AN EMPIRICAL STUDY OF PUBLIC’S OPINION ON GLOBAL WARMING AND SUSTAINABLE DEVELOPMENT WITH REFERENCE TO SHIMLA

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ABSTRACT
Their various environmental issues, global warming threatens the well being of both developed and developing countries. Many studies have conducted in both developed countries and under developed countries to maintain sustain development. The research is conducted to assess level of awareness of global warming. The Study further focused on eco-friendly measures to develop sustainable development in Shimla. A survey of considers a stratified samples of six segments (students, teachers, businessmen, corporate, home maids and government officials) of the society. The study analyses using ANOVA (level of significance at 95%) to identify relationship between demographical variables (Age, Gender, Occupation and education) and awareness. further identify relationship between demographical variables (Age, Gender, Occupation and education) and eco-initiatives to the test significance.

Key words: Global Warming, Demographical variables, Sustainable development, eco-friendly.

Like no other environmental issue, global warming threatens the well being of both developed and developing countries. Public awareness regarding global warming started only after Rio de Janerio in 1992, earth summit conducted by the united nation discussed on climatic change and green house gases(GHG) to address to be stabilizing them. Our Common Future is 1987 report. In it, the UN World Commission of Environment and development issued a call for a new charter –The Earth Charter - to maintain livelihoods and life on our shared planet and to guide state behaviour in the transition to sustainable development. A new Earth Charter was drafted in 1994 at the Rio Earth Summit. A global consultation process was started. Hundreds of groups and thousands of individuals became involved in this process. Between 1997 and 1999 over forty national Earth Charter committees were formed. The Earth Charter was finally launched at a meeting in March 2000 at UNESCO’s Paris headquarters.
The Inter-governmental Panel on Climate Change (IPCC, 2007) has been instrumental in establishing the fact that anthropogenic GHG emissions will lead to many changes in global climate such as melting ice-caps, rising sea-levels, changing agricultural patterns, expansion of deserts, warmer summers, and colder winters (IPCC, 2007). Although global warming is merely one of the consequences of climate change, the term global warming is being used widely in public and media discourse to refer to all impacts of climate change.

The 1997 Kyoto Protocol seeks to reduce global warming through GHG cutbacks by developed countries, as per specific targets. The Kyoto Protocol categorized countries into three groups on the basis of their levels of economic development. India acceded to The Kyoto Protocol in August 2002 as a non-Annex I group member, and in June 2004 submitted to the United Nations its first and only national GHG inventory (NATCOM, 2004). Among other things, the inventory states that with rising incomes, households at all socioeconomic levels in India are increasingly using energy through electric bulbs, fans, televisions, refrigerators, washing machines, aircoolers, air-conditioners, water heaters, scooters, and cars. The related GHG emissions are expected to rise even though energy efficiencies of these appliances are continually improving (NATCOM, 2004). Carbon dioxide (CO2) forms 65% of all GHG emissions in India and the energy sector accounts for 61% of GHG emissions in from all sectors.

Developing countries, including India, have been absolved of any responsibility towards reducing emissions in the first commitment period, i.e., 2008–12, of the Kyoto Protocol. India’s per capita carbon dioxide (CO2) emission is very low: only 1.36 tonnes per annum, which is less than one-third of the world average per capita emission of 4.39 tonnes per annum. In absolute terms, India is the fifth largest emitter of fossil fuel-derived carbon dioxide, and its total emissions are growing rapidly. India is now under severe international pressure to accept binding commitments for emission reduction in the post–2012 phase of the Protocol, which it has managed to evade for the time being, as evinced at Copenhagen in December 2009.

Review of literature:
Although The Kyoto Protocol doesn’t require developing countries like India to reduce GHG emissions, India is being called upon to decrease its GHG emissions, which are expected to increase. A perusal of India’s official documents and policies on climate change and environment indicates that India is not ready to accept quantitative restrictions on its per capita GHG emissions which are much lower than that of developed countries. India also argues that it must continue on the path of development and growth for some years in order to reach the same level of development as that of the rich countries. India asserts that even while pursuing economic growth and development, its per-capita GHG emissions will not exceed those of developed countries which it considers responsible for much of the current global warming (Prime Minister’s Office, 2007). Like other developing countries, India perceives global warming as a problem caused chiefly by wasteful energy use by developed countries. Therefore it would be difficult for India to promote domestic measures to prevent global warming unless it held benefit for the country (Nomuri Research Institute, 2004).

India is aware that global climate change will have an adverse impact on the country’s ecosystems, agriculture, forests, disease vectors, and marine resources. The Prime Minister’s Council on Climate Change oversees the integration of climate change concerns into the national development planning through a “relatively GHG benign sustainable growth path” which includes diffusion of renewable
energy, energy efficiency, forest and water resources management, and environmental education (National Environment Policy, 2006).

India is also implementing sector-specific GHG reduction programs in partnership with multi-lateral organizations and under bilateral programs with developed countries. Global warming needs a multi-pronged approach which involves changes in technology, energy prices, business practices, consumer behavior, and other activities affecting people’s daily lives (Sterman & Sweeney, 2007). Since a low level of awareness about climate change in developing countries is one of the impediments to global warming mitigation, it is necessary to promote and facilitate education, training, and awareness programs in such countries (Chatterjee, 2002).

Since public support for and participation in global warming mitigation are crucial for successfully addressing this issue, this research ascertained the level of public awareness and knowledge about global warming in India. A stratified survey of 851 respondents was done in the year 2007 in Hyderabad, India’s fifth largest metropolis, to learn about public perceptions on energy and environment, causes and effects of global warming, and willingness to take action to reduce GHGs and found that This study shows that even in developing countries like India, people are aware of the issue of global warming and its seriousness. However, they do not have a clear understanding of the causes and impacts of this environmental issue and what they can do to mitigate global warming. Since global warming has wide-ranging impacts, awareness about the problem and effective solutions must be enhanced through concerted efforts by stakeholders in the government, the corporate sector, the media, the NGOs, and educational institutions. Public participation in global warming mitigation programs could be enhanced significantly by increasing people’s understanding of and knowledge about all aspects of global warming. (Rao, 2011).

RESEARCH METHODOLOGY

Statement of problem:

The study is looking at awareness of global warming effects on the individuals and eco-friendly measures taken by the individuals, earlier studies Chatterjee (2002) and Rao (2011) have found that people have people have less awareness about global warming test hypothesis does it hold this hold good in shimla.

Objectives of the study:

To identify the awareness of global warming among the general public in Shimla, the demographical (age, gender, education, occupation and income) relationship between awareness of the public and what are the eco-friendly initiatives & sustainable development, taken by the public to reduce pollution.

Hypothesis:

Null Hypothesis 1: People have less awareness of environment

Alternative Hypothesis 1: people have more awareness of environment.

Null Hypothesis 2: People are not using eco-friendly
Alternative Hypothesis 2: people are using eco-friendly.

Study – Site:

The study is conducted in Shimla. Shimla is the capital city of Himachal Pradesh, with a population size of 8,14,010 as per the 2011 census (male 425,039 and female 388,971). Literacy rate among men is 95.75% and female is 93.35%. The primary occupation of people is agriculture. The geographical area (in km²) is 5131 sq. km, the forest area is 119331 hectares, the cultivated area is 101160 hectares and usable area is 49051 hectares.

Nature of the study:
The study is purely explorative, conclusive and evidence based in nature

Data collection method:
The study considers data from both secondary data and primary data. The primary data is collected through questionnaires from the various people living in the Shimla and secondary is collected through text books, magazines, journal and various websites.

The questionnaires development:
These questionnaires are designed under three stages. First stage covers demographical indicators like age, gender, income, occupation and educational qualification. Second stage covers awareness of individuals toward global warming through structured questionnaires. Third stage covers eco-friendly initiatives taken by individual and willingness to be eco-friendly.

The sample nature:
The sample is stratified random samples, a survey of considers stratified samples of six segments (students, teachers, businessmen, corporate, home maids and government officials) of the society.

The sampling procedure:
The sample is selected based on convenient available people with the specified strata.

Respondents’ demographical profile:
- Gender: The gender of individuals is classified as Male, Female and Transgender.
- Occupation: The occupation of individuals is classified as students, teachers, businessmen, corporate, home maids and government officials.
- Age: The age groups of individuals are classified as 18 -25 years, 26-35 years, 36-50 years and 51 and above.
- Educational Qualification: The qualification of individuals are classified as XII and below, Graduate, Post-Graduate & Doctorate and above.
- Monthly income: The monthly income of individuals are classified as Up to Rs 10,000, Rs 11,000 -25,000, Rs 26,000-50,000 and Rs 51,000 & above.
Period of the study:
The study is conducted in 20 days.

The field work:
The field work is conducted by using questionnaires to selected people, who supports and encourage research. It is conducted in summer hill and Shimla.

The data analysis:
The data analysis using qualitative data into quantitative data by allotting numerical values such as “None” is Zero, “A little” is one, “Quite a lot” is two and “A lot” is three. “None” is Zero, “No problem at all” is one, “Slightly serious” is two and “Very serious” is three. Numerical values such as “Don’t know” is Zero, “No changes” is one, “Minor changes” is two, “Major changes” is three and “Extreme changes” is four. Numerical values such as “Don’t know” is Zero, “Disagree” is one, “Strongly Disagree” is two, “Agree” is three and “Strongly agree” is four. Numerical values for various income levels such as “Rs51, 000 & above” is one, “Rs 26,000-50,000” is two, “11,000 - 25,000” is three and “Up to Rs 10,000” is four. Numerical values for gender such as “male” are one, “female” is two, “transgender” is three. Numerical values for various qualification levels such as “PhD & above” is one, “PG” is two, “degree” is three and “XII” is four. Numerical value the age groups of individuals as “18 -25 years” as four, 26-35 years as three, 36-50 years as two and 51 and above as one. The occupation of individuals numerical values are classified as, teachers as one, government officials as two, businessmen as three, corporate as four, home maids as five and students as six.

Statistical tools used:
The study considers descriptive statistics and Analysis of Variance (ANOVA) to find relationship between the variables i.e., Demographical factors and awareness of global warming (The level of significance at 95%). To identify relationship between demographical variables (Age, Gender, Occupation and education) and awareness. Further study identifies relationship between demographical variables (Age, Gender, Occupation and education) and eco-initiatives to the test significance. Using SPSS vs 20 and MS-Excel is used for analyzing the data.

Scope of the study:
The study is limited to that Shimla city, awareness of global warming and preventing measures taken by the individuals to maintain sustainability, other environmental problems are taken in to consider and policy matters are not considered.
Data Analysis and Interpretation:
Table 1: Demographical characteristics of respondents:

<table>
<thead>
<tr>
<th>Age</th>
<th>%</th>
<th>Occupation</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25</td>
<td>21.43</td>
<td>Teachers</td>
<td>54.29</td>
</tr>
<tr>
<td>26-35</td>
<td>28.57</td>
<td>Services</td>
<td>04.29</td>
</tr>
<tr>
<td>36-50</td>
<td>45.71</td>
<td>Corporate</td>
<td>05.71</td>
</tr>
<tr>
<td>51 and above</td>
<td>04.29</td>
<td>Business</td>
<td>14.28</td>
</tr>
<tr>
<td>Income</td>
<td>%</td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Up to 10,000</td>
<td>17.14</td>
<td>Students</td>
<td>10.00</td>
</tr>
<tr>
<td>11K-25K</td>
<td>11.43</td>
<td>Qualification</td>
<td>%</td>
</tr>
<tr>
<td>26K-50K</td>
<td>37.14</td>
<td>XII</td>
<td>10.00</td>
</tr>
<tr>
<td>51K &amp; above</td>
<td>34.29</td>
<td>Degree</td>
<td>21.43</td>
</tr>
<tr>
<td>Male</td>
<td>62.9</td>
<td>PG</td>
<td>38.57</td>
</tr>
<tr>
<td>Female</td>
<td>37.1</td>
<td>Doctorate</td>
<td>30.00</td>
</tr>
</tbody>
</table>

Interpretation:
The survey has shown various results of respondents’ demographical characteristics such as
a. Age group: age group between 18-25 is 21.43%, 26-35 is 28.57%, 36-50 is 45.71%, 51 and above is 4.29%.
b. Income level: income level of various respondents are Up to 10,000 is 17.14, 11K-25K is 11.43%, 26K-50K is 37.14% and 51K & above is 34.29%.
c. Gender: gender of respondents male is 62.9% and female is 37.1%.
d. Occupation: occupation of the respondents are teachers is 54.29%, services is 4.29%, corporate is 5.71%, business is 14.28%, house maid is 11.42% and students is 10%.
e. Qualification: Respondent’s qualifications are XII is 10%, degree is 21.43%, PG is 38.57% and doctorate is 30%.

Table 2: Anova: Single Factor-demographical factors vs environmental Awareness.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>96.64571429</td>
<td>4</td>
<td>24.16142857</td>
<td>18.32941</td>
<td>1.14E-13</td>
<td>2.397828</td>
</tr>
<tr>
<td>Within Groups</td>
<td>454.7714286</td>
<td>345</td>
<td>1.318178054</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>551.4171429</td>
<td>349</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*at 5% level of significance.

Null Hypothesis 1: People have less awareness of environment

Alternative Hypothesis: people have more awareness of environment.

The column in Table 2, which shows cumulative awareness score for different individuals, F<Critical, the mean awareness score across the individuals is equally aware. Hence F>F critical values, therefore the mean awareness score across is difference. Hence we reject the null hypothesis and accept alternative hypothesis. People are aware of global warming.
Table: 3 Anova: Single Factor-demographical factors vs environmental-friendly.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
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<tr>
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<td>4</td>
<td>24.16143</td>
<td>18.32941</td>
<td>1.14E-13</td>
<td>2.397828</td>
</tr>
<tr>
<td>Within Groups</td>
<td>454.7714286</td>
<td>345</td>
<td>1.318178</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>551.4171429</td>
<td>349</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*at 5% level of significance.

Null Hypothesis 2: People are not using eco-friendly

Alternative Hypothesis: people are using eco-friendly.

The column in table 3, which shows cumulative are eco-friendly score for different individuals, F<Critical, the mean eco-friendly score across the individuals is equally aware. Hence F>F critical values, therefore the mean are eco-friendly score across is difference. Hence we reject the null hypothesis and accept alternative hypothesis. People are using eco-friendly.

Suggestions by individuals:
1. Reduce, reuse and recycled products
2. Conserve resources and renewable resources should be used
3. Conduct more awareness programme to protect environment (rural, tribal and urban areas)
4. Individual should initiate activities through social groups for environmental development and government (state, central and local bodies) should support environmental protection.
5. one has save earth and resources
6. control population to this problem
7. avoid deforestation

Conclusion:
The study has done on global warming and sustainable development was done through survey through sample size 70 individuals, six stratified samples (teachers, students, home-maids, business, government employees and corporate). The study is done using simple descriptive statistics and ANOVA. The hypotheses are concluding with rejection of Null Hypothesis and accept of alternative hypothesis i.e., people are aware of global warming and people are aware of eco-friendly. The study showed majority of age group is 36-50, income level between 26,000 to 50,000, male is 62.9%, occupation are 54.9% and qualification are Post Graduates are 68.57%. The study awareness among people is high and more environment friendly products.

Future scope of the research:
The study can be extended to with the larger samples size, in multiple location, various professions, policy makers and experts in international arena.
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3. http://hpshimla.nic.in/sml_tourism.htm#General Information


