

## **Adaptation towards climate change: The case of Malaysian youth fishermen**

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There are evidences that Malaysia has been affected by the phenomenon of climate change. Among the most obvious symptoms are the rise in temperature (Kwan et al., 2011), unstable rain patterns (Wan Azli, 2010), the rise of sea level (Awang and Abdul Hamid, 2013), extreme waves and strong winds (Razali et al., 2010), and an unpredictable nature of northeast monsoon (Suhaila et al., 2010). Understandably, these symptoms result in several disastrous impacts to the nature. Finding from studies by the Food and Agriculture Organization of the United Nation (FOA) (2007) and Mohd Ekhwan (2006) showed that 29.1% of coastal and 0.8 mangrove areas were eroded, while Ottersen et al. (2009) in their studies has further looked into the link between rising temperature and fish fertility. Riegl and Purkis (2009) on the other hand had concluded that extreme waves and strong winds have negative impacts on coral reefs. Despite the effects of climate change on nature, a number of local studies have looked at its impact to the community; among those who rely heavily on weather stability are youth fishermen. Shaffril et al. (2013) for example, had confirmed that an unstable climate shift had been reducing the fishing operation days of fishermen, which lessens their productivity and increases the risks associated with their fishing routine, meanwhile Allison and Ellis (2001) said that the impacts of climate change can severely damage fishermen's productive assets (e.g. vessel, fishing tools, boat engine) and demolish their non-productive assets (e.g. jetty, community hall). As these impacts are considered as disastrous, adaptation towards it is seen as the best efforts to overcome the problem (Badjeck et al., 2009; Shaffril et al., 2013).

Prior to planning a suitable adaptation strategy, it is necessary to produce a comprehensive understanding on youth fishermen community's adaptation abilities and this can be done by conducting more studies on the issue. Despite the mounting need, much of the existing local studies on climate change (Kwan et al., 2011, Wan Azli, 2010, Awang and Abdul Hamid, 2013, Razali et al., 2010, Suhaila et al., 2010, Mohd Ekhwan, 2006) focuses more on producing scientific knowledge, which result in a gap for social based studies waiting to be conducted, particularly one related to youth fishermen's adaptation towards climate change. Driven to fill in the gap, the following questions have arises:

- 1- Are youth fishermen able to face the impacts of climate change?

- 2- What are their strengths in terms of adaptation towards climate change?
- 3- What are their weaknesses regarding adaptation towards climate change?

This study aims to answer these questions via its main objective, which is to examine the adaptation level towards climate change among Malaysian youth fishermen.

### **Methodology**

This study is quantitative in nature (cross sectional survey) and involved youth fishermen aged between 15 to 40 years old as the respondents. The main sampling technique is the multi-stage cluster sampling, by which a total of 350 respondents from six climate change affected areas (Batu Pahat, Pengkalan Chepa, Setiawan, Redang Island, Tuba Island and Langkawi Island) were selected.

The use of questionnaire was the main instrument for data collection and it was developed based on the International Union for Conservation of Nature (2010). The questionnaire consisted of 17 parts and the first part focused on the demographic background of the youth fishermen, while the following parts of the instrument focused on their adaptation aspects. Unlike the demographic part which provides an open-ended or a closed ended type of answer, the adaptation part of the instrument offers a five Likert scale answer that ranges from 1 (strongly disagree) to 5 (strongly agree). In total the instrument consisted of 95 items.

A pilot study was conducted at Lumut to test the instrument's reliability. Only two adaptation aspects managed to exceed the recommended Cronbach alpha value of .700 (Nunally, 1978). To further strengthen the reliability of instrument, several efforts were placed. First, drawing on 'if item deleted' analysis, several items were removed. Second, several items were rephrased, in particular those which were deemed as imprecise or difficult to understand based on the enumerators' feedbacks. The modified instrument was then presented to two community development experts to validate its content and constructs.

The actual data collection process was conducted for the duration of four months, starting from December 2015 till March 2016. The data collection process was assisted by a number of experienced and trained enumerators and monitored by the research team. The main data collection technique used was a survey, which was conducted in Malay language. On average, each of the survey session took between 15 to 25 minutes to be completed.

## **Results and Discussion**

### ***Demographic background***

A majority of the youth fishermen were male (97.7%). The average age recorded was 31 years and more than 13% of them are within the age group of 21-25 years old. Most of these youth fishermen are lower education achievers as only 2.7% of them actually passed the tertiary education level. More than half were married (58.7%) and most of them had between 4-5 household members (37.5%). Per week, these youth fishermen managed to seize 94 kilos of catches and on average they earned about RM986.90 per month from their fishing activities. The mean score recorded for experience as a fisherman and days spent in a month for operating their fishing routines were respectively 13 years and 19 days. A total of 59.4% used seines as a main catching tool, while 29.9% of them employed fisheries technology (e.g. GPS, echosounder).

### ***Adaptation abilities towards climate change***

The performed analyses has concluded that out of the 16 adaptation aspects studied, only five aspects have recorded a high level of adaptation ability, nine aspects have recorded a moderate adaptation ability and simply two aspects have recorded a low adaptation ability.

The youth fishermen were seen to possess the strongest adaptation abilities in relation to their environmental awareness, value and attitude. This group were found to be aware of the changes that occur around them and express their concern, while at the same time stressing the need for environment conservation. They were also found to possess a local environmental knowledge, which allows them to preserve the environment. Furthermore, these youth fishermen possessed strong adaptation ability in relation to formal and informal networks. Such results are expected as the fishermen community members are closed to each other, actively involved in social activities and frequently helped each other; especially when it comes to fishing routines. Although these youth fishermen were found to be highly attached to their fishing routine, nevertheless, they were found to have strong interests in wanting to learn new things. The analysis also confirmed that the youth fishermen are proactive groups as they have high adaptation abilities in planning, learning and reorganizing matters related to their fishing routines.

Although aspects related to attachment to occupation and attachment to place has recorded the highest and the second highest mean score, it reflects their weaknesses instead of a strength to their adaptation abilities. A strong attachment to occupation reveals their high reliance on fishing activities as their main income generating activity and should one day the climate change would hinder them from operating their fishing routine due to degrading natural resources and extreme weather, eventually, it will post big problems for their community. Furthermore, a strong attachment to place exposes their weakness in mobility to move to other places. Should their place get stricken by the impacts of climate change, there is a mounting need for them to be transferred to other places, thus conflict will arise among this group. Another main concern is related to their adaptation aspects in relation to livelihood diversity as it yields the lowest mean score. Such result might be driven by the lack of alternative skills, the lack of their ability to venture around new catching areas, unemployed wives not able to financially support their family and a high reliance on fishing activities as their main income.

## **Recommendation**

### ***Knowledge management***

Knowledge management is an important element for climate change adaptation. Agencies such as DOF, LKIM and PNK (via their extension officers) and local leaders (village leaders, jetty leaders or skippers) should keep the youth fishermen community updated by disseminating information regarding climate change. This information can be disseminated via interpersonal communication or printed media. As youth community favours towards technology usage, advanced messaging applications such as WhatsApp and WeChat can be utilized by the agencies to disseminate climate change information. Furthermore, researchers and students from higher educational institutions can proactively disseminate climate change information to SSFM. Among potential universities that qualify to implement this are Universiti Malaysia Terengganu, Universiti Sultan Zainal Abidin, Universiti Malaysia Pahang (Pekan Branch), and Universiti Teknologi Mara (Kuala Terengganu Branch) due to their location in close proximity to coastal areas.

### ***Strengthening social relationship***

This aspect can be intensified via several social programs and it should be initiated by agencies such as local municipal, DOF, LKIM and PNK. Common social activities conducted among fisherman community are gotong-royong, merewang, boat racing and fishing tournament. Furthermore, social activities organized by the NGOs or private organization via their

Corporate Social Responsibility are necessary to strengthen the social relationship among youth fishermen.

### ***Offering alternative skills and knowledge***

More SSFM should be given access to skill courses and workshops. DOF, LKIM and PNK can play proactive roles in initiating the plans. These extra skills provides them with alternative human capital, which later can assist them in strengthening their financial ability. Should skill courses and workshops for the youth fishermen be planned by the related agencies, it should be non-environmental related. The tourism industry for example, although it has been proven to assist youth fishermen in generating extra money, it is highly vulnerable to the impacts of climate change. It is important for the concerned parties to offer alternative skills that are in line with the needs and abilities of SSFM. Among potential alternative skills for youth fishermen are vocational and entrepreneurship related activities.

### **Conclusion**

The main objective of the study is to examine the adaptation level towards climate change among Malaysian youth fishermen. The study concluded that out of 16 adaptation aspects studied, only five aspects have recorded a high level of adaptation ability, nine aspects have recorded a moderate adaptation ability and two aspects have recorded a low adaptation ability. To further strengthen youth fishermen adaptation ability towards climate change, recommendations related to knowledge management, strengthening social relationship and offering alternative skills and knowledge were highlighted.

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