Vietnam Journal of Agricultural Sciences

ISSN 2588-1299

VJAS 2021; 4(4): 1241-1256
https://doi.org/10.31817/vjas.2021.4.4.04

Who cares more about the environment?: An empirical study in Vietnam

Tran Cong Chinh & Nguyen Thi Huong Giang

Faculty of Natural Resources and Environment, Vietnam National University of Agriculture, Hanoi 131000, Vietnam

Abstract

Environmental problems have become one of the top concerns in Vietnam since 2016. This study aimed to investigate what groups of people were most concerned about the environment and to what extent their concerns differed from each other. Logistic regression models were used to perform the analyses. The analysis on the gender - environmental concern relationship indicated that males were more likely to be concerned about the environment than females. The age - environmental concern relationship suggested higher concern levels of younger people as compared to older people. In the examination of the social class - environmental concern relationship, people who were wealthier, well-educated, and had greater occupational prestige tended to have more concerns. People with higher education levels also expressed higher levels of concern toward the environment. People with postgraduate degrees reported the highest level of concern, while people with no formal education showed the least concern. From the perspective of the political involvement - environmental concern relationship, it was shown that while people who were not a member of any organization were the least environmentally concerned, the members of university alumni associations were the most concerned. Finally, the exploration of the residence - environmental concern relationship pointed out that Kinh people were more environmentally concerned than Vietnamese ethnic minority groups, and people in the North Central Coast paid the highest attention to the environment in Vietnam.

Keywords

Vietnam, environmental concern, ethnic minority, social class, political involvement

Introduction

Environmental problems resulting from economic growth have increasingly attracted public concerns in Vietnam in recent years. According to the Ministry of Natural Resources and the Environment of the Socialist Republic of Vietnam (MONRE), economic growth has significant impacts on the environment. Industry and construction

Received: November 11, 2020
Accepted: December 23, 2021

Correspondence to
tcchinh@vnua.edu.vn

are the major sectors that boost economic growth but are also the main contributors to environmental pollution (MONRE, 2014). These include water pollution due to discharge from industrial factories, air pollution due to intense construction activities, the increased number of vehicles in big cities, and the development of fossil fuel thermal power plants, etc. (MONRE *et al*., 2012; MONRE, 2014; Tran *et al*., 2020).

Serious environmental disasters have been recorded in Vietnam in recent years. Heavy water pollution in Thi Vai River in 2008 caused by illegal discharge of untreated wastewater by Vedan Vietnam Enterprise Co., Ltd was the wake-up call for the problem of environmental pollution in Vietnam. The Rang Dong warehouse fire in 2019 caused toxic air pollution in several areas in Hanoi. One of the worst and the most well-known environmental disasters in Vietnam was the fish kill tragedy caused by toxic waste spilt from the Formosa Ha Tinh steel plant in April 2016 (Nguyen, 2017; Sands, 2017). This disaster has significantly affected Vietnamese citizens' concern towards the environment (CECODES *et al*., 2017). The release of chemicals seriously polluted more than 200 kilometers of coastline of four provinces in the North Central Coast of Vietnam, namely – Ha Tinh, Quang Binh, Quang Tri, and Thu Thien Hue. This disaster devastatingly destroyed sea life, and local fishing and tourism-based economies (Nguyen, 2017). It resulted in growing environmental activism and increased public environmental awareness (Sands, 2016; CECODES *et al*., 2017). The Vietnam Provincial Governance and Public Administration Performance Index (PAPI) report found that the environment had moved to the second top concern across the country in 2016 (CECODES *et al*., 2017). However, little effort has been made in investigating which population groups are more concerned about environmental issues in Vietnam. This study aimed to fill in this gap of knowledge by exploring the complex linkages between public environmental concerns and sociodemographic characteristics.

Materials and Methods

Theoretical framework of environmental concern, hypotheses, and methodology

Environmental concern was measured by the choices of Vietnamese citizens in stating environmental issues as one of the three most important national problems that the government should address. The level of concern was based on whether citizens ranked the environment as the first, second, or third most important national problem. To identify the factors that influenced the citizens' environmental concerns and how citizens with different sociodemographic characteristics differed in their levels of concern, we identified a series of factors and grouped citizens in different categories, namely social class, age, gender, political involvement, and residence. Each category included one or more citizens' sociodemographic features. The social class category contained information about household wealth, education level, and occupational prestige. The age category included information about the age of the respondents. The gender category presented whether the respondents were male or female. The political category included information about organizations that the respondents were members of and the number of information sources they had access to. The residence category included information about the region where they were located and whether they lived in an urban or rural area (**Figure 1**).

These sociodemographic factors have been included in studies of environmental concerns worldwide (Morrison *et al*., 1972; Dunlap, 1975; Malkis & Grasmick, 1977; Murdock & Schriner, 1977; Catton Jr & Dunlap, 1978; Tremblay & Dunlap, 1978; Dunlap & Catton Jr, 1979; Liere & Dunlap, 1980; Arcury *et al*., 1986; Arcury *et al*., 1987; Buttel, 1987; Arcury, 1990; Davidson & Freudenburg, 1996). Arcury *et al*. (1987) studied sex differences regarding environmental concerns about rain acids. Arcury (1990) compared age, gender (female), education, family income, and metropolitan residents with the measures of environmental attitude and environmental knowledge. Buttel & Flinn (1974) examined age, education, political party, and political ideology in relation to the awareness of

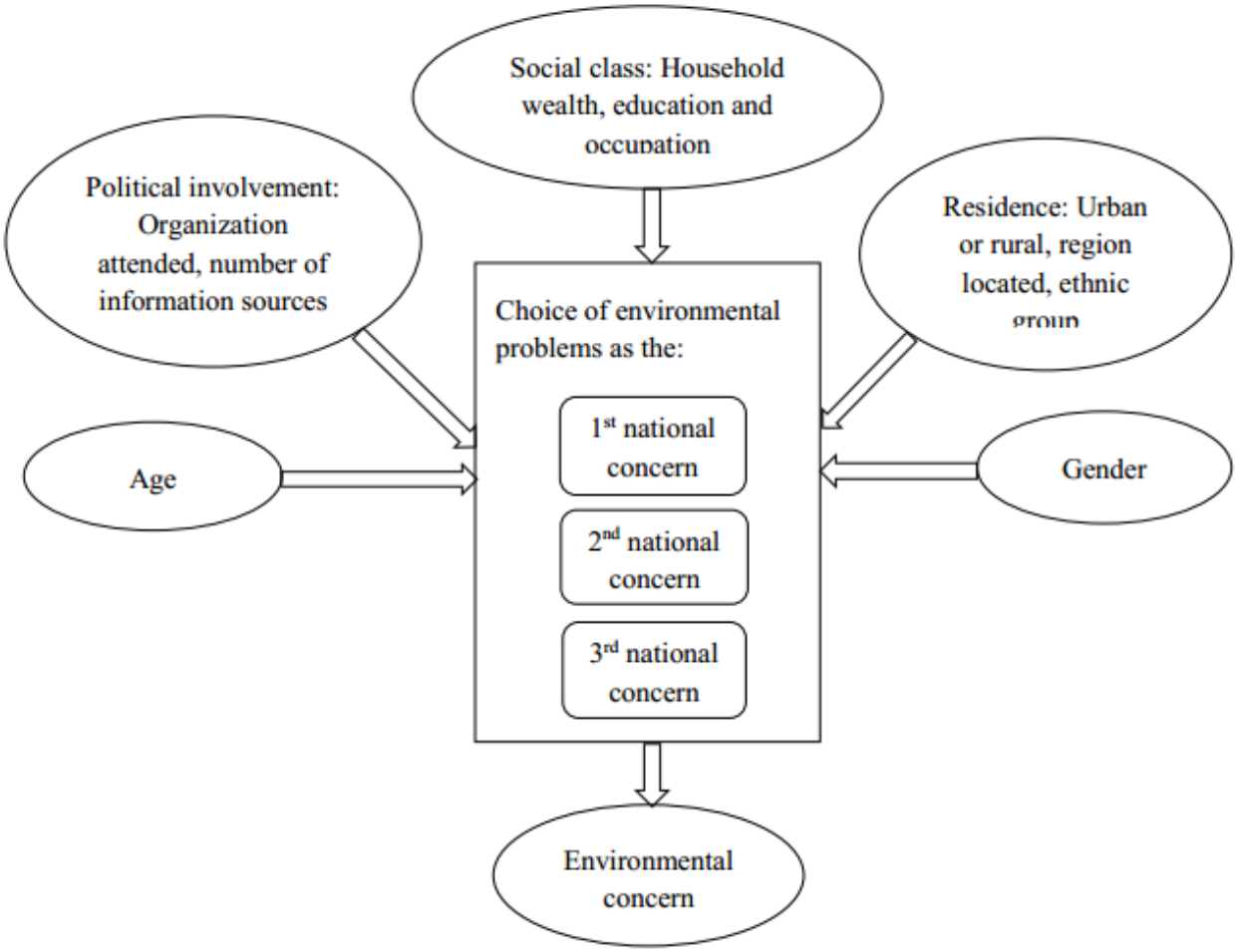

Figure 1. Theoretical framework of environmental concern

environmental problems. Van Liere & Dunlap (1978) considered age, education, income, occupation, residence, sex, political party, and political ideology features in association with measures of environmental concern.

In this study, we assumed that citizens' sociodemographic characteristics were the key factors that led to their support for the environment in Vietnam; therefore, we formed the following five hypotheses:

Gender: Males will be more concerned about the environment than females.

Age: Younger people will have a higher level of concern than older people.

Social class: People with higher levels of education, who are wealthier, and who have a more prestigious occupation will be more environmentally concerned.

Political involvement: People who are more socially and politically proactive will be more concerned about the environment.

Residence: People who have an urban residence, are in the majority Kinh group, and who live near environmental pollution sources and in more developed regions will have higher levels of environmental concern.

The variable characterizing Vietnamese citizens' environmental concern was recorded as a binary variable, and coded as 1 if the respondent was concerned about the environment and 0 if the respondent was not concerned.

Logistic regression models were performed to explain the effects of the explanatory variables on the binary response. These models essentially described the probability that the environmental

concern depended on an individual's sociodemographic characteristics, namely gender, age, education, occupation, urban residence, ethnic group, organization memberships, household wealth, number of information sources, and geographic region.

The logistic regression results reported the odds ratios (ORs), standard errors, p-values, and 95% confidence intervals. The value OR = 1 indicated no relationship between the explanatory variables and the response variable, while OR > 1 indicated a positive relationship and OR < 1 represented a negative relationship (Verbeek, 2008). We also computed variance inflation factors (VIFs) for each explanatory variable to check for the presence of multicollinearity. If a VIF value was greater than 10, it suggested severe collinearity and should be excluded from the model (Verbeek, 2008). The logistic regression models were performed by using the STATA version 12 software (StataCorp LP., College Station, TX, USA).

Data

Data used in this study were collected through the 2016 Vietnam Provincial Governance and Public Administration Performance Index, also known as PAPI 2016 (CECODES *et al*., 2017). The data collection process was conducted through face-to-face interviews with 14,063 citizens who were randomly selected from all 63 provinces across Vietnam. The survey utilized a tablet-based questionnaire which allowed interviewers to immediately upload collected data to a server after the interviews.

The measure of environmental concern was gathered through Question D306, which asked citizens to identify up to three of the most important problems facing Vietnam that they thought the government should address. They could have chosen "Do not know" if they were not able to name any problems or "Refuse to answer" if they did not feel comfortable with the question. The interviewees were required to identify these problems by themselves without any guidance. As long as the respondents named environment as one of their three most important national concerns, we coded it as 1 – environmental concern. Environmental concern was the second most frequently mentioned problem in Vietnam with 2616 out of 14,063 responses, following poverty and hunger. A code of 0 was assigned to indicate all other problems, including "Do not know" or "Refuse to answer". This was the response variable that characterized Vietnamese citizens' environmental concern in the analysis.

Other variables representing sociodemographic and geographic characteristics were collected as part of the survey, namely gender, age, education, occupation, urban residence, ethnic group, organization memberships, household wealth, number of information sources, and geographic region. These were explanatory variables among which, gender, urban residence, and ethnic group were binary variables.

The gender variable showed whether the respondent was male or female. The urban variable indicated either an urban or rural location where the respondents resided. Ethnic group revealed whether the respondent belonged to the Kinh or ethnic minority groups (see **Table 1**).

Table 2 presents the population sizes relating to age group, education, and occupation characteristics. The age variable was categorized into four groups on a scale from 1 to 4, respectively representing youth (age from 18-25), younger adults (age from 26-35), older adults (age from 36-50), and the elderly group (age >50). The nominal categorical variables were comprised of education and occupation, which characterized the respondent's level of education and primary occupation, respectively.

Other variables included household wealth, organization memberships, and geographic regions. Household wealth was determined based on the household's assets such as automobiles, motorbikes, electronic equipment, appliances, etc. Assets were classified into four types – luxury, necessary, normal, and inferior with assigned points 10, 7, 5, and 2 to each type,

Table 1. Population sample size and gender, urban and ethnic group characteristics

Variables	Number of people	Percent (%)	Cummulative percent (%)
Gender			
Female	7,712	54.84	54.84
Male	6,351	45.16	100
Urban - Rural			
Urban	6,008	42.72	42.72
Rural	8,055	57.28	100
Ethnic group			
Others	2,295	16.32	16.32
Kinh	11,768	83.68	100

Table 2. Population sample size and age group, education and occupation characteristics

Variables	Number of people	Percent (%)	Cummulative percent (%)
Age group			
Youth	707	5.03	5.03
Young adults	2,031	14.44	19.47
Older adults	5,264	37.43	56.9
Elderly	6,061	43.1	100
Education			
No formal education	662	4.71	4.71
Incomplete primary	1,396	9.93	14.63
Complete primary	929	6.61	21.24
Incomplete secondary	1,942	13.81	35.05
Complete secondary	3,188	22.67	57.72
Incomplete high school	999	7.1	64.82
Complete high school	2,976	21.16	85.98
Some university education	131	0.93	86.92
University education completed	1,727	12.28	99.2
Post-graduate degree	113	0.8	100
Occupation			
Unemployed	1,546	10.99	10.99
Retired	1,174	8.35	19.34
Farmer	4,985	35.45	54.79
Unskilled worker	1,589	11.3	66.09
Skilled worker	1,288	9.16	75.25
Sale/admin/clerk	470	3.34	78.59
Manager/supervisor/professional, technical	1,361	9.68	88.27
Smallholder business	1,650	11.73	100

respectively. Total points indicated the wealth level of a household. The higher point value a household achieved, the wealthier the household was.

Organization memberships and geographic regions characterized the respondent's level of social organizations they most actively participated in and ecological regions in which

they were located, respectively. The number of information sources was grouped into discrete numerical variables (see **Table 3**).

Results

The analysis results, as shown in **Table 4**, indicated differences in environmental concerns

Table 3. Population sample size and organization memberhips, number of sources of information, and region

Variables	Number of people	Percent (%)	Cummulative percent (%)
Organization memberships			
No organization	5,066	36.02	36.02
The Party	1,018	7.24	43.26
Community-based organization	142	1.01	44.27
Religious group	278	1.98	46.25
Sports club	495	3.52	49.77
Cultural/recreational clubs	119	0.85	50.62
Charities	335	2.38	53
Retirement club	442	3.14	56.14
Labor union	515	3.66	59.8
Farmers union or agricultural association	863	6.14	65.94
Professional association	140	1	66.93
Veterans union	661	4.7	71.63
Parent-teacher association	472	3.36	74.99
Youth union	480	3.41	78.4
Women's union	2,725	19.38	97.78
Other	312	2.22	100
Number of sources of information			
One	4,681	33.29	33.29
Two	2,707	19.25	52.54
Three	2,164	15.39	67.92
Four	1,608	11.43	79.36
Five	1,191	8.47	87.83
Six	834	5.93	93.76
Seven	561	3.99	97.75
Eight	310	2.2	99.95
Nine	7	0.05	100
Regions			
RRD	2,443	17.37	17.37
Northeast	1,742	12.39	29.76
Northwest	1,160	8.25	38.01
North Central Coast	1,552	11.04	49.04
South Central Coast	1,548	11.01	60.05
Central Highlands	967	6.88	66.93
South-East South	1,914	13.61	80.54
MRD	2,737	19.46	100

Table 4. Association between gender and among age groups and environmental concern

Variables	OR	SE	P	VIF
Male[a]	1.23***	0.05	0	1.01
Age group: The youth				
Younger adult[b]	0.89	0.09	0.291	3.31
Older adult[b]	0.77**	0.07	0.006	5.31
The old[b]	0.78*	0.08	0.012	5.45

Note: [a]*Compared to female*
[b]*Compared to age group 18-25*
** P< 0.05, **P< 0.01, *** P< 0.001*
LR chi^2(4) = 36.33
Model Prob > chi^2 < 0.001
Pseudo R^2 = 0.0027
OR: Odds ratio; SE: Standard error; P: P-values; VIF: Variance inflation factor

Table 5 presents the analysis results about the social class and environmental concern relationship. Social class, as examined in this study, was characterized by household wealth, education level, and occupational prestige. The data suggested that household wealth was significantly positively associated with environmental concern, meaning that people in wealthier families were likely to have more concern. There appeared to be statistical differences in environmental concerns among people with different education levels. People with higher education levels also expressed higher levels of concern toward the environment as the odds ratio increased along with increases in educational level. People with a postgraduate degree posed the highest level of concern, while people with no formal education showed the least concern. The odds ratio of 17.91 indicated that people with a postgraduate degree were 17.91 times more likely to be worried about the environmental quality than people with no formal education. People who had earned a university degree were the second most environmentally concerned, followed by people with some university education.

In the examination of the association among occupations and environmental concerns, the model used the professionals and technical experts variable as the base for the logistic regression. No statistical significance was found between the group of professionals and technical experts and the groups of managers/supervisors, clerical/administrative sale, company owners, owners of properties for rent, students, and others. This meant that there was no difference in environmental concern between these occupations and the group of professionals and technical experts. On the other hand, the odds ratios of less than one showed that the professionals and technical experts variable had significant negative associations with the groups of variables that included skilled workers, unskilled workers, farmers, small stakeholders, unpaid family workers, housewives/homemakers, retired, and unemployed people. These results suggested that people who work in these occupations were likely to be less concerned about the environment than professionals and technical experts.

Table 6 presents the analysis results for the association between environmental concerns and people's political roles as measured by their participation in an organization and the number of information sources accessed. People who were not a member of any organizations were the least concerned about the environment. Except the members of cultural/recreational clubs, business associations, parent-teacher associations, producer cooperatives, and volunteer groups, the members of other organizations were statistically positively associated with environmental concern as compared to people without any organization memberships. The members of university alumni associations were the most environmentally

Table 5. The social class – environmental concern relationship

Variables	OR	SE	P	VIF
Wealth	1.01***	0	<0.001	1.6
Education: No formal education				
Incomplete primary[c]	2.83***	0.8	<0.001	2.85
Complete primary[c]	3.82***	1.1	<0.001	2.3
Incomplete secondary[c]	5.26***	1.43	<0.001	3.56
Complete secondary[c]	8.41***	2.25	<0.001	4.85
Incomplete high school[c]	8.47***	2.34	<0.001	2.55
Complete high school[c]	11.47***	3.09	<0.001	5.15
Some university education[c]	12.52***	4.27	<0.001	1.46
University education completed[c]	14.85***	4.1	<0.001	4.48
Post-graduate degree[c]	17.91***	6.03	<0.001	1.31
Occupation: Professionals and technical experts				
Manager/Supervisor[d]	1.02	0.132	0.906	1.33
Clerical/Administrative sale[d]	0.83	0.103	0.127	1.4
Skilled worker[d]	0.49***	0.048	<0.001	2.08
Unskilled worker[d]	0.32***	0.032	<0.001	2.3
Farmer[d]	0.35***	0.028	<0.001	3.86
Small stakeholder[d]	0.49***	0.045	<0.001	2.31
Company owner[d]	0.58	0.273	0.248	1.03
Owner of properties for rent[d]	0.58	0.333	0.344	1.02
Unpaid family worker[d]	0.51**	0.110	0.002	1.13
Housewife/homemaker[d]	0.31***	0.036	<0.001	1.86
Student[d]	1.03	0.203	0.875	1.12
Retired people[d]	0.64***	0.061	<0.001	1.99
Other[d]	0.31	0.191	0.057	1.02
Unemployed[d]	0.27***	0.054	<0.001	1.24

Note: [c]Compared to no formal education

[d]Compared to professional and technical experts

** P< 0.05, ** P< 0.01, *** P< 0.001*

LR $chi^2(24)$ = 868.91

Prob > chi^2 < 0.001

Pseudo R^2 = 0.0643

OR: Odds ratio; SE: Standard error; P: P-values; VIF: Variance inflation factor

concerned and were followed by the members of public interest groups, labor unions, and the Party, etc. It was estimated that the members of university alumni associations were 1.2, 1.79, and 4.49 times more likely than the members of public interest groups, the members of the Party, and people without any organization memberships in terms of environmental concern, respectively.

Table 6 also indicates that people with access to more information sources showed higher concern about the environment. People with access to one source of information were found to have the least concern, while people

Table 6. Political involvement - environmental concern relationship

Variable	OR	SE	P	VIF
Organization membership: no organization memberships				
The Party[e]	2.21***	0.19	<0.001	1.2
Community-based organization[e]	1.75*	0.42	0.018	1.02
Religious group[e]	2.05***	0.3	<0.001	1.04
Sports club[e]	1.56***	0.18	<0.001	1.09
Cultural/recreational club[e]	1.47	0.34	0.101	1.02
Charities[e]	1.36*	0.2	0.037	1.05
Public interest group[e]	3.73***	1.31	<0.001	1.01
Labor union[e]	2.51***	0.27	<0.001	1.11
Farmers union[e]	1.57***	0.15	<0.001	1.1
Professional association[e]	1.78*	0.42	0.014	1.02
Business association[e]	1.09	0.49	0.846	1.01
Parent-Teacher Association[e]	1.19	0.16	0.174	1.07
Producer Cooperatives[e]	1.12	0.41	0.761	1.01
University alumni association[e]	4.49***	1.14	<0.001	1.01
Volunteers group[e]	1.94	0.81	0.113	1.01
Women's Union[e]	1.39***	0.09	<0.001	1.25
Youth Union[e]	1.89***	0.22	<0.001	1.1
Veterans Union[e]	1.65***	0.17	<0.001	1.09
Retirement club[e]	1.45**	0.19	0.004	1.06
Other[e]	2.02***	0.34	<0.001	1.03
Number of sources of information: One				
Two sources of information[f]	1.56***	0.11	<0.001	1.29
Three sources of information[f]	1.50***	0.11	<0.001	1.27
Four sources of information[f]	1.94***	0.15	<0.001	1.23
Five sources of information[f]	1.85***	0.16	<0.001	1.21
Six sources of information[f]	2.12***	0.2	<0.001	1.19
Seven sources of information[f]	2.13***	0.23	<0.001	1.14
Eight or more sources of information[f]	2.22***	0.3	<0.001	1.08

Note: [e]Compared to no organization memberships

[f]Compared to one source of information

** P< 0.05, ** P< 0.01, *** P< 0.001*

LR $chi^2(28)$ = 466.41

Prob > chi^2 < 0.001

Pseudo R^2 = 0.0345

OR: Odds ratio; SE: Standard error; P: P-values; VIF: Variance inflation factor

with access to eight or more sources of information were the most concerned with the highest odds ratio of 2.22.

To characterize the residence - environmental concern relationship, this study examined three residential variables, namely urban residence, ethnicity, and region. The urban residence variable referred to either an urban or rural area where a respondent resided. The ethnic variable referred to the residential ethnicity which characterized whether a respondent belonged to the Kinh group (the major ethnic

group in Vietnam) or an ethnic minority group. The region variable referred to one of the eight ecological regions in Vietnam where the respondent resided.

The regression results shown in **Table 7** found statistically positive significant differences between urban or rural residents, meaning that urban residents were more concerned about the environment than rural residents. A significant positive association was also found between the ethnic variable and environmental concern. Kinh people were about 2.09 times more likely to be environmentally concerned than ethnic minority people. By comparing the concern levels among people in different regions, the analysis found that people in the North Central Coast of Vietnam were the most concerned about the environment, while people in the South-East South and Mekong River Delta were less concerned than those in other regions. There was no difference in environmental concern between people in the Red River Delta and people in the Nort East, North West, South Central Coast, and Central Highlands.

Discussion

The broad goal of this study was to investigate how Vietnamese citizens' environmental concern was influenced by their sociodemographic characteristics and to what extent their concerns differed from each other. The five hypotheses related to gender, age, social class, political involvement, and residence were examined to address the objectives.

The gender - environmental concern relationship

The analysis results, as shown in **Table 4**, found that males were more environmentally concerned than females. This finding is consistent with McEvoy's (1972) hypothesis. McEvoy (1972) and Arbuthnot & Lingg (1975) argued that males are more politically active and more involved in community issues and therefore, they are more likely to be concerned about the environment. The 2015 and 2016 PAPI reports suggested a low rate of engagement in

Table 7. Residence - environmental concern relationship

Variables	OR	SE	P	VIF
Urban	1.37***	0.06	<0.001	1.08
Ethic group: Kinh people	2.09***	0.17	<0.001	1.29
Region: Red River Delta				
North East[g]	0.99	0.08	0.8770	1.7
North West[g]	0.89	0.09	0.2380	1.51
North Central Coast[g]	1.59***	0.12	<0.001	1.46
South Central Coast[g]	0.95	0.08	0.5530	1.47
Central Highlands[g]	1.01	0.1	0.8860	1.33
South-East South[g]	0.65***	0.05	<0.001	1.56
Mekong River Delta[g]	0.51***	0.04	<0.001	1.73

Note: [g]Compared to the Red River Delta

** P< 0.05, ** P< 0.01, *** P< 0.001*

LR $chi^2(9)$ = 420.22

Prob > chi^2 < 0.001

Pseudo R^2 = 0.0311

OR: Odds ratio; SE: Standard error; P: P-values; VIF: Variance inflation factor.

politics for women (CECODES *et al*., 2016, 2017). The 2015 PAPI report noted that females found personal economic conditions and public services such as poverty and education issues their top concerns. Teerawichitchainan *et al.* (2010) noted that the majority of women spend most of their time doing housework and taking care of their families. Taking on the role of family caregivers, women, therefore, have less time to engage in activities outside of the family. Men, on the other hand, as the household heads, often work and make decisions regarding family and social issues (Institute for Social Development Studies, 2015). Women are often less socially active as compared to men, and therefore, they are less concerned about social issues, including the environment.

The age - environmental concern relationship

There existed statistically significant differences in environmental concerns among different age groups (**Table 4**). Younger people tended to have a more significant concern about the environment than older people. Malkis & Grasmick (1977) suggested that important events occurring at the crucial pre-adulthood stage may permanently affect them as they move into adulthood. The continued exposure to news about environmental deterioration via news media or environmental courses in America in the sixties and seventies may have accounted for the "youth movement" towards their greater concern about environmental problems (Malkis & Grasmick, 1977). The same trend may have been seen with the situation in Vietnam. With the development of technology, the internet, and social media such as Facebook, YouTube, vlogs, and Twitter, etc., information has become more accessible for people, especially for the youth. The 2016 PAPI survey asked interviewees to select sources of information they access to receive information or news on national affairs and the government, including television, newspapers/magazines, radio, internet, personal contacts, meetings, cellphone message, social media, or other (CECODES *et al*., 2017). It was suggested that young people in the youth group and the younger adult group were the ones who had access to the most information with 65.78% of people in the youth group and 58.25% of people in the young adult group having access to three or more sources of information. They were followed by the adult group with 46.62% and the elderly with 42.46%. As per the results, the continued exposure to news about environmental disasters occurring in Vietnam in recent years, especially the fish kill tragedy in April 2016, via social media, newspaper, and television, etc. may have resulted in increasing the young people's engagement in environmental concerns and environmental activism.

The social class - environmental concern relationship

Social class, as examined in this study, was characterized by household wealth, education level, and occupational prestige. The analysis results found that people who were wealthier, well-educated, and who had more occupational prestige were more likely to have environmental concerns. These findings were also consistent with the 2016 PAPI report, which noted that 13% of people with a postgraduate degree said that the environment was the top national concern while only 4% of people with primary education expressed their concern.

Figure 2 presents the percentages of people with different wealth levels by their education. Wealth scores were calculated based on the household's assets such as automobiles, motorbikes, electronic equipment, appliances, etc. Assets were classified into four types – luxury, necessary, normal, and inferior with assigned points 10, 7, 5, and 2 to each type, respectively. Total point values indicated the wealth level of a household. The higher point values a household achieved, the wealthier the household was. There appeared two different trends. The percentage of people with no formal education or incomplete primary school mostly fell in the lower wealth level, while most people with a university or postgraduate degree had a higher wealth level.

Figure 3 characterizes the percentages of people with different occupations by their education. It was noticeable that most people who held a university degree worked as a professional/technical expert, a manager/

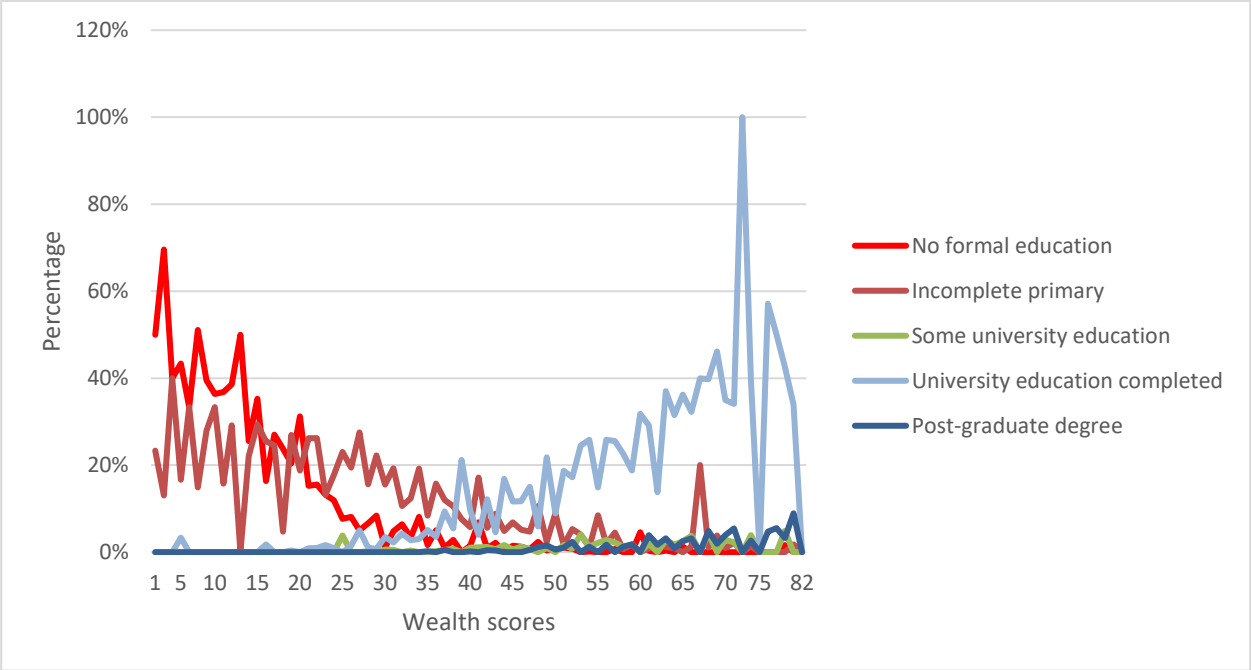

Figure 2. The household wealth trends by education levels.

supervisor, or a company owner. These people also had higher wealth levels as compared to others and therefore were often categorized into the upper or middle classes due to their higher levels of wealth, education, and occupational prestige. This result supports the social class hypothesis that upper and middle classes will tend to have higher levels of environmental concern than the lower class (Maslow, 1970; Liere & Dunlap, 1980). The World Bank's World Development Report 1992 (IBRD, 1992), which was based on the popular Environmental Kuznets Curve (EKC), stated that greater economic development initially led to environmental degradation, but the demand for improvements in environmental quality increased after a certain level of development as income rose. It was suggested that the upper and middle classes are most politically and socially active (Martinson & Wilkening, 1975) and experience pleasant residential, work, and environmental recreation (Morrison *et al*., 1972). Consequently, they are more concerned about environmental problems. The lower class, on the other hand, typically lives and works in physical environmental areas with poor conditions and thus are less aware of the environmental problems (Morrison *et al*., 1972).

The political involvement - environmental concern relationship

Political involvement was considered in this study as the form of citizens' participation in the Party, mass organizations, professional associations, or cultural or social groups in which they played active roles and the number of information sources from which they received the news. Information played an important role in the public environmental concern. The main sources of information included television, newspapers/magazines, radio, internet, personal contacts, meetings, cellphone message, social media, or others. **Table 6** illustrates that the more information sources a Vietnamese citizen had access to, the more likely they were concerned about the environment. It was also found that people actively participating in the Party or an organization were more likely to be concerned than people without any organization memberships. **Figure 4** characterizes the percentages of people in each organization by their number of information sources.

More than 50 percent of members of the Party, labor unions, business associations, university alumni associations, sports clubs, public interest groups, and youth unions reported four or more sources of information. These

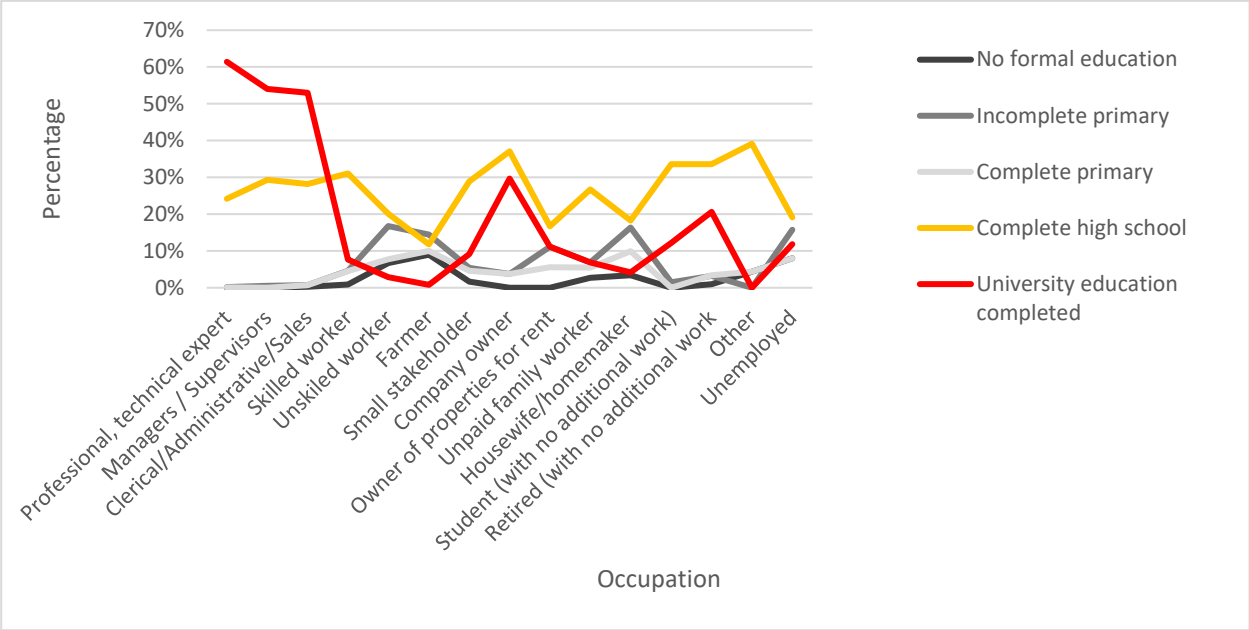

Figure 3. Occupation by education levels

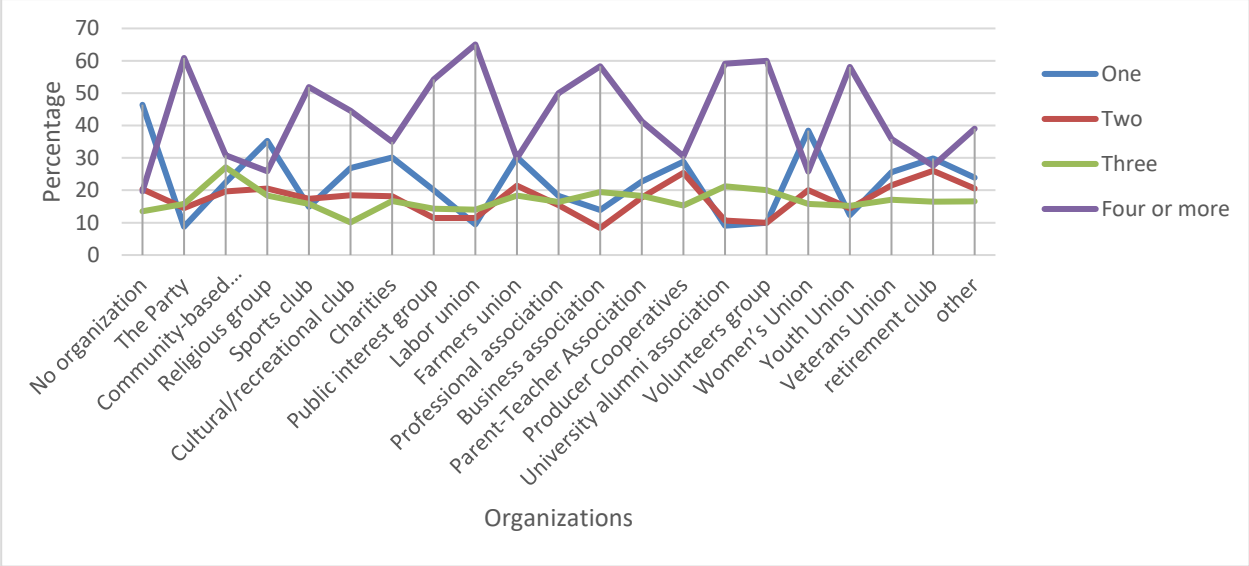

Figure 4. Participation in an organization by the number of information sources accessed

members were likely to have higher levels of environmental concerns as compared to those in other groups (**Table 6**). Of which, the members of university alumni associations showed the highest level of concern and about 60% of them had four or more sources of information. The majority of people with only one source of information were not members of any organization. These people showed less concern as compared to other group members.

The proportion of males having access to two or more sources of information about socioeconomic issues, national affairs, and the government was 13.33% more than the proportion of females (74.02% vs. 60.69%). Young people in the youth group and the younger adult group were the ones who had access to the most information with 65.78% of people in the youth group and 58.25% of people in the young adult group having access to three or more sources of information. They were followed by the adult group with 46.62% and the elderly with 42.46%. This suggests that those linked to more information sources were more likely to be

environmentally concerned. Constant exposure to the news about environmental problems probably increased awareness about the environment and therefore increased the environmental concern. The 2016 PAPI report noted that the fish kill tragedy was the main factor that increased Vietnamese citizens' interest in the environment in 2016 (CECODES *et al*., 2017).

The residence-environmental concern relationship

The analysis results in **Table 7** suggested a positive association of urban residents and environmental concerns. The possible explanations for this relationship are (i) urban residents had higher education levels and had wealthier lives, therefore they were more aware of the environmental problems around them; (ii) they were generally exposed to higher levels of pollution, especially air pollution, emitted from motorbikes, cars, trucks and other types of transportation in the city; (iii) they received more information on environmental problems from various sources such as TV, newspapers, and Facebook, etc.

The Kinh majority group was also found to be more environmentally concerned than minority ethnic groups. This was probably because minority ethnic people mostly live in remote areas, such as mountainous or island areas. The environmental quality in these areas is generally better than in urban cities. They lack access to information to know the environmental problems happening elsewhere in the country.

By comparing the concern levels among people in different regions, the analysis found that people in the North Central Coast of Vietnam were the most concerned about the environment compared to other regions. The possible explanation for this is because of the environmental disaster caused by toxic waste spilt from the Formosa Ha Tinh steel plant in April 2016, which seriously polluted more than 200 kilometers of coastline of four provinces in the North Central Coast of Vietnam, namely – Ha Tinh, Quang Binh, Quang Tri, and Thua Thien Hue. This environmental tragedy has resulted in significant growth in environmental activism and increased environmental concern not only in this region but also across the country (CECODES *et al*., 2017).

Conclusions

The study found the existence of a gender-environmental concern relationship. The regression models performed in the study showed the substantial and significant positive association between males and environmental concern, meaning that men are more likely to be concerned about environmental quality than women. It is also found that younger people tended to be more concerned about the environment than older people. The examination of the social class - environmental concern relationship indicated that the wealthier, well-educated, and more occupationally prestigious people who were categorized as upper or middle class were found to be more environmentally concerned. People who were not a member of any organization were least concerned about environmental quality. Members of university alumni associations were the most environmentally concerned.

The analysis results suggested policy implementations to increase environmental quality. The policies should concentrate on human resources as the main factor with a focus on the young, more educated, and wealthier people. Highly-educated young people now make up the majority of the population in Vietnam. This is the core force in combating environmental degradation and climate change. The middle and upper-income classes are also appearing more and more in numbers. These are classes of people who have a great interest in environmental quality who are ready to act for the environment. Their actions and perceptions can change production and consumption behaviors in favor of the environment.

Acknowledgments

This research was conducted using data collected in 2016 through the project "The Vietnam Provincial Governance and Public Administration Performance Index (PAPI)".

This research did not receive any specific grants from funding agencies in the public, commercial, or not-for-profit sectors. We would like to thank Ms. Ha Le, School of International Service, American University and Ms. Quynh Nguyen, National Economics University, for their comments, suggestions, and language editing.

References

Arbuthnot J. & Lingg S. (1975). A comparison of French and American environmental behaviors, knowledge, and attitudes. International Journal of Psychology. 10(4): 275-281.

Arcury T. (1990). Environmental attitude and environmental knowledge. Human Organization. 49(4): 300-304.

Arcury T. A., Johnson T. P. & Scollay S. J. (1986). Ecological worldview and environmental knowledge: The "new environmental paradigm." The Journal of Environmental Education. 17(4): 3540.

Arcury T. A., Scollay S. J. & Johnson T. P. (1987). Sex differences in environmental concern and knowledge: The case of acid rain. Sex Roles. 16(9-10): 463-472.

Buttel F. H. (1987). New directions in environmental sociology. Annual Review of Sociology. 13(1): 465-488.

Buttel F. H. & Flinn W. L. (1974). The structure of support for the environmental movement, 1968-1970. Rural Sociology. 39(1): 56.

Catton Jr W. R. & Dunlap R. E. (1978). Environmental sociology: A new paradigm. The American Sociologist, 41-49.

CECODES, VFF-CRT & UNDP (2016). The Vietnam Provincial Governance and Public Administration Performance Index (PAPI) 2015: Measuring citizen's experiences. A Joint Policy Research Paper by Centre for Community Support and Development Studies (CECODES), Centre for Research and Training of the Viet Nam Fatherland Front (VFF-CRT), and United Nations Development Programme (UNDP). Retrieved from http://papi.org.vn/eng/wp-content/uploads/2016/04/PAPI-2015_REPORT_ENGLISH-1.pdf on December 7, 2016.

CECODES, VFF-CRT & UNDP (2017). The Vietnam Provincial Governance and Public Administration Performance Index (PAPI) 2016: Measuring citizen's experiences. A Joint Policy Research Paper by Centre for Community Support and Development Studies (CECODES), Centre for Research and Training of the Viet Nam Fatherland Front (VFF-CRT), and United Nations Development Programme (UNDP). Retrieved from http://papi.org.vn/eng/wp-content/uploads/2017/04/PAPI2016_Report_Final_ENG-1.pdf on September 8, 2019.

Davidson D. J. & Freudenburg W. R. (1996). Gender and environmental risk concerns: A review and analysis of available research. Environment and Behavior. 28(3): 302-339.

Dunlap R. E. (1975). The impact of political orientation on environmental attitudes and actions. Environment and Behavior. 7(4): 428-454.

Dunlap R. E. & Catton Jr W. R. (1979). Environmental sociology. Annual Review of Sociology. 5(1): 243-273.

IBRD (1992). World Development Report 1992: Development and the Environment. Oxford University Press.

Institute for Social Development Studies (2015). Social determinants of gender inequality in Vietnam. Retrieved from https://vietnam.embassy.gov.au/files/hnoi/ISDS_Report_Binh%20dang%20gioi_EN_PDF-2.pdf on September 15, 2021.

Liere K. D. V. & Dunlap R. E. (1980). The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence. Public Opinion Quarterly. 44(2): 181-197.

Malkis A. & Grasmick H. G. (1977). Support for the ideology of the environmental movement: Tests of alternative hypotheses. Western Sociological Review. 8(1): 25-47.

Martinson O. B. & Wilkening E. A. (1975). A scale to measure awareness of environmental problems: Structure and correlates. Annual Meeting of the Midwest Sociological Society. Chicago. IL: Midwest Sociological Society.

Maslow A. (1970). Motivation and Personality: Second Edition (Second edition). Harper & Row.

McEvoy J. (1972). The American concern with the environment. Social Behavior, Natural Resources and the Environment: 214-236.

MONRE (2014). National environmental report 2013 – Air environment (National Environmental Report No. 31-2014/CXB/19-915/BD) (in Vietnamese).

MONRE, RRC.AP, IGES & NIES (2012). Vietnam National Environmental Performance Assessment (EPA) Report.

Morrison D. E., Hornback K. E. & Warner W. K. (1972). The environmental movement: Some preliminary observations and predictions. Social Behavior, Natural Resources and the Environment: 259-279.

Murdock S. H. & Schriner E. C. (1977). Social and Economic Determinants of the Level of Support for Environmental Protection and Economic Growth in a Rural Population

Nguyen M. (2017). Formosa steel plant in Vietnam restarts after toxic spill. etrieved from https://www.reuters.com/article/us-vietnam-environment-formosa-plastics/formosa-steel-plant-in-

vietnam-restarts-after-toxic-spill-idUSKBN18P186 on September 8, 2019.

Sands G. (2016). Vietnam's Growing Environmental Activism | The Diplomat. Retrieved from https://thediplomat.com/2016/10/vietnams-growing-environmental-activism/ on March 3, 2020.

Teerawichitchainan B., Knodel J., Loi V. M. & Huy V. T. (2010). The Gender Division of Household Labor in Vietnam: Cohort Trends and Regional Variations. Journal of Comparative Family Studies. 41(1): 57-85. JSTOR.

Tran C. C., Ta T. D., Duong A. T., Phan O. T. & Nguyen D. A. (2020). Analysis on Temporal Pattern of Fine Particulate Matter (PM 2.5) in Hanoi, Vietnam and the Impact of Meteorological Conditions. Journal of Environmental Protection. 11(3): 246.

Tremblay K. R. & Dunlap R. E. (1978). Rural-urban residence and concern with environmental quality: A replication and extension. Rural Sociology. 43(3): 474.

Van Liere K. & Dunlap R. (1978). Environmental Concern: Consistency Among its Dimensions, Conceptualisations and Empirical Correlates. Annual Meeting of the Pacific Sociological Association, Spokane, Washington.

Verbeek M. (2008). A Guide to Modern Econometrics (3rd ed.). John Wiley & Sons.