

Assessment of Knowledge, Perception, and Attitude Towards Causes Related to Climate Change Among the Undergraduates of the Non-Science Students of Universiti Teknologi MARA, Perlis Branch

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ABSTRACT

The purpose of this study is to assess the respondents' knowledge and attitudes towards causes related to climate change and their behaviour towards climate change. An online questionnaire has been distributed to non-science students at the Universiti Teknologi MARA, Cawangan Perlis, Kampus Arau, Perlis. A total of 42 respondents have responded to the survey. The study assesses the participant's knowledge of climate change, attitude, and individual behaviour to cope with climate change. Most respondents offered positive responses to the questions about climate change knowledge and attitudes, as well as their perceptions of climate change. The study also acknowledges the awareness of climate change that has been raised among non-science students. Additionally, this is to support the appropriate climate change initiatives in conjunction with the proposed policies that promote sustainable development.

Keywords: *Attitudes, Climate Change, Knowledge, Non-Science Students, Undergraduates*

INTRODUCTION

Climate change is a potential challenge to poverty alleviation and could reverse decades of development efforts. Although climate change is universal, poor people and emerging countries feel more serious about its harmful effects (Kelley, 2001). The protection and restoration of critical habitats in their adaptation efforts will aid communities and preserve livelihoods that depend on the services of these ecosystems and will help to reduce greenhouse gas emissions, improve human health and well-being, and create green jobs by increasingly moving towards low-carbon societies. To date, the impacts of global warming on humanity and social-economic sectors, especially in developing countries, are still being studied by many researchers (Abounaga et al., 2019).

Global warming and climate change are associated with an increase in global average temperatures due to increased greenhouse gas emissions, even when the Covid-19 epidemic afflicts the entire world. (Forster et al., 2020). Natural disasters are such as forest fires, volcanic eruptions, the release of methane from the refreezing of permafrost on the ocean floor, the emission of methane gas from cattle, wetlands, and anthropogenic exhaust sources across all kinds of industrial combustion production of greenhouse gases, agricultural water logging activities such as paddy cultivation artificial wetlands, and deforestation. There are many measures of these shifts in the warming environment following the National Oceanic and Atmospheric Administration (NOAA).

Climate change problems may be addressed professionally by adjusting to change or reducing the likelihood of disasters. The United Nations Development Programme (UNDP) proposed a three-step approach for working on carbon finance, which consists of ending obstacles to climate-friendly technologies, creating successful host country procedures for the Clean Development Mechanism (CDM), and developing carbon facility projects through the Millennium Development Goal (MDG). If we were to prevent an unsustainable build-up of greenhouse gases (GHGs) and global warming at a potentially massive expense to the world's economy and society, we need to increase awareness. However, this breathing room declines every year of hesitation, thus, it demands more rigorous steps to make a significant difference. There is no reason to prolong climate change actions due to the emerging monetary crisis. Indeed, its macroeconomic implications will be tackled in a brief time, after which the progress will resume, while the impacts of inaction on global warming will continue to become far more expensive eventually. Several earlier studies have suggested that a person's understanding of climate change risk is intricately linked to mitigating actions and changes in adaptive behaviour (Berry et al., 2009).

The purpose of this study is to assess the perceptions among undergraduate students (Diploma and Degree) towards climate change, individual behaviour change, mitigation, and adaptation measures by the central government. To better present the current knowledge and perceptions of the students about climate change and response actions, this study recruited all undergraduate students (Diploma/Degree) of UiTM Arau, Perlis, with the background of non-science students to be the participants. This study will assist us in establishing mitigation and adaptation strategies to combat the adverse effects of climate change in the future. Furthermore, it will add to our understanding of the problem, particularly in the Malaysian context, and provide helpful information for health planners and decision-makers to adjust to climate change challenges.

METHODOLOGY

The targeted study population was the undergraduate students of non-science faculties in UiTM, Arau Campus, Perlis. The purpose of this study is to assess respondents' knowledge and attitude towards causes related to climate change and the perception of climate change, behavioural change, and mitigation measurements issued by the Malaysian government. To collect data from the respondents, a set of online questionnaires was given out and distributed using WhatsApp Messenger. A conventional method of distributing questionnaires to respondents was not possible due to the implementation of a Movement Control Order (MCO). This technique allowed for faster data retrieval and analysis while supplying ease to the respondents to answer the questionnaire according to their convenience. The development of questionnaires is guided by research conducted by Wei et al. (2014). The questionnaire consisted of three sections. In the first section, respondents were inquired about their details such as their gender, age, education details, race, household income, state (where the respondents are currently living), and town. The second section intended to ask the respondents about their awareness of policies imposed by the government to counter the adverse effects of climate change. The third section was about the respondents' perspectives on how important the guidelines are. The data collected was then analysed using Microsoft Excel and was presented using diagrams. The results were then inferred to derive conclusions from the data collected from the respondents.

RESULTS

Respondents' Demographic Characteristics

A total of 43 respondents aged 18-26 had completed the questionnaires. The respondents consisted of 25.58% male and 74.41% female. In terms of the level of education, most of the respondents, 81.40%, had a Diploma and 13.57% had a bachelor's degree. The targeted respondents were non-science students at the Universiti Teknologi MARA, Perlis Branch, Arau Campus.

Respondents' Perceptions Addressing Climate Change

Respondents were asked about their awareness of the occurrence of climate change. 86% of respondents answered "yes" and 14% answered "uncertain". Then respondents were asked if climate change had occurred in their region. Most respondents, 58%, answered "yes", only 7% answered "no", and 35% answered "uncertain". 100% of respondents showed they thought global climate change would lead to adverse outcomes. The respondents agreed that the internet is the most common source of such knowledge (77%), followed by radio or newspaper (9%), relatives or friends (7%), personal involvement in environmental protection activities (5%), and television (2%). Table 1 shows the response to climate change knowledge items.

Table 1: Response to climate change knowledge items

Climate change knowledge items	Per cent
Do you think global warming has already happened?	
Yes	86
Uncertain	14
In your local region, has climate change happened?	
Yes	58
No	7
Uncertain	35
What impacts do you think climate change will bring to us?	
Negative effect	100
Where do you usually get information about climate change from?	
Internet	77
Personal involvement in environment protection activities	5
Radio or newspaper	9
Relative or friends	7
Television	2

Impact of Climate Change on Respondents' Attitudes

The respondents were asked how concerned they were about climate change's consequences. Most respondents chose the "Strongly Agree" option based on the study compared to "Agree". The respondents believed that the increasing extraordinary weather and the causes of ecological crises were the significant impacts of climate change. The study notified that most of them agreed that climate change could cause a natural ecological crisis, triggering sea-level and low-lying areas to submerge and increasing the risk of infectious diseases. The respondents also agreed that climate change could have health effects on humans and agriculture production. Table 2 shows the attitude items on climate change effects.

Table 2: Response to climate change attitude items

Attitude items on climate change effects	Per cent
Does climate change bring effect towards the increasing extraordinary weather?	
Strongly agree	35
Agree	64
Do not know	3
Does the influence of climate change have effects on human health?	
Strongly agree	28
Agree	67
Do not know	5
Does climate change have effects on agricultural production?	
Strongly agree	36
Agree	50
Do not know	14
Does climate change cause a natural ecological crisis?	
Strongly agree	11.25
Agree	24.56
Do not know	8.19
Do climate change trigger sea-level rise and low-lying areas submerging?	
Strongly agree	40
Agree	53
Do not know	7
Does climate change bring a risk of infectious diseases?	
Strongly agree	30
Agree	63
Disagree	6
Does climate change bring effects towards the increasing extraordinary weather?	
Strongly agree	35
Agree	64
Do not know	3

Respondents' Knowledge and Attitudes Towards Causes Related to Climate Change

The respondents were asked about their knowledge and attitude towards the causes of climate change. They indicated many reasons such as population explosion (17%), severe air pollution (17%), destruction of forest and farmland (12%), the rapid development of industry (50%), motor vehicles increasing (2%), changes in the atmosphere (50%), and the greenhouse effect (17%). 54% of respondents believed that carbon dioxide (CO₂) has made the most significant contribution to the greenhouse effect (54%), followed by carbon monoxide (CO) (28%). In addition, 79% of the respondents believed human activities were the leading cause of climate change. In terms of mitigation, most respondents (79%) thought that both the developed and developing countries need to take responsibility fairly for climate change. Table 3 shows the response of respondents to the causes of climate change.

Table 3: The causes of climate change

Attitude items on climate change causes	Per cent
What are the causes of global warming?	
Changes in the atmosphere	50
Forest, farmland destroyed	12
Motor vehicles increasing	2
Population explosions, changes in the atmosphere, greenhouse effect, motor vehicle increasing	17
The rapid development of the industry	2
Severe pollution, forest, farmland destroyed, motor vehicles increasing	17
Which gases do you think are the causes of the greenhouse effect?	
Carbon Dioxide	54
Carbon Monoxide	28
Freon substances (CFCs)	8
Methane	5
Oxygen	5
Ozone	0
Do you believe human activities (such as excessive logging, harmful gas emission, usage of CFC-containing aerosol) are the leading causes of climate change?	
Yes	79
No	5
Uncertainty	16
Which one do you think (well-developed countries or developing countries) need to take greater responsibility for global climate change?	
Both responsibilities fairly	79
Differentiated responsibilities	3
The latter	2
Unable to explain clearly	16

DISCUSSION

This study showed that most of the respondents are aware of global warming that had already happened and they believed that climate change has been happening in their local region. Several studies have shown that the dual monsoon season, the Northeast monsoon and the Southeast monsoon, have changed in terms of size and intensity. Phenomena like extreme events have become more common based on the intense winds, heavy rains, high waves, and droughts (Bonati, 2021; Chen et al., 2018; Cianconi et al., 2020; Claborn, 2009; Raymond et al., 2020). Most of the respondents believed that climate change would bring an impact on humankind. They strongly agreed that it would have more negative effects than positive ones. Climate change will have a profound impact on the health, wealth, and well-being of all individuals. Malaysians, for instance, are considered vulnerable to the impacts of extreme weather events such as droughts and floods related to climate change. The rise in sea level can be expected in many low land areas around the globe (Kenney & Janetos, 2020; Marino, 2018; McMichael et al., 2020; Tebaldi et al., 2021). The impact of climate change can be serious to individuals as well as the whole nation. For example, in the agricultural sector, production from eroded or inundated lands will be halted (Haro et al., 2021; Moriniere, 2013).

Based on the results, most of the respondents usually received information about climate change via the internet. There are many platforms (other than television) that address climate change issues, such as the World Wildlife Fund (WWF). It is essential to address the climate crisis in many ways, for instance, by supporting governments to execute more ambitious climate strategies, encouraging the move to renewable energy, and realising a climate-resilient society (Susskind et al., 2020). Other than that, most respondents strongly agree that climate change will cause and trigger sea-level rise and low-lying areas to submerge. The increasing greenhouse gases in our atmosphere resulted in a positive forcing of the

climate system, that increases the surface temperatures and a rise in sea level due to the thermal expansion of the warmer seawater and the melting of glaciers and ice sheets. (Nicholls et al., 2011; Park et al., 2020; Warren, 2011). In other circumstances, even if the greenhouse effects concentration is stabilised, the climate's thermal inertia will continue to result in temperature increases, and the sea level will continue to rise. In other circumstances, even if the greenhouse effects concentration is stabilised, the climate's thermal inertia will continue to result in temperature increases, and the sea level will continue to rise (Cline, 1991; Seo, 2021; Zickfeld et al., 2017). In addition, most of the respondents agreed that the causes of climate change are due to the changes in the atmosphere. For the past 100 years, the results of forest clearing and the burning of coal and oil have affected and changed the chemical composition of the thin atmospheric layer (Brown et al., 2021; Kaufman et al., 1991; Liang et al., 2012). Changes in chemistry have already had far-reaching consequences for our planet's climate, ecosystems, human health, and economy (Raj & Singh, 2012). The chemical and physics of the earth's atmosphere determine our climate but it has accelerated during the past few years (Robb, 2019). Even though the atmosphere looks like a noticeably extensive reservoir that can absorb many limitless quantities of our industrial emissions, it is only a thin film (Stan, 2021). The physics and chemistry of the earth's atmosphere are fundamental to sustaining the living things on the planet (Coker, 2014).

Moreover, most of the respondents agreed that carbon dioxide gas is the primary cause of the greenhouse effect. Carbon dioxide is a natural part of the atmosphere and it is very biologically reactive (Bouzalakos & Mercedes, 2010). Carbon dioxide could be reduced into carbon biomass by photosynthetic uptake in plants and biological oxidation or respiration that converts it into carbon dioxide and returns it to the atmosphere (Dusenge et al., 2018). The primary natural carbon sources in the atmosphere are animal respiration, microbial breakdown of dead organic matter, and soil carbon (Aczel, 2019). All these natural cycles have kept the atmospheric concentration of carbon dioxide for several thousand years before the industrialisation era. For the past 100 years, humans have significantly increased the concentration of atmospheric carbon dioxide and the vast reservoirs that have been stored for millions of years as fossilised organic carbon in the crust of the earth have been used for fuel (Barnosky et al., 2011; DePaolo, 2015).

Many of the respondents believe that human activities are the leading causes of climate change in some cases. Humans are affecting the earth's climate and temperature by doing activities such as burning fossil fuels, deforestation, and intensifying husbandry activities (Koneswaran & Nierenberg, 2008). One of these is by cutting down forests (deforestation). Generally, the trees help to regulate the climate by absorbing carbon dioxide from the atmosphere (Nelson, 2018). So, when humans deforested these natural filters, the beneficial effect is lost, and the carbon stored in the trees is released into the atmosphere, which adds to the greenhouse effect. Another example that can be easily seen is the increase in livestock farming. Animals like cows and sheep produce substantial amounts of methane when they digest their food (Black et al., 2021). The gas, however, is released in smaller quantities and is being phased down by the European Union (EU) regulation. Other than that, fluorinated gases are also being removed and have a more potent warming effect than carbon dioxide (Jones, 2017). Furthermore, many respondents agreed that both well-developed and developing countries should take greater responsibility for climate change. European researchers stated that both the developed and the developing worlds may almost be equally responsible for contributing to climate change. The contributions to climate change are most likely determined by their emissions for the last four decades. However, since then, the relative contributions to global warming have been changing fast, mainly because of the rapid rate of industrial emergence (Oyilieze Akanwa & Joe-Ikechebelu, 2020). The real question is that can we avoid climate change? Many of the respondents agreed it is possible. One of the things that we can do is use renewable energy. Clean and renewable energy has been dramatically studied in many countries. Examples of renewable energy are solar, wind, geothermal, and biomass (Owusu & Asumadu-Sarkodie, 2016). Another way to avoid climate change is by using sustainable transportation. Out transport methods must be aligned with the environmental requirements and reduce their carbon footprint (Susskind et al., 2020). The eco-friendly vehicle should be encouraged to reduce

air pollution problems. Reduction in the consumption of fossil fuels, limiting industry emissions, and waste accumulation also helps to improve the atmosphere (Perera, 2017).

Other than that, the simplest way to do it is by doing recycling. The need for recycling must also be recognised in our consumption habits. Most respondents stated that environmental factors should be considered before purchasing any items. Over the last decade, consumers' consumption of goods and services has increased tremendously across the world, and it has resulted in the depletion of natural resources and severe damage to the environment (Joshi & Rahman, 2015). One of the significant repercussions of environmental damage is global warming. From the questionnaire, most of the respondents said yes, they would like to join the current efforts to mitigate climate change, but in other cases, many of them are not very willing to sacrifice their benefits to solve the existing problem. Environmentally, responsible purchasing is significant as unplanned purchasing of goods can severely damage the ecosystem. The consumer owns the capability to bring down the percentage of environmental damage by buying green products (Dilotsotlhe, 2021).

CONCLUSION

To summarise, most respondents are aware of climate change and recent global trends such as global warming. The majority of people come from diverse backgrounds, educational levels, ages, gender, races, and academic disciplines. According to the data, practically, everyone agrees that global warming and climate change have already occurred. Apart from that, the majority of respondents preferred to learn about climate change via the internet. Additionally, many respondents agreed that climate change could increase uncommon weather events such as storms, floods, droughts, and hurricanes. Finally, most respondents agree that climate change can be avoided, which is the highest choice. The findings of this study will enable researchers and policymakers to understand better the knowledge and attitudes of undergraduates, particularly non-science students at the university level, to develop a sustainable approach to climate change and the United Nations Sustainable Development Goals.

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