

Awareness and Adaptation Responses on Climate Change in Malaysia

Aisyah Zulaikha Roslan ¹, Mohd Amirul Mahamud ^{1,*}, Mohd Azmeer Abu Bakar ¹, Azli Abdullah ² and Ita Mardiani Zain ³

¹ School of Humanities, Universiti Sains Malaysia, 11800 USM, Penang, Malaysia.

² Faculty of Architecture and Ekistic, Universiti Malaysia Kelantan, 16100 Kota Bharu, Kelantan, Malaysia.

³ Faculty of Social Sciences and Law, Universitas Negeri Surabaya, 60231 Surabaya, East Java, Indonesia.

*Correspondence: mohd.amirul@usm.my

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Abstract: Being conscious of climate change is essential for emerging nations to attain sustainability. In developing countries, a major obstacle to adapting to climate change is a lack of awareness. This research, therefore, assesses the awareness of climate change impacts among Malaysians. The findings are based on an online survey conducted among citizens in Malaysia. The survey explores the level of awareness among Malaysians and their adaptation to face climate change. Based on the research, the highest mean score for awareness is 4.29 (agree–very agree), while the highest mean score for structure is 3.76 (neutral–agree). Even though the level of awareness is quite high among Malaysians, most of them believe that they and the government are not fully prepared to face climate change in Malaysia. It is recommended that the government strengthen the institutional setup to prepare and implement related climate change adaptation strategies in Malaysia.

Keywords: Adaptation, Awareness, Climate Change, Environment

1.0 Introduction

The most pressing worldwide environmental problem of our time is climate change. The safety and prosperity of the planet in the twenty-first century are gravely threatened. Having more knowledge makes it easier to plan and carry out climate change adaptation actions, like modifying natural and man-made systems to lessen the effects of climate change.

In several academic fields, there has been extensive research on climate change (Bello, 2014; Rahman et al., 2014). However, the primary emphasis of studies on climate change has typically been on scientific analysis and its implications, ignoring the human aspect of climate change impacts in developing nations. Research on understanding climate change and preparing for it in underdeveloped nations is still in its infancy. The degree to which individuals, groups, and businesses are environmentally conscious is a good indication of how well-informed they are about environmental issues. The development and forecasting of early warning and evacuation systems, by Oxley (2010), can aid in enhancing disaster preparedness by raising awareness of and interest in disaster risk reduction.

Malaysia has a tropical and humid climate (Abdul Rahman, 2018). The intricate land-sea interactions and high topography have a significant impact on it (Awang and Abd. Hamid, 2013). Malaysia might be thought of as a disaster-free zone due to its climate. Disasters caused by a moderate climate, however, are happening more frequently these days. These allude to the occurrence of floods and droughts that had a substantial socioeconomic impact on the country, whereas landslides brought on by heavy rain and high winds that occurred in mountainous and coastal areas caused less harm (Abdul Rahman, 2009; Awang and Abd. Hamid, 2013).

Sea level rise, decreased crop yields, increased diseases among forest species and biodiversity loss, erosion of shorelines, more intense floods, coral reef bleaching, increased disease incidences, tidal inundation of coastal areas, decreased water availability, loss of biodiversity, and more droughts are some of the potential effects of climate change in the Malaysian context (Abdul Rahman, 2009).

Thus, it makes good sense to investigate what is known about climate change impacts and adaptation among various sections of society. Therefore, the research aims to explore the level of awareness among Malaysians and their adaptation to face climate change.

2.0 Study Area



Figure 1: The study area.

Located near the equator, Malaysia's climate is classified as sub-equatorial, hot and humid all year round (Baharuddin, 2007). The average rainfall is 250 centimetres (98 in) per year and the average temperature is 27 °C (80.6 °F). The climate of the peninsula and the east differ, as the climate of the peninsula is directly influenced by winds from the mainland, as opposed to the more marine climate of the east.

Malaysia is susceptible to the El Nino effect that reduces rainfall during the dry season (NAHRIM, 2010). Climate change has the potential to significantly affect Malaysia, raising sea levels and rainfall, and increasing the risk of severe flooding and drought.

Malaysia experiences very consistent weather all year long, with lowland mean temperatures ranging from 26 to 28 degrees Celsius. The diurnal fluctuation can be as high as 12°C, even if the annual variance of the daily mean temperature is just 2° to 3°C. According to predictions, Malaysia would experience a temperature increase of up to 1.5°C by 2050 (IPCC, 2021).

3.0 Materials and Methodology

An online questionnaire was created using Google Forms and distributed through social media such as Facebook and WhatsApp. The questionnaire contains three major sections (respondent background, awareness, and adaptation response) arranged in an orderly manner to be answered by the respondents. A questionnaire is an effective tool for a researcher because the quality of the questionnaire will determine the value of the research as a whole (Thuaibah, 2007).

In order to ensure the questionnaire is reliable and valid, Cronbach's alpha analysis was calculated, and all the questions were verified by two experts in the climate change study. If the question in the questionnaire is vague, then the answer obtained is no and will not have real meaning. This will damage the results or findings of a study. Table 1 shows the result of Cronbach's alpha.

Table 1: Cronbach Alpha results

Theme	Cronbach Alpha	N Items
Awareness	0.8471	8
Adaptation Response	0.8125	8

The study used random sampling, and 574 respondents were recorded in the Google Form. Through a convenience random sampling technique (a non-probability sampling method), 574 respondents from different states in Malaysia voluntarily participated in this study and answered the quantitative online survey questionnaire. Section 1 was used for collecting the demographic background of the respondents, such as gender, age, occupation, and state of residence. Of the total number of respondents, 223 (38.9%) were male and 351 (61.1%) were female. Further, 17 (3.0%) were below 20 years old, 366 (63.8%) were 20–40 years old, and 191 (33.3%) were 41 years old or older.

Section 2 (Awareness) and Section 3 (Adaptation Response) employed a Likert scale of 1 to 5, where 1 strongly disagrees, 2 disagrees, 3 is not sure, 4 agrees, and 5 strongly agrees. The three sections in the questionnaire are based on the objectives of this study. The data were analyzed descriptively, i.e., frequency analysis and mean score, for the data obtained from Sections A, B, and C in the quantitative online survey questionnaire.

4.0 Results

Table 2 shows the frequency distribution of respondents' profiles. The respondents are distributed almost equally among all states in Malaysia. Wilayah Persekutuan consists of Kuala Lumpur, Putrajaya, and Labuan. The majority of the respondents are informal sector workers (30.7%), whose nature of business depends on the weather. Academics (27.5%) and farmers (18.6%) are the second and third-highest respondents who participated in the survey.

Table 2: Respondents' profile

Demographic Profile	Frequency	Percentage
State		
Perlis	31	5.4
Kedah	33	5.7
Pulau Pinang	37	6.4
Perak	39	6.8
Selangor	46	8.0
Kelantan	73	12.7
Terengganu	66	11.5
Pahang	39	6.8
Negeri Sembilan	31	5.4
Melaka	33	5.7
Johor	30	5.2
Sabah	29	5.1
Sarawak	32	5.6
Wilayah Persekutuan	55	9.6
Occupation		
Academic	158	27.5

Administration	31	5.4
Informal Sector Workers	176	30.7
Farmer	107	18.6
Student	38	6.6
Others	64	11.1

4.1 Awareness of Climate Change

Table 3 shows the mean score for awareness of climate change. Most of the respondents are aware of 'Temperature in your area is getting hot', 'Weather in your urban or rural area is unpredictable', 'Rainy season is uncertain', and 'Heavy rains and floods affected your daily activities with each other, with a mean score above 4.00 (agree-very agree). While 'Not many rains in your area', 'Climate change reducing the source of income in this area', 'Climate change makes it difficult to get raw materials in this area', and 'The scorching heat affects your daily activities show that each has a mean score from 3.00 to 4.00 (neutral-agree). According to the results obtained, Malaysians have a high awareness of climate change, which has affected their daily activities.

Table 3: Mean score for awareness.

Awareness	Mean	Sample
The temperature in your area is getting hot	4.11	574
Weather in your urban/rural area is unpredictable	4.18	574
Not many rains in your area	3.13	574
The rainy season is uncertain	4.29	574
Climate change reducing the source of income in this area	3.86	574
Climate change makes it difficult to get raw materials in this area	3.73	574
Heavy rains and floods affected your daily activities	4.29	574
The scorching heat affects your daily activities	3.69	574

4.2 Adaptation Response to Climate Change

Table 4 shows the mean score of adaptation responses to climate change by the Malaysian government and related agencies. All items for adaptation response in terms of effort taken by related people have a mean score from 3.00 to 4.00 (neutral to agree). From the results obtained, respondents believe that Malaysian governments and related agencies play their roles in the event of a disaster caused by climate change, but they have not reached a more conclusive solution. It can be seen that the highest mean score is 3.76, which is 'Usually, the decisions made by this government agency are in line with the needs and interests of the communities'. Meanwhile, the lowest mean score is 3.53, which is 'There are many other job opportunities (related to the activities engaged in) offered by related agencies.

Table 4: Mean score for adaptation response.

Adaptation Response	Mean	Sample
Government agencies often disseminate weather information to residents in your area	3.61	574
Government agencies often advise residents regarding the adverse effects of climate change in this area	3.66	574
There are many other job opportunities (related to the activities engaged in) offered by related agencies	3.53	574
In the event of a natural disaster, aid will be distributed equally to the affected communities	3.72	574
Government agencies offer loans to affected residents to repair property damaged by bad weather	3.55	574
In this area, many associations can help the affected population to diversify their economic resources	3.68	574
Government agencies prepare to redevelop the affected communities	3.75	574
Usually, the decisions made by this government agency are in line with the needs and interests of the communities	3.76	574

5.0 Discussion

According to the findings of the study, the awareness aspect has a higher level of agreement when compared to the adaptation response aspect. The adaptation response aspect is seen to be at a moderate level based on the mean score of adaptation items. The awareness aspect is very dominant, as this aspect is a comprehensive and important finding in this study. It was a significant finding, as Malaysians are aware of climate change that occurs in the world generally and in Malaysia especially. The majority of the respondents are informal sector workers and farmers, who are most affected by climate change as they generate their income depending on the weather. Hawkers are unable to sell their products if heavy rain and flooding occur in their area, while farmers are unable to gain crops if a drought exists on their farm. However, the action and intervention of the Malaysian government and related agencies in response to climate change can ease their adaptation to it. Although most of the respondents believe that the Malaysian government and related agencies' adaptation response is in

line with the needs and interests of the communities, support and encouragement through climate change-related policies can help them sustain their current engagement and livelihood.

6.0 Conclusions

The fragility of the ecosystem in the region and people's overdependence on it for their livelihood make climate change without question the greatest threat to the environment and livelihoods in Malaysia. Therefore, raising people's understanding of climate change and related issues is crucial for enhancing their resilience, risk management, and climate change adaptation. This is crucial to provide a sufficient supply of ecosystem services, which serve as the foundation for residents' livelihoods and means of subsistence. In order to ensure that economic activities are carried out in a sustainable and environmentally friendly manner, whether the project is owned by the government or private developers, the government's short-term action plan should also include the enforcement of laws and policies relating to the environment and natural resources in economic activities.

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