

## **Local Leaders' Perception on the Adaptive Capacity towards Climate Change Impacts among Small Scale Fishermen**

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### **Abstract**

This study aims to explore the local leaders' perceptions on the adaptive capacity towards climate change impacts among small scale fishermen. This study is quantitative in nature which used a questionnaire that was developed based on the International Union Conservation of Nature community adaptive capacity framework. Multi-stage cluster sampling was employed resulting in the selection of 300 small scale fishermen from Pengkalan Chepa and Batu Pahat as respondents. Results have shown that local leaders perceived that the small scale fishermen had possessed strong adaptation in three aspects, namely, in terms of the capacity to experiment and learn, community assets and flexibility. A number of discussions have been highlighted in this paper which would hopefully further add understanding on the views of local leaders on adaptive capacity towards climate change impacts among small scale fishermen in Malaysia.

**Keywords:** Leaders' Perception, Community Development, Adaptation Capacity

### **Introduction**

Climate change is not a new phenomenon and it is expected to worsen in the future. This phenomenon is predicted to cause difficulties to the community especially those who rely heavily on the nature stability. The small scale fishermen is one of the important groups in Malaysia particularly on their roles to sustain the food security of the nation. This group is expected to be affected, as the rising temperature, sea level rise, extreme wind and waves are expected to impinge their socio-economic routine. The government has realized this and try to gather as much as possible feedbacks from the community in order to construct the best adaptation strategies that would fit the need, ability and interests of the local community. Another thing that should be considered is to harmonize the opinions of local leaders to these adaptation strategies.

Prior to the harmonization of these varying views, more studies would need to be conducted. These studies should produce more climate change-related views from the concerned organizations, the communities and the local leaders. As far as climate change is concerned, many studies related to concerned parties and organizational views can be found in the existing literature (see Shaffril et al., 2016; Shaffril et al., 2013; Muhammad et al., 2016; Omar et al., 2013; and Abu Samah et al., 2016)). Nevertheless, the same cannot be said within the context of the local leaders' views on climate change which creates a gap in the literature. To fill this gap, the present study sought to explore the perspective of the local leaders on the adaptation ability of SSFM towards climate change impacts. More importantly, this study aimed to address the mounting need for the localization of adaptation plan. Hence, this paper presents the perspectives of the local leaders on the issue which would hopefully be referred to in developing adaptation strategies that are in line with the needs, abilities and interests of the respective affected local communities.

### **Literature Review**

Climate change is a serious current issue as its impacts on the community are disastrous. Several local and international scholars have detected a number of climate change symptoms in Malaysia. Tanggang et al. (2012) and Kwan et al. (2011), for example, studied the connection of these symptoms with the rising temperature in several areas in Malaysia while studies conducted by Loo et al. (2015) and Wan Azli (2010) looked into the variability of monsoon rainfall in South East Asian countries. Other researchers such as Culver et al. (2015) and Mallinson et al. (2014) have detected rising sea level in certain areas in Peninsular Malaysia while Razali et al. (2010) have identified several potential areas which are at risk of being hit by strong winds in the future. These climate change symptoms are affecting the local communities especially a community such as the small scale fishermen (SSFM) who rely on weather stability for their routines. Undeniably, climate change impacts reduce the productivity of the SSFM, enhance the risks associated with their fishing operation, eventually affecting their health and destroying their assets.

As the impacts are expected to worsen in the future (IPCC, 2007), strengthening community adaptation ability towards these impacts is believed to be effective. Realizing this, the government has initiated a number of efforts such as conducting environmental awareness and conservation programs, introduction of several fisheries technologies and establishment of the National Policy on Climate Change (NPCC) in 2009. The NPCC emphasizes the importance of harmonizing the views of concerned organizations, communities and local leaders in any adaptation plan. Shaffril et al. (2016) have studied the importance of this harmonization and confirmed its necessity in producing adaptation strategies that are in line with the needs, abilities and interests of SSFM in Malaysia.

Shaffril et al. (2016) have stressed on the importance of considering the opinions of the local leaders as their understanding on the cultural and socio-economic aspects of the life of the fishermen is most important in developing adaptation strategies that are line with the needs, abilities and interests of the fishermen. Furthermore, these groups communicate with SSFM on a common basis which possibly provides them an in-depth and greater understanding on the ability of the SSFM to absorb the climate change impacts.

Within the scope of this study, local leaders among the fishermen community are referring to Jawatankuasa Kemajuan dan Keselamatan Kampung (JKKK) or Village Development and Security Committee members, Persatuan Nelayan Kawasan (PNK) or Local Fishermen Association, skippers, Kumpulan Wanita Nelayan (KUNITA) or Group of Fishermen Wives and

Kumpulan Belia Nelayan (KUBENA) or Group of Youth Fishermen. Basically, all these local leaders are responsible to strengthen the socio-economic aspects of fishermen and their family members.

### Methodology

This quantitative study used questionnaire as its main data collection tool. The development of the questionnaire was based on the adaptive capacity of communities' frameworks by International Union Conservation of Nature (IUCN, 2010). The study was a social survey that measured indicator variables and responses to indicator statements which would offer practical measures of the adaptive capacity to changes at the level of the communities. One new variable, namely, organization responsibility was included in the framework of the present study as a substitute for the original factor, namely, culture of corruption. This was done as previous studies such as by Shaffril et al. (2016) and Shaffril et al. (2013) had stressed on the roles of related organizations in strengthening the adaptation capacity of fishermen. The questionnaire consisted of two main sections: demography and adaptation aspects. The demographic section consisted of six items of either open-ended or closed questions. The adaptation section consisted of eight sub-sections and items included for each sub-section were based on the operational definitions of each of the adaptation aspects in which an option of 5 point Likert-scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Table 1 gives details of the instrument used in the present study.

Table 1:

Operational definition and number of items for each adaptation aspects

Adaptation aspect	Operational definition (IUCN, 2010)	Number of items
The capacity to experiment and learn	The capacity to experiment and learn at a community level.	6
The capacity to reorganize	The capacity to reorganize given an extreme climate event	6
Community assets	The assets upon which a community can draw upon during change periods	6
Flexibility	The level of social, cultural, political, economic and environmental flexibility within a community	6
Gender relation	The extent to which decisions are biased towards a community sector	6
Environmental institution and social norms	The effectiveness of environmental institution	6
Organization responsibility	Roles played by an organization to strengthen fishermen adaptation capacity	5
Market	The rigidity of markets in encouraging change in resource products.	6

The developed instrument was initially pre-tested in Malacca. Reliability analysis during pilot study produced Cronbach alpha value for each of the eight adaptation aspects that ranged from .092 to .922. The preliminary results indicated some of the factors had failed to exceed the recommended value of .700 by Nunally (1970) and there were some multicollinearity

problems within the factor of organization responsibility. To overcome this problem, three steps were taken. First, based on if item deleted suggestions in the reliability analysis during the pilot study, a number of items were deleted. Second, multicollinearity problems were overcome by deleting items that carry similar meanings with those of the other items. Third, based on the feedback from enumerators and respondents, some items were rephrased and reworded in order to achieve greater clarity. The revised questionnaire was then presented to two community development experts for validation process before it was used in the main study.

During the main study, multi-cluster sampling was employed. Respondents comprised 300 committee members of fisheries-related organizations and skippers of deep sea boats (25 feet or more) from two selected fisheries districts, namely, Pengkalan Chepa and Batu Pahat. Prior to data collection, researchers had made contact with representatives of JKKK, PNK, skippers, KUNITA and KUBENA. This is important because researchers had to seek permission to collect data within the areas under the administration of these organizations as well as seek assistance from the organizations in identifying suitable respondents for the present study. The data collection process took three months to be completed (from October 2016 until December 2016) with survey as the main data collection technique. Researchers were assisted by enumerators who had experience and had been well-trained. Data collection process was monitored by research team members. Each questionnaire was able to be completed between 20 and 30 minutes.

The collected data were then analysed using descriptive statistics in terms of frequency, percentage, and mean score analyses. The levels of adaptation were based on the range of score calculation whereby:

$$\frac{\text{Maximum mean score (5.00)} - \text{minimum mean score (1.00)}}{\text{Number of intended levels (3)}}$$

The calculation resulted in the range of score of 1.33 for each level which indicated that the low level of adaptation was represented by the range of the mean scores of 1.00 to 2.33, while the moderate and high levels of adaptation were represented by the ranges of the mean scores of 2.34 to 3.67, and 3.68 to 5.00, respectively.

## Result And Discussion

### *Demographic Results*

Table 2 presents the respondents' demographic background. Majority of the respondents were male (87.3%) and the highest number fell into the age group of 51 – 60 years old (32.7%), closely followed by the 41-50 age group (28.0%) with another 19.0% aged 60 years or more. In other words, majority of the respondents were 40 years old and above. With regard to their education achievement, very few of the respondents had received formal education leading towards tertiary level qualifications with only 3.0% possessed Diploma and 0.3% undergraduate and/ or postgraduate Degree qualifications. A huge majority of them were married (90.0%) and the remaining were either single (7.3%) or divorced (2.7%). The highest percentage for income group was the group of respondents who earned between RM701–RM1,000 (39.7%), followed by those who earned less than RM700 (23.7%). Although the lowest income group earners were living on RM1,001–RM1,500 per month (15.0%), more respondents (21.7%) earned RM1,501 or more per month, which was the highest band of

income group. Most of the respondents surveyed were either members of JKKK (37.3%) or skippers (39.7%).

Table 2:  
Respondents Demographic Factors

Factor	Frequency	Percentage	Mean
<b>Gender</b>			
Male	262	87.3	
Female	38	12.7	
<b>Age</b>			
			50.4
<40	61	20.3	
41-50	84	28.0	
51-60	98	32.7	
>60	57	19.0	
<b>Level of education</b>			
Never been to school	14	4.7	
Primary school	99	33.0	
PMR/LCE	68	22.7	
SPM/SPMV/MCE	98	32.7	
Skill Certificate/ STPM	11	3.7	
Diploma	9	3.0	
Degree/Master/PhD	1	0.3	
<b>Marital status</b>			
Married	22	7.3	
Single	270	90.0	
Divorced	8	2.7	
<b>Income per month</b>			
			RM1,170.80
<RM700	71	23.7	
RM701-RM1,000	119	39.7	
RM1,001 – RM1,500	45	15.0	
RM1,501	65	21.7	
<b>Organization</b>			
PNK	52	17.3	
JKKK	112	37.3	
TEKONG	119	39.7	
KUNITA/KUBENA	17	5.7	

#### *Local Leaders' Perception on SSFM Adaptation Capacity*

Table 3 presents the mean scores of the perceptions of leaders towards the adaptation ability towards climate change among small scale fishermen. Based on the range of score calculation as described in the methodology section, respondents perceived that the small scale fishermen had high adaptation ability in three aspects, namely, the capacity to experiment

and learn, community assets and flexibility. The remaining factors showed moderate levels of mean scores.

The respondents had high perceptions of the capacity of the fishermen under their administration to experiment and learn ( $M=3.90$ ). The respondents' perceptions might be influenced by vast experience possessed by the fishermen which strengthened their capacity to experiment and learn. Understandably, to face new challenges, especially those brought by the climate change, experimenting and learning new skills would be needed to diversify the fishermen capabilities to absorb the impacts (Shaffril et al., 2016).

The respondents also had high perceptions of the fishermen's good adaptation ability regarding community assets. In other words, the respondents believed that the fishermen had had enough assets to draw on should they be struck by climate change impacts. Nevertheless, this finding is not in tandem with those of the past studies, as the findings of past studies had directed towards the fishermen's inadequacy especially related to financial and infrastructure assets (Shaffril et al., 2013; Shaffril et al., 2016).

The respondents held the perceptions that the fishermen had been flexible in absorbing the climate change impacts. This showed that the respondents believed in the fishermen's flexibility to absorb climate change impacts from the social, cultural, political, economic and environmental perspectives. Such perception would not be surprising as the respondents were well exposed to common culture of fishermen- frequent gathering at the small huts and the local coffee shops. This unique culture would provide them with the opportunity to strengthen their social relationship and result in cooperative behaviour and social reciprocity vital for pre- and post-disaster (Shaffril et al., 2016). Furthermore, respondents might have been convinced by the fishermen's vast experience, which would transform them to be environmentally flexible in order to absorb the climate change impacts.

A total of five factors showed moderate levels of mean scores. The first factor was the adaptation aspect regarding market ( $M=3.62$ ). The respondents' perceptions might have been influenced by the fishermen's high reliance on the middle persons to market their catch. As noted by Shaffril (2013), despite marketing their catch on their own, most of the fishermen would prefer to market their catch using the services of the middle persons and this preference could be related to factors such as the local culture and the fishermen's level of education.

Meanwhile, moderate levels of mean scores were observed for the perceptions of the respondents related to environmental institution and social norms ( $M=3.58$ ). This provided evidence to support the findings of previous studies by Omar et al. (2013) and D'Silva et al. (2012) who had looked into opportunity for improving the relationship between governing parties and the fishermen.

The fishermen's abilities regarding their capacity to reorganize were also perceived by respondents to be moderate ( $M=3.42$ ). This supported the finding of another study by Shaffril et al. (2016) who had drawn a similar conclusion on the moderate level of reorganization abilities of the fishermen and had further concluded that financial capacity, a strong social relationship, business knowledge and organizational support would be needed to strengthen the fishermen's capacity to reorganize. Table 3: SSFM' adaptation capacity.

The fourth factor which was perceived at moderate level was organizational responsibilities ( $M=3.21$ ). Such finding might have been influenced by a strong social relationship that had existed among the fishermen which would lead to a strong perception that this relationship might lead to cooperative behaviour that might benefit them during disasters. Nevertheless, these perceptions might have been moderated by a commonly known fact that fishermen

had strong attachment to their surrounding and occupation, and problems would be expected to emerge if their organization's reorganization plan would involve transfer to other places or exposing fishermen to skill diversification (Abu Samah et al., 2016).

Finally, gender relation showed the lowest mean score among the moderate level five factors (M=3.03). This perception was expected among leaders as most of the women in the fishing community would not be working and had non-active role in most of the organizations which eventually had limited the opportunity of involving women in any decision-making roles.

<b>Adaptive factors</b>	<b>Mean score</b>
The capacity to experiment and learn	3.90
The capacity to reorganize	3.42
Community assets	3.88
Flexibility	3.73
Gender relation	3.03
Environmental institution and social norms	3.58
Organization responsibility	3.21
Market	3.62

### **Recommendations**

Climate change is a serious current issue that needs to be solved. The views of the local leaders play an important role in strengthening the SSFM' adaptation capacity towards this phenomenon. Hence, based on the findings of the present study, some recommendations are made. Firstly, periodical meetings between decision makers and local leaders need to be conducted. This will inform the concerned organizations and provides a great understanding regarding the adaptation ability of the SSFM especially in connection with their adaptation strength and weakness. Secondly, a needs analysis study should be conducted with local leaders as target respondents. Despite developing strategies that are in line with the organizational interests, having need analysis studies will develop adaptation plans that are compatible with the local needs, abilities and the interests of the SSFM.

### **Conclusion**

Climate change impacts such as rising temperature, rising sea level, unstable rainfall patterns and strong winds are expected to worsen in the future. Within the scope of SSFM, strengthening their adaptation towards climate change impacts is seen to be an effective measure. In addition to views from concerned organizations and members of the affected community, opinions from local leaders are significantly of similar importance as these leaders are well exposed to the socio-economic aspects of life and the local culture of the fishermen while at the same time communicate with the fishermen on a common basis, thus providing these leaders an in-depth and greater understanding on the ability of SSFM to absorb the climate change impacts. Within the scope of this study, the local leaders had high perceptions of the adaptation capacity of the SSFM in their areas in three aspects, namely, the capacity to experiment and learn, community assets and flexibility. Furthermore, it was evident from the present study that the local leaders had moderate views on five adaptation aspects of the SSFM in their areas, namely, market, environmental institution and social norms, the capacity to reorganize, organizational responsibilities, gender relation.

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