An Empirical Study about Social Factors and Pro-environmental Behaviors in Southeast Asia

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Abstract

This study aims to investigate the various factors affecting environmental behaviors of the residents in ASEAN countries. To achieve the objective, the data from questionnaire survey "ASEAN Barometer 2009" (sample number of completed questionnaire = 9,080) were used to examine the relationships among demographic characteristics, information access, environmental concerns and environmental behaviors. The data were analyzed using analysis of variance (ANOVA), correlation analysis and path analysis. The empirical results showed that, first, demographics often appeared in previous studies including gender, age, education, income and residence are the determinants of environmental behaviors in ASEAN countries as well. Secondly, policies with economic incentives might largely change people's environmental behaviors in ASEAN countries, in particular, people's participation level in public environmental activities. Thirdly, improved information access through education campaigns and public environmental activities might be effective ways to change ASEAN residents' individual (household) behaviors in terms of environmental protection.

Keywords: social factors, pro-environmental behaviors, environmental concerns, ASEAN Barometer

1. Introduction

Over the past four decades, social scientists have conducted numerous studies on investigating individuals' motivations underlying pro-environmental activities. The reason for this line of studies is that, human behaviors are altering the environment at an unprecedented pace during the 21st century; many of the current environmental problems, more or less, are the consequences of those behaviors. Therefore, it requires the behavior changes while seeking the solutions to environmental problems. The central presumption of this line of studies is that, in general, individuals' environmental behaviors are directly influenced by the degree of their environmental concerns. To be exact, individuals are likely to become engaged in pro-environmental behaviors to the extent that environmental problems have threatened various objects they value, and they are aware of the harmful impacts. This insight is largely captured in s series of studies of Value Belief Norm (VBN) theory (e.g., Stern *et. al,* 1993; Stern and Dietz, 1994; Stern *et. al*, 1995; Stern, 1999; Stern *et. al*, 1999; Stern, 2000). Those studies argued that that environmental attitudes are the result of a person's more general set of values, which are further classified into three distinct dimensions , i.e., egoistic, altruistic, biospheric.

The above-mentioned presumption, in consequence, stimulated another line of studies which investigated the genesis of individuals' environmental concerns. Although several previous studies have attempted to document the value structure behind environmental behaviors and concerns, empirically, both lines of the studies have increasingly addressed the relationships between environmental indices with various factors including age, gender, education, income, and residence (e.g., Arcury and Christianson, 1990; Baldssare and Katz, 1992; Howell and Laska, 1992; Adeola, 1994; Lyons and Breakwell, 1994; Davidson and Freudenburg, 1996; Zelezny *et al.*, 2000; Aytulkasapoglu and Ecevit, 2002; Dietz *et al.*, 2002; Hunter *et al.*, 2004; and Deng *et al.*, 2006). These factors consist of the social bases of environmental concerns and behaviors. To date, though plenty, vast majority of the empirical studies investigated the issues in developed countries. Regarding developing countries, the studies are few possibly due to the lack of data. Particularly, there is hardly any empirical study of ASEAN countries. This study is thus the first attempt in this respect.

ASEAN's approach to environmental problems has stressed on regional cooperation, particularly, the cooperation for environmental education. ASEAN member countries have developed their own action programmes of environmental education since the first International Conference on Environmental Education held in Belgrade in 1975 (ASEAN Environmental Education Action Plan (AEEAP) 2008-2012). According to the latest AEEAP 2008-2012, ASEAN's move toward regional cooperation on the environment dates back to 1977 with drafting of the first ASEAN Subregional Environment Programme (ASEP I). This was followed by ASEP II (1982 - 1987) and ASEP III (1988 - 1992). All these three programmes had, as one of six priority programme areas, Environmental Education, Training and Information. The latest AEEAP 2008-2012, succeeding the AEEAP 2000-2005, clearly states its aim to improve people's awareness of environmental issues through formal and informal education, and consequently enable them to participate as active and informed citizens

in pursuing sustainable development. It is therefore valid to treat the issue of environmental behaviors in ASEAN as a whole. In addition, it is of importance to trace the impacts of environmental education on environmental concerns, and then trace the impacts of environmental concerns on individual behaviors in ASEAN. Specifically, this study attempts to identify the following relationships.

1. The relationships between various individual/demorgraphic factors and environmental concerns/behaviors.
2. The relationship between information access to environment-related knowledge and environmental concerns/behaviors. Note that, as explained in section 2, the dataset used in this study did not measure environmental education directly. We therefore use the level of ordinary residents' information access to environment-related knowledge as an alternative measurement.
3. The relationship between environmental concerns and behaviors.

The rest of this paper proceeds as follows. Section 2 presents the methodology of this study. The detailed data description is also provided in the section. In section 3, we report the empirical results and their implications. Section 4 concludes the study.

2. Method

2.1. ASEAN Barometer 2009

The present study was based on questionnaire survey "ASEAN Barometer 2009". It is a research project investigating public opinions on various issues of health and environment in ASEAN member countries. The project encompassed nine countries in ASEAN, i.e., Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. The questionnaire survey was conducted using the methods of stratified random sampling (three-stage or forth-stage depending on the country) with face-to-face interview through household visits from October 4th to December 30th in 2009. Different market research companies were involved to conduct the survey in different countries. The response rate differed largely from country to country. In each country, around 1,000 completed (valid) answers were collected. In the case of Malaysia and Myanmar, 1,024 and 1,056 valid answers were collected respectively. In the case of other countries, exactly 1,000 valid answers were collected. The detailed fieldwork summary is available upon request.

The questionnaire used in ASEAN Barometer 2009 is very comprehensive to incorporate 55 content questions and 10 demographic questions. The 55 content questions include three sections, i.e., health module, environment module and value module. This study only focused on six content questions, - Q31, Q32, Q34, Q35-1, Q35-2 and Q39 in the original questionnaire -, which are mostly taken from environment module of the questionnaire. The six content questions used in this study include one question about information access to environment-related knowledge, two questions about environmental behaviors and three questions about environmental

concerns. Regarding two questions about environmental behaviors, one is defined as public-level environment behaviors which reflect the individuals' responsibility as citizens to voice their environmental concerns in public and take part in organized pro-environmental activities. It largely refers to the actions which do not bring any economic benefit to the individuals. Another one is defined as individual-level (private) environmental behaviors. It refers to the actions which are often aligned with direct economic benefits to the individuals. Regarding the three questions about environmental concerns, they are classified into concerns at the local level, concerns at the global level, and health risk concerns (local environmental issues-induced).

2.2. Characteristics of sample and Scale Construction

This study uses five demographics of questionnaire including gender, age, education level, income level and residence (Table 1). The sample was 48.2% male and 51.8% female. Age ranged from 20 to 69 years old, with a mean of 39 years old (20-29 (27.5%), 30-39 (26.5%), 40-49 (21.6%), 50-59 (15.6%), 60-69 (8.8%)). Regarding education level, three levels were classified as primary/lower secondary, upper secondary and higher. With a mean of 1.63 as the average educational level, 55.2% of the respondents completed primary/lower secondary education, 25.7% of the respondents completed upper secondary education, and only 18.8% of the respondents completed higher education. Regarding income level, three levels (lower, middle, upper) were defined based on each country's income level. The currency and income range therefore differed from country to country. On the whole, lower income group accounted for 45.3% of the respondents, middle income group accounted for 35.3% of the respondents, and upper income group accounted for 15.1% of the respondents. Regarding residence, 52.9% of the respondents lived in urban area, while 47.1% of the respondents lived in the rural area.

To measure the sophisticated concepts of environmental concerns and behaviors, six content questions used in this study contained multiple items (Table 2). To examine the reliability of the self-reported response to these items, we calculate the Cronbach's Alpha. In general, the results ranged from 0.610 to 0.929, indicating an acceptable consistency (Table 2). By transforming the categorical responses to these items into interval data, it is possible to use statistical techniques such as analysis of variance (ANOVA), correlation analysis, regression and path analysis to capture the relationships among environmental indices. Data transformation process for each environmental index is explained as follows (Table 1).

Table 1 Summary of environmental behavior indices and factor variables

Variable name	Description	No.	Minimal value	Maximum value	Average value	Standard deviation
InfoAccess	Access to information of health and /or environment (1=not available, 2=a little, 3=moderately, 4=mostly, 5=completely)	9076	1.00	5.00	2.32	0.79
PubBehaviors	Public pro-environmental behaviors (0=never participated any activities, 1=participated in one, 2=participated in two, 3=participated in three, 4=participated in four, 5=participated in five)	9066	0.00	5.00	0.77	1.09
PrivBehaviors	Private pro-environmental behaviors (1=never, 2=seldom, 3=sometimes, 4= often, 5=always)	9087	1.00	5.00	2.87	0.81
LocConcerns	Local environmental concerns (1=much less serious, 2=less serious, 3=unchanged, 4=more serious, 5=much more serious)	9071	1.00	5.00	3.73	0.60
HelConcerns	Health-related environmental concerns (1=much decreased, 2=decreased, 3=unchanged, 4=increased, 5= much increased)	9070	1.00	5.00	3.70	0.59
GlobConcerns	Global environmental concerns (1=not at all, 2=not so much, 3=to a certain extent, 4=very much)	7987	1.00	4.00	3.18	0.63
Gender	Gender (1=female, 0=male)	9088	0	1	0.52	0.50
Age	actual age of the respondent	9088	20	69	39.41	12.89
Education	Education level (1=primary/lower secondary, 2=upper secondary, 3=higher)	9063	1.00	3.00	1.63	0.78
Income	Household income level (1=lower, 2=middle, 3=upper)	8698	1.00	3.00	1.68	0.73
Residence	Residence (1=urban, 0=rural)	9088	0.00	1.00	0.53	0.50

Table 2 Reliability analysis of environmental indices

	No. of items in the scale	Alpha value
Access to information of health and /or environment	4	0.636
Public pro-environmental behaviors	5	0.610
Private pro-environmental behaviors	5	0.616
Local environmental concerns	16	0.916
Health-related environmental concerns	16	0.929
Global environmental concerns	8	0.895

1. Information access (InfoAccess)
   The InfoAccess scale was formed by combining the answers for asking the respondents to identify their accessibility to information sources (a) TV or radio, (b) newspaper or magazines, (c) internet, (d) community-based meetings. The 4 information sources were presented as questions which started with "how available to you is the information of health and/or environment through the following?" The mean of the scores for these 4 information sources was calculated to represent the general accessibility to health and/or environment information.
2. Public pro-environmental behaviors (PubBehaviors)
   The construction of PubBehaviors scale was conducted by combining the answers for asking the respondents to identify whether they have done the following activities or not (a) to attend lectures or seminars about an environment issue, (b) to take part in volunteer activities for environment conservation, (c) to sign a petition about an environmental issue, (d) to give money to an environmental group, (e) to take part in a protest or demonstration about an environmental issue. To reflect to what extent each respondent participates in public pro-environmental activities, PubBehaviors was developed by aggregating scores for five items. The result is a 6-point scale variable, ranging from 0 to 5.
3. Private pro-environmental behaviors (PrivBehaviors)
   The construction of PrivBehaviors scale was conducted by combining the answers for asking the respondents to indicate how often they performed each of five private pro-environmental activities (a) to reuse or recycle something rather than throw it away, (b) to try to reduce water consumption, (c) to try to reduce the amount of energy for cooking, cooling and heating, (d) to use public transportation instead of using personal car, (e) to buy organic or chemical-free vegetables. The five private pro-environmental activities were presented as questions which started with "how often have you done any of the following actions during the last 12 months?" The mean of the rating scores for these 5 private pro-environmental activities was calculated as a measurement of individual behaviors.
4. Local environmental concerns (LocConcerns)
   The construction of LocConcerns scale was conducted by combining the answers for asking respondents to indicate the level of their concerns about 16 environmental issues at the local level. It was presented as questions which started with "compared to five years ago, do you think that the following issues have become more serious now?"The 16 environmental issues at the local level ranged from living environmental problems to ecological problems (a) air pollution, (b) water pollution, (c) soil pollution, (d) noise pollution, (e) climate change, (f) urban heat island, (g) pollution of beaches, river-side, lake-side etc., (h) deforestation, (i) genetically modified food issues, (j) water shortage, (k) using up our natural resources, (l) usage of chemicals and pesticides, (m) disposal of household waste and garbage, (n) disposal of industrial waste, (o) disposal of toxic or nuclear waste, (p) loss of biodiversity. The mean of the rating scores for these 16

environmental issues was calculated as a measurement of each respondent's general environmental concerns at the local level.

5. Health-related concerns (HelConcerns)
   The HelConcerns scale was constructed by combining the answers for asking respondents to indicate the level of their concerns about 16 health risks induced by the corresponding environmental issues of LocConcerns. The mean of the rating scores for these 16 health risks was calculated as a measurement of each respondent's health-related concerns.
6. Global environmental concerns (GlobConcerns)
   The GlobConcerns scale was constructed by combining the answers for asking respondents to indicate the level of their concerns about 8 environmental issues at the global level (a) deletion of ozone layer, (b) acid rain, (c) climate change, (d) deforestation, (e) loss of biodiversity, (f) marine pollution, (g) nuclear waste disposal, (h) usage of chemicals and pesticides. The mean of the rating scores for these eight environmental issues was calculated as a measurement of each respondent's global environmental concerns.

2.3. Hypotheses

Based on the previous studies' empirical findings, this study assumes:

1. There are significant differences between respondents with different demographic characteristics including age, gender, education, income and residence in terms of environmental behaviors and environmental concerns;
2. Information access affects people's environmental concerns, and consequently environmental behaviors;
3. Environmental concern is the determinant of people's environmental behavior.

It is worthy to mention that, though no consistent results in explaining social determinants of environmental concerns and environmental behaviors, regarding the age, gender, education, income, and residence, the previous studies generally suggest that younger people, female, higher education, high income and urban residents tend to express greater environmental concerns and support for pro-environmental activities.

3. Results and discussions

3.1. Environmental behaviors

Comparing the frequency of public-level pro-environmental behaviors to individual-level (private) behaviors, it is clear that majority of the respondents conducted individual-level behaviors to some extent in their daily life; however, there is only a minority of respondents involved in public-level pro-environmental activities in ASEAN countries (Table 3). 23.0% of the respondents have the experiences to attend lectures or seminars about an environmental issue, 20.5% of the respondents have taken

part in volunteer activities for environment conservation, and 24.4% of the respondents have given money to an environmental group. In contrast, a much smaller share of respondents has the experiences to sign a petition about an environmental issue (6.1%) and take part in a protest or demonstration about an environmental issue (3.4%). Overall, the respondents reported participating in organized environmental activities more frequently than voicing their environmental concerns in public.

Individual-level behaviors covered four domains of everyday behaviors including recycling/reusing, environmentally responsible consumption, transportation choices, and food consumption patterns. For all domains, over 70% of respondents reported performing environmental behaviors in their daily lives to some extent. Moreover, the respondents appear to engage in environmentally responsible consumption (saving water and energy) and transportation choices (public transportation use) more actively than recycling/reusing and food consumption patterns (purchase of organic and chemical-free vegetables).The respondents, therefore, are far more likely to engage in environmental activities that would bring a direct economic benefit to them. This implication is also supported by the comparison between public-level environmental behaviors and individual-level environmental behaviors. The respondents reported performing individual-level environmental activities which requires the least organized efforts much more often than organized public activities.

Table 3 Public-level and individual-level pro-environmental behaviors

Have you done the followings?

	Yes		No		Total	
	Frequenc	%	Frequenc	%	Frequenc	%
a. to attend lectures or seminars about an environmental issue	2076	23.0	6962.00	77.0	9038.00	100.0
b. to take part in volunteer activities for environment conservation	1855	20.5	7172.00	79.5	9027.00	100.0
c. to sign a petition about an environmental issue	549	6.1	8467.00	93.9	9016.00	100.0
d. to give money to an environmental group	2187	24.2	6843.00	75.8	9030.00	100.0
e. to take part in a protest or demonstration about an environmental issue	310	3.4	8717.00	96.6	9027.00	100.0

How often have you done any of the following actions during the last 12 months?

	Never		Seldom		Sometimes		Often		Always		Total	
	Frequenc	%	Frequenc	%	Frequenc	%	Frequenc	%	Frequenc	%	Frequenc	%
a. to reuse or recycle something rather than throw it away	2068	22.8	1976.00	21.8	2762.00	30.4	1537	16.9	734	8.1	9077.00	100.0
b. to try to reduce water consumption	1443	15.9	1470.00	16.2	2419.00	26.6	2445	26.9	1305	14.4	9082.00	100.0
c. to try to reduce the amount of energy for cooking, cooling and heating	1399	15.5	1508.00	16.7	2483.00	27.5	2428	26.9	1224	13.5	9042.00	100.0
d. to use public transportation instead of using personal car	1642	18.2	2258.00	25.0	1901.00	21.0	1737	19.2	1498	16.6	9036.00	100.0
e. to buy organic or chemical-free vegetables	2281	25.6	1969.00	22.1	2057.00	23.1	1756	19.7	834	9.4	8897.00	100.0

3.2. ANOVA and Correlation Analysis

Table 4 summarized the results of analysis of variance (ANOVA). In general, demographics investigated repeatedly in previous studies appeared to be significant in explaining environmental variables in ASEAN countries as well. Table 4 depicts that there is a significant difference between female and male in terms of access to environment-related information, public pro-environmental behaviors, private pro-environmental behaviors and local environmental concerns. Public pro-environmental behavior is also significantly different between respondents with different education level and living in urban and rural areas, but not different between respondents of different age and income level. In terms of access to information, private pro-environmental behaviors, local environmental concerns, health-related environmental concerns and global environmental concerns, there are significant differences between respondents with different age, education, income and residence.

Table 4 Analysis of variance for gender, age, education level, income level, and residence (F-value)

	Gender	Age	Education	Income level	Residence
Access to information	15.431**	1.855***	442.539**	167.366**	371.166**
Public pro-environmental behaviors	19.569**	1.332	29.398**	0.202	33.174**
Private pro-environmental behaviors	82.939**	1.809***	137.836**	48.564**	544.063**
Local environmental concerns	4.362*	2.418***	62.121**	35.899**	8.918**
Health-related environmental concerns	0.464	1.971***	59.833**	12.165**	10.034**
Global environmental concerns	2.713	2.155***	16.717**	5.269*	81.088**

Note: * indicates a 5% significant level. **Significant a 1% significant level.

Table 5 Correlation among different environmental variables

	InfoAccess	PubBehaviors	PrivBehaviors	LocConcerns	HelConcerns	GlobConcerns
Access to information	1.000					
Public pro-environmental behaviors	0.116**	1.000				
Private pro-environmental behaviors	0.183**	0.103**	1.000			
Local environmental concerns	-0.028**	0.033**	0.080**	1.000		
Health-related environmental concerns	-0.016	0.043**	0.065**	0.768**	1.000	
Global environmental concerns	-0.090**	0.113**	0.051**	0.385**	0.388**	1.000

Note: *Correlation is significant at 5% level. **Correlation is significant at 1% level.

To examine the relationships among different environmental variables, correlation analysis was applied. Table 5 shows that local environmental concerns are significantly correlated with health-related environmental concerns (0.768). Considering the question design which asked the respondents to indicate the level of their health risk concerns related to local environmental problems, it is natural that two variables have high correlation. Local environmental concerns and health concerns are also rather strongly correlated to global environment concerns, 0.385 and 0.388 respectively. People who reported having environmental concerns at the local level are more likely to perceive the importance of environmental problems at the global level. In addition, though weakly,

information access is correlated to public pro-environmental behaviors (0.116) and individual-level pro-environmental behaviors (0.183).

3.2. Path Analysis

To trace the cause/effect relationships among various environmental variables, path analysis was conducted using the software Amos 19. The model was finalized in a two-step process. In the first step, the model was adjusted to find acceptable estimation results. In the second step, all statistically insignificant paths were excluded and the model was re-estimated. Figure 1 depicts one of the acceptable model, wherein all the significant path coefficients at 5% level were indicated. The estimated significant path coefficients derived from the various steps of multiple regressions of environmental variables. The direct effect of one variable on another is presented as the weight given by the path coefficient, while the indirect effect can be calculated by multiplying the relevant estimated coefficients of direct paths. The value of direct effect lies into the range between -1 to +1. It indicates the relative change in the dependent variable induced by one unit of change in the independent variable.

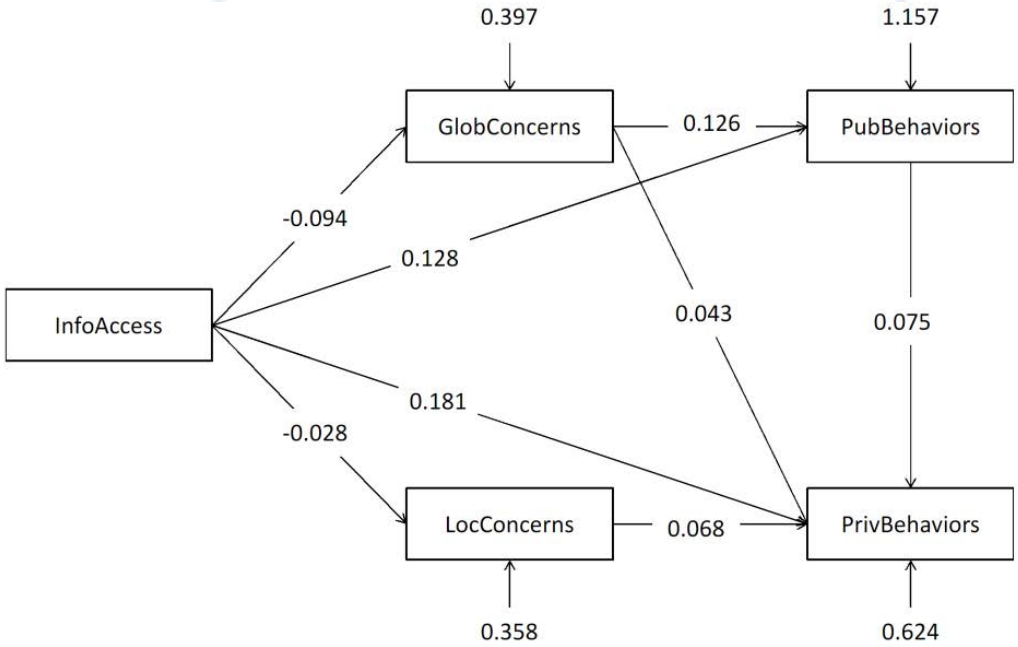

Figure 1 Path analysis: information access environmental concerns, and pro-environmental behaviors. Chi-squre=1360.034, degree of freedom=2, p-value=0.000, RMSEA=0.273.

Figure 1 indicates that our initial hypothesis of causal effect from information access to environmental concerns and consequently to environmental behaviors was not confirmed in ASEAN countries. The chi-square is significant with 2 degrees of freedom. The root mean square error of approximation (RMSEA) is 0.273.The significant chi-square value and a RMSEA larger than 0.05 indicate that our model does not fit the data very well. Although the overall goodness of fit of our model was low, the predicted paths still provided indicative information about cause/effect relationships among

environmental variables. The predicted paths among information access, environmental concerns and environmental behaviors were significant, but the effects were negligible for both public-level and individual-level. In addition, the indirect effects of information access on environmental behaviors through environmental concerns were found to be negative (-0.094×0.126 and -0.028×0.068, respectively), while the direct effects of information access on environmental behaviors were found to be positive (0.128 and 0.181, respectively). The finding suggests that access to environment-related information might effectively promote people's involvement in pro-environmental activities (at both public- and individual-level), but not necessarily improve people's awareness of environmental issues in ASEAN countries. In the meantime, compared to public environmental behaviors, we found more diversified significant paths from various environmental variables to private environmental behaviors. In particular, there is significant path from public environmental behaviors to private environmental behaviors. These findings suggest that, first, improved information access and environmental awareness are more likely to lead to the active participation in environmental activities at the individual level, but less in environmental activities at the public level. Second, the improved environmental knowledge and awareness through organized public environmental activities might contribute to the more active involvement of in individual environmental behaviors.

4. Conclusion

This study investigated the factors affecting environmental behaviors in ASEAN member countries. The data from questionnaire survey "ASEAN Barometer 2009" was used in empirical analyses. We first examined the relationships between various environmental variables with demographics including gender, age, education, income and residence. We then examined the relationships among environmental variables. The empirical results derived from the data showed that, first, demographic characteristics affect the attitude and behavior patterns of respondents towards environment in ASEAN countries. Among five demographics examined in this study, gender appeared relatively weak in explaining the differences of environmental variables. In addition, public environmental behaviors appeared to be less affected by demographic characteristics.

Secondly, through differentiating the environmental behaviors between public-level one and individual-level one, we found that public environmental behaviors, which largely involved organized activities, were overall less frequent than private environmental behaviors. Individuals in ASEAN countries are more likely to participate in the pro-environmental activities that have direct self-interest for the individuals involved. This finding implies the importance of introducing economic incentives when ASEAN countries' governments implement environmental policies. Appropriate economic incentives might greatly change people's willingness to be involved in environmental protection activities, especially organized public activities in ASEAN countries.

Thirdly, the results of path analysis presented the causal relationship from information access to environmental behaviors, and the causal relationship from public environmental behaviors to private environmental behaviors. This finding implies the

importance of environmental education in ASEAN countries. Although the indirect impacts of information access on environmental behaviors through environmental concerns were not clearly presented in our analysis, the results suggest the possibility that better information access through various education campaigns may effectively influence people's individual (household) environmental activities. Regarding environmental concerns at different levels (global and local), they did not appear to make much difference in influencing environmental behaviors. Instead, the people who have high awareness of local environmental concerns appear to have high awareness of global environmental concerns as well in ASEAN countries, and vice versa.

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