset suitable for such testing.

Future research can build upon these findings through primary surveys of consumers who have encountered Ecomark or other recognised environmental labels. Such studies can examine awareness, trust, willingness to pay, perceived credibility and actual purchase intention. Structural equation modelling could be used to examine relationships among environmental awareness, perceived credibility, consumer attitude, price sensitivity and purchase intention. Experimental research could compare consumer responses to products carrying verified environmental information with responses to products carrying generic environmental claims. Longitudinal studies could additionally examine whether repeated exposure to environmental labels produces sustained changes in purchasing and usage behaviour. Such research would complement the present secondary-data analysis by moving from macro-level consumption conditions and published household survey evidence towards direct measurement of consumer decision-making.

12. Conclusion

The study examined eco marks and green marketing behaviour within the broader context of sustainable consumption and consumer expenditure in India. The empirical evidence demonstrates that household consumption conditions differ substantially across rural and urban settings and across States and Union Territories. The HCES 2023–24 State/UT analysis shows a mean rural MPCE of ₹5,307.44 and a mean urban MPCE of ₹7,741.00, producing a mean paired difference of ₹2,433.56. The paired-samples t-test confirms that this difference is statistically significant, $t(35) = 14.627$, $p < .001$, with a 95 percent confidence interval of approximately ₹2,095.81 to ₹2,771.30 and a large standardised effect size of 2.438. The analysis also demonstrates a strong positive association between rural and urban MPCE, with Pearson $r = .871$ and Spearman $\rho = .846$, both statistically significant at $p < .001$.

The BEE–CLASP evidence complements these statistical findings by showing that consumer behaviour is influenced by more than purchasing capacity. Energy-efficiency awareness is relatively widespread, while specific energy-saving practices and conscious selection of energy-efficient products remain much less common. The findings concerning purchase priorities show that consumers consider energy savings, durability, cost, warranty, brand reputation and discounts alongside environmental characteristics. This indicates that green marketing is most likely to be effective when environmental performance is integrated into a broader consumer value proposition.

The Ecomark framework and the regulation of greenwashing provide an institutional foundation for strengthening the credibility of environmental information in the Indian market. Their effectiveness, however, depends upon consumer awareness, trust, affordability, transparency and the availability of products whose environmental claims can be meaningfully verified. The study therefore concludes that eco marks should be viewed not simply as promotional symbols but as components of a wider information and consumer-protection system. When credible environmental certification is combined with transparent communication, measurable energy and resource benefits, appropriate affordability and behavioural awareness, green marketing can contribute more effectively to the transition towards sustainable consumption in India.

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