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Content available at www.cognixpress.in Online ISSN: XXXX-XXXX**EDUCATION AS A CATALYST FOR SUSTAINABLE DEVELOPMENT AWARENESS
AMONG BACKWARD-CLASS WOMEN: POST HOC ANALYSIS****MONIKA RAJAK¹ and MINARA YEASMIN²***¹Department of Education, Aliah University, Park Circus Campus 17, Gorachand Road, Beniapukur, Kolkata, West Bengal 700014, India.**²Assistant Professor, Department of Education, Aliah University, Park Circus Campus, 17, Gorachand Road, Beniapukur, Kolkata, West Bengal 700014, India.*

ARTICLE HISTORY	ABSTRACT
Received: 10.03.2026 Revised: 16.04.2026 Accepted: 26.04.2026	In the technological era, awareness of sustainable development is an essential attribute for individuals. The present inspection aims to examine the role of education on awareness towards sustainable development (ATSD) (social, economic and environmental) among backward class women using a post hoc test. A total of 101 backward class women were chosen using stratified random sampling. This study employed statistical techniques, including Mean, Standard Deviation (SD), and ANOVA. The results indicate that more educated women demonstrate greater awareness of sustainable development compared to the Primary to Upper Primary and Secondary to Higher Secondary groups. This study recommends that more importance should be placed on basic or school-level education, sustainable related topics should be incorporated in basic school-level curriculum, and educational programmes at the school level on these issues.
Keywords: Awareness of Sustainable Development, Backward Class Women, Post Hoc Test, Educational Qualification, Murshidabad District. West Bengal.	
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INTRODUCTION

In the technological era, sustainable development has arisen as the first priority worldwide, specifically, following the report of Sustainable Development Goals (SDGs) by the United Nations. These goals highlighted the three aspects, i.e, economic, social, and environment to ensure sustainable human well-being [1]. Due to that, education is a crucial element of creating awareness for sustainable development. Education not only builds one's skills and knowledge but also develops the values and attitudes needed to solve the complex issues facing society with regards to sustainable development [2].

When exploring the role of education on women from backward classes in India, we find that the educational system is even more important for backward classes women, because they face different form of disadvantage of the society. So their education attainment helps to brake the social stigma. Women from the Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Classes (OBC) in India do not have adequate access to high-quality education and, therefore, do not have adequate levels of awareness nor participation in sustainable development processes [3]. Because of these barriers (socio-economic), these women do not have the ability to effectively participate in environmental decision-making or in sustainable livelihoods.

For women from disadvantaged backgrounds, education acts as a vital means through which they can develop an understanding of sustainability-related matters, enhance critical thought, build social awareness and responsibility, gain access to economic prosperity, and develop an awareness and consciousness of environmental progress, all of which are essential for achieving sustainable development. As well, studies show that educational attainment positively influences people's attitudes toward environmental conservation, resource-management practices, and community development [4]. Therefore, for the backward class population, education can be instrumental in breaking cycles of marginalization and supporting individuals' participation in sustainable efforts.

In addition to this, Education for Sustainable Development (ESD) is an important area of research because it emphasizes the need to include sustainability principles into education systems as a means to benefit all individuals regardless of their background. ESD encourages learners to adopt sustainable lifestyles, support gender equality, and contribute to community resilience [5]. However, disparities in educational access and quality continue to limit the effectiveness of such initiatives

among disadvantaged groups, particularly in rural and semi-urban regions of India. In this present study, examined the role of education in developing sustainable developmental awareness among backward class women becomes highly relevant. Form analysis this perspective, understanding how different levels of educational attainment influence sustainable developmental awareness among backward class women.

LITERATURE REVIEW

Fostering sustainable developmental awareness, education plays a crucial role, particularly among backward-class women. Education for Sustainable Development (ESD) is an approach that focuses on providing people with information, ethics, and competence in a way that ensures sustainability and equity. From research findings, it can be noted that education not only raises people's awareness about environmental matters but also fosters social responsibility and critical thinking [6].

Within the framework of sustainable development, education has been a crucial tool for changing the thoughts and perspectives [7]. For instance, González and Sebastián-López argue that learning; particularly interdisciplinary learning provides individuals with the capacity to understand the complex interconnections between society and the environment and to enhance awareness of the Sustainable Development Goals (SDGs) [8]. This is particularly important for women from backward communities who are often faced with structural barriers that limit their access to information and resources.

In the context of backward class populations, education is closely linked to empowerment and participation in sustainable practices. Mukoni argues that community-based environmental education increases women's participation in sustainability initiatives by means of dialogue, collaboration and inclusion of marginalised voices. This kind of initiatives is curcial for the backward-class women as they help to bridge the gap between knowledge and practice [9]

Additionally, intersectional analysis has proven that caste, class, and gender affect educational access and achievement in India. According to Kumar and Kumar, women from disadvantaged backgrounds (e.g., SC, ST, or OBC) experience multiple barriers that restrict their ability to obtain a quality education, thus limiting their awareness of sustainable development issues [10]. As such, there is a need for inclusive, quality, and equitable education policies so that sustainable development awareness can be accessible throughout society.

Further research shows that education is a major contributor to women's empowerment and decision-making ability, both of which are key components of sustainable community development. Research conducted by Ogbonnaya and Ebere indicates that education-related initiatives lead to increased participation by women in community development projects, thereby enabling the implementation of sustainable grassroots development practices [11]. Additionally, the inability of indigenous women to obtain an education affects their capacity to participate in sustainable development processes, creating continued cycles of marginalization [12].

Furthermore, gender-responsive schooling systems are fundamental to addressing inequality and ensuring sustainability.

Damanik explains that inclusive education policies will positively affect gender equality and support sustainable development outcomes [2, 13]. However, socio-cultural barriers impede progress. Therefore, it is important to integrate gender-sensitive educational practices into educational systems to create awareness and support the participation of backward-class women.

Form the review of literature, education is a importance determinant of sustainable developmental awareness among backward-class women. It not only facilitates knowledge acquisition but also promotes empowerment, participation, and social transformation. However, persistent inequalities in access to education necessitate targeted interventions to ensure that marginalized women can fully contribute to and benefit from sustainable development.

OBJECTIVES

- To compare the differences in Sustainable developmental awareness among Backward Classes women with respect to the level of education.
- To explore inter-group variations in sustainable developmental awareness among backward class women with respect to educational levels through post hoc comparisons.

Hypotheses

H01: There is no significant difference in Sustainable developmental awareness among Backward Classes women with respect to the level of education.

H02: There is no significant inter-group variation in sustainable developmental awareness among backward class women with respect to educational levels.

Operational Definition

Sustainable Development Awareness (SDA)

In this study, the researchers seek to investigate three aspects of sustainable developmental awareness i.e., economic, social, and environmental.

Backward Class Women

In the present study, "Backward Class women" refers to women from Scheduled Cast (SC), Scheduled Tribe (ST) and Other Backward Class (OBC).

Educational Qualification

In the present study, primary to upper primary, secondary to higher secondary, and higher education area considerate.

METHODOLOGY DESIGN

The descriptive survey method was used in this study, as it is highly effective for collecting data from a large number of participants [14].

Sampling technique and sample

This study employed a stratified random sampling method to select 101 backward class women from the Murshidabad district. The total sample was stratified based on demographic variables, including educational qualification. Two areas, Samserganj Block and Domkal Municipality were randomly chosen from the district to collect the data.

From the selected areas, data were collected from 30 backward-class women with primary to upper primary education, 18 with secondary to higher secondary education, and 53 with higher education from Samserganj Block and Domkal Municipality in Murshidabad district in West Bengal.

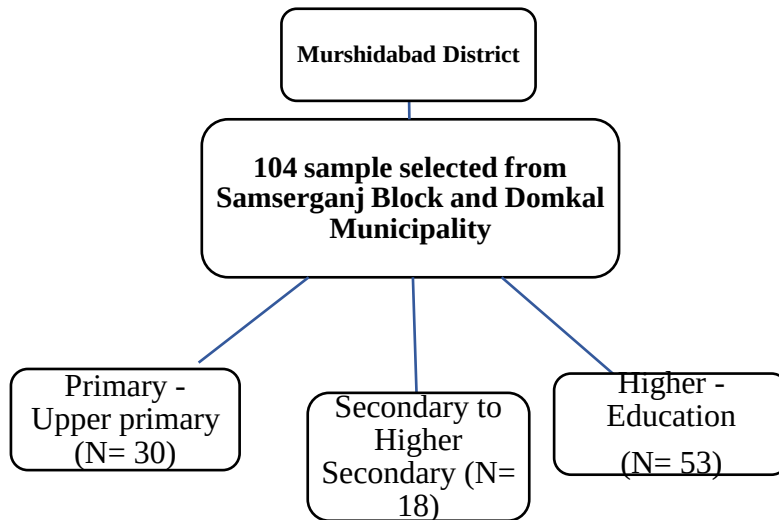


Figure 01: Structure of Sample Instruments

Sustainable Development Awareness (SDA): A total of 36 items for the SDA were developed by Atmaca, Kiray and Pehlivan in 2019, using a five-point rating scale [1, 15]. This scale consists of three subscales: Economy, Society and Environment. The alpha values were 0.77 for Economy, 0.87 for Society, 0.82 for Environment and 0.91 for the whole scale value. Content and construct validity were assessed for validation, while the alpha value determined reliability.

RESULTS

The study employed descriptive and inferential statistical techniques, using IBM SPSS 25 as the primary software for the data analysis.

Normality results

Table 01: Normality Test by absolute Sk and Ku

N	Valid	101
	Missing	0
Mean		131.75
Std. Error of Mean		1.519

Std. Deviation	15.263
Variance	232.948
Skewness	-.240
Std. Error of Skewness	.240
Kurtosis	-.765
Std. Error of Kurtosis	.476
Range	65
Minimum	95
Maximum	160

Based on the established guidelines provided by Kline and Kim, Table 01, all variables exhibit skewness values below 2 and 3, as well as kurtosis values below 7 and 10, indicating that the data adhere to the assumptions of normality [7,8, 16].

H01: There is no significant difference in Sustainable developmental awareness among Backward Classes women with respect to the level of education.

Table 02: Significant difference in Sustainable developmental awareness with respect to level of education

Scale: Sustainable developmental awareness					Test of Homogeneity of Variances			ANOVA		
Cast	Educational Qualification	N	Mean	Std. Deviation	Levene's Statistic		Sig	F	Sig	Remark
Overall scores of backward classes women	Primary - Upper primary	30	128.23	14.503	Equal variance assumed	.352	.704	4.037	0.02	Sig
	Secondary to higher Secondary	18	126.06	16.060						
	Higher - Education	53	135.68	14.569						
	Total	101	131.75	15.263						

**Significance at the 0.05 level*

The objective of H01 analysis, in Table 02, differences in sustainable developmental awareness among backward class women across different levels of educational qualification (Primary–Upper Primary, Secondary–Higher Secondary, and Higher Education).

The Levene's Test result was found to be non-significant ($F = 0.704$, $p = 0.352$), indicating that the assumption of homogeneity of variance was satisfied. Therefore, the use of one-way ANOVA is appropriate for further analysis. The ANOVA results revealed that there is a statistically significant difference in sustainable developmental awareness among the groups ($F = 4.037$, $p = 0.02 < 0.05$). Hence, the null hypothesis is not accepted. On the other side, comparison of mean scores indicates that women with higher education (Mean = 135.68) demonstrate greater sustainable developmental awareness compared to those with primary–upper primary education (Mean = 128.23) and secondary–higher secondary education (Mean = 126.06). However, since the ANOVA only indicates the presence of overall differences, post hoc analysis is required to identify which specific groups differ significantly from each other.

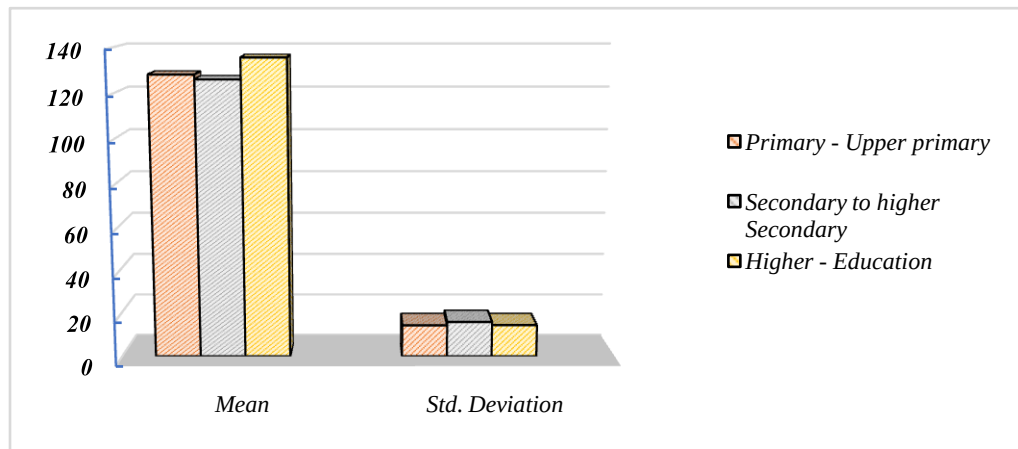


Figure 02: Difference in Sustainable developmental awareness with respect to level of education

H02: There is no significant inter-group variation in sustainable developmental awareness among backward class women with respect to educational levels.

Table 03: Tukey's HSD test for pairwise comparison.

Dependent Variable	(I) Educational Qualification	(J) Educational Qualification	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Sustainable Developmental Awareness	Higher Education	Secondary to Higher Secondary	9.624*	4.043	.050	.00	19.24
		Primary to Upper Primary	7.446	3.386	.076	-.61	15.50
	Secondary to Higher Secondary	Higher Education	-9.624*	4.043	.050	-19.24	.00
		Primary to Upper Primary	-2.178	4.418	.875	-12.69	8.34
	Primary to Upper Primary	Higher Education	-7.446	3.386	.076	-15.50	.61
		Secondary to Higher Secondary	2.178	4.418	.875	-8.34	12.69

*Significance at the 0.05 level

Table 03, reveals the result that backward class women with higher education demonstrate a significantly higher level of sustainable developmental awareness compared to those with secondary to higher secondary education (Mean Difference = 9.624, $p = .050$). The confidence interval (0.00 to 19.24) indicates that this difference is at the threshold of statistical significance, suggesting that higher education plays a decisive role in enhancing awareness related to sustainable development.

However, the difference between Secondary to Higher Secondary and Primary to Upper Primary groups (Mean Difference = -2.178, $p = .875$) is not statistically significant. Similarly, the difference between higher education and primary to upper primary groups (Mean Difference = 7.446, $p = .076$) is not statistically significant, suggesting that Secondary to Higher Secondary and Primary to Upper Primary groups are relatively comparable levels of awareness.

Overall, the Post Hoc test result indicates that higher educated backward classes women are more conscious and aware about sustainable development rather than Secondary to Higher Secondary and Primary to Upper Primary groups. So, this result implies that advanced education may act as a critical threshold for fostering deeper understanding and awareness of sustainable development issues among backward-class women.

DISCUSSION

In the present study examine the role of educational attainment in developing sustainable developmental awareness (SDA) among backward-class women. This objective was assessed in two ways. First, a comparative analysis using ANOVA was conducted to determine whether significant differences exist in SDA across different levels of educational qualification

(primary- upper primary, secondary- higher secondary, and higher education). The findings indicated a statistically significant difference in awareness levels across these groups, suggesting that education plays a crucial role in influencing attitudes toward sustainable development. This result is supported by other results which also revealed the same results. [9,10,13,5,15. 17].

However, while the ANOVA confirmed the existence of overall group differences, it did not recognize which specific educational categories differed significantly from one another. To address this limitation, a post hoc analysis was conducted. The results of the post hoc test revealed that women with higher education exhibit significantly greater sustainable developmental awareness compared to those with secondary and higher secondary education, whereas differences among the lower educational categories were not statistically significant.

These findings can be interpreted in focus of the broader socio-educational context, particularly in the post-COVID-19 pandemic period. The pandemic situation led to a notable decline in student enrolment and attendance in formal education systems. In such a context, women who have attained higher education are likely to represent a more self- motivated and self- learner group, having overcome socio economic barriers to continue their education [18]. Their persistence reflects not only access to resources but also a higher degree of intrinsic motivation, cognitive engagement, and exposure to diverse knowledge systems.

Consequently, higher-educated women are more likely to develop critical thinking skills, future-oriented perspectives, and a deeper understanding of sustainability issues. Their educational experiences enable them to internalize and interpret knowledge rather than merely acquiring it at a superficial level. This, in turn, shapes a more informed and proactive orientation toward sustainable development, including awareness of environmental, social, and economic dimensions [19]. On the other side, women with lower levels of education may not have had many opportunities for integrative and analytical learning experiences, which could explain the absence of significant differences among these groups [20]. So, the findings emphasize that it is not merely basic education, but advanced levels of education that serve as a transformative force in enhancing sustainable developmental awareness. In conclusion, the study shows that higher education serves as an important step in shaping progressive attitudes toward sustainability among backward-class women [21]. It suggests that policies focused on improving access to and retention in higher education for these women can significantly foster awareness of sustainable development and contribute to broader social change.

CONCLUSION

This study looked into the influence of education on creating an awareness of sustainable development for backward-class women. The finding from the study, that expanding access to higher education is essential for cultivating informed, responsible, and sustainability-oriented citizens. Strengthening the availability of higher education also has important implications for transforming attitudes, expanding awareness and therefore indirectly contributing to the overall inclusive sustainability of social development.

REFERENCES

1. Atmaca AC, Kiray SA, Pehlivan M. Development of a measurement tool for sustainable development awareness. *Int J Assess Tools Educ*. 2019;6(1):80-91. doi:10.21449/ijate.518099.
2. Damanik FHS. Gender and education in the context of sustainable development goals. *Entita J Pendidik Ilmu Pengetah Sos Dan Ilmu-Ilmu Sos*. 2025;1:251-266. doi:10.19105/ejpis.v1i.19186.
3. Desai S, Kulkarni V. Changing educational inequalities in India in the context of affirmative action. *Demography*. 2008;45(2):245-270. doi:10.1353/dem.0.0001.
4. González RM, Sebastián-López M. Education on sustainable development goals: geographical perspectives for gender equality in sustainable cities and communities. *Sustainability*. 2022;14(7):4042. doi:10.3390/su14074042.
5. Javaid S, Ahmad MS, Hussain A. An assessment of postgraduate students' perceptions and engagement with sustainable development practices in Lahore: knowledge, attitudes, and actions. *J Dev Soc Sci*. 2023;4(4):186-194. doi:10.47205/jdss.2023(4-IV)17.
6. Kumar G, Kumar J. Intersectionality in education: how caste, class, and gender shape educational outcomes in India under the SDGs. *Anusandhan Pravah*. 2025;2(1):33-45.
7. Kim HY. Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restor Dent Endod*. 2013;38(1):52-54. doi:10.5395/rde.2013.38.1.52.
8. Kline RB. *Principles and practice of structural equation modeling*. New York (NY): Guilford Press; 1998.
9. Legaspi JT, Linggas ES, Taping RT, Bacatan JR. Student's attitude towards sustainable development. *Contemp Res Anal J*. 2024;1(6):248-257. doi:10.55677/crajl/12-2024-vol01i6.
10. Michael FL, Mulok AM, Hamidi H, Sumilan H, Jonathan V, Omar Lim SL, et al. Sustainable development concept awareness among students in higher education. In: *International Conference on Environmental Sustainability and Resource Security*;

- 2019 Nov 5–6; Kuala Lumpur, Malaysia. Kota Samarahan (MY): Universiti Malaysia Sarawak; 2019. Available from: <https://ir.unimas.my/id/eprint/28332/>.
11. Mukoni M. Interfacing women participation and community environmental education: a step towards education for sustainable development. *Int J Soc Sci Res*. 2015;3(2):132-137. doi:10.5296/ijssr.v3i2.8378.
 12. Ogbonnaya KA, Okechukwu AE. Enhancing women's participation in community development through community education for sustainable development in South-East Nigeria. *Int J Sustain Dev Plann*. 2023;18(7):2293-2300. doi:10.18280/ijssdp.180734.
 13. Pouratashi M, Zamani A. University students' level of knowledge, attitude and behavior toward sustainable development: a comparative study by GAMES. *J Appl Res High Educ*. 2022;14(2):625-639. doi:10.1108/JARHE-06-2020-0163.
 14. Sen A. *Development as freedom*. Oxford: Oxford University Press; 1999.
 15. Singh A, Kazi R, Gorde S, Shukla RP, Gawande A, Kumar A. Exploring the role of environmental education in promoting sustainability mindset: an empirical analysis using forward and hierarchical regression methods. *Nat Environ Pollut Technol*. 2025;24(3):B4290. doi:10.46488/NEPT.2025.v24i03.B4290.
 16. Sk S, Halder S. Resilience among undergraduate first-year students: the differential effects of gender and socioeconomic status. *J Educ Psychol Stud*. 2025;19(1):111-124. doi:10.53543/2521-7046.1006.
 17. Tilbury D. *Education for sustainable development: an expert review of processes and learning*. Paris: UNESCO; 2011. 132 p. (ED-2010/WVS/46). Available from: <https://sdgs.un.org/sites/default/files/publications/927unesco10.pdf>
 18. Thomas ST, Thomas ET, McLean M, Titus TT. Paving the way to achieving the United Nations Sustainable Development Goals for women from Indigenous communities: lessons from Attappady, India. *Discov Sustain*. 2021;2:4. doi:10.1007/s43621-021-00009-y.
 19. Tafese MB, Kopp E. Embedding social sustainability in education: a thematic review of practices and trends across educational pathways from a global perspective. *Sustainability*. 2025;17(10):4342. doi:10.3390/su17104342.
 20. United Nations. *Transforming our world: the 2030 agenda for sustainable development* [Internet]. New York (NY): United Nations; 2015 [cited 2026 Jun 12]. Available from: <https://sdgs.un.org/2030agenda>
 21. UNESCO. *Education for sustainable development goals: learning objectives*. Paris: United Nations Educational, Scientific and Cultural Organization; 2017. ISBN: 9789231002090. doi:10.54675/CGBA9153.
 22. UNESCO. *Education for sustainable development: a roadmap*. Paris: United Nations Educational, Scientific and Cultural Organization; 2020. Available from: <https://unesdoc.unesco.org/ark:/48223/pf0000374802>.