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# Public knowledge of climate change: Malaysia's perspective

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## Abstract

Increasing public awareness and educating the public about climate change is necessary in lieu of its effects on the health, wealth and well-being of all individuals concerned. Climate change is happening, extreme events related to it are on the rise globally and Malaysia is no exception. Recent events of the tsunami in 2004, extraordinarily large floods of 2006 and 2014 are evidences of this. Similarly longer hot spells resulting in droughts and water shortage substantiate the results of studies done both locally and globally. Therefore there is a need for the general public to be aware of and to understand climate change. The public has a critical role to play in responding to climate change. The dissemination of knowledge and awareness to the general public is now the concern being raised by many, especially those directly involved in scientific studies of climate change. This paper discusses studies and initiatives done in various parts of the world and some concerns raised on the matter. A proposed initiative for Malaysia will also be discussed. Climate change is intertwined with human behaviour, how we handle the world, how we sustain our natural resources will have an impact on our future climate. It is imperative that people are made aware of these issues and they play a bigger role in handling these issues as a means of increasing its saliency.

*Keywords:* Climate change; awareness; behavioral change; knowledge

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## 1. Introduction

Knowledge of climate change is a rising matter invoking interest from many quarters. Several categories of climate change are knowledge about how the climate system works; specific knowledge about the causes, consequences and possible solutions and practical knowledge for individual and collective actions. However public knowledge of global climate change and its associated environmental issues have received little attention globally. Changing deep rooted habits and behaviours which are detrimental to the health of our planet requires significant understanding of climate change and its impact. This understanding, derived from knowledge of climate change, will lead to conviction which will bring positive behavioural change in the general public.

Malaysia is a tropical country located 1°N and 6°N in the northern latitude and between 100°E to 103°E longitude. Its close proximity to the equator and surrounded by water bodies on most parts of the country, lends it a highly variable and hot climate throughout the year with pronounced monsoonal seasons. The average annual rainfall is around 2500mm and average temperature is 27° C. Multi-racial in citizen's composition, its economic activities range from agricultural and fishing activities up to highly technical industrial employment. Even though the industry and services sector dominate the country's economy, about a third of the population depend on the agriculture sector for their source of livelihood and this make up about 3.6% of the nation's GNP. In 2010,

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agriculture, forestry and fishing accounted for 13.3% of total employment of 11.1 million. The fisheries sector of Malaysia plays an important role by generating income and employment with foreign exchange. In 2010 it contributed 18% of the nation's GNP (Jab. Perangkaan Negara, 2014).

Climate change is an international threat that has no geographical boundaries and Malaysia is no exception to the phenomenon. Numerous scientific studies has been done to understand, analyze and predict changes in climatic conditions of Malaysia such as work by Tanggang et.al (2006), Zin et.al (2010), Syafrina et.al (2014) and Zalina et.al (2014). A number of studies have shown that the dual monsoon season, namely the North-east monsoon and the South-west monsoon has changed in its intensity and magnitude. Incidence of extreme events is becoming more common resulting in strong winds, heavy rains, high waves and not forgetting droughts as well. The tsunami of 2004, the big floods of 2006 and most recently of 2014 are among the most devastating events to hit Malaysia. The economic loss runs in the billions. Losses of lives, property and for some loss of source of income are realities that need to be dealt with. The estimated damage assessment for floods uses a conservative figure of RM 100 million per year.

Outcome of studies on climate change done in Malaysia is representative to a certain extent of other tropical countries, bearing in mind that climate is a very highly variable phenomenon. The knowledge derived out of the various research done could be disseminated and shared with communities of similar climate conditions. Public awareness approach, knowledge sharing activities with the public, as well as mitigation efforts the general public could participate in are all common things Malaysia and other countries could share. To date limited work on public awareness of climate change has been done globally. It is thus important that countries sharing similar climate conditions and also similar demographic make-up to consolidate and share their findings. As we know, climate change is happening and the effect from it could be devastating, so it is timely that we put our efforts together and share our concern.

## **2. The need to understand climate change**

Climate change will have far-reaching effects on the health, wealth and well-being of all individuals concerned. A large proportion of Malaysian population is vulnerable to the effects of extreme weather events such as droughts and floods that are associated with climate change. It was also reported that there had been a 1.3mm rise in sea level per year from 1986 to 2006 measured at Tanjung Piai, Johor. As discussed earlier, the impact of such events can be devastating to individuals and the nation as a whole. Without adequate measures, occurrence of floods and increase in sea level could cause displacement of people and damage infrastructures. Climate change threatens to make existing problems of poverty, disease, and inadequate housing worse. The aftermath of flooding bring forth diseases such as cholera, skin diseases, diarrhea, leptospirosis and so on. These outbreaks are associated with the contamination of drinking-water facilities, improper sanitation and lack of adequate sewage treatment.

Besides that, agricultural production from eroded or inundated lands will be halted. In Peninsular Malaysia alone, 29,000 square km of land area has been identified as flood prone, affecting approximately 4.82 million people (Norsam, 2014). Threat from drought is another factor bringing extensive impact to environment and social activities. The 1997/98 El Nino related drought was among the most impactful in Malaysia putting large parts of the nation under threat of wild forest and peat fire due to prolong dry weather condition. The country experienced months of hazy atmosphere that impeded the health of every citizen. Again, there is economic deficit as yields from crops and livestock suffers a decrease.

It was estimated that for every 1<sup>o</sup>C temperature rise there will be a 10% reduction in rice yields. Oil palm plantation may also be negatively affected by either a rise in temperature causing drought or increased rainfall that leads to flooding (Ramadasan et al., 2001). According to Low and Ahmad Jamaluddin, (2001), the increase in flood intensity and frequency would incur additional costs on water resources management due to the needs to

adjust future flood mitigation plans as well as the existing flood mitigation schemes and drainage systems. Similarly rise in sea level will lead to tidal inundation, shoreline erosion, increased wave action and saline intrusion, causing submergence of corals, loss of fisheries resources, plantation lands, and mangrove forests, and possible relocation of coastal infrastructure (Lee and Teh, 2001).

Globally, the scientific community practically reach a consensus that there exists a causal relationship between human activities and climate change (Lorenzoni and Pidgeon, 2006). Greenhouse gases (GHG) emitted by the use of fossil fuel, land-use changes associated with extensive farming, logging and land clearing for development purposes all contribute towards warming of the earth atmosphere. As more water retention land is turned into impervious surfaces, rainfall runoff will increase in volume, swelling up rivers creating the floods. The Intergovernmental Panel on Climate Change (IPCC) admitted that developing countries are more vulnerable to climate change compared to developed countries. The rapid industrialization in most developing countries saw a higher consumption of energy that relied heavily on fossil fuel. While most developed countries saw their carbon dioxide emission decrease between 2006-2010, developing countries saw an increase over the same period of time (Masud et.al, 2013). However the research of PEW Global (2006) indicated that developing countries have a lower level of awareness of climate change issues compared to developed countries. A study conducted by WWF Malaysia and Partners in 2007 reported that only 45% of adults and students are aware of the causes of environmental problems. Similarly a study by Meerah et.al (2010) found that school students' knowledge of environmental related issues is still very low.

In view of all the climate change related disasters discussed above, it is imperative that steps be taken to alleviate and further prevent the problem from escalating. Responding to climate change means changing our behaviour and the way we think about natural resources. There is need to change the mindset of the public, to instill a sense of responsibility towards conserving the earth to prevent it from further deterioration which will link to changes in the world's climate. Recycling, reducing household energy consumption, keeping and increasing the greenery are all efforts that should be inculcated to the general public. Using public transport instead of personal transport will cut down carbon emissions by about one quarter and for the year 2014 Malaysia emit more than 234 thousand metric ton of carbon dioxide.

### **3. Review of global studies on climate change awareness**

Worldwide, decision-makers are confronted with challenges in adapting to a changing climate (Moss et al., 2013). Lessening the susceptibility and applying the needed measures to reduce climate change impact are not necessarily the task and responsibility of governments. The gravity of climate change calls for public participation to work together with decision makers in reducing the vulnerability and how best to adapt to the impacts. Public must be aware and be informed about climate change consequences and the actions they could adopt in order to adjust to climate change. Awareness raising, therefore plays a crucial role in the adaptation process to manage the impacts of climate change, heighten the adaptive capacity, and decrease the overall vulnerability. In addition, political awareness is also as important because policy makers and politicians are key players in the policy process of adaptation.

In order to achieve the desired outcome in educating the public, awareness raising crusade should have the appropriate strategies in disseminating information. Although awareness campaigns could be different from one another, the essence of the campaigns is basically similar. Most would focus on increasing concern, informing the targeted audience, creating a positive image, and attempts to change their behaviour.

Pugliese and Ray (2009) reported outcomes of a Gallup conducted between 2007 and 2008, to survey global opinions about climate change of which two questions were posted to respondents in 128 countries: 1) *How much do you know about global warming or climate change?* and 2) *How serious of a threat is global warming to you and your family?* Results of the survey differ by region with the highest awareness in Europe and tapers down to

lowest among adults in sub-Saharan Africa. What is rather interesting is adults in Asia are the least likely of all to say climate change is a serious threat; less than a third, 32%, perceive it as a threat.

Communicating to the public a scientific knowledge is a challenge. Bringing it down to the level that the general public can appreciate to understand minus the skepticism of it being unnecessary fear creation is an approach that requires some strategic thinking. What people might want (or need) to know about climate science, and the chance of them acting on climate change will be determined by their conviction on the matter. In a recent paper in the journal *Nature Climate Change*, Nick Pidgeon and Baruch Fischhoff suggested that instead of assuming what people should know about climate science, a better way of beginning the process of climate change communication is to find out what they *want* to know (Pidgeon & Fischhoff, 2011). However, prior to that an assessment of their awareness level should be conducted to minimize a gap in the communication. A recent study by Anthony Leiserowitz at Yale University showed that although 92% of Americans know about the issue, it remains a low priority relative to other issues and lacks urgency. Harriet (2000) in a study on Australian public understanding of climate change concludes that ignorance about climate change is preventing appropriate public action. He states that in order to create public support for individual behavioral change more information concerning the correct understanding of the problem must be given to the public. Climate change is an indicator of the nature of environmental problem with the relation between society and nature, experts and the public and local and global communities. There is a need therefore to move from a narrow conception of public knowledge towards recognition of the complex and contradictory nature of understanding of global environmental issues.

There have been many efforts by the international community in promoting public awareness as well as finding ways to reduce the impact of climate change. For example, the general mass-media are regarded one of the tools which is frequently employed in an effort to influence public opinion of some particular issues. In particular, media is essential in educating and informing the public on effects of the deteriorating environment and related human impact. Many public opinion surveys in developed countries revealed that television and daily newspapers are used as primary sources of information (Project for Excellence in Journalism, 2006). In Japan, Aoyagi-Usui (2008) reported that most of the Japanese public derive information regarding environmental issue from televisions and daily newspaper. Sampei and Aagoyagi-Usui (2009) conducted a study on Japanese newspaper coverage of global warming from January 1998 to July 2007 and how public opinion during parts of that period were influenced by newspaper coverage. It was found that an extraordinary increase in newspaper coverage of global warming from January 2007 correlated with an increase in public concern for the issue. In the 6th Asia-Europe Journalists' Seminar in 2011, it was discussed how the media can be more effective role in increasing public awareness to address the problem of climate change and the need to speed up the global response to this challenge.

#### **4. What we intend to do in Malaysia.**

As discussed earlier, Malaysia has been experiencing more and more severe weather in the last two decades. Coastal communities are among those badly hit by changes in sea level as well as floods. A study to examine the awareness and adaptation to climate change impact is proposed to be conducted on the coastal communities of Peninsular Malaysia. This will be a case study on two badly hit coastal communities located on the east coast of Peninsular Malaysia. The specific objectives of this study are to identify the socio-economic characteristics of the respondents and examine the level of awareness about climate change among respondents in the study area.

##### *4.1 Research instrument and data collection*

A preliminary visit to the coastal areas was done to identify two communities for the case study. A questionnaire will be developed and variables of interest will be demography of the respondents, their socio-economic activity, the effect of climate change on their lives which involve displacement and changes in socio-

economic activities and their awareness of climate change issues. Data will be collected via face to face interviews on focus groups. The respondents will be a mixture of both young and older folks. This study will employ both quantitative and qualitative approaches. The aim of the study is to assess the impact of climate change on economic activities of coastal communities as well as the awareness of coastal communities on the impacts of climate change. Three focus groups will be identified for each location: (i) fishing community, (ii) local businesses, and (iii) residents. Each focus group will comprise of about ten participants. An analysis of the source of climate change awareness will be done to reveal their awareness of the phenomenon.

#### *4.2 Expected result*

The relationships between some selected socio-economic variables and the use of climate change adaptation measures is expected to reveal that educational qualification influence the use of adaptation measures among the respondents. Education plays an important role in creating awareness because educated people are better equipped to source information. The adaptation mechanisms to climate change being used by the respondents will be analyzed. A closer study at the adaptation mechanisms will be done to determine the factors that influence adaptation to climate change by the respondents. The study will also identify the constraints to adaptation to climate change by the coastal communities in the study area. It is expected that respondents or the authority have adopted certain measures against climate change. These adaptation measures will be studied and factors influencing specific measures will be determined. Adaptation in terms of the number of strategies may be used by respondents. These adaptation measures may correlate with the level of education of the respondents.

Age may also be significant in influencing the use of adaptation measures among the respondents. This is because younger respondents may have greater tendencies to improvise and adopt new technologies because they are relatively more knowledgeable, more open to risk taking, and have longer planning horizons than their older counterparts. Household size may also be significant in influencing the use of adaptation measure among the respondents. Household size could be a measure of available labour for economic activities. In the undertaken adaptation measures, there may exist constraints to adaptation to climate change. Some form of hindrance to adaptation to climate change may surface in the study such as poor financial resource base or unavailability of weather information and poor access to technology to access information and services. Finally, the result of this study would help us in creating public awareness of climate change impact and also determining the best adaptation measures to climate change to be adopted for coastal communities in Peninsular Malaysia. Further study can later be extended to East Malaysia coastal communities too.

## **5. Conclusion**

Undoubtedly knowledge of climate change and its impact on the environment and people's lives should be ingrained in every individual. The mass public should be informed on the impact of climate change, and demonstrate ways in which its negative impacts can be mitigated. Efforts on sustaining a liveable earth for the current and future generation must be a priority in any community. In order to create behavioural change in the public, appropriate information on the scientific aspects of climate change need to be conveyed to the public. As discussed earlier, efforts have been undertaken in a number of developed countries on public awareness of climate change effect, and the results does vary with regions and communities. Ignorance of climate change will be a hindrance to efforts made by policy makers, scientists, environmentalists and others, hence continuous efforts must be carried out as a mitigation measure.

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