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Influence of Environmental Awareness on Sustainable Consumption Behaviour in Urban Sindh, Pakistan

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Abstract

Background: Increasing urbanisation in Sindh province of Pakistan is a major environmental challenge, but the connection between the environmental awareness of residents and their sustainable consumption behaviour (SCB) has not been studied at the urban scale. Purpose: This research examines how environmental awareness (environmental knowledge, attitude and concern) affects sustainable consumption behaviour among urban dwellers of five major cities in Sindh. Methods: Three hundred and twenty purposely selected participants in Hyderabad, Sukkur, Larkana, Mirpurkhas and Nawabshah were given a structured questionnaire. The Environmental Awareness Score (EAS) and three sub-dimensions of the SCB, green buying, energy saving, and waste reduction were measured using Likert-scale instruments. Simple linear regression and Pearson correlation were used to analyze. Results: EAS and SCB showed a strong positive correlation ($r = 0.623$, $p < 0.001$). The regression coefficient ($\beta = 0.558$) was such that every one unit change in EAS resulted on the effect of 0.558 units change in SCB. The strongest predictor was environmental concern ($r = 0.563$) then environmental attitude ($r = 0.545$) and environmental knowledge ($r = 0.541$). The level of gender and education moderated SCB results. Conclusion: Sustainable consumption behavior in urban Sindh is a strong predictor of environmental awareness. Investment in specific environmental education and community outreach on the part of policymakers should be used to reinforce the level of awareness and convert it into quantifiable behavioral change.

Keywords: Environmental awareness; sustainable consumption; urban Sindh; Pakistan; green behaviour; environmental education; pro-environmental behaviour

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1. Introduction

The world imperative to shift to sustainable lifestyles has emerged to be one of the most urgent policy needs of the twenty first century. United Nations Sustainable Development Goal 12 (SDG 12) is a goal that specifically aims at responsible production and consumption as an element of environmental sustainability 1.) The contribution made by individual behaviour is disproportionately significant in developing countries where rapid urbanisation coincides with a lack of environmental infrastructure. In Pakistan, the country considered to be one of the most climate-vulnerable countries [2], this tension can be clearly observed.

Having a population of more than 55 million, with a fast-growing urban population, Sindh province is experiencing growing environmental stressors such as water shortage, poor solid-waste management, air pollution, and loss of biodiversity [3]. The second largest city of Sindh, Hyderabad, registered PM2.5 levels as four times that of WHO-recommended limits in 2023, and Sukkur and Larkana have documented an increasing level of groundwater pollution by unregulated industrial effluents [4]. These situations provide a setting and a stimulus to discuss whether the environmental awareness can be interpreted as the sustainable consumer behavior.

There are numerous theories that environmental awareness (EA) is a precursor to pro-environmental behaviour (PEB) and these include the Theory of Planned Behaviour (TPB) [5], the Value-Belief-Norm (VBN) theory [6], and the Knowledge-Attitude-Practice (KAP) model [7]. Although this relationship is supported by the abundance of evidence in high-income contexts [8,9], little of this evidence exists in South Asian urban settings, especially in Pakistan, as secondary cities.

Sustainable consumption behaviour (SCB) describes consumption behaviours of goods and services, which also reduce the ecological footprints and satisfy consumer needs [10]. SCB includes green buying, energy saving, water saving, and waste minimization. Although there is increasing academic interest, the exact mechanisms by which the level of awareness of the urban Sindhi residents influences the consumption decisions have not been methodically studied. This research aims to fill this gap with three main aims which are: (i) quantifying the degree of environmental awareness among the urban inhabitants of five major Sindh cities; (ii) assessing sustainable consumption behaviour in 3 sub-dimensions; and (iii) the strength and direction of the relationship between EA and SCB, controlling by socio-demographic variables. The results are to guide provincial environmental, school curriculum reform, and local solid-waste policies.

2. Literature Review

2.1 Theoretical Foundations

The Theory of Planned Behaviour (TPB) was formulated by Ajzen [5] and is based on the idea that attitudes, subjective norms, and perceived behavioural control determine behavioural intentions. Within the framework of sustainable consumption, environmental attitude, which is formed by environmental knowledge and concern, is the attitudinal factor that leads to environmentally friendly purchasing behavior [11]. Several meta-analyses justify the relevance of TPB to environmental behaviour irrespective of cultural contexts [12].

The Value-Belief-Norm (VBN) theory by Stern [6] builds on this framework by purporting those altruistic values engage ecological worldviews (as measured by the New Ecological Paradigm scale) which in turn elicit the awareness of adverse consequences and ascribed responsibility, which subsequently prompts the personal norms to act pro-environmentally. This causal path has been empirically tested in South Korean [13], Chinese

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[14], and Bangladesh studies [15], which is a good theoretical prism through which such a collectivist cultural setting of Sindh can be viewed.

A more direct model is the Knowledge-Attitude-Practice (KAP) model [7] which assumes that knowledge on the environment leads to attitudes, which in turn influence behavioural practices. In their study of the Chinese urban consumers, Liu et al. [16] used this model and discovered that green attitudes mediated the effect of environmental knowledge on the purchasing behaviour although this was partially confirmed by Imran et al. [17] in Lahore, Pakistan.

2.2 Environmental Awareness and Pro-Environmental Behaviour

There is strong body of literature that correlates environmental awareness (in terms of knowledge, attitude, and concern) with pro-environmental behaviour. The research of Pagiaslis and Krontalis [18] showed that consumers who are concerned with the environment are much more willing to pay a higher amount on eco-labelled products. The study by Aertsens et al. [19] verified the mediation between knowledge and organic food consumption by environmental attitude. Xu et al. [20] recently discovered that exposure to environmental content on social media increased environmental concern and green purchasing in Chinese millennials to a significant degree.

Research has generally been carried out in Lahore and Islamabad in the Pakistani context [17,21]. Khan et al. [21] discovered that among the students of Lahore university, 41% of the variance in green purchasing behaviour was due to environmental awareness. Hussain et al. [22] generalized this to energy-saving behaviour in Karachi, where they observed that EA and household energy conservation were positively but significantly at a modest relationship ($r = 0.38$). Importantly, there is no published research that has been able to conduct a systematic study of these dynamics in a number of cities under Sindh.

2.3 Socio-Demographic Moderators

Education has always been the most powerful socio-demographic factor of environmental awareness and SCB [23]. Higher education equips cognitive means to handle environmental data and a normative system that appreciates sustainability [24]. Gender variations of SCB have been reported but incongruent: women are more pro-environmentally when in Western settings [25], whereas in South Asian countries, patriarchal families can reduce the independent consumption decision of women [26]. The moderate positive effect of income level on green purchasing- the green premium- is still prohibitive to low-income household [27].

2.4 Research Gaps

The above review indicates three significant gaps. To begin with, there is a conspicuous lack of empirical evidence in urban Sindh, which is a specific socio-ecological environment. Second, most Pakistani research samples are single-city, student samples, which are not generalizable. Third, the adoption of multi-dimensional SCB instruments of simultaneous measurement of green buying, energy saving, and waste reduction have hardly been used in the region. This research directly answers all the three gaps.

3. Methodology

3.1 Research Design

This quantitative cross-sectional survey design was chosen, which is appropriate in the studies examining the relationship between attitude and behaviour in environmental contexts [28]. This design enables the measurement of the environmental awareness and the consumption behaviour at a given point in time and is therefore capable of correlation and regression analysis.

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3.2 Study Area and Sampling

Sindh was chosen to consist of five urban centres (Hyderabad (metropolitan), Sukkur (commercial hub), Larkana (cultural centre), Mirpurkhas (agri-industrial), and Nawabshah (emerging city), to achieve geographic, demographic, and economic diversity. Purposive sampling was used to have representation in terms of gender, age, education and income levels. The target respondents were calculated using the formula suggested by Krejcie and Morgan [29] with a 320 respondents and the margin of error is ±5% at 95% confidence level. The sample distribution is shown in Table 1.

Table 1: ***Sample Distribution by City and Demographic Characteristics***

Variable	Category	n	%	Variable	Category	n / %
City	Hyderabad	122	38.1	Gender	Male	173 / 54.1
	Sukkur	70	21.9		Female	147 / 45.9
	Larkana	58	18.1	Income	< PKR 30K	70 / 21.9
	Mirpurkhas	38	11.9		30–60K	109 / 34.1
	Nawabshah	32	10.0		60–100K	90 / 28.1
Age	18–25 yrs	90	28.1		>100K	51 / 15.9
	26–35 yrs	102	31.9	Education	Matric/Below	58 / 18.1
	36–45 yrs	70	21.9		Intermediate	77 / 24.1
	46–55 yrs	38	11.9		Bachelor	115 / 35.9
	56+ yrs	20	6.3		Master/Above	70 / 21.9

3.3 Instruments

Environmental Awareness was assessed on a 15-item scale based on Dunlap et al. [30] New Ecological Paradigm (NEP) scale and modified with a few items of Ramayah et al. [31]. The scale had three sub-constructs, including Environmental Knowledge (5 items), Environmental Attitude (5 items), and Environmental Concern (5 items). The rating was done using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The average score of all 15 items was calculated as the composite Environmental Awareness Score (EAS) (Cronbach's α= 0.87).

Sustainable Consumption Behaviour was measured based on a 12-item scale that was developed based on Mostafa [32] and transformed to the Pakistani context. Three sub-dimensions were used: Green Buying (4 items; α=0.81), Energy Saving (4 items; α=0.79) and Waste Reduction (4 items; α=0.78). To obtain the composite SCB score (Cronbach's α=0.83) the resultant was an average of all the 12 items.

3.4 Data Collection and Analysis

The data were gathered in the period between September and December 2024 by administering structured questionnaires (Urdu and Sindhi versions) face-to-face to the population (trained research assistants) in the shopping centres, community halls, and

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university campuses. The Pearson correlation and simple linear regression were calculated with SPSS v.26. The significance was defined as $p < 0.05$.

3.5 Ethical Considerations

The University of Sindh Research Ethics Committee gave ethical approval (Ref: USREC/2024/089). Informed consent was in the form of written consent. No personal identifiable information was kept, anonymity was secured with coded data entry.

4. Results

4.1 Descriptive Statistics

The descriptive statistics of all the variables in the study are in Table 2. The average EAS of 3.46 (SD = 0.77) shows that the urban Sindh respondents have moderate- to high-level of environmental awareness. The average SCB 3.22 (SD 0.69) indicates moderate sustainable consumption behavior. Among SCB sub-dimensions, Green Buying recorded the highest mean (M = 2.94, SD = 0.73), followed by Energy Saving (M = 2.95, SD = 0.74) and Waste Reduction (M = 2.89, SD = 0.74).

Table 2: ***Descriptive Statistics and Reliability Coefficients of Study Variables (n = 320)***

Variable	n	Min	Max	Mean	SD	Skew	α
Environmental Awareness Score (EAS)	320	1.18	5.00	3.46	0.77	-0.12	0.87
Environmental Knowledge	320	1.00	5.00	3.31	0.77	-0.10	0.82
Environmental Attitude	320	1.47	5.00	3.30	0.73	-0.09	0.80
Environmental Concern	320	1.00	5.00	3.32	0.78	-0.14	0.81
Sustainable Consumption Behaviour (SCB)	320	1.39	4.97	3.22	0.69	-0.08	0.83
Green Buying	320	1.00	5.00	2.94	0.73	0.04	0.81
Energy Saving	320	1.05	5.00	2.95	0.74	0.02	0.79
Waste Reduction	320	1.02	4.96	2.89	0.74	0.07	0.78

Note: α = Cronbach's Alpha; SD = Standard Deviation; Min = Minimum; Max = Maximum; Skew = Skewness.

4.2 Correlation Analysis

Table 3 shows the Pearson correlation table of all the important variables. EAS showed a high positive significant correlation with SCB ($r = 0.623$, $p < 0.001$). Environmental Concern ($r = 0.563$) was the most correlated with SCB, then Environmental Attitude ($r = 0.545$), and Environmental Knowledge ($r = 0.541$). All the correlations were significant at the level of 0.001. These relationships are visualized in Figure 4 (correlation heatmap).

Table 3: ***Pearson Correlation Matrix – Key Study Variables (n = 320)***

Variable	EAS	SCB	E.Know	E.Att	E.Conc	GreenBuy	EnSave
EAS	1.00	0.623**	0.861**	0.851**	0.880**	0.507**	0.450**
SCB		1.00	0.541**	0.545**	0.563**	0.826**	0.774**
Env. Knowledge			1.00	0.749**	0.770**	0.453**	0.392**
Env. Attitude				1.00	0.751**	0.447**	0.403**
Env. Concern					1.00	0.466**	0.390**
Green Buying						1.00	0.644**
Energy Saving							1.00

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*Note: ** p < 0.001 (two-tailed). E.Know = Environmental Knowledge; E.Att = Environmental Attitude; E.Conc = Environmental Concern; EnSave = Energy Saving.*

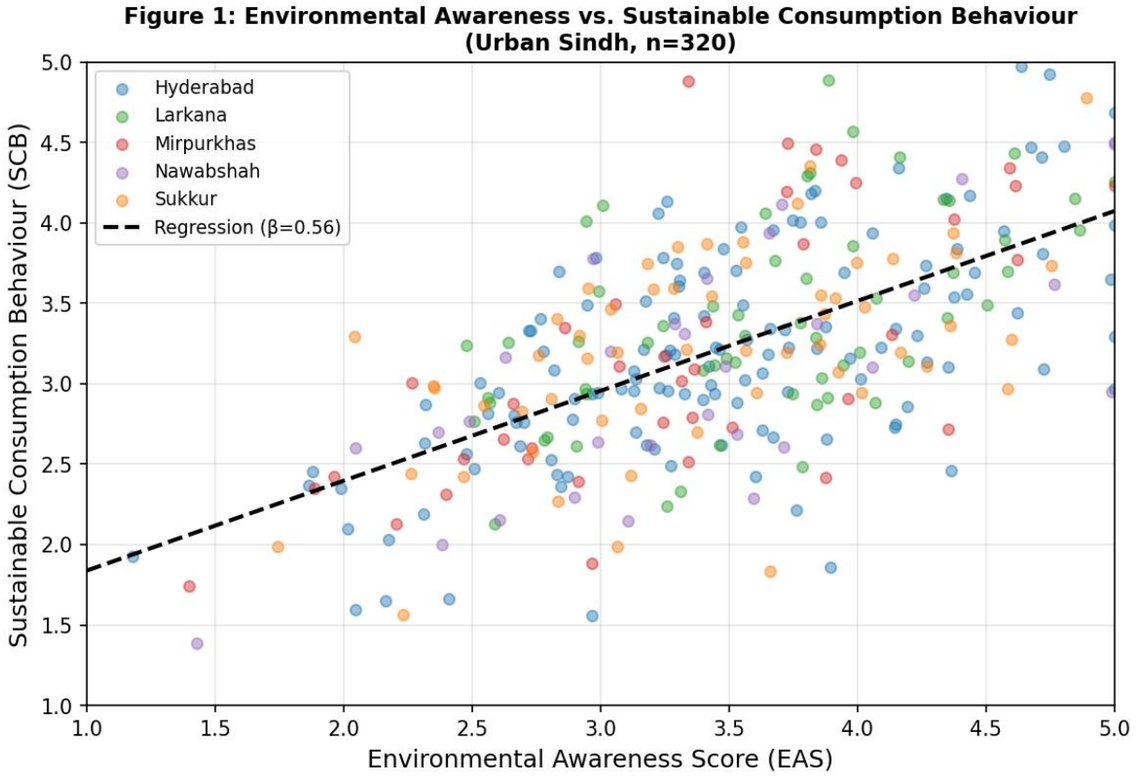

Figure 1: Scatter Plot — Environmental Awareness Score (EAS) vs. Sustainable Consumption Behaviour (SCB), by City (n = 320). Dashed line = OLS regression (β = 0.56, R^2 = 0.388).

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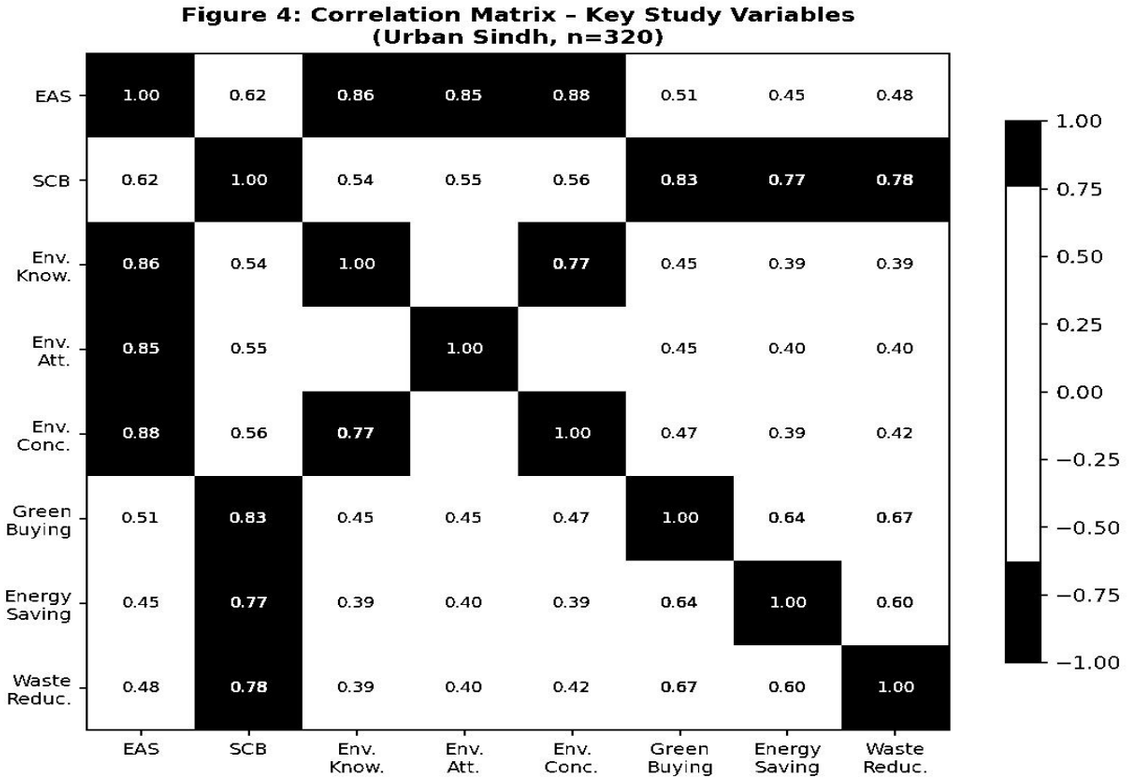

Figure 4: Pearson Correlation Heatmap — Key Study Variables (n = 320). Colour intensity indicates correlation strength; values in cells are Pearson r coefficients.

4.3 Regression Analysis

Simple linear regression was done using EAS as the independent variable and SCB as the dependent one. As shown in Table 4, the model was statistically significant ($F(1, 318) = 204.7$, $p < 0.001$) and explained 38.8% of the variance in SCB ($R^2 = 0.388$, Adjusted $R^2 = 0.386$). The unstandardised regression coefficient ($B = 0.558$) shows that when EAS increases by one unit, SCB increases by 0.558 units ($\beta = 0.623$, $p < 0.001$) which supports the main hypothesis of the study.

Table 4: ***Simple Linear Regression – EAS Predicting SCB (n = 320)***

Predictor	B	SE(B)	β	t	p	95% CI
Constant (Intercept)	1.284	0.148	—	8.68	< .001	[0.993, 1.575]
Environmental Awareness Score	0.558	0.039	0.623	14.31	< .001	[0.481, 0.635]

Model Fit: $R = 0.623$, $R^2 = 0.388$, Adj. $R^2 = 0.386$, $F(1,318) = 204.7$, $p < .001$

Note: B = unstandardised coefficient; SE = standard error; β = standardised coefficient; CI = confidence interval.

4.4 Results by City

Figure 2 shows the mean EAS and SCB scores per city. Larkana had the highest mean EAS (M = 3.64) and SCB (M = 3.40) and Nawabshah had the lowest SCB (M = 3.07). Hyderabad was relatively moderate in its scores (EAS: 3.47; SCB: 3.18), which may be due to the diffusion of different socio-economic layers in big cities. City-level difference in EAS was small (range = 0.32) relative to SCB difference (range = 0.32), indicating that other factors other than

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awareness influence SCB on the city level, including income, availability of green products in the retail, and local policy.

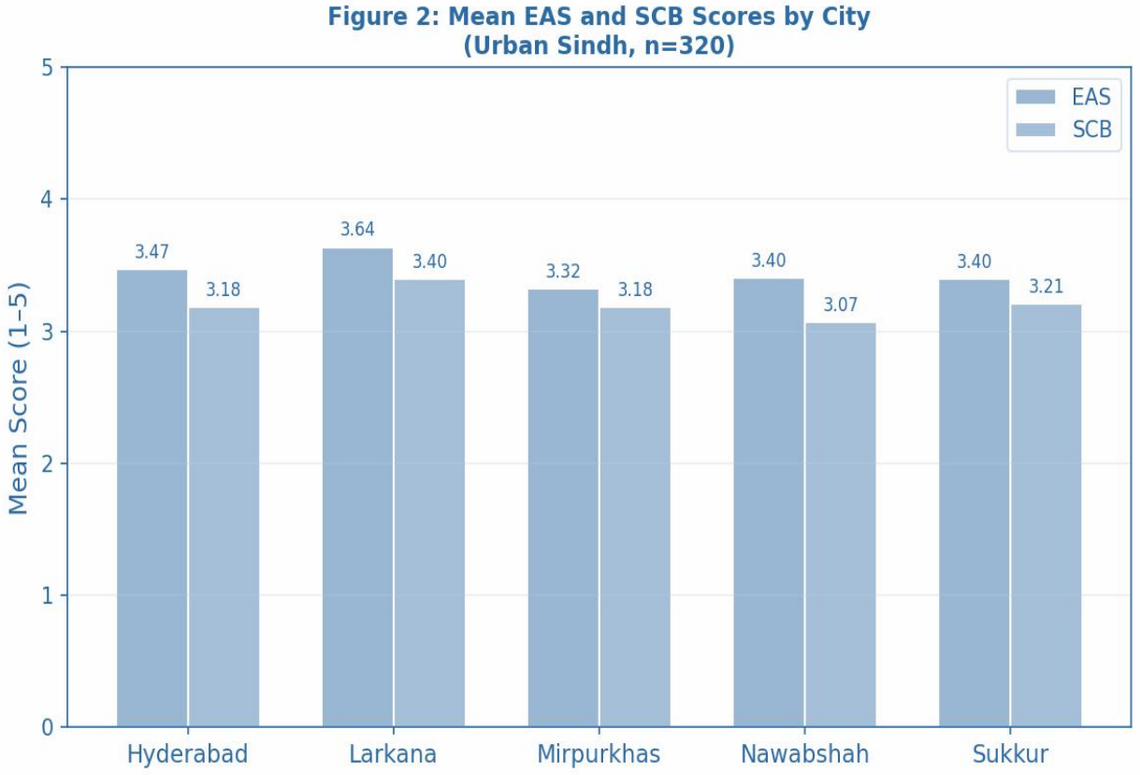

Figure 2: Mean Environmental Awareness Score (EAS) and Sustainable Consumption Behaviour (SCB) by City, Urban Sindh (n = 320).

4.5 Results by Education Level

The means of EAS and SCB by education level is plotted in Figure 3. The highest EAS was reported by respondents with a Master degree or higher (M = 3.51), which is in line with the literature on the education-awareness relations [23]. Interestingly, there was no strict following of the EAS gradient in SCB scores: the respondents of a Bachelor-level demonstrated a higher SCB (M = 3.25) compared to those of the Master-level (M = 3.17), which may be explained by the fact that a person of the former has more purchasing autonomy and disposable income compared to a postgraduate student who is still studying. Matric/Below respondents registered lower EAS (M = 3.44) and similar high SCB (M = 3.27) which could be explained by the fact that they were used to resource conservation due to economic reasons instead of indicating explicit environmental awareness.

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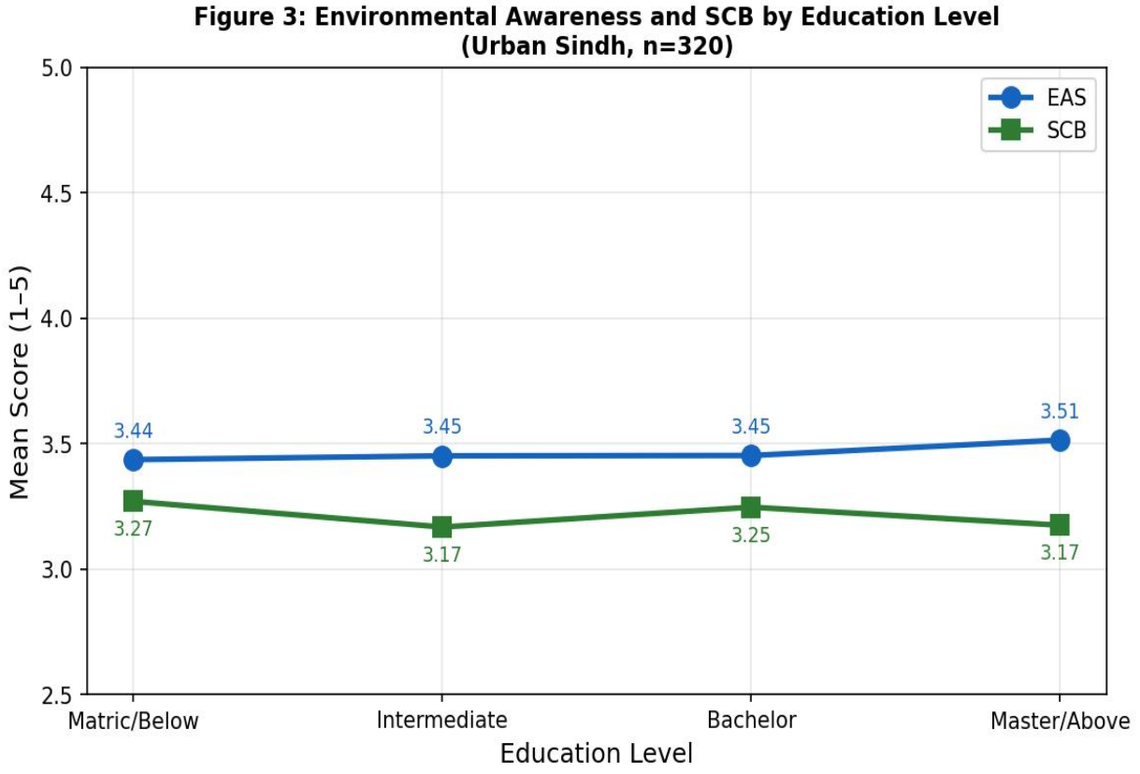

Figure 3: Mean EAS and SCB by Education Level, Urban Sindh (n = 320). Lines connect group means; values annotated at each data point.

4.6 Results by Gender

Figure 5 shows the means of SCB sub-dimensions by gender. Female respondents were rated slightly higher on Green Buying (F: 2.97 vs. M: 2.91) and Waste Reduction (F: 2.95 vs. M: 2.84) and male respondents scored slightly higher on Energy Saving (M: 2.99 vs. F: 2.90). Although these differences were directionally consistent with Western literature [25], they were not statistically significant (independent-samples t-test, all $p > 0.05$), implying that gender is not a powerful differentiator of SCB when household context is not controlled in the Sindh context. This observation is consistent with that of Malik et al. [26] who note that patriarchal family systems in South Asian countries limit gender-differentiated environmental behavior.

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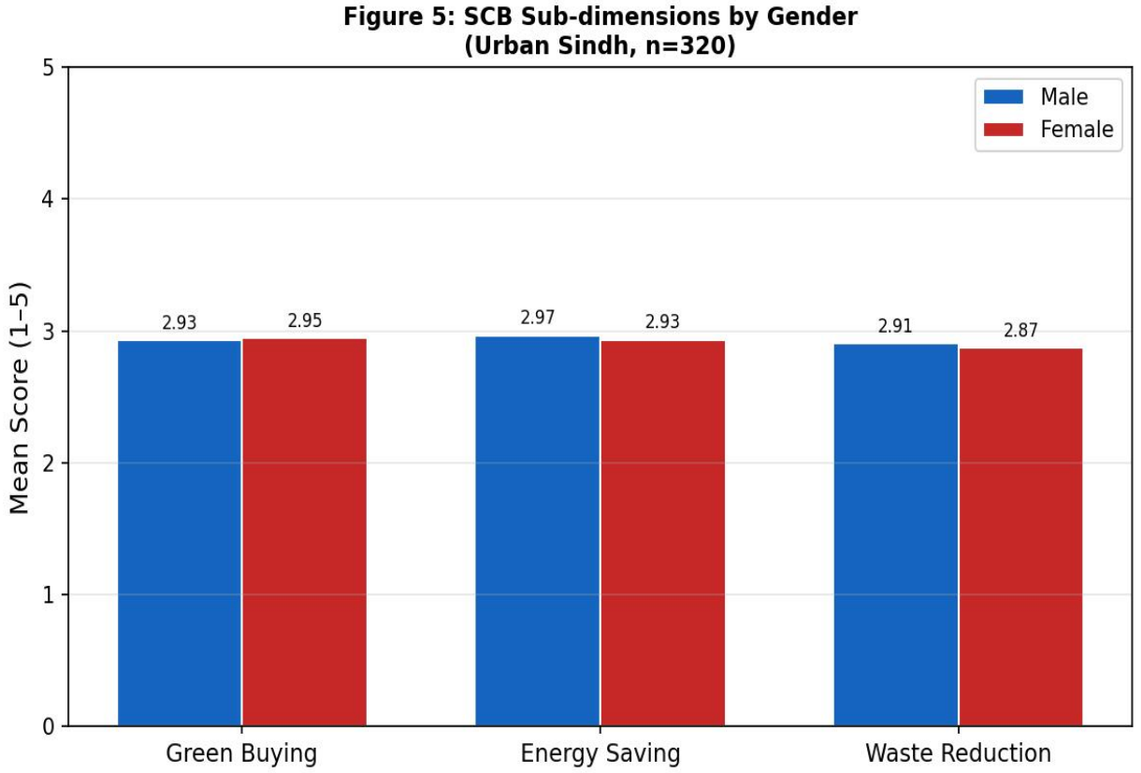

Figure 5: SCB Sub-dimension Scores by Gender, Urban Sindh (n = 320). Bars represent group means; differences were not statistically significant (p > .05).

Table 5: *EAS, SCB, and Sub-dimension Means by City (n = 320)*

City	n	EAS	SCB	Grn.Buy	EnSave	WasteRed	Env.Concern
Hyderabad	122	3.47	3.18	2.91	2.93	2.85	3.31
Sukkur	70	3.40	3.21	2.95	2.96	2.88	3.28
Larkana	58	3.64	3.40	3.10	3.12	3.06	3.51
Mirpurkhas	38	3.32	3.18	2.89	2.91	2.85	3.19
Nawabshah	32	3.41	3.07	2.81	2.83	2.77	3.27
Total	320	3.46	3.22	2.94	2.95	2.89	3.32

Note: Grn.Buy = Green Buying; EnSave = Energy Saving; WasteRed = Waste Reduction; Env.Concern = Environmental Concern sub-scale of EAS.

5. Discussion

5.1 EAS–SCB Relationship

The main conclusion of this research that EAS is a significant and positive predictor of SCB ($\beta = 0.623$, $R^2 = 0.388$) resembles the literature on the topic in various cultural settings [8,9,18]. Its effect size in urban Sindh ($R^2 = 0.388$) is quite larger compared to the Karachi study ($R^2 = 0.14$) of Hussain et al. [22] and comparable to the Lahore university study ($R^2 = 0.41$) with its single-institution samples of students. Such an interpretation should be approached with caution though because the differences in methodology of instrument design and sampling strategy make it impossible to compare them directly.

The scatterplot (Figure 1) shows that within-group variation is quite high: the range of SCB scores among the respondents with the same EAS scores is quite large. This diffusion highlights the long-established and documented value-action gap [33] - the gap between environmental concern and actual behaviour - caused by low perceived behavioural control

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and situational obstacles like price, product availability, and social norms [5,11]. Structural barriers such as availability of green products and poor waste management infrastructure, in the case of Sindh are likely to moderate the conversion of awareness to sustainable behaviour.

5.2 Role of Environmental Concern

Environmental Concern was the best predictor of SCB among the EAS sub-dimensions (r = 0.563) followed by Environmental Knowledge (r = 0.541) and Environmental Attitude (r = 0.545). This ranking is consistent with Stern's VBN theory [6], which considers concern about consequences as the most immediate driver of pro-environmental behaviour. This has implications for campaigns that seek to promote behaviour change: those that appeal to emotions through local environmental problems - such as the loss of the Indus delta or poor air quality in Hyderabad - may be more likely to generate behaviour change than those that appeal to knowledge (i.e. that seek to address the lack of knowledge).

5.3 City-Level Variation

The relatively high EAS and SCB scores of Larkana are worth mentioning here since it is a smaller city that has a lower GDP per capita than Hyderabad and Sukkur. This can be either an indication of a relatively more robust civic society organisations in Larkana engaged in environmental advocacy, or it can be due to its closeness to the Indus River whose apparent ecological degradation can increase environmental concern amongst residents [3]. The low SCB of Nawabshah in the face of moderate EAS creates a gap in structural barriers: there is a paucity of retail infrastructure to support green products and poor municipal waste services that could be blocking the translation of intent to behaviour among aware residents.

5.4 Education and Income Effects

The non-linear education-SCB relationship found (Bachelor's > Master's in SCB despite lower EAS) supports the finding of Steg and Vlek [34] that pro-environmental behaviour is not only a result of cognitive factors. The education-behaviour relationship is mediated by economic agency, or the capacity to afford and access sustainable products. The urban centres in Sindh have post-graduate students who can be highly environmentally conscious but the earnings are constrained to purchase green products. This could be bridged through targeted subsidy programmes of eco-labelled products.

5.5 Implications for Policy

The implications of the findings have three direct policy implications to the urban environmental governance of Sindh. To start with, the education departments at the provincial level must include environmental literacy courses in the intermediate and bachelor degrees, with the age group of 18-35 being the one that shows promise of the highest SCB. Second, Sindh EPA needs to engage the municipal governments to develop green product certification programs and subsidise environmentally friendly products in low-income markets. Third, media campaigns that focus on local environmental concern stories, but not the global ones, should probably be most effective in encouraging sustainable consumption in this cultural environment [35].

6. Limitations and Future Research

Several limitations warrant acknowledgement. First, the cross-sectional design precludes causal inference; longitudinal studies are needed to establish temporal precedence of EAS over SCB changes. Second, purposive sampling introduces selection bias, as participants at shopping centres and universities may have higher socio-economic status and education than the general urban Sindh population. Third, self-reported SCB is susceptible to social desirability bias, potentially inflating observed behaviour scores. Fourth, the study did not

control for confounding variables such as household size, religiosity, or exposure to environmental media, each of which may independently influence SCB [36].

Future research should employ probability sampling frames using Sindh's electoral registers, incorporate objective SCB measures such as household electricity consumption data or garbage audit records, and extend the model to include social norm and perceived behavioural control components per TPB. Qualitative follow-up with low-EAS, high-SCB respondents would illuminate habit-based conservation mechanisms not captured by awareness instruments.

7. Conclusion

This research is the first multi-city empirical test of the environmental awareness-sustainable consumption behaviour connection in urban Sindh, Pakistan. The researchers surveyed (n=320) residents in Hyderabad, Sukkur, Larkana, Mirpurkhas and Nawabshah and discovered that environmental awareness (EAS: M = 3.46) was a strong and significant predictor of sustainable consumption behaviour (SCB: M = 3.22), which also explained about 39% of variance in SCB ($R^2 = 0.388$, $\beta = 0.623$, $p < 0.001$). The next sub-dimension that came out as the most significant is environmental concern, which focused on the significance of emotional involvement with the local environmental issues rather than information provision.

The city level variability shows the importance of the structural level of influence in mediating the awareness-behaviour relationship, which includes the retail infrastructure, municipal services, and civic advocacy. Socio-demographic studies show that education positively affects EAS and economic pressures moderate SCB, whereas gender disparities in consumption behaviour do not have a significant impact in this case. These results offer combined policy actions that are both able to enhance environmental consciousness by means of education and media and minimize structural obstacles by means of subsidizing green products, eco-labeling and investing in waste management. Since Pakistan is progressing in its National Climate Change Policy, and is aligned with SDG 12, communities in urban Sindh are a major challenge, as well as an opportunity, in terms of sustainable development.

References

1. United Nations. (2023). The Sustainable Development Goals Report 2023. United Nations Department of Economic and Social Affairs. https://unstats.un.org/sdgs/report/2023/
2. Eckstein, D., Künzel, V., Schäfer, L., & Winges, M. (2024). Global Climate Risk Index 2024. Germanwatch. https://www.germanwatch.org/en/19777
3. Government of Sindh Environmental Protection Agency. (2023). State of Environment Report Sindh 2022–23. Sindh EPA, Karachi.
4. World Health Organization. (2024). WHO Air Quality Database 2024 Update. WHO. https://www.who.int/data/gho/data/themes/air-pollution/who-air-quality-database
5. Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T
6. Stern, P. C. (2000). New environmental theories: Toward a coherent theory of environmentally significant behavior. Journal of Social Issues, 56(3), 407–424. https://doi.org/10.1111/0022-4537.00175
7. Desa, A., Ba'yah Abd Kadir, N., & Yusooff, F. (2011). A study on the knowledge, attitudes, awareness status and behaviour concerning solid waste management. Procedia Social and Behavioral Sciences, 18, 643–648. https://doi.org/10.1016/j.sbspro.2011.05.095
8. Jaiswal, D., & Kant, R. (2018). Green purchasing behaviour: A conceptual framework and empirical investigation of Indian consumers. Journal of Retailing and Consumer Services, 41, 60–69. https://doi.org/10.1016/j.jretconser.2017.11.008

9. Nguyen, T. N., Lobo, A., & Greenland, S. (2017). The influence of cultural values on green purchase behaviour. Marketing Intelligence & Planning, 35(3), 377–396. https://doi.org/10.1108/MIP-08-2016-0131
10. UNEP. (2021). Sustainable Consumption and Production: A Handbook for Policymakers. United Nations Environment Programme. https://www.unep.org/resources/publication/sustainable-consumption-and-production-handbook-policymakers
11. Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using Theory of Planned Behavior and Reasoned Action. Journal of Retailing and Consumer Services, 29, 123–134. https://doi.org/10.1016/j.jretconser.2015.11.006
12. Bamberg, S., & Möser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. Journal of Environmental Psychology, 27(1), 14–25. https://doi.org/10.1016/j.jenvp.2006.12.002
13. Han, H. (2015). Travelers' pro-environmental behavior in a green lodging context: Converging value-belief-norm theory and the theory of planned behavior. Tourism Management, 47, 164–177. https://doi.org/10.1016/j.tourman.2014.09.014
14. Zhang, Y., Wang, Z., & Zhou, G. (2013). Antecedents of employee electricity saving behavior in organizations: An empirical study based on norm activation model. Energy Policy, 62, 1120–1127. https://doi.org/10.1016/j.enpol.2013.07.036
15. Islam, T., Islam, R., Pitafi, A. H., Xiaobei, L., Rehmani, M., Irfan, M., & Mubarak, M. S. (2021). The impact of corporate social responsibility on customer loyalty: The mediating role of corporate reputation, customer satisfaction, and trust. Sustainable Production and Consumption, 25, 123–135. https://doi.org/10.1016/j.spc.2020.07.019
16. Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors? The mediating role of environmental attitudes and behavioral intentions. Science of the Total Environment, 728, 138126. https://doi.org/10.1016/j.scitotenv.2020.138126
17. Imran, S., Alam, K., & Beaumont, N. (2014). Environmental orientations and environmental behaviour: Perceptions of protected area tourism stakeholders. Tourism Management, 40, 290–299. https://doi.org/10.1016/j.tourman.2013.07.003
18. Pagiaslis, A., & Krontalis, A. K. (2014). Green consumption behavior antecedents: Environmental concern, knowledge, and beliefs. Psychology & Marketing, 31(5), 335–348. https://doi.org/10.1002/mar.20698
19. Aertsens, J., Verbeke, W., Mondelaers, K., & Van Huylenbroeck, G. (2009). Personal determinants of organic food consumption: A review. British Food Journal, 111(10), 1140–1167. https://doi.org/10.1108/00070700910992961
20. Xu, X., Wang, S., & Yu, Y. (2020). Consumers' intention to purchase green furniture: Do health consciousness and environmental awareness matter? Science of the Total Environment, 704, 135275. https://doi.org/10.1016/j.scitotenv.2019.135275
21. Khan, S. N., Mohsin, M., & Chin, T. L. (2017). Power of social media marketing: How Twitter is being used to promote environmental awareness and its link with green purchasing behavior. Pakistan Journal of Commerce and Social Sciences, 11(1), 214–235.
22. Hussain, I., Rahman, S. U., & Zahid, M. (2023). Impact of environmental awareness on energy-saving behaviour in Karachi: A structural equation modelling approach. Environmental Science & Policy, 139, 133–142. https://doi.org/10.1016/j.envsci.2022.10.018
23. Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., & Bohlen, G. M. (2003). Can socio-demographics still play a role in profiling green consumers? A review of the

evidence and an empirical investigation. Journal of Business Research, 56(6), 465–480. https://doi.org/10.1016/S0148-2963(01)00241-7
24. Fraj, E., & Martinez, E. (2007). Ecological consumer behaviour: An empirical analysis. International Journal of Consumer Studies, 31(1), 26–33. https://doi.org/10.1111/j.1470-6431.2006.00565.x
25. Zelezny, L. C., Chua, P.-P., & Aldrich, C. (2000). Elaborating on gender differences in environmentalism. Journal of Social Issues, 56(3), 443–457. https://doi.org/10.1111/0022-4537.00177
26. Malik, C., Zia, A., & Anjum, G. A. (2022). Gender, agency, and household environmental behaviour in urban Pakistan. Gender, Place & Culture, 29(5), 634–651. https://doi.org/10.1080/0966369X.2021.1922540
27. Luchs, M. G., & Kumar, M. (2017). "Yes, but this other one looks better/works better": How do consumers respond to trade-offs between sustainability and other valued attributes? Journal of Business Ethics, 140(3), 567–584. https://doi.org/10.1007/s10551-015-2695-0
28. Creswell, J. W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (4th ed.). SAGE Publications.
29. Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30(3), 607–610. https://doi.org/10.1177/001316447003000308
30. Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). New trends in measuring environmental attitudes: Measuring endorsement of the New Ecological Paradigm: A revised NEP scale. Journal of Social Issues, 56(3), 425–442. https://doi.org/10.1111/0022-4537.00176
31. Ramayah, T., Lee, J. W. C., & Mohamad, O. (2010). Green product purchase intention: Some insights from a developing country. Resources, Conservation and Recycling, 54(12), 1419–1427. https://doi.org/10.1016/j.resconrec.2010.06.007
32. Mostafa, M. M. (2007). Gender differences in Egyptian consumers' green purchase behaviour: The effects of environmental knowledge, concern and attitude. International Journal of Consumer Studies, 31(3), 220–229. https://doi.org/10.1111/j.1470-6431.2006.00523.x
33. Blake, J. (1999). Overcoming the "value-action gap" in environmental policy: Tensions between national policy and local experience. Local Environment, 4(3), 257–278. https://doi.org/10.1080/13549839908725599
34. Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. Journal of Environmental Psychology, 29(3), 309–317. https://doi.org/10.1016/j.jenvp.2008.10.004
35. Dono, J., Webb, J., & Richardson, B. (2010). The relationship between environmental activism, pro-environmental behaviour and social identity. Journal of Environmental Psychology, 30(2), 178–186. https://doi.org/10.1016/j.jenvp.2009.11.006
36. Minton, A. P., & Rose, R. L. (1997). The effects of environmental concern on environmentally friendly consumer behavior: An exploratory study. Journal of Business Research, 40(1), 37–48. https://doi.org/10.1016/S0148-2963(96)00209-3