University of BRISTOL

Practical Statistics for Use in Research and Policy

MSc in Climate Change Science and Policy

Department of Geographical Sciences

A Study of Willingness to Pay for The Environmental Tax in India using World Value Survey Data

Abstract-:

India is projected to be seriously affected by climate change by 2100. Therefore, understanding the factors influencing the citizens' willingness to pay for the environmental tax is necessary before implementing new environmental policies in response to climate change. Hence, this study investigated various elements affecting the public's desire to pay for the eco-system by the binary logistic regression method. The findings revealed that more than 70% of people in India showed a willingness to pay environmental tax. However, since only 6.25% of the entire population pay any kind of tax due to poor tax culture, the Government of India may be advised to simplify the current tax system and create a better tax culture before implementing any environmental taxes. Also, no reports were found about the current implementation of environmental education. Since education was reported as a key factor in this study, it is suggested to back the eco-education policies up with research that may aid in their implementation.

Introduction-:

Recent studies have shown that if the current trend for adaptation to climate change persists, the globe may warm by 3^0C–4^0 C by 2100 (Thaker, and Leiserowitz, 2014). India being one of the largest economies in the world, and home to nearly 1.3 billion people (nearly 15% of the total population of the world), may be seriously affected by climate change (Garg et al., 2007). The possible reasons for India's impact may be attributed to its economic dependence on natural resources and agriculture with overall crop production projected to decline (Singh et al., 2021).

Therefore, the Indian Government may try to explore social elements that may have a substantial impact on environmental behaviour before developing environmental policies (Jones et al., 2010). One such social element of understanding ecological concern is citizens' attitude towards climate change prior to implementing an environmental policy. This is because the public's cooperation and willingness to comply is found to be an important factor for environmental policies to be effective(Anderson, 2011).

However, there has only been limited research such as Franzen and Vogl (2013) on public environmental attitudes in India. Considering the increasing vulnerability to climate change, environmental policies will be needed, so it is imperative to understand how supportive the Indian population will be to these.

Hence, this study aims to identify the factors influencing Indian citizens' willingness to pay part of their income for the environment so that the Government of India can understand the public perceptions

and potential obstacles before creating any new environmental taxes and policies(Kollmann, Reichl and Schneider, 2012).

Data Source-:

The World Values Survey (WVS) (www.worldvaluessurvey.org) is an international network of social scientists led by an international team of experts that studies evolving values and their impact on political and social life (WVS Database, 2021). WVS is considered one of the best datasets available in social science (Kollmann, Reichl and Schneider, 2012). So, the data used for the study was acquired from this website and "SPSS version 26" was used for all of the analyses. On the other hand, the "Microsoft Excel" application was used to make graphs and tables.

Method-:

The question *"Would you give part of your income if you were certain that the money would be used to prevent environmental pollution"* was asked on a four-point scale i.e., "strongly agree", "agree", "disagree", and "strongly disagree"(Franzen and Vogl, 2013). Then, India was selected as the country of interest. Five thousand three hundred and thirty (5330) valid responses were recorded across three waves i.e., 1989-1993, 1999-2004, 2005-2009. Here, the question does not directly address the usage of environmental taxes and specifies that the money would be used to avoid pollution. Still, the responses to this research may be considered as a proxy for citizens' approval for the environmental taxes (Kollmann, Reichl and Schneider, 2012).

The "Binary logistic Regression" technique is one of the most successfully used tools for understanding the relationship between a dependent variable and its corresponding independent variables. The given question was chosen as the dependent variable. Then, it was converted into a new variable by merging responses from "strongly agree" with "agree" and "strongly disagree" with "disagree".

Consequently, all the non-categorical independent variables were converted to categorical variables. Then, different binary logistic regression models were run with different combinations of independent variables such as age, gender, marital status, education level, the feeling of happiness, household income, concern with unemployment, social class, socio-economic status etc. The strength of the independent variables was determined using a Pearson correlation analysis. All the independent variables having Pearson's R>0.7 and <-0.7 were eliminated from the model.

After running several models with different variables, the Chi-squared statistic (at the 95% critical values) and associated degrees of freedom were used to choose the best fit model i.e., "*Model 2*".

Results-:

Table 1-: (The survey responses of the Indian Public to the environmental tax question)

Does the public of India want to give part of their income for the Environment?	**Frequency**	**Percent**
Disagree	1416	26.6 %
Agree	**3916**	**73.4 %**
Total No. of Cases (N)	5330	100 %

Table 1 shows that more than 70% of the people were willing to pay environmental tax. Also, as shown in table 2, Indian citizens in 1989-1993 were twice more willing to pay environmental tax compared to 2005-2009 ($p<0.05$) whereas the results obtained for the time period 1999-2004 were statistically insignificant. This result was reported while taking into the account of age, gender, education level and satisfaction with the financial situation within the household in the final model (*Model 2*).

Indian citizens having the middle level of education were twice more willing to pay for the environmental tax (approximately) in comparison to the people with lower levels of education($p<0.05$) (Table 2). On the other hand, compared to the low level educated people, highly educated people showed nearly 3 times more willingness to pay environmental tax.

Model 2 demonstrates that males were as likely to pay environmental tax as females($p<0.05$). Also, the younger generation of India indicated nearly 1.8 times more willingness to pay environmental tax compared to the oldest generation($p<0.05$). The more financially satisfied households are 5 times more likely to pay environmental tax compared to the least satisfied households financially($p<0.05$), in model 2.

Table 2-:

Model 2	**Statistical Significance (p value)**	**Exp(B)**
Wave (2005-2009) As Base	0.000	
Wave (1989-1993)	0.000	1.997
Wave (1999-2004)	0.651	0.974
Education Level-: Lower as Base	0.000	
Middle	0.000	1.918
Higher	0.001	3.115
Gender-: Female as Base	0.000	
Male	0.002	1.013
Age-: Old as Base	0.000	
Middle	0.061	1.102
Young	0.001	1.894
Satisfaction with Financial Situation of Household-: Least Satisfied as Base	0.000	
Most Satisfied	0.000	5.001
df= 16, Chi-Squared Value= 364.67		

(Table 2 shows the "Model 2" which was found to be the best fit model for this study)

Figure 1-:

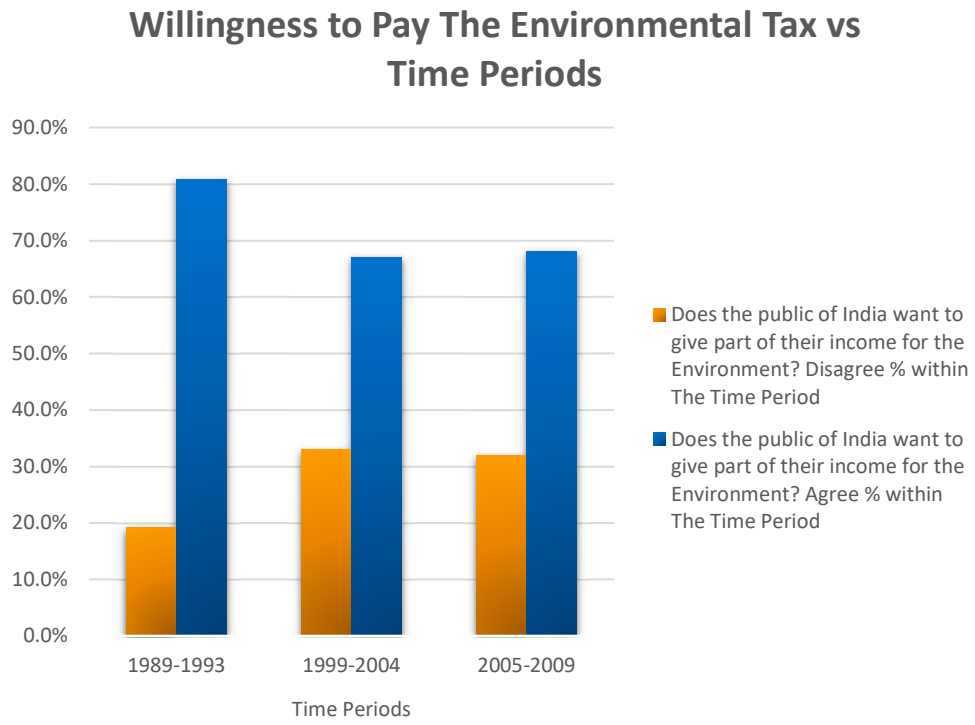
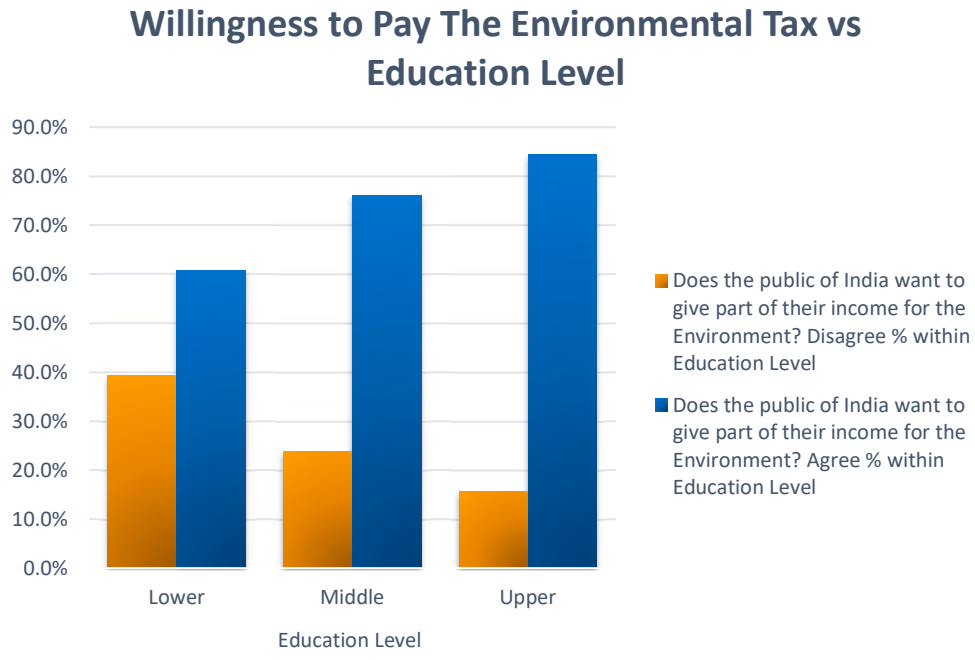


Figure 2-:



Discussion-:

In the first part of the 1980s, environmental protection was considered an issue of global importance, but its importance decreased over the next twenty years with unemployment issues taking the centre stage in many countries, from 1993 onwards (Kollmann, Reichl and Schneider, 2012). This may be one of the reasons for the decline in willingness to pay environmental tax over time in India.

Prior studies have noted the importance of education in understanding environmental issues (Franzen and Vogl, 2013; De Silva and Pownall, 2014). Also, greater education was linked to higher approval rates for environmental tax ideas in the Swiss proposal (Dietz et al.,1998). The result of this study corroborates with that of Deroubaix, J.-F. & Leveque, F. (2006) who suggested that comprehending the complexities of environmental concerns necessitates a greater level of education, motivation, and time to learn, therefore gathering information could be one of the most important elements for willingness to pay for the environmental tax.

Contrasting to most studies, this analysis couldn't find any difference in willingness between males and females to pay for the environmental tax in India. This was unexpected since most of the studies found that in comparison to men, women exhibited greater environmental beliefs (Lee, 2009; Rahim et al., 2017). One of the reasons for this gender indifference in India may be attributed to its social culture which is based on much more collective value orientation compared to western civilization (Hofstede, 2001; Van de Vijver and Leung, 1997) and the value of family bonds is also instilled in Indian males (Smith and Fischer, 2008). So, they were as likely to pay the environmental tax as the females.

According to Gelissen (2007), age has a substantial impact on individual support for environmental protection, with the younger generation showing more enthusiasm towards environmental concern compared to the older generation. This study on India is consistent with many literatures (Dietz et al., 1998; Gelissen, 2007; Franzen and Meyer, 2010).

Bornstein and Lanz (2008) discovered that public concern for paying environmental tax does not depend on financial satisfaction or wealth. However, the finding of this study disagreed with it. The results confirmed the association between financial satisfaction and environmental concern with an increase in the financial situation of the house is linked with an increase in willingness to pay the environmental tax. Since the financial situation of the household and wealth are correlated (Pearson's R = 0.637), it may be concluded that wealthy people in India are more concerned about the environment compared to the poor. This premise, however, contradicts the growth in climate change scepticism among the world's wealthiest communities (Lo and Chow, 2015).

Policy Suggestions-:

Policy 1-: (Creating A Better Tax Culture Before Implementing Any Environmental Taxes)

- Although more than 70% Indian public showed a willingness to pay environmental tax in this study, it was discovered that only 6.25% people in India pay tax compared to 45% of people in the United States of America, with India losing 10.3 billion pounds in income tax (Why Should I pay tax, 2021). This may be attributed to weaker tax laws along with poor tax culture.

- So, before bringing any new environmental taxes, the govt of India may be advised to create a better tax culture in India by raising awareness about the benefits of paying taxes to the public.
- Indian public considers the tax system to be complicated (Why Should I pay tax, 2021). So, the govt of India must find a way to simplify the tax collection procedures and the whole tax system. Only then, the Govt. of India may implement new environmental taxes. Implementing environmental tax before reforming the tax culture may cause the environmental taxes system to be a failure (Cottrell et al., 2016).

Policy 2-: (More Research on Implementation of Eco-education Policies)

- Since higher education was demonstrated to be a key factor for environmental concern, therefore, environmental education may be prioritised at an early age which may result in more willingness to pay the environmental tax.
  Despite environmental education being mandated to be compulsory across all years of formal schooling since 2003, no steps had been taken to measure the success or failure of the policy (Almeida and Cutter-Mackenzie, 2011). Policies are meaningless unless they are accompanied by efforts to put them into action (Ravindranath, 2007).
- Therefore, it is suggested to back the eco-education policies up with research that may aid in their implementations (Ravindranath, 2007).

Table 3-:

Levels of Education	**Modes of Environmental Education in India as recommended by the Govt. of India**
Primary	Through Activities
Upper Primary	Environmental Studies (EVS)
Secondary and High School	Through Infusion Model of Teaching
College	Project-Based Study

(Table 3 talks about the recommended modes of environmental education in India. Here, the infusion model of teaching means incorporating thinking skills into the learning process (Zulkpli et al., 2017).)

Policy 3-: (Possible Construction of National Parks)

- Since financial satisfaction was observed to be an important factor regarding willingness to pay for the environment, the Govt. of India may strive to create new jobs so that people may become happier with their financial situation and care for the environment more (Garg et al., 2007).
- One way to both preserve the environment, natural habitats and create new jobs may be to build national parks in suitable areas all over India (Wang, 2019). China released its first policy

framework for creating a national park system in 2017 (Wang, 2019). India may follow a similar path to create national parks.

Conclusion-:

From this study, it may be concluded that education and financial satisfaction play a key role in willingness to pay environmental tax in India. But one of the drawbacks of this study was that it didn't investigate the relationship between cultural values and environmental tax which was considered as one of the key factors in some of the literatures (Kollmann, Reichl and Schneider, 2012; Franzen and Vogl, 2013). Also, future studies may be recommended to gather a larger sample size along with more independent variables.

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References

Almeida, S. and Cutter-Mackenzie, A. (2011) "The historical, present and future ness of environmental education in India," *Australian Journal of Environmental Education*, 27(1), pp. 122–133.

Anderson, J. E. (2011) *Public Policymaking: An Introduction*. Wadsworth/Cengage Learning.

Blaine, T. W. *et al.* (2005) "An assessment of household willingness to pay for curbside recycling: A comparison of payment card and referendum approaches," *Journal of Environmental Management*, 76(1), pp. 15–22.

Bornstein, N. and Lanz, B., 2008. Voting on the environment: Price or ideology? Evidence from Swiss referendums. *Ecological Economics*, *67*(3), pp.430-440.

Cherry, T. L., Kallbekken, S. and Kroll, S. (2017) "Accepting market failure: Cultural worldviews and the opposition to corrective environmental policies," *Journal of Environmental Economics and Management*, 85, pp. 193–204.

Cottrell, J., Schlegelmilch, K., Runkel, M. and Mahler, A., 2016. *Environmental tax reform in developing, emerging and transition economies* (No. 93). Studies.

de Groot, J. I. M. and Schuitema, G. (2012) "How to make the unpopular popular? Policy characteristics, social norms and the acceptability of environmental policies," *Environmental Science and Policy*, 19–20, pp. 100–107.

De Silva, D.G. and Pownall, R.A., 2014. Going green: does it depend on education, gender or income? *Applied Economics*, *46*(5), pp.573-586.

Deroubaix, J.F. and Lévèque, F., 2006. The rise and fall of French Ecological Tax Reform: social acceptability versus political feasibility in the energy tax implementation process. *Energy policy*, *34*(8), pp.940-949.

Dietz, T., Stern, P.C. and Guagnano, G.A., 1998. Social structural and social psychological bases of environmental concern. *Environment and behavior*, *30*(4), pp.450-471.

Franzen, A. and Meyer, R., 2010. Environmental attitudes in cross-national perspective: A multilevel analysis of the ISSP 1993 and 2000. *European sociological review*, *26*(2), pp.219-234.

Franzen, A. and Vogl, D. (2013) "Acquiescence and the willingness to pay for environmental protection: A comparison of the ISSP, WVS, and EVS," *Social Science Quarterly*, 94(3), pp. 637–659.

Garg, A., Shukla, P.R. and Kapshe, M., 2007, May. From climate change impacts to adaptation: A development perspective for India. In *Natural Resources Forum* (Vol. 31, No. 2, pp. 132-141). Oxford, UK: Blackwell Publishing Ltd.

Gelissen, J., 2007. Explaining popular support for environmental protection: A multilevel analysis of 50 nations. *Environment and behavior*, *39*(3), pp.392-415.

Gilg, A., Barr, S. and Ford, N. (2005) "Green consumption or sustainable lifestyles? Identifying the sustainable consumer," *Futures*, 37(6), pp. 481–504.

Goulder, L. H. (1995) *Environmental Taxation and the Double Dividend: A Reader's Guide*, *International Tax and Public Finance*.

Gupta, M. (2016) "Willingness to pay for carbon tax: A study of Indian road passenger transport," *Transport Policy*, 45, pp. 46–54.

Hofstede, G., 2001. *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage publications.

Incometaxindia.gov.in. 2021. *Home - Central Board of Direct Taxes, Government of India*. [online] Available at: <https://incometaxindia.gov.in> [Accessed 23 July 2021].

Incometaxindia.gov.in. 2021. *Why Should I pay tax*. [online] Available at: <https://www.incometaxindia.gov.in/Charts%20%20Tables/Why%20should%20I%20pay%20tax.htm > [Accessed 23 July 2021].

Inglehart, R., Haerpfer, C., Moreno, A., Welzel, C., Kizilova, K., Diez-Medrano, J., Lagos, M., Norris, P., Ponarin E. and Puranen B. (eds.) (2014) World Values Survey: All Rounds - Country-Pooled Datafile Version. [Online] Available at: https://www.worldvaluessurvey.org/WVSDocumentationWVL.jsp. Madrid: JD Systems Institute.

Jones, N. *et al.* (2010) "Social factors influencing perceptions and willingness to pay for a market-based policy aiming on solid waste management," *Resources, Conservation and Recycling*, 54(9), pp. 533–540.

Kallbekken, S. and Sæælen, H. (2011) "Public acceptance for environmental taxes: Self-interest, environmental and distributional concerns," *Energy Policy*, 39(5), pp. 2966–2973.

Kim, J. *et al.* (2013) "Attitudes towards road pricing and environmental taxation among US and UK students," *Transportation Research Part A: Policy and Practice*, 48, pp. 50–62.

Kollmann, A., Reichl, J. and Schneider, F. (2012) "Who is Willing to Pay for the Environment in the EU-An Empirical Analysis," *Euro Economica*, 31(5).

Kotchen, M. J., Boyle, K. J. and Leiserowitz, A. A. (2013) "Willingness-to-pay and policy-instrument choice for climate-change policy in the United States," *Energy Policy*, 55, pp. 617–625.

Lee, S.-H. (2009) "How do online reviews affect purchasing intention?" *African Journal of Business Management*, 3(10), pp. 576–581.

Liu, A. A. (2013) "Tax evasion and optimal environmental taxes," *Journal of Environmental Economics and Management*, 66(3), pp. 656–670.

Lo, A. Y. and Chow, A. T. (2015) "The relationship between climate change concern and national wealth," *Climatic Change*, 131(2), pp. 335–348.

Rahim, R. A. *et al.* (2017) "E-WOM Review Adoption: Consumers' Demographic Profile Influence on Green Purchase Intention," in *IOP Conference Series: Materials Science and Engineering*. Institute of Physics Publishing.

Ravindranath, M., 2007. Environmental education in teacher education in India: experiences and challenges in the United Nation's Decade of Education for Sustainable Development. *Journal of Education for Teaching*, 33(2), pp.191-206.

Rhodes, E., Axsen, J. and Jaccard, M. (2014) "Does effective climate policy require well-informed citizen support?" *Global Environmental Change*, 29, pp. 92–104.

Singh, C., Madhavan, M., Arvind, J. and Bazaz, A., 2021. Climate change adaptation in Indian cities: A review of existing actions and spaces for triple wins. *Urban Climate*, *36*, p.100783.

Smith, P.B. and Fischer, R., 2008. Acquiescence, extreme response bias and culture: A multilevel analysis. *Multilevel analysis of individuals and cultures*, pp.285-314.

Thaker, J. and Leiserowitz, A., 2014. Shifting discourses of climate change in India. *Climatic Change*, *123*(2), pp.107-119.

Van de Vijver, F. and Leung, K., 1997. *Methods and data analysis of comparative research*. Allyn & Bacon.

Wang, B. *et al.* (2018) "Effects of carbon and environmental tax on power mix planning - A case study of Hebei Province, China," *Energy*, 143, pp. 645–657.

Wang, J., 2019. National parks in China: Parks for people or for the nation. *Land Use Policy*, 81, pp.825-833.

Worldvaluessurvey.org. 2021. *WVS Database*. [online] Available at: <https://www.worldvaluessurvey.org/wvs.jsp> [Accessed 23 July 2021].

Zulkpli, Zulhelmi & Abdullah, Abdul & Abdul Kohar, Umar Haiyat & Ibrahim, Nor. (2017). A review research on infusion approach in teaching thinking: Advantages and impacts. *Man in India*. 97. 289-298.