Do Environmental Norms and Climate Change Perceptions Influence Mitigation Behaviour? Thailand as a Case Study

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Abstract—Global climate change is now widely recognized as one of the most significant environmental threats of the 21st century. The need to reduce its impact requires the sharing of responsibilities between organizing authorities and the local public. It is widely acknowledged that, to date, the current state of scientific knowledge on climate change is objective. This could lead to it being more or less directly translated into actions. This study aims to investigate which factors are motivating people to undertake mitigation measures, with a particular focus on environmental norms and climate change perceptions held by the rural citizens of Thailand. Questionnaires were distributed to 253 selected households in village 4 of Nongbuasala, Nakhon Ratchasima province, Thailand. Statistical analysis indicated that there was a significantly positive correlation between environmental norms and climate change perception ($r = .383$, $p < 0.01$). Both perception of climate change as a phenomenon and concern for the environment were found to be significantly positive correlated with the behavioural intention to take voluntary mitigation actions ($p \leq 0.05$). Specifically, only the intentions to implement afforestation and reduce plastic consumption were significantly positive correlations with the perceptions of climate change. And beside this, the willingness to eliminate the use of plastic, increase waste stream recycling and implement afforestation activities ought to be positively related to environmental norms held by the respondents ($r = .325$ to $r = .058$; $p \leq 0.05$). Implications for further research were finally raised.

Index Terms—Climate change perceptions, environmental norms, mitigation behaviour, Thailand.

I. INTRODUCTION

The urgent need to mitigate the problem of climate change is now becoming more widely understood by both academia and policy makers, but at the same time public awareness and actions often lag far behind [1]. Until recently, despite increasing consensus on the subject, many people around the world are still skeptical about the concept of climate change [2], [3]. A series of international studies conducted by [4] revealed that most respondents do not seem to exactly understand the mechanisms of *how* climate change work and/or *what* its cause is. To exemplify this, in Thailand, a

national survey showed that only 9% of Thai respondents correctly identified burning fossil fuels as the primary cause of climate change [5].

A large body of empirical literature also indicated that many people remain reluctant to change their behaviour to deal with climate change problem. Indeed, the relationship between knowledge, attitudes and behaviours has long been debated for more than a century (e.g., the theory of planned behaviour; value-norm-belief (VNB); and information deficit model). [6] articulated that knowledge is often recognised as a background factor that influences a person's attitude and subjective norm to behaviour intention and gives the possibility of association between attitude and actual behaviour (See Fig. 1).

Fig. 1. Theory of Planned Behaviour [6].

However, interestingly, it is important to realise that there are a few studies which examine the predictors of public perception and action in response to climate change, and even fewer set in Thailand. In most cases, past research has also failed to clearly address the following fundamental issues: Are people reluctant to take responsibility because they lack the knowledge to do so? Or, perhaps they don't care enough to make changes. Subsequently, the aim of this study was to investigate the linkage between climate change perceptions, environmental norms and their preferences for climate change mitigation actions in Thailand, a country case study.

II. MATERIAL AND METHODS

This paper draws on mixed research methods. Literature reviews, semi-structured interviews, community observation and questionnaire surveys were used.

A. Literature Rreviews

Basically, climate change is caused by increasing concentration of greenhouse gases (i.e. carbon dioxide; CO₂) in the atmosphere. There is very strong evidence that the main contribution to the problem is human activity, most significantly the burning of fossil fuels for electricity and

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power generation. Taken globally, the total world energy consumption and CO₂ emission continue to increase steadily. In 2009, the International Energy Agency [7] revealed that electricity and heat generation produced nearly half (>40%) of global CO₂ emissions.

To act to mitigate undesirable climate change, the US Environmental Protection Agency has been exploring a variety of mitigation measures in the household sector include:

- Save energy by switching appliances off when not in use.
- Improve energy efficiency by replacing household's old applicant with an energy star.
- Implement the 3Rs by reducing, reusing and recycling waste such as plastic, glass, metal.
- Build a green in backyard.

B. Case Study

Local people who lived in village 4 of the Nongbuasala sub district, Muang district, Nakhon Ratchasima province, the Northeast region of Thailand was considered as the target population in this study (See Fig. 2).

Fig. 2. Study area, Muang Nakhon Ratchasima district, Thailand

Crucially, in 2008, according to the survey of local opinion toward environmental and climate benefits from waste-to-energy project in this community, [8] found that the majority of respondents did not fully understand the key concepts of climate change and related issues. Therefore, in this study, a random sample of 253 households (among the total population of 724 households) was classified using a probability-proportional-to-size sample selection with 95% confidence interval.

C. Questionnaire

To begin with, all the respondents were simply asked open-ended questions. For example, *Are you concerned about the environment in general? Do you know about global climate change? Does climate change and related topics bring anything else to your mind? Do you want to do something to help combat climate change?* Further to this, a questionnaire was developed based on multidisciplinary reviews. The respondents were asked to use a Likert scale numerical rating from 'strongly disagree' to 'strongly agree' for each statement in a series of questions. In this context, 'perceptions' were explored using respondents' understanding of the general notion of climate change (e.g. definition and its cause). As mentioned above, according to USEPA, a variety of climate change mitigation measures

include: i) saving household energy, ii) improving household energy efficiency, iii) enhancing recycling practices, iv) reducing plastic consumption, and v) increasing afforestation (Appendix A). All statistical analyses were computed using SPSS software at less than or equal to 0.05 significance level.

III. RESULTS AND DISCUSSION

A. Survey and Interviews: Perception

Although half of respondents reported that they had heard and/or seen about climate change, there were still plenty of misconceptions around these issues in general. With these main categories, the majority of respondents tended to perceive climate change and extreme weather events in their local area (e.g. drought and extreme temperature) as meaning the same thing. Most of them also identified deforestation as the 'primary cause' of climate change rather than their use of fossil fuels. Specifically, in terms of mitigation measures, the majority of respondents *perceive* that increasing afforestation and reducing the usage of plastic were considered to be one method of mitigating the impacts of global climate change. Nearly a half of respondents also believe that saving household energy consumption can reduce their contribution to the problem. Whereas, a relatively small number knew about the climate benefits from waste recycling and improving energy efficiency of household appliances, as illustrated in Fig. 3.

Fig. 3. Local people's perceptions of climate change mitigation activities

Fig. 4. Behavioral intention related to mitigation activities

B. Survey and Interviews: Intentions

As shown in Fig. 4, more than half of respondents disagreed with the statement that they have an intention to take voluntary action in dealing with climate change. Regarding their norm of attention, compared to the other problems (e.g. economic and political issues), a relatively

small number of respondents (14%) expressed concern for environmental problems. Moreover, interestingly, whether they know about climate change or not, the majority of respondents intended to reduce their energy consumption, separate recyclable household materials, plant trees in their community rather than reduce the use of plastic and/or installing energy efficient appliances in their home.

TABLE I: CORRELATION ANALYSIS BETWEEN CLIMATE CHANGE PERCEPTION AND THEIR BEHAVIOURS INTENTION RELATED TO MITIGATION ACTIVITIES (* $p < 0.05$; ** $p < 0.01$)

Behaviour intentions	1	2	3	4	5	6	7	8
1. Intention to take actions on climate change	1.00	.139*	.066	-.149*	-.037	-.168**	.108	-.176**
2. Perception of climate change	--	1.00	.383**	-.142*	-.180**	-.084	.325**	.262**
3. Concern for the environment	--	--	1.00	-.010	-.043	.058	.066	.061
4. Intention to save household energy	--	--	--	1.00	.376**	.387**	.039	.220**
5. Intention to improve household energy efficiency	--	--	--	--	1.00	.284**	-.011	.018
6. Intention to recycle waste	--	--	--	--	--	1.00	.094	.157*
7. Intention to reduce plastic use	--	--	--	--	--	--	1.00	.130*
8. Intention to plant a tree	--	--	--	--	--	--	--	1.00

To our knowledge, this is because of the general sense that it is so hard for local people to clearly differentiate between pro-environmental activities and specific actions that help to mitigate climate change. Obviously, however, almost all respondents who conserve household energy and recycle waste mostly do so for financial reasons rather than environmental preservation and climate change. The following interview statements are considered:

"I have no idea how to protect our planet (e.g. environment and climate)"

"I have a sense of helplessness sometime; I can do is very small"

"Indeed, I just would like to save more money on my electricity bill and/or make money through recycling job"

C. Data Analysis

Table I illustrates the relationship between the perceptions of climate change, environmental norms, and their behaviour intentions toward the specific mitigation measures. The results of correlation analysis indicate a significant positive correlation between the concern for the environment and the perception of climate change as a phenomenon ($r=.383$; $p < 0.01$).

Taken as a whole, the statistically significant positive correlations were found between climate change perceptions, environmental norms and behavioural intentions to take voluntary mitigation actions. In short, if the respondents have concerns about environmental issues and correctly perceived the mechanism of climate change, then they were more willing to make sacrifices to mitigate future climate change. Regarding specific mitigation measures, only the intention to plant a tree and reduce the use of plastic were found to be significantly correlated with the perceptions of climate change. Added to this, the intention to recycle household waste, implement afforestation, and reduce the usage of plastic was also positively correlated with the environmental concerns held by Thai local respondents ($p \leq 0.05$). In brief, the main purpose of each specific action is summarized in Table II.

TABLE II: PURPOSE OF MITIGATION BEHAVIOURS

Behaviour intentions	Purpose of actions		
	Environ-mental	Climate change	Economic
• Saving household energy consumption	N/A	N/A	√
• Improving household energy efficiency	N/A	N/A	N/A
• Recycling household waste	√	N/A	√
• Reducing plastic consumption	√	√	N/A
• Increasing afforestation	√	√	N/A

IV. CONCLUSIONS AND IMPLICATIONS

Climate change has emerged as one of the biggest environmental challenges facing the world. Scientists suspect that the Earth's climate change, further accelerating global warming, is largely attributable to emission from anthropogenic activities, especially burning of fossil fuels and engaging in other form of unsustainable consumption patterns. Yet, to date, there is still an alarming gap growing between knowledge and action on climate change.

From this standpoint, this study has discovered links between climate change perceptions, environmental norms, and behavioural intentions of Thai local residents to undertake voluntary climate change mitigation actions. Our observation is that if the perception of scientific knowledge on climate change can somehow be transformed into personal concern for the environment, then perhaps people are more

likely to change their behaviour in response to the problem accordingly. In a way, only some specific mitigation behaviours (e.g. increasing afforestation and reducing plastic consumption) were found to be significantly correlated with climate change perceptions and environmental concerns.

Throughout this study recommendations for stakeholders and possible directions for further study were raised as follows:

- Multi-stakeholders should seek out the ways to translate climate change (and/or environmental sustainability) into people's daily lives to make these issues urgent, local and personal. Complex connection between climate change and other key environmental problems should be more highlighted.
- Government should use financial incentives to increase people's environmental concerns and promote their participation in pro-environmental actions relevant to climate-change, especially the ways in which to improve their household energy efficiency.
- Different types of behavioral outcomes should focus more on a variety of socio-political and cultural preferences. Also, some core psychological components, such as self-efficacy, social competence, and sense of civic responsibility, are strongly recommended and needs further study.

APPENDIX

Appendix A: Questionnaire

	A	B	C	D	E
Environmental concern*					
I am concerned about environmental problems in my community	☐	☐	☐	☐	☐
Intention to tackle action on climate change**					
I have an intention to change my behaviours to combat climate change problem	☐	☐	☐	☐	☐
Perception of climate change**					
I agree with the following statements					
Definition: Climate change is all change in global temperature and weather patterns over time.					
☐	☐	☐	☐	☐	☐
Its cause: Climate change is primary caused by fossil fuel burning (e.g. oil, coal, gas)					
☐	☐	☐	☐	☐	☐
Perception of mitigation activities**					
I believed that the problem of climate change can be mitigated through the following actions:					
-Saving household energy consumption	☐	☐	☐	☐	☐
-Improving energy household efficiency	☐	☐	☐	☐	☐
-Recycling household waste	☐	☐	☐	☐	☐
-Reducing plastic consumption	☐	☐	☐	☐	☐
-Increasing afforestation	☐	☐	☐	☐	☐

Mitigation behaviours**

I have an intention to save household energy consumption	☐	☐	☐	☐	☐
I have an intention to improve household energy efficiency	☐	☐	☐	☐	☐
I have an intention to recycle household wastes	☐	☐	☐	☐	☐
I have an intention to reduce plastic consumption	☐	☐	☐	☐	☐
I have an intention to plan a tree in my community	☐	☐	☐	☐	☐

Remarks:

* A = not at all concerned; B = slightly concerned; C = somewhat concerned; D = moderately concerned; E = extremely concerned

** A = strongly disagree; B = disagree; C = neutral; D = agree; E = strongly agree

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