

# Personal Values, Environmental Knowledge And Environmental Attitudes As Predictors Of Pro-Environmental Behaviour

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## ABSTRACT

Environmental exploitation is a perennial challenge across the globe while causes are common and remedies are stagnant. However, the reduced personal values, environmental knowledge and environmental attitudes are claimed as reasons for it by the past researches. The current research strives to ascertain whether the personal values, environmental knowledge and environmental attitudes are the predictors of pro-environmental behavior or not? Keeping in view, the researchers have selected the research problem entitled as “Personal Values, Environmental Knowledge and Environmental Attitudes as Predictors of Pro-Environmental Behaviour”. In the venture, a descriptive study with quantitative research method was adopted. A total of 680 (n =680) secondary school going students from different strata were selected as simple using stratified proportionate random sampling technique. Four data collection instruments were developed and standardized to measure the personal values, environmental knowledge, environmental attitudes and pro-environmental behavior of secondary students. Descriptive statistics along with multiple regression were employed to analyse the data. Pro-environmental behavior was found to be significant correlation with three independent variables. Besides, personal values, environmental knowledge and environmental attitudes were unveiled as the predictors of pro-environmental behavior of secondary students. The findings suggest to make environmental education based on Knowledge-Attitudes-Values (KAV) Model at Secondary level.

**Keywords:** Personal Values, Environmental Knowledge, Environmental Attitudes, Pro-Environmental Behaviour, Secondary School Students.

## (A) INTRODUCTION:

The adolescent school going boys and girls at secondary level 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. To develop the environment awareness among masses various curricular and co-curricular programmes have been organised. Various plans and policies have been undertaken and programmes have been organised, but the success rate in actual sense is unsatisfactory. Knowledge and information have been disseminated but eco-friendly attitudes and proper level of pro-environmental behaviour have not been found among the masses. Before taking any action and in implementing the policies relating the environment, the factors relating to behaviour and attitudes must be identified. Many factors like personal characteristics, knowledge, attitudes, values, gender, localities, customs and traditions, and many other personal, societal and educational factors are more or less important contributing factors which are responsible in Pro-

Environmental Behaviour. In the present study, an effort has been made to find out and explore the factors of Pro-environmental behaviour to solve the environmental crisis.

### **(B) OBJECTIVES OF THE STUDY:**

Objectives for the present study were:

1. To measure the level of Personal Values, Environmental Knowledge, Environmental Attitudes and Pro-environmental behavior of Secondary level school students.
2. To find out the relationship of Personal Values, Environmental Knowledge, Environmental Attitudes with Pro-environmental behavior of Secondary level school students.
3. To develop and or adopt, and standardize three tools to measure Personal Values, Environmental Knowledge, Environmental Attitudes and Pro-environmental behavior of Secondary level school students.
4. To study the impact of three Independent Variables i.e. Personal Values, Environmental Knowledge and Environmental Attitudes on Dependent Variables i.e. Pro-environmental behavior of Secondary level school students.

### **(C) SIGNIFICANCE OF THE STUDY:**

The right kind of research studies would provide the right direction in assisting for proper utilization of resources and would be helpful to teachers, educational planners, policy makers, administrators, further researchers etc. in various ways. Ultimately the present study might be helpful for qualitative upliftment of environmental education i.e. in framing curriculum, organizing programmes relating to Protection and Preservation of Environment. The results and findings would help to prepare and plan novel, creative and unique program on environmental issues. The present study might be helpful in developing methodologies and tools to measure the variables selected for the study.

### **(D) HYPOTHESES:**

**H<sub>01</sub>:** No significant relationship would exist between the measures of Personal Values and Pro-environmental behavior of Secondary level school students.

**H<sub>02</sub>:** No significant relationship would exist between the measures of Environmental Knowledge and Pro-environmental behavior of Secondary level school students.

**H<sub>03</sub>:** No significant relationship would exist between the measures of Environmental Attitudes and Pro-environmental behavior of Secondary level school students.

**H<sub>04</sub>:** The measures of Personal Values, Environmental Knowledge and Environmental Attitudes of Secondary level school students combined together might not be a good predictor of their Pro-environmental behavior.

**(E) REVIEW OF RELATED LITERATURE:**

The following were the important studies reviewed by present researchers: (a) Study on 'Environmental Awareness' conducted by Archana Singhal and Urmila Verma (2012), G.B. Rakh, D.D. Khamkar, A.M.Late, A.S.Dhapate and M.B.Mule (2009), Tripathi (2000), Astalin P. K. (2011), Baruah B. K., Das B., Medhi C. and Misra A. K. (2011), Kumar, Rajive Malti and Kumar Narendra (2011), Pillai S. K. P. (2012), V.K. Ushadevi and R. Dhanya (2009); (b) Study on 'Environmental Awareness and Environmental Behaviour' conducted by Dave Deeksha. (2012); (c) study on 'Environmental Awareness and Environmental Attitude' conducted by Shahnawaj (1990), Tarrant & Cordel (1997), Stern *et al.*, (1993), Arcury (1990); (d) Study on 'Environmental Knowledge' by Gopinath D. and Gopinath M.D. (2008), Joachim Schahn and Erwin Holzer (1990); (e) Study on 'Environmental Knowledge and Environmental Behaviour' conducted by Frick (2004); (f) study on 'Environmental Knowledge and Environmental Attitude' conducted by Arcury (1990), Julie Ann Pooley and Moira O'Conner (2000); (g) Study on 'Knowledge, Attitudes and Environmental Behaviour' conducted by Smith, Rechenberg, Cruey, Magness & Sandman (1997), Palmberg (1997), Laroche, Tomiuk, Bergeron & Barbaro-Forleo (2002), Kumari, et. al, (2006); (h) Study on 'Human Values' by Amalraj, A. (1994), Verma, B.P. (1995), Taj, Haseen and Rekha, S. (1995), Das, S.K., (1996), Nanda, R.T., (1997), Mahmood, Ali, (1998), Verma, B.P and Ram Murti, (1998), Rajinder Toong (2007), Anshu Narad (2007), Gardia Alok (2007) S.L. Kaushal and Yasmin Janjhua (2011) Jorge Lengler, Carlos Mello Moyano and Carlos Callegaro (2006), Rob Lawson, Miranda Miroso, Daniel Gnoth and Amy Hunter (2010); (i) Study on 'Values and Environmental Attitudes' by Linda Steg, Goda Perlaviciute, Ellen van der Werff and Judith Lurvibk (2012); (j) Study on 'Environmental Behaviour' conducted by Tasos Hovardas and Konstantinos Kofiatis (2011), Gihar & Saxena (2006), Hungerford & Volk (1990), Kollmuss and Agyeman (2002), Groot and Steg (2009), Richard Osbaldiston and John Paul Schott (2011), Chenyang Xiao and Aaron M. McCright (2012); (k) Study on 'Environmental Attitudes and Environmental Behaviour' conducted by Kaiser, Ranney, Aartig And Bowler (1999), Stewart Barr (2007).

**(F) METHODOLOGY:****Variables involved in the Study**

The variables studied in the present study were divided into two categories a) Independent variables and b) Dependent variable.

**Independent variables**

- a) Personal Values (PB)
- b) Environmental Knowledge (EK)
- c) Environmental Attitudes (EA)

**Dependent variable**

Only one variable that is Pro-Environmental Behaviour (PEB) as a dependent variable was considered in the present study.

## Methods of the Study

The study at present has been planned an implemented descriptive frame work. It aims at comprising the level of Pro-Environmtnal Behaviour (PEB) in respect to Personal Values (PB), Environmental Knowledge (EK) and Environmental Attitudes (EA). As such the method of the investigation was confined to a descriptive and analytical approach.

## Tools Used

Three self-made Test were used in the present study. These tests are:

- a) Personal Values Questionnaire (PBQ)
- b) Environmental Knowledge Scale (EKC)
- c) Environmental Attitudes Scale (EAS)
- d) Pro-Environmtnal Behaviour Questionnaire (PEBQ)

**Population and the Sample :** The population of the study was secondary schools students of West Bengal. A purposive sampling was adopted to select the respondents for the study. The size of sample was 680 (n=680) in number and keeping in view of better representiveness of the population students were selected from various strata.

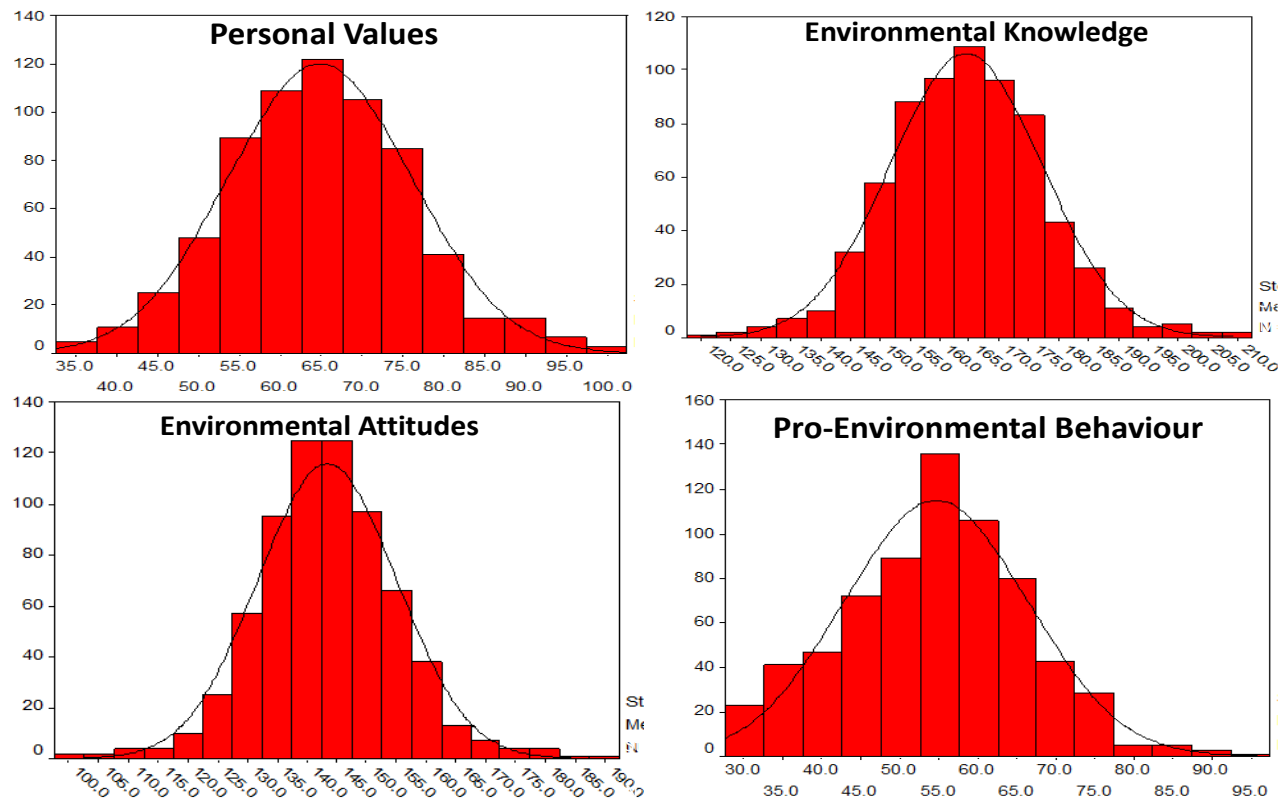
## Statistical Treatment of the Collected Data

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.

- i) Descriptive Statistics,
- ii) Inferential Statistics,
- iii) Correlational Statistics and
- iv) Multiple Regression Analysis.

**(G) ANALYSIS AND INTERPRETATION OF DATA:****Table-1 : Showing the Descriptive Statistics of the Scores of PVQ, EKS, EAS and PEBQ**

<b>Variables→ Statistics ↓</b>	<b>Personal Values</b>	<b>Environmental Knowledge</b>	<b>Environmental Attitudes</b>	<b>Pro-Environmental Behaviour</b>
N	680	680	680	680
Mean	64.83	164.43	143.37	54.61
SE <sub>M</sub>	0.43	0.49	0.45	0.45
Median	65.00	164.00	143.00	55.00
Mode	63	164.00	143.00	55.00
SD	11.28	12.77	11.69	11.78
Variance	127.35	162.96	136.65	138.76
Skewness	0.139	0.095	0.062	0.062
SE <sub>sk</sub>	0.094	0.094	0.094	0.094
Kurtosis	0.092	0.587	1.268	-.072
SE <sub>ku</sub>	0.187	0.187	0.187	0.187
Range	65	88	93	63
Minimum	34	121	98	30
Maximum	99	209	191	93
P25	57.00	156	136	47
P75	72.00	173	150	62
Interquartile Range	15.00	17.00	14	15



**Fig.-1: Showing Histogram with NPC of the Scores of PVQ, EKS, EAS and PEBQ**

**Table-2: Showing Inter-correlation among the Variables (N=680)**

Variables	PEB	PV	EK	EA
A. Ach.	1.00	0.697	0.563	0.574
INT	0.697	1.00	0.537	0.497
SC	0.563	0.537	1.00	0.414
EA.	0.574	0.497	0.414	1.00

### **Analysis of Relationships between Scores of Dependent Variable (PEB) and Independent Variables (PV, EK Sand EA) for Secondary Students**

The co-efficient between the scores of the schedule tribe students on academic Achievement and their scores on each independent variables i.e. Personal Values, Environmental Knowledge and Environmental Attitudes along with inter-correlation of independent variable were computed. All the computed r-values were tested at significance of 0.01 level using two tailed test. The statistical result of correlation-coefficient had been shown in Table-5.30

**Table-3: Showing the relationship between Scores of Dependent Variables and Independent Variables for Secondary School students**

Variable	N	r	Level of Significance
PV	285	0.621	Significant at 0.01 level
PEB	285		
EK	285	0.386	Significant at 0.01 level
PEB	285		
E.A	285	0.473	Significant at 0.01 level
PEB	285		

**(a) Analysis of the Relationship between Pro-Environmental Behaviour and Personal Values of the Secondary students pertaining to the Null Hypothesis No-1 (H<sub>01</sub>)**

From the Table-3 it was found that, there was a positive and high correlation (0.621) between Pro-Environmental Behaviour and Personal Values of Tribal students which was significant at 0.01 levels. Hence H<sub>01</sub> was rejected. It could be stated that, “there was a significant relationship between Personal Values and Pro-Environmental Behaviour of Secondary students.”

**(b) Analysis of the Relationship between Pro-Environmental Behaviour and Environmental Knowledge of the Secondary students pertaining to the Null Hypothesis No-2 (H<sub>02</sub>)**

The Table-3 portrayed that there was a positive correlation (0.386) between Pro-Environmental Behaviour and Environmental Knowledge of Secondary students which was significant at 0.01 level. Hence H<sub>02</sub> was rejected. Therefore it could be stated that “there was a significant relationship between Environmental Knowledge and Pro-Environmental Behaviour of Secondary students”.

**(c) Analysis of the Relationship between Pro-Environmental Behaviour (PEB) and Environmental Attitudes (EA) of Secondary students pertaining to the Null Hypothesis No-3 (H<sub>03</sub>)**

With reference to the Table-3 it could be stated that, H<sub>03</sub> was rejected as the r-value was significant at 0.01 level. Hence H<sub>03</sub> was rejected. So it could be concluded that, there was a significant relationship between Pro-Environmental Behaviour and Environmental Attitudes of Secondary students. The Table-3 also revealed that such relationship between Pro-Environmental Behaviour and Environmental Attitudes was positive.

**(d) Analysis of the Personal Values, Environmental Knowledge and Environmental Attitudes as predictor of Pro-environmental behavior pertaining to the Null Hypothesis No-4 (Ho4)**

**Step-Wise Multiple Regression Analysis**

The objective of the step-wise multiple regression analysis was to prepare a prediction about the dependent variables based on its co-variance with all the concerned independent variables. Through step-wise multiple regression analysis models, one could predict the level of the dependent variables, given the levels of independent variables. One specific advantage of the application of step-wise multiple regression analysis was the possibility of valuating the relative contribution of the step of independent variables to the variance in the dependent variable. This would provide an idea of the nature and extent to which independent variables were involved in predicting the dependent variable. The multiple regression equation used in the present investigation was as follows:

$$\hat{Y} = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n$$

**Pro-Environmental Behaviour of the Secondary Level School students.**

In this analysis, Pro-Environmental Behaviour (PEB) of the secondary students was treated as the dependent or out-come variable, and Personal Values (PV), Environmental Knowledge (EK) and Environmental Attitudes (EA) were independent or Predictor variables. Step-wise multiple regression analysis was carried out to find out the maximum possible variance in Pro-Environmental Behaviour (PEB) of the secondary students, that could be explained with the help of each of the independent variables. Results of the Step- wise multiple regressions had been shown in Table-4 and Table-5

**Table-4 : Summary of the Step-wise Multiple Regression Model (Outcome Variable- PEB)**

Model	R	R Square	Adjusted R Square	F Value	Sig	Durbin Watson value
1	0.697a	0.485	0.485	639.526	.000	
2	0.744b	0.554	0.553	104.542	.000	
3	0.765c	0.585	0.583	49.413	.000	2.060

a= Predictor: (Constant) =PV

b= Predictors: (Constant) = PV, EA

c= Predictors: (Constant)= PV, EA, EK

d= Dependent variable = PEB



**Table-5: Showing the Step-wise Multiple Regression on Pro-Environmental Behaviour with the Predictor Variables**

Model	Predictor Variables	Constant	Unstandardised Coefficients		Unstandardised Coefficients Beta	t-value	Sig.	Correlation		% of Variance	Collinearity Statistics	
			$\beta$	Standard Error				Zero Order	Partial		tolerance	VIF
1	PV	7.462	0.727	0.029	0.697	25.289	0.00	0.697	0.697	45.58	1.00	1.00
2	PV	-26.051	0.570	0.031	0.547	18.484	0.00	0.697	0.579	38.126	0.753	1.328
	EA		0.305	0.030	0.302	10.225	0.00	0.574	0.366	17.335	0.753	1.328
3	PV	-45.826	0.474	0.033	0.454	14.414	0.00	0.697	0.485	31.644	0.620	1.612
	EA		0.263	0.029	0.261	8.959	0.00	0.574	0.326	14.981	0.723	1.383
	EK		0.195	0.028	0.211	7.029	0.00	0.563	0.261	11.879	0.653	1.465

**(i) Model-1 (Predictor: Personal Values):** From the Table-4 and Table-5, it was seen that the first variable entered in the step-wise multiple regression analysis was Personal Values (PV). The multiple correlation (R) obtained was 0.697. The value indicated that the strength of relationship between the two variables was about 69.7%. The F-ratio for the first model was significant ( $F=1/678$ ) = 639.526,  $P<0.001$ ). One could interpret this result as the first model which could significantly improve the ability to predict the out-come variable Pro-Environmental Behaviour (PEB). The co-efficient of multiple R Square ( $R^2$ ) was 0.485. This showed that 48.5% of the variance on Pro-Environmental Behaviour (PEB) of secondary students was accounted by Personal Values (PV). Moreover, the adjusted R square was 0.485 and there was no difference between  $R^2$  and adjusted  $R^2$  as  $0.485-0.485=0.00$ . This revealed that if the model were derived from the population rather than sample, it would accounted for no variance in the out-come. The Standard error of the estimate for the model was 0.029 and the 't'- value was highly significant ( $t=25.289$ ,  $P<0.001$ ), it revealed that  $\beta$  value differed significantly from Zero. In other word the predictor was making a significant contribution on the model. The constant or intercept value that was considered in equation at the end of the first step, with which prediction of Pro-Environmental Behaviour would be possible, it was -7.462. Thus the multiple regression equation at the end of this step would be as follows:-  $PEB= 7.462+ .727 (PV)$ .....(1)

**(ii) Model-2 (Predictors: PV, EA) :** The next predictor variable entered in the second step was Environmental Attitudes (EA). The multiple correlations obtained between Pro-Environmental Behaviour (PEB) and two predictor variables was 0.744. The multiple  $R^2$  was 0.554. It revealed that the two variables, put together would explain about 55.4% of the variance in the out-come variable (PEB). From this 55.4%, PV explained 38.12% of variance and EA contributed 17.33 % of variance. The F- value for the second model was also significant [ $F(2/677) =104.542$ ,  $P<0.001$ ]. It could be seen that, by the inclusion of Personal Values, the contribution of EA had brought down from 48.58% to 38.12% due to intercorrelation between the two predictor variables. The t-

values of these two variables were also significant ( $P < 0.001$ ). In this step regression equation would be:  $PEB = -26.051 + 0.570(PV) + 0.305(EA) + \dots\dots\dots(2)$

**(iii) Model-3 (Predictors: PV, EA, EK):** In the third step, the variable entered in the analysis was Environmental Knowledge (EK) Score. All these three variables put together explained 58.5% ( $R^2 = 0.585$ ) of variance on the out-come variable. The multiple R was 0.765 and adjusted  $R^2$  was 0.583. For this third model the F-ratio was also significant [ $F(3/676) = 49.413, P < 0.001$ ]. From the total variance 58.5% explained by the predictor variables, Intelligence was accounted for 31.64% and 14.98% was explained by Environmental Knowledge (EK) and remaining 11.87% of variance was explained by Environmental Knowledge (EK). By including Environmental Knowledge (EK) score in the analysis, the variance explained by PV decreased from 38.12% to 31.64% for this model. The variance, explained by EA has also come down from 17.33% to 14.98% due to inter-correlation prevailing among the three predictor variables. The t-values for PV and EA were significant with t-value of 14.414 and 8.959 and significant at  $P < 0.001$ . Accordingly the third predictor (EK) the t-value was also significant ( $t = 7.029, P < 0.001$ ), this indicated that Environmental Knowledge (EK) was also contributed significantly to the model. The regression equation which would predict the Pro-Environmental Behaviour (PEB) of the students at this step would be:

$$PEB = -45.826 + 0.454(PV) + 0.261(EA) + 0.211(EK) + \dots\dots\dots(3)$$

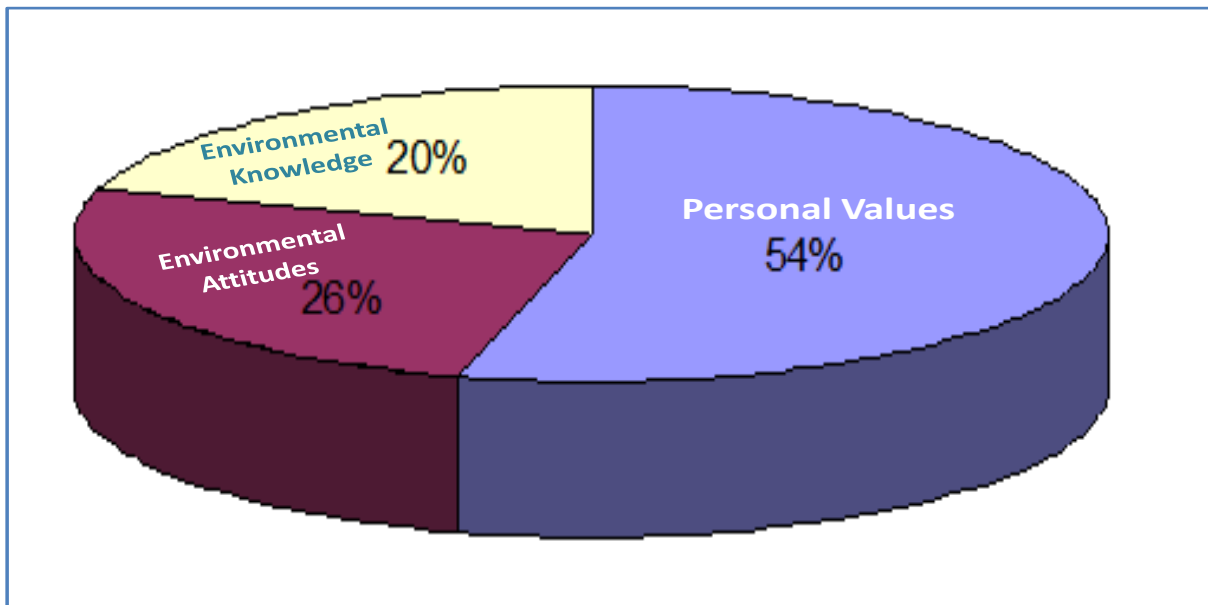
All these three predictor-variables put together could explain 58.5% of variance on the out-come variable. The PV explained 31.64%, the Environmental Attitudes (EA) accounted for 14.98% of variance and Environmental Knowledge (EK) explained 11.87% of variance. Personal Values appeared to be the relatively greater contributing factor in Pro-Environmental Behaviour (PEB) of the secondary students. The next contributing factors were Environmental Attitudes (EA) and Environmental Knowledge (EK). Hence Null Hypothesis ( $H_{04}$ ) was rejected and the above statements had established that “the measures of Personal Values, Environmental Knowledge (EK) and Environmental Attitudes of Secondary students combined together might be a good predictor of their Pro-Environmental Behaviour (PEB).” Fig.-2 showed the relative contribution of Predictor variables on Pro-Environmental Behaviour (PEB).

**(iv)  $\beta$ - Value Analysis :** The calculation of  $\beta$  Values were important because they would explain the relationship between academic achievement and each predictor. Positive  $\beta$  value represented the positive relationship between the predictor and out-come and negative value represented negative relationship. For the present analysis of Model-3 all the three predictors had positive  $\beta$  values (Table-5). Thus, when the predictor variable was increased, the Pro-Environmental Behaviour (PEB) would be increased. Apart from these,  $\beta$  values expressed the degree of each predictor effect on the out-come when the effects of all other predictors were held constant.

- **Personal Values ( $\beta = 0.474$ ):** This value indicated that when Personal Values increased by one unit, PEB would increase by 0.474 unit. This interpretation was true only when the effect of EA and EK were held constant.
- **Environmental Attitudes ( $\beta = 0.263$ ):** This value indicated that the increase of Environmental Attitudes (EA) by one unit the PEB would increase by 0.263 unit. This interpretation was true only, when the effect of PV and EK were held constant.
- **Environmental Knowledge ( $\beta = 0.195$ ):** This value indicated that one additional score on Environmental Knowledge (EK) would expect additional development of PEB by 0.195 units. This interpretation was true only if the effects of PV and EA were held constant.

**(v) Standardised  $\beta$  values Analysis:** The standardize versions of the  $\beta$  value were in many ways, easier to interpret because they would tell the degree of change in outcome variable Pro-Environmental Behaviour (PEB) as a result of change in one standard deviation of the predictor variables.

- **Personal Values (Standardized  $\beta = 0.454$ ):** This value indicated that with increase of PV by one standard deviation (11.28), the Pro-Environmental Behaviour (PEB) of secondary students would increase additional 0.454 standard deviation. The SD for PEB was 11.78 and this constitute a change of 5.34% ( $0.454 \times 11.78$ ) in their Pro-Environmental Behaviour (PEB). This interpretation was true only if the effects of EA and EK were held constant.
- **Environmental Attitudes (Standardize  $\beta = 0.261$ ):** This value indicated that the Pro-Environmental Behaviour (PEB) would increase by 0.261 Standard Deviations when the score in EA increased by one standard deviation (11.69). The SD for Pro-Environmental Behaviour (PEB) was 11.78 and so this constituted a change of 3% ( $0.261 \times 11.78$ ). Therefore, if the students secure an extra score 11.69 in Environmental Attitude Scale (EAS), 3% of additional results could be expected in their Pro-Environmental Behaviour (PEB). This interpretation was only if the effect of PV and EK were held constant.
- **Environmental Knowledge (Standardized  $\beta = 0.211$ ):** This value indicated that Pro-Environmental Behaviour (PEB) would increase by an additional 0.211 standard deviation when Environmental Knowledge score increased by one standard deviation (12.77). This constituted a change of 2.48% ( $0.211 \times 11.78$ ) in Pro-Environmental Behaviour (PEB). Therefore the secondary students secured an additional 12.77 score in Environmental Knowledge he/she could expect 2.48% additional increase in Pro-Environmental Behaviour (PEB). This interpretation was true only if the effect of PV and EA was held constant.



**Fig. -2 : Relative contribution (in Percentage) of the predictor variables to Pro-Environmental Behaviour of Secondary Students.**

#### MAJOR FINDINGS:

1. The Pro-Environmental Behaviour of Secondary level school students were significantly correlated with their Personal Values, Environmental Knowledge, and Environmental Attitudes. The better in Personal Values, Environmental Knowledge, and Environmental Attitudes enhanced the Pro-Environmental Behaviour of Secondary level school students.
2. All the independent variables considered in the present study (Personal Values, Environmental Knowledge, and Environmental Attitudes) were the successful predictors of the Pro-Environmental Behaviour of the secondary students.

#### RECOMMENDATIONS:

- 1 The prediction of Pro-environmental behaviour could have been elaborated if some correlates like parental attitude, cognitive style, psycho- social constraints, curriculum practice, social processes, socio-economic status were considered.
- 2 The study needs to be made on a larger sample of educational organization for various strata such as Nursery, Primary, Middle schools, Colleges and other educational institutions, so as to get a more reliable and comparable results.
- 3 The study needs to be made on larger cross sections of populations like illiterate, literates, educated and high educated to have a broad generalization.
- 4 To draw the better conclusion it may be suggested to study on such variables in case of variations of professions such as students, teachers, administrators, common people etc.
- 5 Longitudinal studies may be conducted to study the impact of background variables of students on their environmental knowledge, personal values and Pro-environmental behaviour.

- 6 Cross-cultural studies of these variables among students in India and some foreign countries may be attempted.
- 7 Practical environmental education programs might be more effective in changing attitudes and behaviour than knowledge-based presentations.
- 8 For environmental educators interested in changing environmental attitudes, emotions and beliefs, rather than knowledge, need to be targeted as sources of information on which to base their environmental programs.

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