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Awareness of Climate Change and Environmental Issues among Farmers in Kelantan, Malaysia

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Abstract: Climate change is one of the world's most today's critical issues. Change is primarily the result of human activities and natural processes. This happens because some people do not understand the concept of climate change, which is the primary factor contributing to this phenomenon. As an outcome, this study was carried out to identify the profile and awareness of farmers regarding climate change and examine the efforts and roles played by agencies in the event of a disaster caused by climate change. Purposive sampling and snowball methods were used to select 80 respondents to fill out the survey form. According to the results of a study, men outnumber women (73.8%) among farmers in the state of Kelantan (26.3%). Farmers' awareness is also high, as shown by the mean value for each item is nearest to 5.0. A high degree of awareness regarding climate change will cause farmers to appreciate, preserve, and conserve natural resources that are extremely valuable in their lives, particularly in terms of well-being.

Keywords: Awareness; Climate Change; Environment; Farmers.

1.0 Introduction

Climate change is one of the main issues in the world today. Human activities and natural processes mainly cause climate change occurring today. Adaptation and mitigation are two approaches used to deal with the problem of climate change. Climate change is a natural phenomenon that is greatly influenced by anthropogenic activities. The anthropogenic activities that significantly affect climate change are fuel burning and land use change. This is because these two activities are the main contributing factors to the increase of greenhouse gases in the atmosphere (Nicholls et al., 1999; Crowley, 2000; IPCC, 2007; Cazenave & Le Cozannet, 2013; Intergovernmental Panel on Climate Change, IPCC, 2013). This causes the average global surface temperature to increase from year to year. The global surface temperature increase was recorded at a rate of 0.2°C per decade from 1990 to 2005 (IPCC, 2007). The increase in global surface temperature is expected to reach 1.5°C by the end of the 21st century, while heat waves are expected to occur more frequently over a more extended period (Intergovernmental Panel on Climate Change, IPCC, 2013). According to Ratnaningayu (2009), climate change is also affected by unstable weather conditions such as erratic rainfall, storms, extreme air temperatures, sudden changes in wind direction, etc. Climate change in Malaysia harms agricultural production and affects farmers' income. Global climate change affects four climate elements and natural components closely related to agricultural activities, i.e. the rise in air temperature impacts other climate elements such as humidity, change in rain patterns, increasing extreme climate events or climate anomalies such as El Nino and La-Nina.

Two main factors contribute to climate change: natural changes in the Milankovitch cycle, oceans and atmosphere and human activities that contribute to the increase of greenhouse gases and their extinction. According to The United Nations (2009), human activity has been the dominant factor in climate change since the middle of the 20th century. Society today needs to understand what is meant by climate change. This is because some in the community realise that climate change is weather change. The weather naturally changes from day to day, even hourly. Meanwhile, climate change is a weather pattern referred to as climate that changes suddenly and leaves long-term effects. The effects of climate change include rising sea levels, global warming and the frequency of extreme weather phenomena such as floods and droughts. Various adaptation and mitigation measures are carried out to overcome this climate change. However, to what extent is the level of awareness of the community in a country itself about climate change? Based on data from the British Broadcasting Corp (BBC) World Service Poll (2007), the level of understanding of climate change in developed countries is 87% per cent. Therefore, people living in developed countries have heard or read about climate change. On the other hand, only 57% of people are in developing countries. In the Asian region, Korea recorded the highest level of awareness at 94% compared to less developed countries such as India (48%) and Indonesia (28%). China shows a relatively high public understanding of climate change at 72%. Regarding concern, Bangladesh is one of the poorest countries in Asia, offering a high percentage of matter of 85% compared to Japan and South Korea (So, 2011). Therefore, every country should take the public's awareness of climate change seriously, especially Malaysia.

Farmers should be aware of climate change occurring in this country and its effect on the quantity of crop production. This is important so that they can adapt and find solutions to overcome the negative impact of uncertain climate change on their agricultural activities. To overcome the adverse effects of climate change, the Malaysian government has enacted a policy on climate change as an adaptation and mitigation measure to reduce the impact of climate change. However, public awareness throughout the country must exist in line with the goals set by the government in implementing the government's policy. This situation has raised a question: the level of awareness of the Malaysian community about climate change, especially the farmers. This is said to be so because the farmers are the most affected group if climate change often occurs, such as droughts and floods. This is because it can affect their production and income. To determine the level of public awareness in Malaysia about climate change, especially among farmers, the researcher has conducted a field study on the understanding of climate change and environmental issues among farmers in Kelantan. The level of knowledge of farmers in the state of Kelantan about climate change is the focus of the researcher because the state of Kelantan is a state that carries out agricultural activities and is exposed to sudden climate changes such as monsoons, rain, drought and so on. This is also due to the farm sector contributing as much as 22.8% to the entire GDP of the state of Kelantan in 2019 (Kelantan State Socioeconomic Report, 2019). Climate change has an impact on farmers and the contribution of the agricultural sector. Therefore, this study must be conducted to assess the level of awareness of farmers in the state of Kelantan about climate change.

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2.0 Study Area

This study was conducted in Kelantan (Figure 1 below) because the shape of Kelantan is one of the states exposed to northeast monsoon winds. In addition, the influence of weather, such as rain and drought, significantly affects economic activities in the state, especially agriculture. In terms of geographical location, Kelantan is located on the east coast of Peninsular Malaysia between latitudes 40º 32" and 60º15" in the North and the projected lines of longitude 101º 19" and 102º 37" in the East. To the North, there is the China Sea South with 60 miles of coastline.

Figure 1: Map of Kelantan, Malaysia

3.0 Materials and Methodology

The questionnaire method was employed by the researcher in this study. The method of questioning The survey is categorised into two distinct methods: face-to-face and online. The utilisation of two research methods, namely online administration of a questionnaire through Google Forms, was necessitated by the prevalence of Covid-19 cases. The second approach involves the researcher administering face-to-face questionnaires to respondents in specific study locations within the Kelantan region. The questionnaire is structured systematically, presenting a series of questions for respondents to answer. The utilisation of a questionnaire is a crucial instrument for a researcher in the execution of a study, as the efficacy of the questionnaire will ultimately determine the significance and worth of the research (Thuaibah, 2007). The questionnaire consists of three sections: Part A, which focuses on gathering respondent information; Part B, which aims to assess awareness of climate change; and Part C, which examines the efforts and role of responsible entities in supporting farmers. The Likert scale is utilised to assess levels of awareness, effort, and role. The formula employed by the researcher for determining the sample size in this study is as follows:

Determination of Sample Size (Source: http://www.raosoft.com/samplesize)

$n=N/ [1+N (e2)]$

Where n = required sample size
N = total amount (sample frame)
e = confidence level (error limit)

In addition, the interview method was also used in the data collection of this study. From the study sample, the researcher randomly selected some respondents to be interviewed. This method was used to get precise information from the respondents, which was not obtained from the questionnaire. This method can explain a matter more clearly and in detail, and the researcher can also see the reaction of the respondents when they give answers. This two-way interaction is significant to ensure that the answers given by the respondents are true and accurate, as desired by the researcher.

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Data analysis was conducted using descriptive methods to organise, summarise and present data in the form of information. Statistical Package for The Social Science SPSS presents the data in tables and graphs to show the frequency and percentage of each title and required data. According to Thuaibah (2017), data analysis is undoubtedly one of the critical stages of research methodology because it will reflect a study's and research results. This is because data analysis aims to explain the relationship between variables and is the only technical method that can produce a conclusion for a study (Bakri, 2013).

4.0 Results

Table 1 below shows the frequency distribution of respondents according to gender. A total of 80 respondents were involved in this study who are farmers in the state of Kelantan. Out of that number, 59 male respondents were involved in this study, with a percentage as much as 73.8% and a total of 21 female respondents, equal to 26.3%. Several men outnumber female respondents because many men work as farmers to earn a living and are also the head of the family responsible for making a living. In addition, of the 80 respondents involved in this study, 13 had a Bachelor's Degree, with a percentage of 16%. In addition, 15 PMR respondents with a percentage of 19%, 24 SPM respondents equal to 30%, 18 STPM/Diploma respondents with a percentage of 22% and 10 UPSR respondents equal to 13%. The number of respondents with the highest level of SPM education is because most of those who did not get good results in the SPM exam chose a career as modern farmer by participating in agricultural programs organised by the government. As for the monthly income, a total of 44 respondents have an income of less than RM1,150 with a percentage of as much as 55% and a total of 32 respondents have a monthly income of RM1,150 - RM2,208 to 40%. While for respondents with a monthly income of RM2,209 -RM2,500, there are four people with a percentage of 5%. Most farmers have a monthly income of less than RM1,150 due to the uncertain and large output influenced by capital factors, equipment, quantity and marketing of agricultural products.

Table 1: Demography Profile Respondents

Demography Profile	Frequency (people)	%
Gender		
Male	59	73.8
Female	21	26.3
Level of Education		
Higher Education	31	38.8
Secondary School	39	48.8
Primary School	10	12.4
Monthly Income		
>RM 1, 150	44	55.0
RM 1, 151 - RM 2, 208	32	40.0
RM 2, 209 - RM 2, 500	4	5.0

From the perspective of population awareness [refer to Table 2 below], it can be concluded that farmers in the state of Kelantan are aware of the uncertain climate change from the aspect of the temperature in the area getting hotter, the weather in the town/village cannot be predicted, the rainy season is uncertain, climate change reduces the source of income in this area, heavy rains and floods affect daily activities with each other have a mean value above 4.0. In addition, the awareness aspect for not much rain in this area, climate change causes the difficulty of obtaining raw materials in this area and the scorching heat affect daily activities showing that each has a mean value of 3.0 and above and no more than 4.0. From the data obtained, farmers in the state of Kelantan have an awareness of uncertain climate change.

Table 2: Aspects of Awareness (Farmers Against Climate Change That Do not Determine)

No	Awareness Aspect	Min
1	The temperature in your area is getting warmer.	4.09
2	The weather in your town/village is unpredictable.	4.14
3	There is not much rain in this area.	3.20
4	The rainy season is erratic.	4.24
5	Climate change reduces income sources in this area.	4.10
6	Climate change makes it difficult to get raw materials in this area.	3.95
7	Heavy rains and floods affect your daily activities.	4.44
8	The scorching heat affects your daily activities.	3.76

From the perspective of efforts and roles by agencies in solving problems or even disasters that occur as a result of climate change [Table 3 below], all question items for structural aspects in terms of effort and role performed by the agency in the event of a disaster due to climate change each has a mean value of 3.0 and above and not exceeding 4.0. From the data obtained, it can be concluded that agencies play efforts and roles in the event of a disaster caused by climate change, but they have not reached a more efficient and systematic level. It can be seen that the highest mean value is 3.90. The question item with the highest mean value of 3.90 is that government agencies are preparing to redevelop the affected communities. Meanwhile, the question item with the lowest mean value, with a mean value of 3.45, is that government agencies often disseminate weather information to residents in the area.

Table 3: Efforts and Roles Performed by Agencies in the Event of a Disaster Due to Climate Change

No	Efforts and Roles Aspect	Min
1	Government agencies often disseminate weather information to residents in your area	3.45
2	Government agencies often advise residents about the adverse effects of climate change. This area	3.60
3	Related agencies offer many other job opportunities (related to the activity engaged in).	3.56
4	Related agencies offer many other job opportunities (unrelated to the activity engaged in).	3.55
5	In the event of a natural disaster, aid will be distributed equally to the population which is affected.	3.81
6	Government agencies offer loans to affected residents to repair property damaged by bad weather	3.71
7	Many associations can help the affected population diversify their economic resources in this area.	3.63
8	Government agencies are preparing to redevelop the community which is affected.	3.90
9	The decision made by this government agency is in line with the requirements and the interests of the population.	3.79

5.0 Discussion

Farmers' awareness of climate change occurring in the area is essential for them to organise or even plan their activities in continuing their daily lives, especially in generating income for their families. Through this awareness, it allows farmers to adapt to the changing environment to get more profitable results, like the study done by Noorazuan and Zaini (2019): Nabilah and Tuan Mastura (2020) have said that having a high awareness of climate change that is happening allows the fishing community to plan and predict and adapt to the current scenario in doing fishing activities. The same goes for farmers, who will plant crops that are compatible with climate change. In this regard, knowing can create anxiety in individuals and subsequently create an attitude of willingness to change their behaviour towards climate change (Shi et al., 2015). Lifestyle changes are significant for all individuals. Individuals need to have interdependent awareness and behaviour and a clear understanding of climate change based on general trends, time and broader scale. Habits and social norms are the main drivers of actual individual behaviour (Ajzen, 2008; Francique, 2007; The United Nations, 2009; Stevenson, 2014). Nevertheless, awareness and knowledge are essential to change a person's thinking. Farmers in the state of Kelantan manage their lives and agricultural activities to get many results, thus generating family income.

In addition, according to Radin Firdaus et al. (2018), in some countries, climate change is expected to have a positive and negative impact on production results in the agricultural sector. Based on Gawda et al. (2018) climate change has the potential to either enhance or deteriorate the agricultural conditions in various regions. For instance, alterations in temperature, precipitation patterns, and the duration of frost-free periods are resulting in extended periods suitable for cultivation in nearly all states. However, many studies show the effects of climate change on agricultural production in developing countries in tropical climates such as Malaysia, Thailand, Indonesia and so on. Probably, climate change will significantly contribute to the issue of food insecurity in the coming years, primarily through the escalation of food prices and the decline in food production. The cost of food may potentially rise in tandem with the escalation of energy prices resulting from climate change mitigation endeavours. The availability of water for food production may potentially diminish as a result of heightened agricultural water consumption and the occurrence of drought conditions. The competition for land resources may intensify as specific regions experience a decline in climatic suitability for agricultural production. Furthermore, it is worth noting that climate change can give rise to severe weather phenomena, which in turn can result in abrupt declines in agricultural output, ultimately leading to swift escalations in prices. The occurrence of heat waves during the summer of 2010 resulted in reduced yields in significant agricultural regions such as Russia, Ukraine, and Kazakhstan. Additionally, these heat waves played a role in the substantial escalation of staple food prices. The escalating prices compelled an increasing proportion of the local population to experience poverty, thereby serving as a poignant illustration of how the impact of climate change can contribute to the issue of food insecurity Ziska et al. (2016). Therefore, the role and intervention of responsible agencies can open opportunities for farmers and agriculture to adapt to the changes. Although most of the adaptation measures are directed at farmers' response at the farm level, support and encouragement through agriculture-related policies can accelerate and expand the acceptance of any highlighted action plan. Among them is research in agriculture to create synergy in farmers' responses, especially in countries with low levels of rural farmers' education.

6.0 Conclusions

In conclusion, farmers in the state of Kelantan are aware of climate change happening in their area and daily activities. This is proven through the data showing that farmers in Kelantan are aware of climate change. However, in terms of efforts and the role played by government agencies should this happen, natural disasters caused by climate change show a moderate level of awareness. This matter may be due to the lack of involvement of farmers. Therefore, the government should assist farmers in the state of Kelantan in terms of adaptation measures or innovations that they can make from their awareness of climate change. In addition, the government must also increase cooperation and assistance in advice, financial assistance, skills, and knowledge to farmers in Kelantan. The researcher proposes that future investigations should focus on examining the adaptive strategies employed by farmers in response to climate change. This phenomenon occurs due to the modifications implemented, which can enhance the resilience of farmers in response to climate change.

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Conflicts of Interest: The authors declare no conflict of interest.

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