
ASSESSMENT OF ENVIRONMENTAL KNOWLEDGE OF SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR GENDER AND LOCALITIES

Dr. Rebati Mani Samal

Assistant Professor of Education, Gour Mahavidyalaya, Mangalbari, Malda,, West Bengal.

Dr. Jagabandhu Behera

Assistant Professor of Education, Sukanta Mahavidyalay, Dhupguri, Jalpaiguri. West Bengal.

Abstract:

The Adolescent school going boys and girls are very emotional and sensitive about any issue what they learn. So also the Environmental education must not be presented to them with a sense of doom or disaster so they don't avoid or dislike it. Again many factors are responsible in shaping their level of awareness and knowledge. Personal characteristics, environmental factors, gender, localities, customs and traditions, and various societal factors are more or less important contributing factors in Knowledge and awareness. For the present study researchers assumed the localities and gender as factors of Environmental Knowledge. For that purpose, the State, West Bengal has been divided into six topographical zones and a sample of 680 (N = 680) Secondary School Students of different parts of West Bengal has been taken. Environmental Knowledge Scale (EKS) developed by researchers has been used to measure the selected variable. Descriptive statistics along with t-test have been employed to analyze the data. No difference of the Environmental Knowledge was found in case of gender but the significant differences were found in case of localities. It might be concluded that the localities might mediate in pro- Environmental Knowledge of person.

KEY WORDS: Environmental Knowledge, Localities, Gender, Secondary School Students

1.0: INTRODUCTION:

The various hazards and crisis relating to environment created by development are due neither to the need for economic development, nor to the technology that produces pollution, but rather to a lack of proper awareness, lacking the sufficient and authentic information about the environment and resources, lastly the consequences of anti environmental behavior of persons. The proper level of knowledge and awareness on environment encourage individuals to behave with their surroundings and other species on earth. Each action by an individual must be linked to its consequences in his/her mind, so that a Proper level of Environmental Knowledge is created that strengthens pro-environmental behaviors and prevents anti-environmental actions. The proper selected studies might distinguish and relate environmental awareness and environmental education, and consider the factors fostering the Environmental Knowledge and Awareness in different contexts. The present study emerged out of above considerations and researchers selected one major variable i.e. Environmental Knowledge to assess in relation to other attribute variables i.e. gender (boys and girls) and localities (Rural and urban).

1.1: WHAT IS ENVIRONMENTAL KNOWLEDGE? : Knowledge is the storage of events, concepts, principles, information etc. which the human mind gets through experiences. With the help of recalling or recognition, anyone can expose his ideas of material phenomena. The environmental knowledge thereby defined as the storage of events, concepts, principles, information etc about

the broad environment surrounding, which the individual mind gathers by through experiences. In the book, -"Dictionary of Education." Carter V. Good defines knowledge as the (a) The accumulated facts, truth, principles and information to which the human mind has access. (b) The out-come of specified rigorous inquiry. The people get experience in the process of environment and depend upon the accumulated facts, truth etc. They expose their opinions either by recalling or by recognizing. Knowledge is defined as the remembering of previously learned material, this may involve the recall of a wide range of material, from specific facts to complete theories, but all that is required in bringing to mind of the appropriate information (Linn and Ground, 2002). This definition finds its root in *Bloom's Taxonomy of Educational Objectives* and also accordingly knowledge represents the lowest level of learning outcomes in the cognitive domain. As such, knowledge is gained either by experience, learning and perception or through association and reasoning. Consequently, Environmental Knowledge can be defined as remembering of previously learned material regarding the environment. The researchers have considered Environment Knowledge in her present study as the information gained regarding the natural environment (both biotic and abiotic components) through the curriculum.

1.1.1: GEOGRAPHICAL STATUS AND TOPOGRAPHICAL REGIONS OF WEST BENGAL: West Bengal as a province of India is a land of heterogeneity in terms of climate which extends between latitude $21^{\circ} 50' N$ and $27^{\circ} 10' N$ and longitudes $85^{\circ} 58'E$ and $89^{\circ} 50'E$. The state covers an area of 88,752 sq.km stretching from the Himalayas in the north to the Bay of Bengal in the south. This state of West Bengal is bounded on the north by Sikkim and Bhutan, on the east by Assam and Bangladesh, on the south by the Bay of Bengal and on the west by Orissa, Jharkhand and Bihar. West Bengal is a land of the great rivers, Great Plains including deltaic hive of massed humidity. The state of West Bengal is divided into 20 districts. The term 'region' is generally applied to an area of any size throughout which there is some kind of homogeneity as specified by the criteria adopted to define it. Such type of homogeneity of geographical conditions in a region is clearly observed only around the core of its territory. On the basis of landforms, structure, climatic characteristics and human activities, the state of West Bengal may be divided into the following regions: 1) Darjeeling Himalayan Region, 2) Tarai Region, 3) North Bengal Plains, 4) Eastern Fringes of the Chhotanagpur Plateau Region, 5) Rargh Region, 6) Coastal Plain, 7) Sunderbans and 8) Ganga Delta. Out of eight regions, only six regions have taken for the present study.

2.0: OBJECTIVES OF THE STUDY: The researchers proposed the following objectives for the study-

1. To measure the environmental knowledge of the school secondary students.
2. To adopt the tools for measuring environmental knowledge of the secondary school students.
3. To find out the differences of the environmental knowledge of the secondary school students belonging to different strata.
4. To recommend for the further studies in the related field of investigation.
5. To suggest for fostering environmental knowledge among the students.

3.0: SIGNIFICANCE OF THE STUDY

The proper design of campaigns and programs in a sustainable way may assist the target groups with the acquisition of knowledge, skills and attitudes that are necessary to solve actual and local environmental problems. In this connection, the researchers purposed that environmental knowledge is the variable, which is more responsible for enhancing the pro-environmental behavior. The right kind of studies conducted in such field can prevent our environment, assist for proper utilization of resources and would be helpful in policy making. Many studies proved that, the greater the degree of environmental knowledge and awareness is more positive and high environmental attitudes and behavior of individuals. Students, teachers and parents will be benefited from this study experiencing the knowledge of importance issues related to environment, the art of learning to preserve own atmosphere, setting mass programmes etc. The planers and administrators will be able to assume the effects of some interactive nonintellectual psychological factors in relation to environmental knowledge of secondary school students. Ultimately the study might be helpful for qualitative upliftment of environmental education i.e. in framing curriculum, organizing programmes relating to Protection and Preservation of Environment in West Bengal and India as a whole. The study would be helpful to teachers, educational planners, administrators, further researchers etc. in various ways. The results and findings would help to prepare and plan novel, creative and unique program on environmental issues.

4.0: HYPOTHESES: The following null-hypotheses were considered for the present study.

H01: There exists no significant difference between Secondary Girls and Boys in respect to their Environmental Knowledge.

H02: There exists no significant difference between Urban and Rural Secondary students in respect to their Environmental Knowledge.

5.0: METHODOLOGY AND DESIGN OF THE STUDY

A. Methods Employed: The major objective of this study was to assess the Environmental Knowledge of secondary students of West Bengal. The study at present has been planned an implemented descriptive frame work. It aims at comprising the level of Environmental Knowledge in respect to gender and locality. As such the method of the investigation was confined to a descriptive and analytical approach, the methodology of the study involves collection, tabulation and meaningful analysis of the data; and drawing out the relevant inferences. Hence, description of the investigation is obviously combined with analysis, comparison, contrast, interpretation and evaluation.

B. Variables Studied: (A) *Environmental Knowledge*, (B) two Attribute variables i.e. *Gender* (boys and girl) and *Localities* (Rural and Urban)

C. Population and Sample: The population of the study was secondary schools students of West Bengal. The schools included in the sample were found in seven districts from six topographical zones classified on the basis of the climate existing in West Bengal. Judgment samples of fifteen (15) schools were selected, the main consideration being that the schools should be situated in both the rural and urban areas. Moreover, all the schools were categorized into six zones in accordance with the climate existing. Out of 15 schools, there were 7 co-educational, 4 were exclusively for boys and 4 were exclusively for girls. 8 Schools were in a rural and other 7 schools were in urban areas. Initially, all the tools were

administered on a sample of 722 secondary school students. Incomplete responses from students and the students who missed one or two tests out of three were excluded from the sample. After exclusion, the remaining sample was 680 in number; out of this 680 sample 335 were boys and 345 were girl students. Out of 680, 346 students (boys =184 and girls =162) were from rural areas and 334 (boys=151 and girls=183) were from urban areas. The distribution of the simple had been presented from the table-1

Table - 1: The Sampling Distribution (N-680)

Localities	Gender	Tarai	NNorth Bengal Plains	Plateau Region	Rarh Region	Sundarban Region	Ganga Delta	Total
Rural	Boys	28	25	28	27	76	00	184
	Girls	29	30	28	26	49	00	162
Urban	Boys	20	30	28	31	00	42	151
	Girls	36	30	26	29	00	62	183
Total		113	115	110	113	125	104	N= 680

D. Tools Used: For the present study the researcher found Environmental Knowledge Scale (EKS) constructed by Sarkar, B. developed on the basis of "*Children's Environmental Attitude and Knowledge Scale*" popularly known as CHEAKS was found to be more suitable for measuring Environmental Knowledge. The psychological basis of the dimensions and the items involved in this test was matched perfectly with the present situation of this investigation.

E. Statistics Used: The collected data from students were subjected to different statistical techniques. All the statistics used in the study can be divided into four major parts, i.e.

- Descriptive Statistics: In order to find out the nature of sampling distribution, descriptive statistics were carried out for the variable. For this purpose, the statistics such as Mean, Median, S.D., Q, SK, K.U. were calculated.
- Inferential Statistics: The 't'-test was adopted to find out whether there was any significant mean difference between gender and students groups within the variables under consideration.

6.0: DESCRIPTION OF ENVIRONMENTAL KNOWLEDGE SCALE (EKS):

A. Dimensions Considered for Environmental Knowledge Scale : Environment may be broadly classified into two categories natural and manmade. The natural environment consists of physical (abiotic) and biological (biotic) components. The physical environment can be further classified into atmosphere (air), hydrosphere (water) and lithosphere (soil) and the biological environment can be further classified into animals and plants. The researcher had considered Environmental Knowledge in the present study as the information gained regarding the natural environment (both biotic and abiotic components) and also information regarding energy, pollution and other general issues regarding the environment. For the purpose of determining environmental knowledge of secondary students the researcher has considered the Physical (air, water & soil), Biological (animals & plants), Energy, Pollution, General Issues and Recycling as vital aspects of environmental knowledge. For the purpose of the present study, the researcher chose the dimensions – physical (air, water & soil) , biological (animals & plants), energy, pollution and general issues as depicted in the following chart.

Table- 2: Showing the Dimensions cum Item Chart Considered for the EKS.

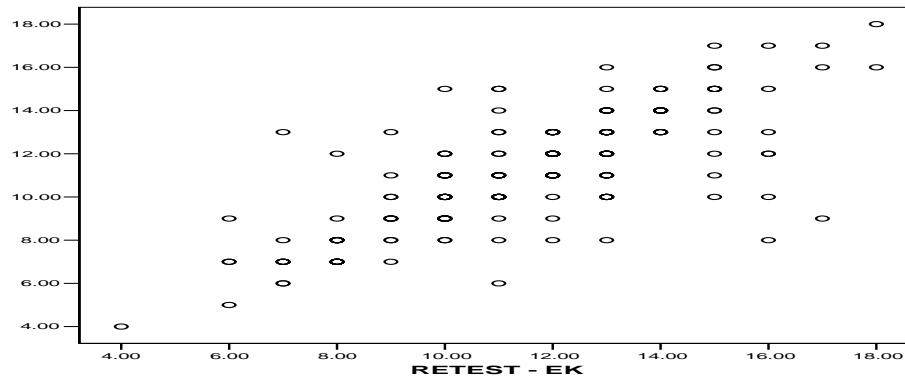
Sl No.of Dimensions	Dimensions Considered in EKS	No. of Items
D1	Physical (air, water & soil)	6
D2	Biological (animals & plants)	6
D3	Energy	6
D4	Pollution	6
D5	General Issues	6
Total Items		30

B. Reliability of Environmental Knowledge Scale (EKS): Before adopting the EKS, the researcher determined the reliability of the test. For that purpose, the statistical measures for determining the reliability of the test viz., Test-retest was considered. The researchers re-administered the test on a sample of 180 students to calculate the Test-retest reliability. The test was re-administered after an approximate gap of 15 days. The Test-retest correlation value was presented in Table –3 and the Scatter Plot of the Test-retest of the Environmental Knowledge Scale scores were presented in Figure – 1.

Table – 3: Test-retest Correlation of Environmental Knowledge Scale

		TEST	RETEST
TEST	Pearson Correlation	1	.749** *
	Sig. (2-tailed)	.	.000
	N	202	202
RETEST	Pearson Correlation	.749** *	1
	Sig. (2-tailed)	.000	.
	N	202	202

** . Correlation is significant at the 0.01 level



($r = 0.749$)

Fig. – 1: Scatter Plot of Test vs. Retest Scores of Environmental Knowledge Scale

The Test-retest correlation value of 0.749 significant at 0.01 levels showed satisfactory reliability according to the researcher

The researchers had determined the dimension- wise Reliability co-efficient of EKS through Test–Retest method, which might be presented in the Table-4

Table-4: Showing the Dimension wise Reliability- coefficient of EKS

Method	N	Dimensions of EKS	Reliability Coefficient
Test-Retest	180	Physical	0.603*
		Biological	0.692*
		Energy	0.718*
		Pollution	0.682*
		General Issues	0.617*

*Significant at 0.01 level.

C) Validity of the Environmental Knowledge Scale (EKS): The scale comprised of 30 items which were taken from the curriculum of class VIII under W.B.S.S.E. Therefore, inspite of several methods which existed for determining validity, the researcher considered '*Content Validity*' as the most suitable measure of validity of the scale. To determine the '*Content Validity*' of the Environmental Knowledge Scale the researcher send the framed items along with the objective of the study, selected dimensions and relevant literature to five experts for their specialised opinion. The experts unanimously gave affirmative response for the framed items.

7.0: ANALYSIS AND INTERPRETATION OF DATA

7.1: Descriptive Statistics: Descriptive statistics are measures based on observation of characteristics of an independent group. Through descriptive statistics, the researcher had tried to describe the numerical properties or characteristics of the sample. In this study, descriptive statistics like- Mean, Median, Mode (for description of the Location of the Distribution), SD, Variance and SE_M (for description of the Amount of Variation or Spread in the Data), SK, KU, SE_{sk} and SE_{ku} (for description of the Shape and Symmetry of the Distribution) were considered.

Table-5: Showing the Descriptive Statistics concerning the Distribution of EKS Scores

N	Mean	Median	Mode	SE _m	SD	Variance	Skewness	SEsk	Kurtosis	SEku
680	16.271	16.50	16.73	0.179	4.661	21.734	-0.122	0.094	-0.606	0.187

The above Table—5 showed that, the value of Mean, Median and Mode of Environmental Knowledge of Secondary Students were 16.2706, 16.50 and 16.73 respectively. There was found no high difference among the measures of central tendencies and had the tendency of coincide. Hence, the closeness of the values of Mean, Median and Mode implied it as Secondary students had no extremity but in normality in case of their Environmental Knowledge. The Skewness of the score distribution of the EKS is -0.122 which indicates it as negatively skewed but such value is very closed to 0.00 and it is partially skewed. The Kurtosis of the score distribution of EKS was -0.606 which was less than 0.263 that indicates it was just peaked than the normal. The above statistics proved the students of secondary level had scored in a laws normal probability in case of their knowledge about environment.

Table-6: Showing the N, Mean and SD of the strata considered for Environmental Knowledge

Strata→ Statistics ↓	Tarai	Plateau	Rarh	Northern Plains	Sundarban	Gangetic Deltaic	Boys (Total)	Girls (Total)	Rural (Total)	Urban (Total)	TOTAL (N)
N	113	115	110	113	125	104	335	345	346	334	680
Mean	14.42	15.03	20.01	14.91	17.05	16.241	16.741	15.81	16.11	16.44	16.27
SD	4.924	4.702	3.644	3.576	4.434	4.196	4.679	4.602	4.668	4.654	4.661

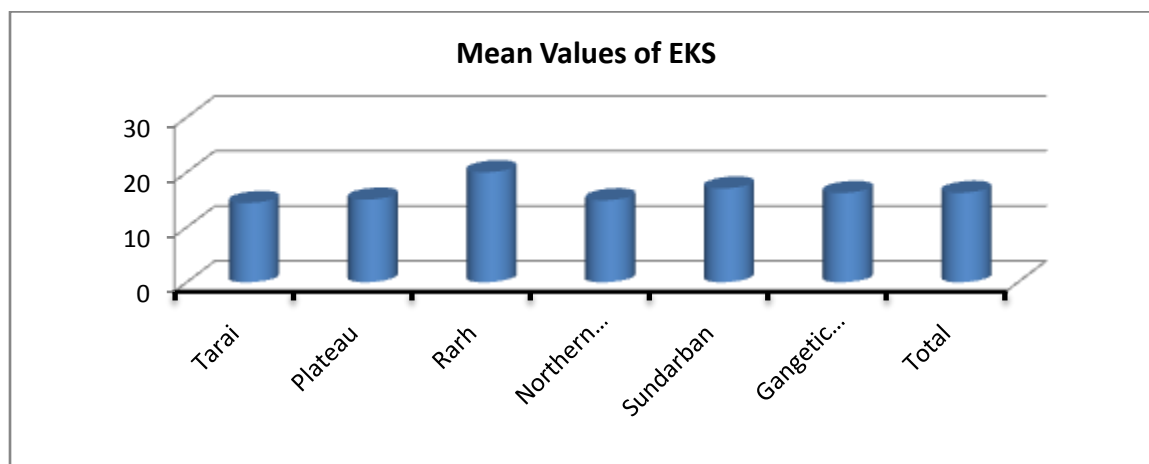
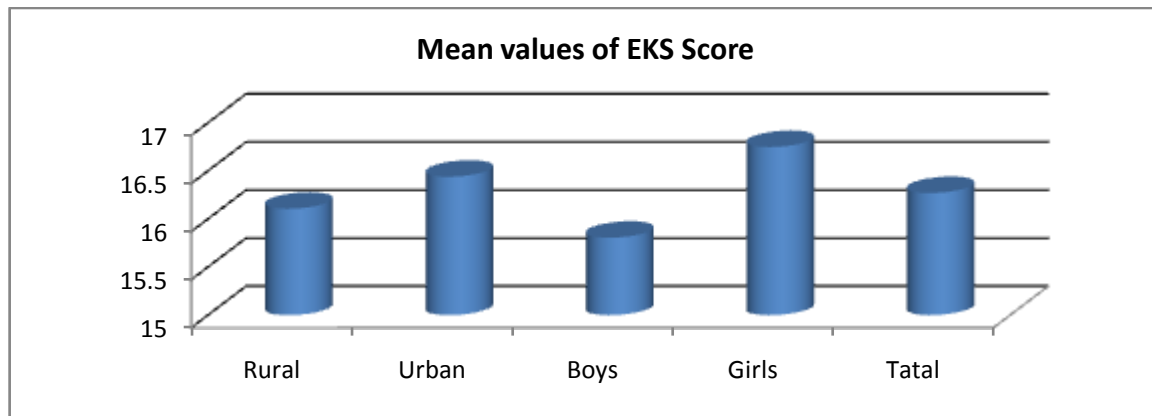


Fig. – 2 : Showing the mean values of EKS in region wise.**Fig. – 3 : Showing the mean values of EKS in Gender and Location wise.**

The Mean value of the scores of the secondary students in their EKS as showed in table----- proved that, in respect to the environmental knowledge secondary students differed in strata wise. Secondary students belonging to the Rarh area had highest mean value where as students residing at Tarai zone had lowest mean value. In terms of the status of EKS students in Sundarban area remained in second position. The mean value of scores of secondary students regarding their Environmental Knowledge belonging to Tarai and North Plains are almost equal. It was also same interpretation in the rural and urban perspectives as the mean values in two instances are much closed.

7.1.1: Inferential Statistics (Analysis of the Differences in Mean Scores for EKS) : The researchers were interested in knowing about the significance of the difference between sample means as they wanted to study the role of Gender and Localities in Environmental Knowledge of Secondary School Students. The researchers selected 't'-test to verify whether the difference between sample means was the result of sample fluctuations which have occurred incidentally or indicated some really valid differences that would help in drawing some valuable interpretations. For this purpose, a summary of computed 't'-value along with Mean, SD and Sample (N) has been presented in following tables.

(a) Analysis of the Difference between Secondary School Boys (SSB) and Secondary School Girls (SSG) in Environmental Knowledge pertaining to Null-Hypothesis No-1 (H_{01})

Table-7 : Showing 't'-value of Environmental Knowledge of Secondary School Boys (SB) and Secondary School Girls (SG)

VARIABLE	Difference Between	N	M	SD	SE _M	SE _D	t-value	df
Environmental Knowledge	SSB	335	15.806	4.679	0.256	0.356	2.650*	678
	SSG	345	16.749	4.602	0.248			

* Significant at 0.01 level

The Table-5.3 showed that the “t” –value between Secondary Boys and Secondary Girls in Environmental Knowledge was significant at 0.01 level. Hence the Null-hypothesis (Ho₁) was not retained. It might be concluded that, “there was a significance difference between secondary boys and girls students in relation to their Environmental Knowledge.” The mean score of girls students was higher than the mean score of the boys students in Environmental Knowledge. So it might be interpreted that boys students had better Environmental Knowledge than the girls students in case of Environmental Knowledge.

(b) Analysis of the Difference between Rural Secondary School Students (RSSS) and Urban Secondary Students (USSS) in Environmental Knowledge pertaining to Null-Hypothesis No-2 (Ho₂)

Table-8 : Showing ‘t’-value of Environmental Knowledge of Rural Secondary School Students (RSSS) and Urban Secondary Students (USSS).

VARIABLE	Difference Between	N	M	SD	SE _M	SE _D	t-value	df
Environmental Knowledge	RSSS	346	14.107	4.668	0.251	0.358	6.535*	678
	USSS	334	16.440	4.655	0.255			

* Significant at 0.01 level

A perusal of Table- 8 showed that “t” value between Rural Secondary School Students and Urban Secondary Students in Environmental Knowledge was significant at 0.01 level. Thus, the Null-hypothesis (i.e. Ho₂) was rejected. It was established that, “there existed a significant difference between Rural Secondary School Students and Urban Secondary School Students regarding to their Environmental Knowledge.” Since the mean score of Rural Secondary School Students was lesser than the mean score of Urban Secondary School Students, it might be interpreted that, the Urban Secondary School Students had better in Environmental Knowledge than Rural Secondary School Students

8.0: MAJOR FINDINGS: on the basis of above analysis of data, the major findings were found as followings:

1. There exists significant difference between boys and girls in relation to their Environmental Knowledge. Gender is a factor of Environmental Knowledge of Secondary School going students.
2. There exists a significant difference between Rural and Urban Secondary School Students in relation to their Environmental Knowledge. Localities are a contributing factor in Environmental Knowledge of Secondary School going students.
3. With regard to environmental knowledge (EKS), it was found (with reference to Table-6 showing the Descriptive statistics) that, secondary students belonging to Rarh area had higher in environmental knowledge than students of other parts and the students of Tarai were poor among all six classified zones.

9.0: IMPLICATIONS OF THE STUDY

The findings and discussions of present study proved that, both gender and the localities are contributing factors in Environmental Knowledge. The students belonging to rural area showed very high having more informed on environment and on the contrary, the group of individuals belonging to urban region was lacking better knowledge on environment issues. So the present study was of vital concern for teachers in particular and curriculum framers along with educational policy makers in

general. The findings of the present study on environmental knowledge would be utilized in various ways:-

- Organising special programmes on various issues of Environment.
- Consultation of environmentalists.
- Assignments like field work, nature study, visits and complicated projects to promote maximum intellectual growth,
- Programmes for developing both knowledge and skills in preservation of the natural resources, waste management, techniques of recycling, etc.
- Supplying the day to day information to students.
- Synthesis of Theory and Practice in school curriculum.
- Framing school curriculum keeping in view that, the students would be able to evaluate the facts, to find cause and effect relationships, to create new ideas and to originate new live of thought.
- Inclusion of local, national and global issues in curriculum.
- Conducting various action oriented programmes like Swachha Bharat Abhiyan, Clining Drives, Deforestation, etc. by the students.
- Literature on Environmental issues.
- Conducting environment literacy programmes.
- Comprising the sufficient and authentic information on environmental issues.

10.0: CONCLUSIONS: In grass root level, particularly from school level, the educational system should be designed in such a manner that each adolescent student would be the environmentally responsible citizens because they are in the true sense the future protector and preserver of this earth. For this purpose, over a period of time, environmental studies as a compulsory subject in school curriculum at secondary level has been included aiming to provide the right kind of knowledge and information about the environment for enhancing the sustainable eco-friendly behaviour and attitudes among adolescent students. To have a green, healthy and pollution free world a strong commitment from all sides is required and all academic community i.e. teachers, students, scholars, corporate world, Govts., NGOs, and others should come together to make success of this programme.

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Biographical sketch of Authors

	<p>Dr. Rebati Mani Samal has obtained her M.A. in education in the year 2005, Ph.D. in Education in 2014 and B.Ed. in 2006 from Kalyani University, West Bengal, India. She was University Topper in B.A. Hons. Degree in F. M. University, Odisha, India. She is now working as Assistant Professor in Department of Education, Gour Mahavidyalaya, Mangalbari, Malda, West Bengal, India. Her area of interest is Educational Technology and Special Education. She is having more than 8 years of teaching experiences. She is having more than 8 publications in international/national journals, conferences and edited volumes. She presented more than 20 papers in International, National and State Level Seminars and Conferences, and participated in various national workshops.</p>
<p>Dr. Rebati Mani Samal Assistant Professor of Education, Gour Mahavidyalaya, Mangalbari, Malda,, West Bengal. PIN: 732101. INDIA</p>	

	<p>Dr. Jagabandhu Behera has obtained his M.A. in education in the year 2000, M.Phil. in Education in 2002 and Ph.D. in Education in 2012 from Kalyani University, West Bengal, India. He has qualified NET conducted by UGC and SLET conducted by West Bengal College Service Commission. He is now working as Assistant Professor in Department of Education, Sukanta Mahavidyalaya, Dhupguri, Jalpaiguri, West Bengal, India. His area of interest is Educational Technology and Research Methodology in Education. He is having more than 12 years of teaching experiences including the experiences of teaching under FIP Scheme of UGC, as guest faculty in various higher education institutions and teaching experience in school. He is having more than 15 publications in international/national journals, conferences and edited volumes.</p>
<p>Dr. Jagabandhu Behera Assistant Professor of Education, Sukanta Mahavidyalay, Dhupguri, Jalpaiguri. West Bengal. PIN-735210, INDIA</p>	