



Awareness about Climate change among Students of Higher Education in India

D. Vadivarasi

School of Education, Pondicherry University, Paducherry, India
dvadivarasi@gmail.com

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Abstract

Ecosystem in the past with abundant green infrastructure and natural environment was the key to the healthy lifestyles of many people, which is envy to today's modern and polluted living spaces. Most of the urban areas in many parts of the world are polluted beyond the capability of the cities to sustain the human life. People started citing natural, greener and pollution free environment is beyond the today's living areas especially cities, despite the fact that we are part of the environment. In the process of economic development, coupled with emergence of irreversible globalization, vested interests –city planning authorities, bureaucrats, politicians, businesses etc. continue to cause irreversible damage to the environment. Mindless alteration to the natural environment and an approach without visionary policies towards sustainable development, all living beings continue to experience hardships from the environment in the form of disasters, varied in their magnitude. Therefore, awareness among the people can mitigate the environment to some extent. Hence, this study on awareness level on the environment among the students of higher education in the city of Pondicherry was conducted. Results show reasonable understanding and awareness levels among the students from various economic strata. However, author cites extraneous reasons make public irresponsible towards the environment.

Keywords: Climate Change, Environmental Awareness, Living Space, Sustainable Development.

Introduction

In the past, when the technology was minimal and advances in the industrial development were just scaling up, people enjoyed abundant green infrastructure, experienced natural disasters, observed wildlife, and the life of the citizens was in harmony with nature, including cities or urban spaces with street trees.

Today, many people find it difficult to understand and accept that our living spaces are part of the environment. Urban areas are often perceived as “places of culture and society and modern infrastructure” contrast to natural landscapes and forestry¹, or places where the built-up area, not nature, dominates attention² as mentioned by the³.

Some people even view cities as the opposite of natural areas^{4,5}, or assume that the natural environment “is found somewhere far from the city or today's modern urban spaces”⁶. This is true in countries such as India where, many urban spaces are being polluted highly and the normal living for human and even other living beings is harmful. In cities such as New Delhi, Mumbai, Bengaluru, there are oxygen cafes⁷. In fact, Japan and France have few thousands of such centers, which point us that the real nature and artificial built modern cities are not the same and huge differences exist between them.

What factors led the development of oxygen centers in today's hitch cities? Answers are not far to reach and understand the

concept of sustainable development. It is suggested to bring in harmony with nature by extending the trees in streets, terraces, and hydrological features in addition to established recreational public parks or other environment-friendly areas and ecological processes; and proposes that, “We must begin to move into a deeper, more profound understanding of cities as nature, as wondrous and significant and valuable as those in the most pristine national parks”⁸ as mentioned in the³ to create green and sustainable living spaces.

Human beings are born out of nature and coexisting with it without severe alterations will bring harmony⁹. With a global rise in population especially among the developing and poor countries is demanding additional exploitation of natural resources for the food and material needs to an ever increasing consumption pattern¹⁰. Added to this, corruption and unethical use of exhaustible resources is adding to the problem of combating climate change¹¹. In addition, there are numerous plausible reasons for disturbing our ecosystem.

Today, it is increasingly accepted that some atmospheric pollutants are causing an increase in global temperature, and began to unleash disastrous consequences with an increasing magnitude of adverse impact¹². In this decade severe hurricanes, droughts and higher magnitude of change in weather pattern is experienced by many nations with a great loss of lives too. Therefore, there is an increase in awareness among general public and students across the globe¹³. It is generally accepted that combating climate change will achieve success only if the

danger is widely known and understood by the public and regulatory agencies who undertake mitigation measures at multiple levels¹⁴.

Alterations to the ecosystem are likely to affect not only the environment but also, as a consequence, human well-being^{15,16}, economic security¹⁷ and political stability¹⁸. In short, many people now believe that climate change caused by global warming is one of the biggest challenges facing world today. The consequences of climate change are predicted to be varied in different locations across the globe. For example, some regions of the world have been receiving excess rainfall whereas; other regions are subject to droughts.

Environmental Status in India

As the issue of climate change has come more to the forefront, it has been incorporated into the agendas of environmental educators. Most of the educational curricula have environmental content. However, its focus is not serious because of high amount of corruption among the vested interests including, policy makers, politicians, bureaucrats, businessmen, etc. Therefore, seriousness among the environmental educators, nor the vested interests exist and open spaces are polluted beyond common sense of being hygiene¹⁹. Moreover, the apathy towards the environment develops from seeing and experiencing the acts of environmental degradation by the elders every-day as one end of the spectrum²⁰. While at the other end of the spectrum, non-availability, not hygiene place of waste disposal, or lack of serious attention, attitude and awareness towards the environment including appropriate policy. For an example, many small restaurants and tea stalls are using disposable tumblers for the tea and coffee. Labour was engaged to wash glass tea tumblers in the past, and these days the cost of labor is increasing, and therefore, these restaurants are using disposable tea tumblers and disposing them without any environmental standards.

Many of these restaurants, simply thrown these disposable of plastic tumblers, etc. in the open spaces or along the roads. Partly in order to support the design of education strategies and teaching interventions, studies have been undertaken to explore the pre-existing ideas of undergraduates in the city of Pondicherry, India to find out their awareness about environment and adverse impact of the environmental pollution in their day-to-day life.

One of the practical aims of environmental education is to change the attitude and overall behavior to encourage actions that are more environmental-friendly. Several scientific research studies identified the many indirect and external reasons for not mitigating or acting environment-friendly among the public. Mere inducements by governments will not suffice to act favorably to the environment¹⁴. As a consequence, environmental knowledge and pro-environmental behavior are

not strongly linked²¹. There is a gap between the knowledge awareness and action²².

Therefore, the author attempted to study the awareness of environmental knowledge among the students studying higher education in the city of Pondicherry and suggest measures that could induce general public to act environment friendly.

Method: Students studying undergraduate programs in the colleges in the city of Pondicherry were surveyed. These students come from various economic backgrounds, with majority being from moderate to poor social and economic strata of the society, reflecting larger amount of Indian population. In addition students from varied colleges – moderate to higher quality were surveyed.

Administration of the questionnaire: The questionnaires were administered in routine classes by the author. Students were assured that the results would be anonymous, and that the questionnaire was 'not a test'. It was well-informed to them that the questionnaire aimed to know the awareness level on the environment and there is no right or wrong answer. They completed the questionnaires individually without consulting others or reference.

Out of 156 questionnaires administered, 120 were found to be correct and useful for the analysis. 26 responses were incorrect, incomplete, and other errors and hence the overall response rate was 77 per cent.

Scoring of the questionnaire and data analyses: The responses were collected using the likert scale where, strongly agree is being coded as the 5 numeric value and agree was coded as 4. Likewise, neither agree nor disagree with a score of 3 and disagree was assigned 2 and lastly, strongly disagree was given score of 1. All responses were fed in the SPSS software.

All variables were grouped into five factors using the compute function in the SPSS software. The factors identified were Awareness with 6 variables, Sources of Information had 5 variables, Reasons with 4 variables. While the Impact had 19 variables and the Measures to Alleviate consisted 24 variables. In all, there were 58 variables. Finally, the five factors were analyzed using the SPSS software to find the answers for the primary objective of finding the awareness level among students studying higher education in the city of Pondicherry. The data was analyzed as per the following three hypotheses and the results are presented in this paper.

Hypotheses

H₁: There is no difference in level of awareness among students studying various courses in higher with respect to the environment.

H₂: There is no difference in the level of awareness about the environment among the students of higher education with based on their residence

H₁: There is no difference in level of awareness among students studying various courses in higher with respect to the environment based on the gender.

Testing of Hypotheses and Discussion

H₁: There is no difference in level of awareness among students studying various courses in higher with respect to the environment.

Mean values Table-1 show the minor differences among the students studying higher education (various courses) in the city of Pondicherry with respect to the five factors on the awareness levels on the environment.

First factor, General Awareness has a mean value of 4.07, the second factor, Source of Information has a mean value of 4.11 while the third factor of Reasons for the environmental degradation has secured a lower mean value of 3.85. Fourth factor, the Impact of the environmental pollution has mean value of 4.03 and lastly, the fifth factor, Measures to Alleviate secured a mean value of 4.01. These differences were statistically tested for significance in the test ANOVA Table-2.

Table-1
Showing the Mean Values

	N	Mean	Std. Deviation
General Awareness	120	4.0708	.54433
Source of Information	120	4.1167	.61005
Reasons	120	3.8521	.70822
Impact	120	4.0399	.41560
Measures to Alleviate	120	4.0198	.46051

Source: Primary Data

Results from the Table-2 show that there is no difference in the four factors on the awareness level among the students of higher education studying various courses, except the fifth factor of measures to alleviate whose significant value is .045 which is below the significant value of 0.5 and hence, the hypothesis is rejected for this factor alone. While the hypothesis is not rejected in the first four factors of general awareness, source of information, reasons and the impact. Their significant values are 0.164, 0.511, 0.068 and 0.829.

To know the differences with respect to the fifth factor of measures to alleviate the environmental awareness and response to mitigate to the climate change, Table-3, showing Post hoc test of Multiple Comparisons for the factor Measures to Alleviate was performed. Results show the difference among the students of B.A. and B.Com, whose significant value is .048.

Table-2
ANOVA, showing the differences between the factors among higher education students

		Sum of Squares	df	Mean Square	F	Sig.
General Awareness	Between Groups	1.924	4	.481	1.659	.164
	Within Groups	33.335	115	.290		
	Total	35.259	119			
Source of Information	Between Groups	1.238	4	.310	.827	.511
	Within Groups	43.048	115	.374		
	Total	44.287	119			
Reasons	Between Groups	4.340	4	1.085	2.254	.068
	Within Groups	55.347	115	.481		
	Total	59.687	119			
Impact	Between Groups	.261	4	.065	.370	.829
	Within Groups	20.293	115	.176		
	Total	20.554	119			
Measures to Alleviate	Between Groups	2.033	4	.508	2.519	.045
	Within Groups	23.203	115	.202		
	Total	25.236	119			

Source: Primary Data

Table-3
Post hoc test of Multiple Comparisons for the factor Measures to Alleviate

	(I) Course	(J) Course	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval
						Lower Bound
Tukey HSD	B.A.	B.Sc.	.38811	.14180	.055	-.0049
		B.Com.	.39713*	.14256	.048	.0020
		B.B.A.	.30288	.16772	.375	-.1620
		B.C.A.	.57372	.23637	.115	-.0814
	B.Sc.	B.A.	-.38811	.14180	.055	-.7811
		B.Com.	.00902	.09690	1.000	-.2595
		B.B.A.	-.08523	.13113	.966	-.4487
		B.C.A.	.18561	.21199	.905	-.4019
	B.Com.	B.A.	-.39713*	.14256	.048	-.7922
		B.Sc.	-.00902	.09690	1.000	-.2776
		B.B.A.	-.09425	.13196	.953	-.4600
		B.C.A.	.17659	.21250	.920	-.4124
	B.B.A.	B.A.	-.30288	.16772	.375	-.7677
		B.Sc.	.08523	.13113	.966	-.2782
		B.Com.	.09425	.13196	.953	-.2715
		B.C.A.	.27083	.23014	.765	-.3670
	B.C.A.	B.A.	-.57372	.23637	.115	-1.2288
		B.Sc.	-.18561	.21199	.905	-.7731
		B.Com.	-.17659	.21250	.920	-.7655
		B.B.A.	-.27083	.23014	.765	-.9087

*. The mean difference is significant at the 0.05 level.

Source: Primary Data

H₂: There is no difference in the level of awareness about the environment among the students of higher education with based on their residence

Students studying higher education widely differ on the awareness level on the environment based on their place of residence – Urban, Semi-urban and Rural. Mean values are presented in the Table-4 which differ. Therefore, ANOVA was

performed to know the significant differences if any whose results are presented in the Table-5. Four factors, namely - General Awareness, Reasons, Impactand Measures to Alleviate have a significant value of .000 while Source of Information has a significant value of .012 which signify the existence of differences among the students with respect to the five factors on the environmental awareness based on their residences of urban, semi-urban and rural.

Table-4
Mean values of students belonging to urban, semi-urban and rural areas

		N	Mean	Std. Deviation	Std. Error
General Awareness	Urban	50	3.8600	.58064	.08211
	Semi-Urban	36	4.3102	.45973	.07662
	Rural	33	4.1414	.45856	.07983
	Total	119	4.0742	.54535	.04999
Source of Information	Urban	50	3.9640	.47067	.06656
	Semi-Urban	36	4.3556	.60872	.10145
	Rural	33	4.0970	.73164	.12736
	Total	119	4.1193	.61193	.05610
Reasons	Urban	50	3.4250	.52792	.07466
	Semi-Urban	36	4.1806	.68298	.11383
	Rural	33	4.1061	.64357	.11203
	Total	119	3.8424	.70325	.06447
Impact	Urban	50	3.8158	.42682	.06036
	Semi-Urban	36	4.2471	.34771	.05795
	Rural	33	4.1531	.30188	.05255
	Total	119	4.0398	.41735	.03826
Measures to Alleviate	Urban	50	3.7767	.36710	.05192
	Semi-Urban	36	4.2546	.42138	.07023
	Rural	33	4.1313	.46992	.08180
	Total	119	4.0196	.46245	.04239

Source: Primary Data

Table-5
ANOVA, showing the mean values of students belonging to urban, semi-urban and rural areas

		Sum of Squares	df	Mean Square	F	Sig.
General Awareness	Between Groups	4.448	2	2.224	8.418	.000
	Within Groups	30.646	116	.264		
	Total	35.094	118			
Source of Information	Between Groups	3.232	2	1.616	4.577	.012
	Within Groups	40.954	116	.353		
	Total	44.186	118			
Reasons	Between Groups	15.122	2	7.561	20.285	.000
	Within Groups	43.236	116	.373		
	Total	58.358	118			
Impact	Between Groups	4.479	2	2.240	16.163	.000
	Within Groups	16.074	116	.139		
	Total	20.554	118			
Measures to Alleviate	Between Groups	5.351	2	2.676	15.609	.000
	Within Groups	19.884	116	.171		
	Total	25.235	118			

Source: Primary Data

Post hoc test of multiple comparisons with respect of place of residence was performed to see where the differences exist in the Table-6. It is found that all the five factors differ since their significant values lie below the threshold value of .05. On the factor general awareness, students from urban and semi-urban and urban and rural whose significant values are .000 and .042 respectively in the Table-6. With respect to the sources of information, urban and semi-urban students differ whose

significant value is .009. While urban students differ from both the semi-urban and rural on the factor 'reasons' with a significant value of .000 for both. Impact had a significant value of .000 for the difference in the urban students from both the semi-urban and rural students. Finally, on the factor of measures to alleviate, again urban students differ with semi-urban students, significant value of .000 and urban- semi-urban difference with a significant value of .435.

Table-6
Post hoc test of multiple comparisons with respect of place of residence

Dependent Variable		(I) House Location	(J) House Location	Mean Difference (I-J)	Std. Error	Sig.
General Awareness	Tukey HSD	Urban	Semi-Urban	-.45019*	.11235*	.000
			Rural	-.28141*	.11528*	.042
		Semi-Urban	Urban	.45019*	.11235*	.000
			Rural	.16877	.12387	.364
		Rural	Urban	.28141*	.11528*	.042
			Semi-Urban	-.16877	.12387	.364
Source of Information	Tukey HSD	Urban	Semi-Urban	-.39156*	.12988*	.009
			Rural	-.13297	.13326	.580
		Semi-Urban	Urban	.39156*	.12988*	.009
			Rural	.25859	.14320	.172
		Rural	Urban	.13297	.13326	.580
			Semi-Urban	-.25859	.14320	.172
Reasons	Tukey HSD	Urban	Semi-Urban	-.75556*	.13345*	.000
			Rural	-.68106*	.13693*	.000
		Semi-Urban	Urban	.75556*	.13345*	.000
			Rural	.07449	.14713	.868
		Rural	Urban	.68106*	.13693*	.000
			Semi-Urban	-.07449	.14713	.868
Impact	Tukey HSD	Urban	Semi-Urban	-.43129*	.08137*	.000
			Rural	-.33732*	.08349*	.000
		Semi-Urban	Urban	.43129*	.08137*	.000
			Rural	.09397	.08971	.549
		Rural	Urban	.33732*	.08349*	.000
			Semi-Urban	-.09397	.08971	.549
Measures to Alleviate	Tukey HSD	Urban	Semi-Urban	-.47796*	.09050*	.000
			Rural	-.35465*	.09286*	.001
		Semi-Urban	Urban	.47796*	.09050*	.000
			Rural	.12332	.09978	.435
		Rural	Urban	.35465*	.09286*	.001
			Semi-Urban	-.12332	.09978	.435

Source: Primary Data, *. The mean difference is significant at the 0.05 level.

H₁: There is no difference in level of awareness among students studying various courses in higher with respect to the environment based on the gender.

Awareness levels with respect to the environment was also computed to see if there were any difference between the

genders. Table-7 presents the mean values of male and female students which show some differences. Independent Samples Test between male and female students was computed and found that there is difference between the male and female students on all the five factors of the environment (Table-8).

Table-7
Mean values of male and female students

	Gender	N	Mean	Std. Deviation	Std. Error Mean
General Awareness	Male	69	4.1812	.57362	.06906
	Female	51	3.9216	.46709	.06541
Source of Information	Male	69	4.2841	.59844	.07204
	Female	51	3.8902	.55471	.07767
Reasons	Male	69	4.0652	.69353	.08349
	Female	51	3.5637	.62619	.08768
Impact	Male	69	4.1465	.38453	.04629
	Female	51	3.8958	.41609	.05826
Measures to Alleviate	Male	69	4.1685	.45880	.05523
	Female	51	3.8186	.38295	.05362

Source: Primary Data

Table-8
Showing the Independent Samples Test between male and female students

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
General Awareness	Equal variances assumed	2.533	.114	2.647	118	.009
Source of Information	Equal variances assumed	1.350	.248	3.675	118	.000
Reasons	Equal variances assumed	3.232	.075	4.079	118	.000
Impact	Equal variances assumed	.209	.648	3.409	118	.001
Measures to Alleviate	Equal variances assumed	2.680	.104	4.423	118	.000

Source: Primary Data

Conclusion

Climatic changes and environmental awareness levels are quite high among the students studying higher education in the city of Pondicherry. However, there are differences exist between the students having their residences in urban, semi-urban and rural areas. Similarly, male and female students differ in their perspective on the environment. Given this scenario of increased awareness levels on the environment, partly on account of increasing usage of personalized electronic gadgets and educational curricula, what is missing is the extraneous factors which cause students to be irresponsible towards the environment. Vested interests across the spectrum of economic, social and political activities often show apathy towards the environment and openly show their irresponsibility. Seeing such open activities and violation of the laws in the nation lead other general public to be careless towards the environment, on the pretext that "our irresponsibility towards the environment is miniscule in comparison with that of the vested interests". In this process of mindless game with the environmental devastation, coupled with increasing population increases huge demand on the decreasing per capita availability and quality of natural resources. Therefore, the author suggests to have visionary policies with serious attention towards cultivating pro-environmental behavior towards the nature. This action is imminent in order to save our planet and enhance our standard of living in harmony with the natural environment.

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