Measuring Environmental Awareness in Nineteen States in India

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Abstract:

In order to improve environmental awareness, it is important to understand the current situation: what is the level of environmental awareness today and which factors affect it. When studying or improving the level of environmental awareness, the basic problem is the lack of a universal method for measuring and comparing environmental awareness. This pilot study aims at tackling this challenge. A modern easy-to-use internet-based tool was developed to measure environmental awareness in different countries/states. As a case study, the levels of environmental awareness was measured and compared in 19 states in India. Moreover, opinions on the state of the environment in different states of India were compared. As a result, both the state of the environment in different states of India and the environmental awareness were found to vary remarkably within India. The results showed that the best perceived state of the environment was found in the Far Eastern states, the Northern states and Kerala. The best levels of environmental awareness were found in Maharashtra, Far East states and West Bengal. Most room for development for both the states of the environment and for the environmental awareness was found in Uttar Pradesh, Chattisgarh and Jharkhand. We can conclude that the methodology developed in this pilot study can be well applied to national and international comparisons of the levels of environmental awareness even globally.

Keywords: Environmental Awareness, State of the environment, India

1.0 Introduction:

Environmental awareness is a very abstract concept and measuring it in an absolute manner is not feasible. Attitude surveys provide many kinds of useful information and environmentally friendly behavior has often been studied successfully, but neither method truly reveals the level of environmental awareness. Although there is no absolute set of indicators, relative comparisons between countries or states can be performed. For instance a person in Maharashtra has an opinion about the level of environmental awareness in his or her state in relation to the situation in Gurajat, Goa, Karnataka and Madhya Pradesh. Similarly, by comparing individual's own state to neighbouring states, it is possible to analyze the relative differences in environmental awareness throughout India.

The system for international measurements of the levels of environmental awareness was created by the author in 1997 and first used manually in the study '*Raising Environmental Awareness in the Baltic Sea*' (Partanen-Hertell *et al*, 1999, and Pemberton *et al.*, 1999). In that project a methodology for comparing countries' levels of environmental awareness was tested for nine countries around the Baltic Sea. For the present study the methodology was further developed and a completely new information technology tool for efficient data gathering was created to be tested in a challenging study area.

2.0 Study Area:

India was chosen as a case study area for testing the new tool, because of the following reasons: 1) it is a huge country with the population soon highest in the world; 2) it is facing enormous environmental challenges; 3) it is an merging economy that will have a striking influence to the global environment in the future; 4) it has tremendous cultural variations from a state to another; 5) English is an official language, therefore there is no need to translate the survey to other languages; and 6) if the methodology works well in India, it probably works well also in the whole world.

The study area, including 28 states, was simplified to comprise 19 states. To make this simplification, 1) the far east states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagalad, Sikkim,

Tripura) were considered as one group; 2) the northern states (Himachal Pradesh, Uttarakhand, Jammu and Kashmir) were grouped together; and 3) Punjab and Haryana was considered as one entity.

2.1 Methodology:
2.1.1 Environmental Awareness

Environmental awareness can be defined as a state of being aware, having knowledge about, and being conscious of the external surroundings in which people live and work, and which tend to influence people's development and behavior. A high level of environmental awareness enables conscious choices to act in an environmentally friendly way. In this project we see that high environmental awareness constitutes of three elements - motivation, knowledge and skills. Motivation is largely based on person's values and attitudes, including concern about environmental problems and understanding of one's responsibilities. Environmental knowledge includes information about environmental problems and knowledge of the cause-effect relationships of environmental problems. Skills are personal abilities to act in different levels: waste, transport, housing, education, political activities, participation, organizational activities etc. How are awareness and behavior (action) related to each other? Figure b illustrates how environmental awareness affects practical activities. When an individual (Box 1 in the Figure b) encounters some external physical or practical stimulus (Box 2), he (a male in this case) may realize that there is potential for environmentally friendly actions (Box 3). If his environmental world views, norms and values (Box 4, see Clapp *et al.*, 2011) support environmentally friendly actions, he wishes to make environmentally friendly choices (Box 5). Thus, as pointed by a substantial literature on values and norms (see for example Dietz *et al.*, 2005, Biel and Thøgersen, 2007, and Stern *et al.*, 1999), values and norms influence our individual and collective decisions – moreover, if they changed we would make different decisions for the biophysical environment. If there are opportunities to act (Box 6), the willingness to make environmentally friendly actions or choices will become actual reality. The environmentally friendly actions and choices (Box 7) will contribute to the state of the environment, give him a satisfying feeling of empowerment, and strengthen his environmental awareness (Box 8) (Developed from Harju-Autti, 2011).
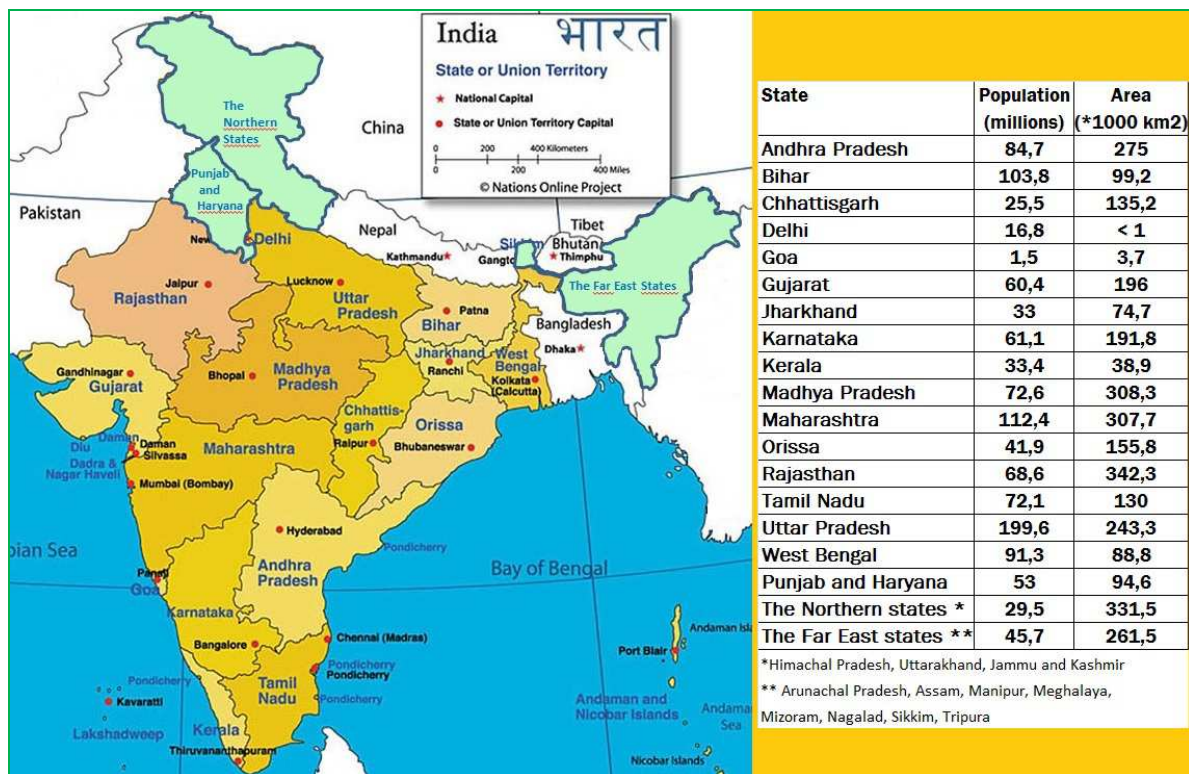

State	Population (millions)	Area (*1000 km2)
Andhra Pradesh	84,7	275
Bihar	103,8	99,2
Chhattisgarh	25,5	135,2
Delhi	16,8	< 1
Goa	1,5	3,7
Gujarat	60,4	196
Jharkhand	33	74,7
Karnataka	61,1	191,8
Kerala	33,4	38,9
Madhya Pradesh	72,6	308,3
Maharashtra	112,4	307,7
Orissa	41,9	155,8
Rajasthan	68,6	342,3
Tamil Nadu	72,1	130
Uttar Pradesh	199,6	243,3
West Bengal	91,3	88,8
Punjab and Haryana	53	94,6
The Northern states *	29,5	331,5
The Far East states **	45,7	261,5

*Himachal Pradesh, Uttarakhand, Jammu and Kashmir
** Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagalad, Sikkim, Tripura

Figure a. The 19 states of India for the study. The agglomerated states are shown in green colour.
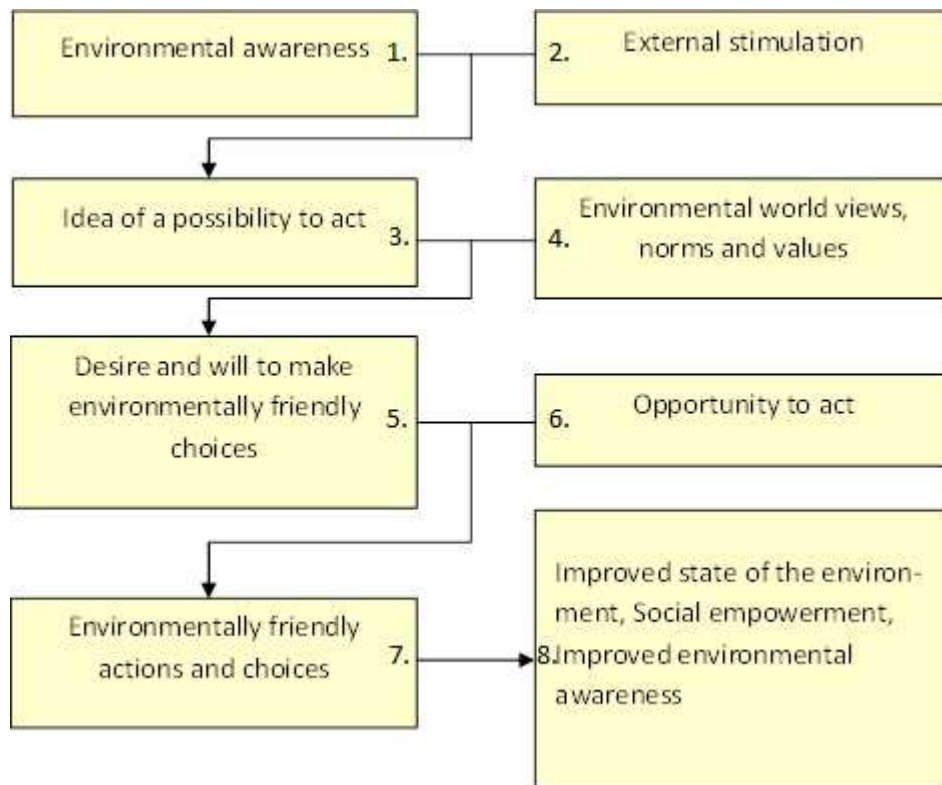
Figure b. Environmental awareness in practice (Developed from Harju-Autti, 2011).

When discussing how environmental awareness affects practical activities we must also note that man is also a rather peculiar habit-forming creature. American psychologist and philosopher William James (1891) stated that "habit is the enormous fly-wheel of society". Modern brain research on learning is pointing out that we automate tasks once we master them (Schwartz, 2002). From the environmental awareness point of view this is very promising: new habits that we constantly learn can also be made to benefit the environment. For example, when an individual starts recycling, sorting their wastes correctly might at first seem to be hard work but as the skills develop recycling becomes an automatic activity and an individual might, in fact, find himself bemused when faced with a situation where they can't separate their wastes.

In addition to the individual level, everyone belongs to a number of groups, based on national/ regional/ ethnic/ religious/ linguistic/ generational/ gender/ social class/ organizational backgrounds. Different groups have their own streams of thoughts that affect us, making us to carry several layers of mental 'programmings' within ourselves (Hoefstede *et al.*, 2010). National/ regional level is one of the strongest of these collective mental programmings, influencing also to our thinking on environment. The main aim of

this study is to create a methodology that can compare mental programmings concerning environmental awareness in a national/ regional level.

2.1.2 Online survey methodology

Usually existing international survey mechanisms use massive surveys for laymen, based on questions such as "on a scale of 1 to 5, where one is "very bad" and five is "very good" for questions like "how do you feel about the state of the environment in your home place?" These five or seven point scales are called Likert scales (Edmondson, 2005). After getting a huge amount of data from each country, the country comparisons can be made statistically. This is generally considered to be the best possible method, but it has significant limitations. Existing international surveys need large amount of respondents, because they are generally prone to certain challenges as 1) people use different scales; 2) people may provide answers they think the researchers want to hear; 3) people may be culturally driven to either select extremes or avoid extremes; 4) people may answer in a way that does not reflect to the actual reality; 5) extraordinary cultural variations within the context of the questions asked; 6) complex data processing. As a result, existing international

surveys are very time-consuming, data-intensive and expensive practices. Therefore, not surprisingly, in a challenging field of environmental awareness no global surveys have so far been performed.

Existing studies have typically compared values or attitudes across a number of countries (Dietz, 2005, Franzen, 2003, Franzen and Meyer, 2010, Inglehart, 1995, Kemmelmeier, 2002, Mostafa, 2012, Schultz and Zelezny, 1998, Soyez, 2012). Alternatively, certain aspects of environmental awareness -"concern for nature" as a typical example, which is noticeably narrowed concept than environmental awareness in this study - have been compared (Abdul-Wahab, 2008, Gelissen, 2007, Kalantari, 2007, Lin, 2011, Marquart-Pyatt, 2007, Ozil, 2008). For this project, a new global method for measuring and comparing environmental awareness was created. As a result, a modern easy-to-use internet-based tool was developed to measure environmental awareness in different countries/states, India being the case study (Harju-Autti, 2012). The methodology is much quicker and less data-intensive than traditional surveys, and thus also remarkably less expensive, because by asking opinions in 5 different states for each respondent, relative comparisons between states can be performed. In this way the major challenge of different individual scales (challenge no 1 in the above list) can be overcome, with a lesser need of massive survey data.

The contents of the online survey were developed from the relevant questions of the previous survey about environmental awareness in the Baltic Sea area (Partanen-Hertell, 1999). The questionnaire was designed to be as general as possible to allow comparisons with possible later uses of the survey. We cannot know the future of environmental problems, but we can assume that our concept of environmental awareness (motivation, knowledge and skills) will continue to be suitable for use in the future. The survey was available only in English. That must have proven difficult for many non-native English speakers. However, keeping to English was a deliberate choice, aiming partly to screen respondents and partly to eliminate the effects of possible slight discrepancies in translations. The respondents were coming from academic circles, usually possessing some environmental expertise.

The survey itself began with a short introduction message: "You will find here statements relating to your home state, three neighbouring state, and one faraway state. What is your opinion - how do these statements reflect to the situation in real life? Naturally, you know best the situation in your own country. However, people are using different scales, so to allow good comparisons it is important that you will answer also how you think the situation is in all the states given." The respondents' states to be evaluated are shown in Table 1.

Table 1: Respondents' states for evaluations.

Andhra Pradesh	Chhattisgarh	Tamil Nadu	Karnataka	Delhi
Bihar	Uttar Pradesh	Jharkhand	West Bengal	Tamil Nadu
Chhattisgarh	Orissa	Andhra Pradesh	Delhi	Madhya Pradesh
Delhi	Rajasthan	Uttar Pradesh	West Bengal	Tamil Nadu
Goa	Karnataka	Maharashtra	West Bengal	Delhi
Gujarat	Maharashtra	Rajasthan	West Bengal	Madhya Pradesh
Jharkhand	Bihar	West Bengal	Orissa	Tamil Nadu
Karnataka	Kerala	Goa	Maharashtra	Delhi
Kerala	Tamil Nadu	Karnataka	West Bengal	Delhi
Madhya Pradesh	Uttar Pradesh	Chhattisgarh	Maharashtra	Rajasthan
Maharashtra	Goa	Gujarat	Delhi	Madhya Pradesh
Orissa	West Bengal	Jharkhand	Chhattisgarh	Delhi
Rajasthan	Gujarat	Delhi	Tamil Nadu	Madhya Pradesh
Tamil Nadu	Andhra Pradesh	Kerala	Karnataka	Delhi
Uttar Pradesh	Delhi	Bihar	Tamil Nadu	Madhya Pradesh
West Bengal	Jharkhand	Orissa	Maharashtra	Tamil Nadu
The Northern states*	Uttar Pradesh	Punjab and Haryana	Tamil Nadu	The Far East states
Punjab and Haryana	Rajasthan	The Northern states*	Tamil Nadu	The Far East states
The Far East states	West Bengal	Bihar	Tamil Nadu	Delhi

* Himachal Pradesh, Uttarakhand, Jammu and Kashmir

For example, a person from Kerala had to give opinions about Kerala, Tamil Nadu, Karnataka, West Bengal and Delhi (Figure c). In this way it is remarkably better to relate the answers given since people are using surprisingly different scales. For example, if a person has an opinion that in Delhi the environmental state is 60 out of 100, it is one thing, but we really don't know how critical he/she generally is on judging this matter. But in this study if he/she says that in Delhi the environmental state is 60 out of 100 and that it is better than situation in the neighboring states, then we can compare different states better. Even though the scales that people use are varying much, the relative comparisons of states are usually very similar.

The survey consisted of four questions, each having two parts (Harju-Autti, 2012):

1. To your mind, how good is the state of the environment in… [each assigned state separately]?
A. Current State of the environment
B. Trend of the environment
2. How good is the level of general education and environmental knowledge in…?
A. General education
B. Environmental knowledge
3. Motivation to try to improve the environment by their own behavior and personal skills to do it (i.e. recycling, energy decisions etc.) in…?
A. Motivation to act
B. Personal skills

4. Possibilities to act environmentally friendly and availability of environmental information…?
A. Possibilities to act
B. Availability of environmental information

The four questions were answered by indicating a point on a two-dimensional space (Figure c). Part A of the question was answered on the x-axis and part B on the y-axis. The scale for both axes went from 0 to 100, where 0 indicated 'Poor', or 'Not at all', and 100 indicated 'Good', or 'Very much'. Therefore, for each four questions the five states in question were placed in the two-dimensional space for comparison.

The online survey service provider ZEF Evaluation Engine® hosted the online survey. Respondents were selected from the fields of academics, business, industries, administration, NGOs and laymen with relatively good understanding of environmental matters.

The data collection period started in 9 January 2013 and continued to the end of March 2013. The data collection was done mainly electronically (by emails) or by face-to-face contacts (in conferences, seminars, visits etc.)
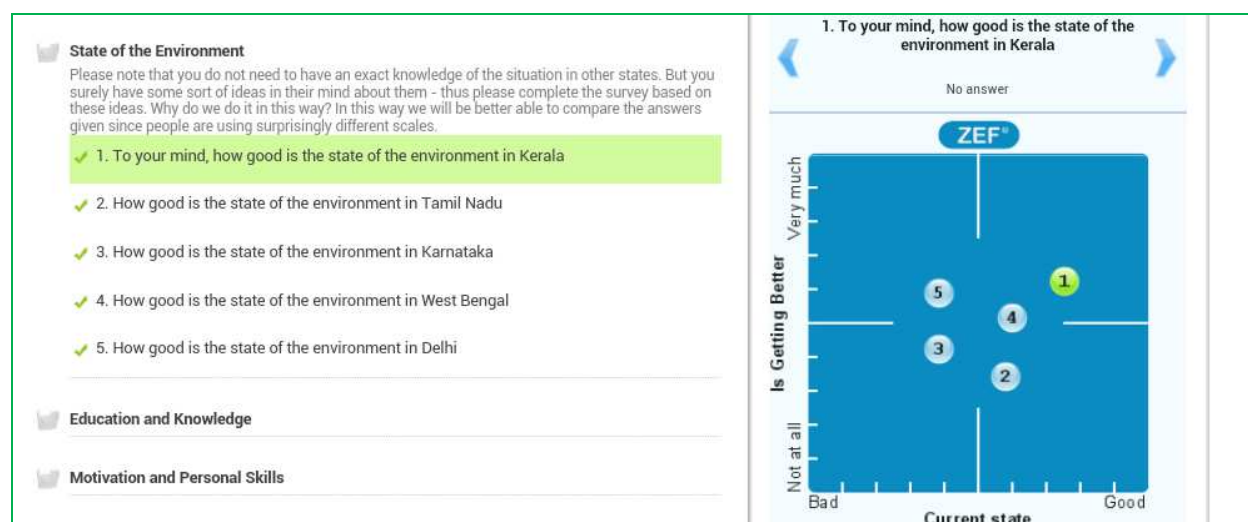

Figure c. An example of an answer from Kerala to the question 1. Each point on the two-dimensional space represents the answer concerning the correspondingly numbered state.

3.0 Results and Discussion:

The resulting number of answers for each states varied from 20 (Bihar) to 190 (Maharashtra and Tamil Nadu). 1624 answers for the different states of India were received. Table 2 shows the number of answers for the 19 states.

Table 2: Answers for the 19 states of India received.

Andhra Pradesh	40	Maharashtra	190
Bihar	20	Orissa	32
Chhattisgarh	52	Rajasthan	111
Delhi	164	Tamil Nadu	190
Goa	103	Uttar Pradesh	68
Gujarat	120	West Bengal	93
Jharkhand	35	The Northern states*	36
Karnataka	107	Punjab and Haryana	29
Kerala	55	The Far East states	37
Madhya Pradesh	165		

3.1 *Validity of the data*

Overall, it was pleasing to find that the methodology provided appropriate data. It seems that the set of four questions is able to pinpoint differences in the state levels of environmental awareness. The concept of environmental awareness is divided suitably: a greater number of questions would be too much work for the respondents, and less would not be enough to describe the differences. Moreover, the questions themselves appear sufficiently relevant, because in a scale from 0 to 100 all the answers to each question have similar ranges from approximately 10 to 80.

In order to assess the validity of our data, the 1624 answers were compared (Figure d). The figure shows the analysis of the question 1 about the state of the environment. The x-axis indicates the current State of the environment and the y-axis indicates the Trend of the environment. Each individual response consisted of data concerning five states: 1) respondents' home state; 2), 3), and 4) neighbouring states; and 5) a faraway state. The ellipse around each point indicates the deviation of the answers.

The relatively small ellipses in the Figure d show that respondents from all round the country have judged the situation in different states similarly. We can see that there is an evident lack of excessive patriotism in the responses. Since the

home state answers (point 1) are very close to neighbour state answers (points 2-4), we can conclude that the respondents have not favoured their own state inequitably. Answers for faraway states (point 5) are a bit different, but the difference is small.

Similar validity checks of the data were plotted for all the four questions. The same conclusions were drawn from all the graphs. Actually, the differences between ellipses were found to be always even smaller than in the Figure d. If any of the abovementioned challenges 2-5 of the existing international surveys (Chapter 2.1.2) would have manifested, the results in these validity checks would have become much more scattered. Therefore, we can conclude that these challenges of the existing international surveys are not causing unsurmountable challenges for this methodology.
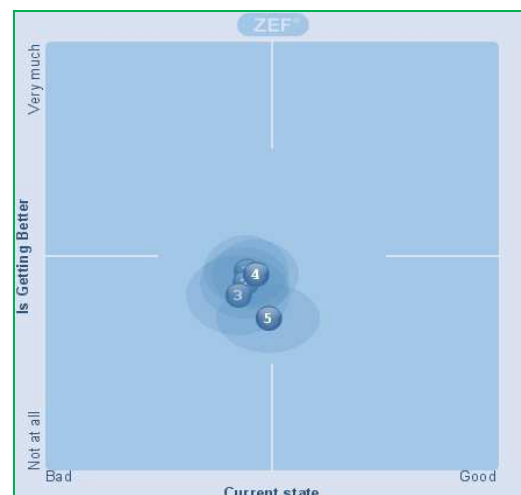

Figure d: Validity check of the data for the question 1 about the perceived state of the environment in 1) respondents' home state; 2) - 4) neighbouring states; and 5) a faraway state.

3.2 *Perceived state of the environment*

The scale used was from 0 to 100, indicating that over 50 points means that the perceived state of the environment is relatively good. The perceived state of the environment (Figure e) varies considerably within India. The results showed that the best perceived state of the environment is found in the Far Eastern states, the Northern states and Kerala. Most room for development for the state of the environment is found in Uttar Pradesh, Chattisgarh and Jharkhand.
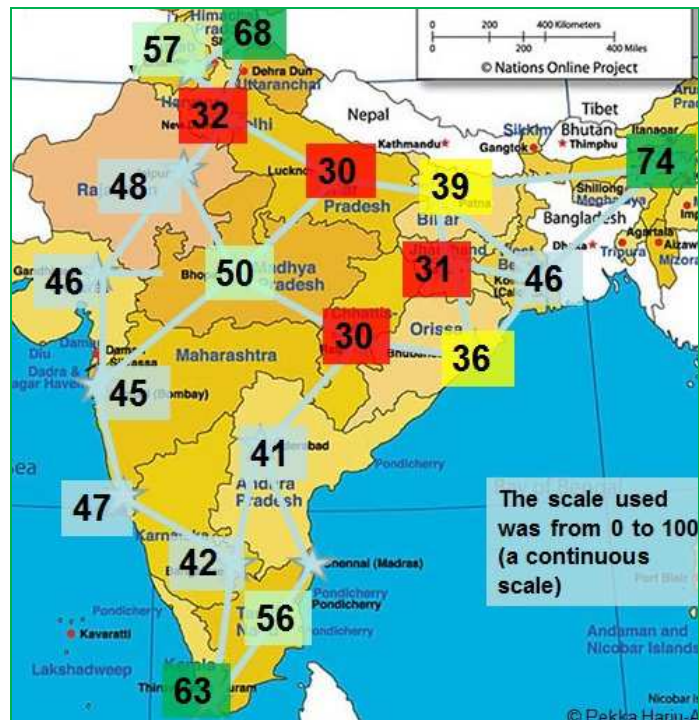
Figure e. Perceived state of the Environment in 19 states of India. The opinions were given on a scale from 0 (bad) to 100 (good)

Also the perceived trend of the environment varies considerably. The scale used was from 0 to 100, indicating that over 50 points means a positive trend of the environment. The results show that only in a small number of states the state of the environment was seen remaining same as before (Table 3). These states were Gujarat, Goa, Kerala, Karnataka, Maharashtra and West Bengal. All the other states show a negative trend of the environment. Most worrying trends are perceived to be found in Jharkand, Delhi and Orissa.

The perceived state of the environment and the perceived trend of the environment in the 19 states is presented in one single graph in Figure f. In this graph the most optimal conditions are found in states that are in the upper-right corner, thus possessing both good perceived state and trend of the environment. Kerala was performing best in this respect. Delhi, Orissa and Uttar Pradesh have both worrying perceived state and trend of the environment.

Table 3: Perceived trend of the environment in the 19 states. The opinions were given on a scale from 0 (bad) to 100 (good)

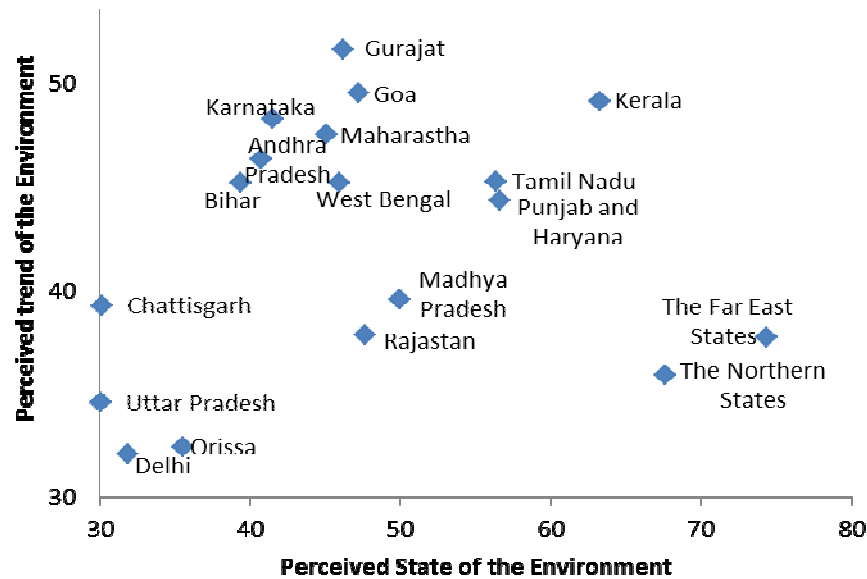|	
Gujarat	52
Goa	49
Kerala	49
Karnataka	48
Maharashtra	47
West Bengal	47
Andhra Pradesh	46
Bihar	45
Tamil Nadu	45
Punjab and Haryana	43
Chhattisgarh	39
Madhya Pradesh	39
Rajasthan	38
Far East states (Assam etc.)	34
Uttar Pradesh	34
Himachal Pradesh, Uttarakhand, Jammu and Kashmir	33
Orissa	32
Delhi	31
Jharkhand	29

Figure f: The perceived state of the environment and the perceived trend of the environment in the 19 states

In a recent highly valuable study by TERI (TERI 2013) the perceived environmental changes in six most populous cities in India (Bangalore, Chennai, Delhi NCR, Hyderabad, Kolkata, and Mumbai) were compared with seven environmental themes selected. These themes were for example changes in air quality, water quality, waste and waste management, climate change and forest/green cover. The results in TERI study showed that 1) In five of the in six most populous cities in India the perceived environmental trend is negative, Mumbai being slightly an exception; 2) Of the six cities Delhi has clearly the most worrying environmental trend. Before we compare these two studies, we have to note that 1) the TERI study compared cities, not entire states like in this study; 2) The TERI study was targeted to laymen, whereas this present study was targeted to people with academic or environmental background. Anyhow, from these two very differently performed studies we can find similarities in the results. In this study 1) also an overall negative trend of the environment was discovered (the average score in India being 42 out of 100); 2) Delhi has clearly the most worrying environmental trend.

3.2 *Environmental Awareness*
As defined earlier, environmental awareness constitutes of three elements - motivation, knowledge and skills. To compare environmental awareness in 19 states, an arithmetic mean of the three components of environmental awareness was taken. As a result, we see that the environmental awareness varies also considerably within India (Figure g). The highest Environmental

Awareness was found in the states of Maharastha, West Bengal, Tamil Nadu, the Far East states and Goa. Most room for development for the environmental awareness were found in Uttar Pradesh, Chattisgarh, Jharkhand and Bihar.

Interestingly, we can note that 1) the countries which have the poorest state of the environment are usually having also the weakest Environmental Awareness; 2) the countries which have the best state of the environment are generally very different from the countries with the highest Environmental Awareness. This can be illustrated by plotting a graph of Environmental Awareness versus perceived State of the Environment in 19 states of India (see Figure h). In this graph the most optimal conditions were found in states that are in the upper-right corner, thus possessing both good awareness and state of the environment. The states that are performing best were the Far East states, the Northern states, Kerala, Tamil Nadu and Maharastha. Most room for development - i.e. states that are in the down-left corner - were found in Uttar Pradesh, Chattisgarh, Jharkhand and Bihar.
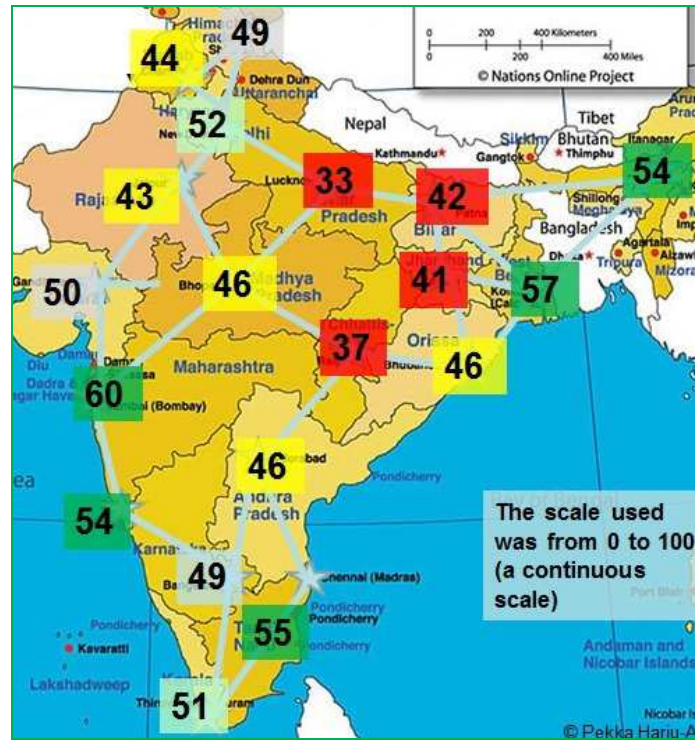
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Figure g. Environmental Awareness in 19 states of India. The opinions were given on a scale from 0 (bad) to 100 (good)
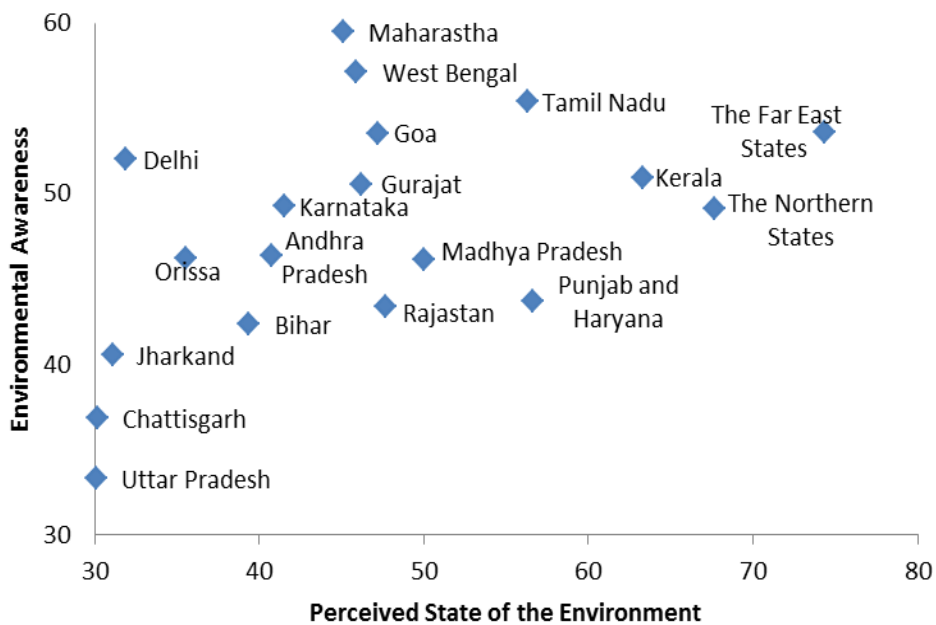

Figure h: Environmental Awareness vs. perceived State of the Environment in 19 states of India.

4.0 Conclusion and Recommendations

The aim of this pilot study was to develop a methodology for international comparisons of the levels of environmental awareness. India was selected as a case study area and it was divided in this study to 19 regions (states or agglomerations of states). Environmental awareness comprises of three elements: motivation, knowledge and skills. The process how environmental awareness affects behavior on individual level was described. The data for the study was acquired from an online survey that was conducted in early 2013 in the 19 regions. The survey asked the respondents to evaluate eight features (current state of the environment, trend of the environment, level of general education, environmental knowledge, motivation to act pro-environmentally, personal skills to act, possibilities to act, and availability of environmental information) in their own state, in three neighbouring states, and in one far away states.

The results show that the most optimal conditions - possessing relatively good environmental awareness and the state of the environment - are found in the Far East states, Kerala, the Northern states, Tamil Nadu and Maharastha. Most room for development were found in Uttar Pradesh, Chattisgarh, Jharkhand and Bihar. The methodology can be well applied to international comparisons of the levels of environmental awareness even globally. This work provides a ready-to-use survey tool for future measurements of environmental awareness internationally, and on smaller scale too. The methodology proved to be highly efficient: with a quick data acquisition time of three months and very reasonable amount of work it was possible to obtain sufficient amount of data for 19 states in India. For the future use of the tool created in this pilot study, it is recommended that more emphasis should be placed on the arrangements of data acquisition. In the Indian context the future study could be performed by a well-known and a top-ranked environmental institute/organization. Using this methodology, an international comparison of the levels of environmental awareness in 59 countries of the world - with a quantitative analysis of the results - will be performed in a forthcoming article.

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