

## Weather Forecasting as an Early Warning System: Pattern of Weather Forecast Usage among Coastal Communities in Malaysia

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**Abstract:** The main objective of this study is to explore the patterns of weather forecasting usage among coastal communities in Malaysia. Focus group discussions (FGD) were held with two groups of communities at Kuala Paka Village in Dungun, Terengganu. A total of seven fishermen were involved in the first FGD, while a total of four housewives were involved in the second. The results show that the fishermen chose television as their main source of weather forecasting, while the housewives chose radio. For the respondents, particularly the fishermen, weather forecasting acts as an early warning system, and they accentuated the importance of weather self-monitoring before making their decision on whether or not to proceed with their fishing activities. In addition, the respondents reflected on the importance of information with regard to wind and waves, and stated that such information is vital for them, particularly during the northeast monsoon season.

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### 1. Introduction

Malaysia possesses a total of 4,809 km of coastal areas, and parts of this have been settled by communities. As coastal areas are vulnerable to weather changes, many activities of coastal communities are directly or indirectly related to these changes. Malaysia's weather is predicted to remain unstable due to the impacts of climate change. Local studies by Shaffril et al. (2011) and Abu Samah et al. (2011a) with regard to social sensitivity towards the changing weather have shown that coastal communities have noticed these changes, and that the changes have negatively impinged their socio-economic activities. These findings are in line with those of local scientific studies by Wai et al. (2005), Kwan et al. (2011) and Suhaila et al. (2010), which have confirmed that weather elements such as temperature, rain and wind have gradually changed.

As a response towards the shifting weather, Shaffril et al. (2013) and Fulsas (2007) have highlighted the importance of access to weather information. Previously, local fishermen relied heavily on their indigenous knowledge to forecast the weather, however the swift evolution of technology has made weather forecasting possible via television and radio. Weather information is vital for coastal communities, as it assists them in managing their responses towards shifting weather, which in turn can save their lives and property. Realizing this, many

scholars across the globe have turned their attention to weather forecasting studies – particularly its impacts on the community (Fulsas, 2007; Lincoln and Lucas, 2009) –however, few studies have dealt with the local Malaysian context. Moreover, studies germane to patterns of weather forecasting among coastal communities are scarce, and there is a crucial need for more studies to be conducted. This has shaped this study's main objective, which is to investigate patterns of weather forecast usage among coastal communities in Malaysia.

### 1.1 Changing climate and the northeast monsoon in Malaysia

It is widely accepted that the global climate is changing. Concrete evidence provided by the Intergovernmental Panel on Climate Change (IPCC) (2007) reveals that on average, a 100-year linear increase has been recorded in the earth's surface temperature (1905-2005) of 0.74°C, while the global average sea level has risen since 1961 at a rate of 1.8 mm/yr. Similar changes can be seen in Malaysia. A number of local and international studies have specifically considered this phenomenon. In terms of rising temperature, a local study conducted by Kwan et al. (2011), for example, detected a range between 45.30% to 62.36% temperature changes in warmer day and a range between 45.85% to 70.76% of temperature changes in warmer night in places such

as Kuala Terengganu, Kota Bharu, Mersing and Kuantan, which make up a large proportion of Malaysia's coastal areas. In another study conducted by Wai et al. (2005), a 1.75°C to 2.69°C increase in temperatures was recorded over a period of 50 years in selected areas in Malaysia, while international bodies such as the IPCC (2007) have predicted that Malaysia will record a temperature increase of between 0.6°C to 4.5°C by 2060. Another concern that should be highlighted relates to the increasing trend of extreme precipitation events over Malaysia (Manton et al. 2001; Wan Zin & Jemain 2010; Subramaniam et al., 2011). Manton et al. (2001) detected an increase in the proportion of annual rainfall from extreme events over a period of ten years, while Subramaniam et al. (2011) proved that areas such as Alor Star, Kota Bharu, Subang and Kota Kinabalu have recorded an increase in extreme rains. According to Subramaniam et al. (2011), it is predicted that by 2099 areas such as Mersing, Bayan Lepas, Malacca and Sitiawan will face similar rainfall problems. In addition, it is forecasted that the average sea level rise for Peninsular Malaysia approaching the 21st century is between 0.25 and 0.52 m (IPCC, 2007). Increases in sea level and changing wave characteristics due to changing winds are predicted to aggravate coastal erosion. Mohd Ekhwan (2007) stated that nearly one third of Malaysian coastal areas – about 1380km – are facing serious erosion problems.

The changing climate in Malaysia is affected by El-Nino, La-Nina, the Indian Ocean Dipole and global warming (Juneng and Tanggang, 2005; Tanggang et al., 2007; Saji et al., 1999). La-Nina has a strong connection with the monsoon season in the east coast region of Peninsular Malaysia. The northeast monsoon in Malaysia occurs over a four-month period, and typically strikes from November through to February the following year. During this period, strong pulses of wind known as cold surges penetrate to the southernmost region of the South China Sea (Chang et al., 2005), which includes states such as Terengganu, Kelantan, Pahang and East Johor. During the northeast monsoon, the waves and winds are stronger compared to other seasons, and this results in heavy seas (Omar and Quah, 2005). Heavy seas typically hinder fishing activities, as they will increase boat motion and enhance fishermen's vulnerability towards bad weather. A number of studies have proven that La-Nina has brought changes to the northeast monsoon season in Peninsular Malaysia. According to Juneng and Tanggang (2005), La-Nina provides more wet conditions and intensifies the monsoon winds and waves, while increasing the occurrence of floods in low-lying areas. Another study by Kajikawa et al.

(2012) recorded a significant increase in mean precipitation of 8% and an extension in the monsoon period across the Asia region, while Suhaila et al. (2010) identified a significant increase in rainfall intensity and extreme occurrences throughout Peninsular Malaysia during the northeast monsoon.

## **1.2 Weather forecasting for coastal communities: Is it important?**

Within the Malaysian context, the majority of coastal communities are made up of fishermen, housewives and students (Muhamad et al. 2012; Shaffril et al. 2013). Their prime income is generated by the fisheries industry, and in some areas they are supported by the tourism industry (Muhamad et al., 2012; Fahmi et al., 2013). It is widely accepted that the changing climate poses a great challenge to coastal communities. The unpredictability of weather elements such as surface temperatures, waves and winds may create issues for sectors such as fisheries and tourism. Previous studies conducted by Badjeck et al. (2009), Shaffril et al. (2013) and Abu Samah et al. (2011a) have concluded that the changing climate will have great impacts on the socio-economic activities of communities. Badjeck et al. (2009), for example, explained how the changing climate will impinge on the daily lives of the coastal communities, and accentuated that such changes will badly damage ecological productivity, fisheries and social activities, which in turn will result in a reduction in marine productivity, damage to community assets, higher vulnerability towards natural disasters, and thus relocation of inhabitants to a safer place. Shaffril et al. (2011) suggested that fishermen, who are one of the main dependents on environment sources, admit that the changing climate has reduced their catches and significantly impinged on their earnings. Additionally, the changing climate has been found to have a negative impact on community health (Pinto et al. 2011). Abu Samah et al. (2011a) and Pinto et al. (2011) added that the changing climate has exposed coastal communities to ailments such as fevers, flu, cough and dengue. Dengue cases, for example, can be significantly influenced by the frequency of rain; as Pinto et al. (2011) explain more rain in an area will cause more stagnant areas for mosquito breeding, and thus lead to more cases of dengue.

Based on the negative impacts mentioned, making early preparations for such impacts are deemed important for communities. Previously, local fishermen relied on a number of indigenous meteorological conditions for forecasting, such as referring to the stars. Comparatively, today, weather forecasts disseminated via television and radio have substituted this conventional method of forecasting.

Weather forecasts play an important role for coastal communities with regard to preparations against the changing climate, and have already become a part of their life. Fishermen, for example, are among the main group that to benefit from such information. Albeit motorization of fishing fleet has lessen their vulnerability towards the hazards of the changing climate, weather information forms a vital part of their fishing activities, whereas information on aspects such as wind direction and speed, wave periodicity, heights, tides, and precipitation are included in their top list before prioritizing their decision making process and deciding whether or not to proceed with their fishing operation. Having accurate information is therefore crucial for the fishermen; as Lincoln and Lucas (2009) confirmed, a total of 61% of fisheries-activity-related fatalities are caused by bad weather. Lincoln and Lucas (2009) also suggested that better weather reporting can significantly reduce the number of fatalities arising from fishing activities, as it provides early warnings for the fishermen, shipping crews and anglers. Furthermore, Abu Samah et al. (2011a) demonstrated that weather forecasting strengthens the economic aspects of coastal communities, as a number of entrepreneurs (e.g. sellers of dried cuttlefish and salty fish) rely on such information for their income-generating activities, and it has been proven that weather forecasting has saved fishermen costs relating to fuel, ice and the payment of crew members. As fishermen are among the main groups who are vulnerable towards the changing climate, Shaffril et al. (2013) accentuated that access to weather forecasts can strengthen the adaptation of fisheries communities to the unpredictable climate; this is supported by the fact that weather information will make fishing safer, whilst assisting other groups of coastal communities to make early preparations against any threats from the changing climate.

### **1.3 Why television and radio forecasting for coastal communities?**

The usage level of traditional media such as radio and television is always related to individual differences such as age, education, income and occupations (Usman et al. 2012; Mtengo, 2012; Olatokun, 2009). Those who are older, less educated, in a lower income bracket and who work in non-professional fields are always associated with a higher usage of conventional technologies such as radio and television. To date, such groups are dominant in the coastal areas of Malaysia and potentially can be a 'loyal user' of television and radio. Shaffril et al. (2011), for example, found that the majority of coastal community members are aged 51 years and above, possess a primary school level of

education, earn an average of RM669 per month, and work as coastal fishermen. In another study conducted by Muhamad et al. (2012), it was found that the majority of coastal community members are aged between 41 to 60 years old, possess an SPM/SPMV level of education, and work as fishermen. Additionally, Omar et al. (2012) and Mazuki et al. (2013) confirmed that, on average, coastal community members are aged 47.0 years, have completed their education up to primary school level, and earn between RM500 to RM1000 per month.

Furthermore, rural communities are said to have positive aspects when it comes to conventional technology usage, in areas such as attitude (Shiro, 2008), social influence (Mazuki et al., 2013), perceived ease of use (Abu Samah et al., 2011b), perceived benefits (Omar et al. 2012) and technology compatibility (Hu et al., 2003). Shiro (2008), for example, stated that negative attitudes have prevented rural communities from using information technology, which has made them rely more on conventional technologies such radio and television. Mazuki et al. (2013) and Omar et al. (2012) concluded that coastal communities, and particularly fishermen, will utilize technology information if they find it to be user friendly and offering benefits to them. Certainly, using television and radio in this modern day is easy, as rural communities have been found to have higher compatibility with conventional technology usage compared to advanced forms such as the internet (Azarian et al., 2012; Shaffril et al., 2012). Furthermore, television and radio forecasting will assist coastal communities to be proactive in planning their upcoming socio-economic activities. Via such information, initial preparations relating to their daily and fishing routines can be strategized, and this will subsequently enhance their safety, reduce their vulnerability and save certain costs (such as fuel, ice, crew members' payment, etc.).

Another study completed by Hassan et al. (2011) claimed that most rural communities are likely to use traditional media rather than the internet as they consider traditional forms to be more trustworthy and reliable. Hassan et al. (2011) further noted that the main reasons behind this is that these people 'grew up' with such sources, whereas information technology is considered as 'new'. Shaffril et al. (2012), on the other hand, explained that most agriculture communities prefer to obtain weather information from television and radio, as they find this information to be more germane to their agriculture routines. Shaffril et al. (2012) further stressed that traditional media are cheaper and more up to date than other forms, particularly when it comes to weather forecasting. Azarian et al. (2012)

supported this by stating that technology such as radio and television can satisfy agriculture communities cognitive needs in seeking informational content.

#### 1.4 Weather forecasting for coastal communities via television and radio

Television has long been used to disseminate valuable information to communities: according to Musa (2008), in 2007 a total of 93.4% of the Malaysian population received information via the television, while Murphy (2008) found that, on average, Malaysians spend an hour and 50 minutes watching television, VCDs, DVDs, and other video sources per day. Malaysian television broadcasting was first introduced on 28 December 1963, and the first television channel was Rangkaian Satu or Channel One, run by Radio Television Malaysia (RTM). To date, there are seven free-to-air television channels in Malaysia (Table 1), and hundreds of paid channels run by ASTRO, the first paid satellite television channel in the country. According to Buyong and Ismail (2011), in 2011a total of 953 hours of airtime were run by all of these free-to-air television channels, which highlight their strengths in terms of disseminating valuable information to communities, including weather forecasts. Television is recognized as a vital tool for information dissemination, and has long been utilized to provide weather forecasting to the public across the globe. It is believed that weather forecasting was first communicated via television in the early 1920s, and that it significantly reduced the number of fatal accidents arising from fishing activities (Fulsas, 2007). In the United Kingdom, for example, the first weather forecast was aired via BBC Television in November 1936, while in the United States the first television forecast was aired in 1940 via DuMont Television Network (BBC Weather, 2009). In Malaysia, weather forecasting is among the compulsory segments included in primetime television news programs. To date, all of the free-to-air television channels have weather forecasting segments in their daily primetime news programs, which are typically aired between 8.00 pm to 9.00 pm. Though the evolution of communication technology has posed a formidable challenge to traditional media such as television, it still plays a significant role in enhancing community awareness with regard to climate threats. When recent climate threats arose from the Sonamu tropical cyclone in Terengganu, for example, all local television channels informed and warned communities, particular those in coastal areas, via their primetime news programs. TV3, for example, provided a specific segment within their primetime news program,

Buletin Utama, wherein an officer from the Malaysian Meteorological Department detailed the threats to coastal communities in relation to the causes, origins and strengths of the storm, as well as advisable preparations and precautions.

Table 1: Free-to-air television channels in Malaysia

Channel	Year of establishment	Transmission (hours per week)
TV1	1968	133
TV2	1969	168
TV3	1984	162.5
NTV7	1998	133
TV8	2004	133
TV9	2003	126
TV Al-Hijrah	2010	97.5

Source: Buyong and Ismail (2011). - The data were based on the airtime of all these channels in a selected week during September 2011.

Radio has also long served as an information provider for the community. It was reported by Musa (2008) that a total of 79.4% of the Malaysian population receive information from radio, while Murphy (2008) confirmed that, on average, Malaysians spend 1 hour and 33 minutes a week listening to the radio. Radio is believed to have been first brought to Malaysia in 1921 by a foreign electric engineer named A.L. Birch, and was first broadcasted by the Johore Wireless Association. In Malaysia, there are hundreds of radio channels; among the leading ones are Era FM, Hot FM, Sinar FM and Classic National FM. Among the main organizations that run these channels are Radio Television Malaysia (RTM), ASTRO and Media Prima. Radio has long been utilized to disseminate weather bulletins to the public through meteorologists across the globe (BBC Weather, 2009). In the United Kingdom, for example, the first radio forecast was aired in 1922, and daily radio forecasts began in March 1923; in the United States, the first public forecast was disseminated to the public in 1925 via WEEI, the Edison Electric Illuminating station in Boston (BBC Weather, 2009). Today radio has evolved to focus more on its role as an entertainment provider; nonetheless, a number of regional radio stations are still active in providing information with regard to weather forecasting – for example, Terengganu FM, THR FM and Manis FM.

## 2. Material and Methods

This study is qualitative in nature. It employed the focus group discussion (FGD) technique to collect the required data. For the purposes of this study, a total of two FGDs were conducted, wherein the first was conducted with a

total of seven fishermen and the second was conducted with four housewives. All of the FGDs were conducted at Kuala Paka village, which is a coastal settlement situated in the district of Dungun, Terengganu. The respondents' background information is presented in Table 2. By employing a phenomenology approach within this qualitative method, we were able to identify the living experience of the coastal communities with regard to weather forecasting based on the meaning of these experiences (Creswell, 2007; Marshall and Rossman, 2011). In addition, it offers a rich and thick

phenomenological description of the aspect being investigated in a particular context. The number of respondents in this study was based on the quality of the data collected and the findings, as is recommended for most qualitative methodologies. The researchers continued to conduct interviews until they believed that they had reached the point of saturation. Generally, the saturation point reflects a full understanding of the experience which will not be altered through further discussion with participants (Laverly, 2003).

Table 2: FGDs respondents' backgrounds

<b>FGD 1</b>				
<b>Name</b>	<b>Gender</b>	<b>Occupation</b>	<b>Age (years)</b>	<b>Experience as a fisherman (years)</b>
R1	Male	Fisherman	55	30
R2	Male	Fisherman	53	20
R3	Male	Fisherman	50	32
R4	Male	Fisherman	50	33
R5	Male	Fisherman	44	33
R6	Male	Fisherman	52	15
R7	Male	Fisherman	69	41
<b>FGD2</b>				
<b>Name</b>	<b>Gender</b>	<b>Occupation of their husband</b>	<b>Age (years)</b>	<b>How long they have lived in the area (years)</b>
S1	Female	Contractor	40	40
S2	Female	Fisherman	35	35
S3	Female	Fisherman	47	47
S4	Female	Fisherman	63	40

Both FGDs lasted slightly longer than an hour. The FGDs started slowly with introductions to the research group and the purposes of the FGD, and then moved on to small talk to get to know the backgrounds of the participants. From here, the FGDs moved into a deeper discussion of the issue at hand. An interview protocol was prepared in advance, and was intended to keep the FGD to a standard interview procedure and maintain the flow of the conversations. The key questions were initially prepared based on the literature review related to the use of weather forecast information among the coastal communities, and the questions were designed to address the following areas: 1) the respondents' choice of media for weather forecasting; 2) their level of confidence in weather forecasting; 3) the type of weather forecasting they seek; and 4) time/period spent viewing weather forecasts. The selection of these samples was assisted by the National Fishermen Association of Paka. Questions for the FGD were developed to meet the objectives of the study, which is to identify patterns of weather forecasting usage among coastal communities in Malaysia. The

questions served as a guide, and respondents were allowed a degree of freedom and flexibility in their answers. Questions with regard to the type of weather information they need took the longest time in both FGDs. The data obtained were later transcribed verbatim and analysed using thematic analysis.

### 3. Results and Discussions

#### 3.1 Choices of media for weather forecasting

To achieve the first objective, the respondents were asked about their preferred source of weather information out of either radio or television. Based on the data analysed, the fishermen chose television as their main choice of weather forecasting information source, while radio was the main choice in the housewives group.

#### Television

It is globally recognized that television is still effective in its traditional role of providing valuable information. Similarly, within the local coastal community setting, groups of fishermen rely greatly on television to obtain weather information.

R3 highlighted the importance of television in providing weather information by stating:

*We gain much information from the television, our free time is only at night, we watch television and gain information with regard to the wind and wave[s]. Commonly two or three days before [...] strong wind[s], television will provide us [with a] weather forecast. (R3)*

As most of the respondents fell into the category of senior villagers', it is no wonder that traditional media such as television are preferred. Selwyn et al. (2003) concluded that older people are more attached to media such as television and radio, as they 'grew up' with these technologies. Shaffril et al. (2009) confirmed that older people prefer television as it fits their information needs and interests, as well as being compatible with and relevant to their daily activities. Another possible driver for this choice can be explained by reference to Shaffril et al. (2012), who clarified that most of the agriculture community has a moderate to high level of satisfaction towards agriculture-related information aired by television, as it offers information in visual and audio forms which accelerates their comprehension of the information disseminated to them.

### Radio

In this modern day, radio still plays a role in disseminating vital weather information, particularly to coastal communities. Based on the data analysed, it can be seen that housewives rely more on radio for their weather information. One of the respondents stated that:

*I listen to radio, radio informs me [about the] weather but not the television as we seldom [watch] the television, we rely more on radio. (S1)*

The same respondent provided several reasons why she prefers radio, for instance because state radio stations such as Terengganu FM provide weather information in her local language. S2 supported this by emphasizing:

*[Radio] is easy for us to understand as they provide [programs in the] local language; they inform us [about] the rain, etc. (S2)*

*They provide the information in Terengganu language; it is mainly for Terengganu people. (S1)*

As they rely more on radio for their weather information, the same scenario is not reflected for fishermen. One of the main reasons for this is their commitment to their daily routine and the limited time they possess to listen to the radio:

*We never listen to the radio [during the] daytime as we have to focus on our fishing routine, we depart from the jetty at 6.00a.m and arrive back*

*at 3.00 p.m, we don't have much free time. (R5)*

The findings that radio is the main preference of housewives are not surprising, as they are in line with a number of previous studies (Das, 2012; Malagar, 2007). Malagar (2007), for example, explained that females, particularly housewives, are more loyal towards media such as radio as they have less job commitment compared to males, which results in more free time.

### **3.2 Confidence in weather forecasts**

It seems that some of the respondents place their full confidence in television for their weather information:

*We believe more on television, though it is only [a] forecast... the [most] accurate one [comes] from the television, [and] we can place our full trust [in] it. (R2)*

Whilst the fishermen seem to believe in television, the housewives were found to place their trust in both radio and television:

*Television and radio can be trusted as we seldom read newspaper[s]. (S1)*

Nonetheless, although some of the respondents demonstrated their trust in television forecasting, others stressed that the information sources are only a form of prediction, and that the onus is on them to understand the actual weather.

*In television, the information is only forecasting, it warns us and we must pay attention to it, then [...] the next day, we have to go to the jetty to find out the real situation, we have to do this especially during the monsoon. [...]* (R2)

*We cannot fully trust the information, actually it depends on us, early in the morning we have to go to the jetty, before or after the dawn, we check the wind... television sometimes provide[s] accurate information and sometimes not, nonetheless, the [warnings are] good for our awareness. (R3)*

S3 seemed to agree with R3, stressing that not all of the information provided via the radio can be relied on:

*Half of the information can be trusted, sometimes the radio informs that tonight [there] will be rain, but [then] we wake up, [and] there is no rain.*

Though some of the respondents expressed their dissatisfaction with the reliability of weather forecasts, Fulsas (2007) argued that confidence among the community in weather information can be categorized according to three main points. First, the information must be generally accessible; this seems to be possible as the coastal communities have full access to weather information via television and radio. Currently, the majority of communities in Malaysia have access to eight free-to-air television

stations and 163 channels via the paid satellite television channel ASTRO. In addition, they have access to 19 radio channels aired by ASTRO, 36 radio channels aired by RTM and three radio channels aired by Media Prima.

The second point stressed by Fulsas (2007) is that the information must be perceived as reliable. Based on the findings of this study, we can say that not all of the coastal community residents see the information provided via weather forecasts as fully reliable. This finding is not in line with studies done by Hassan et al. (2011) and Yassin et al. (2011), who stressed that communities in rural areas demonstrated their needs on television and radio and perceived it as the trusted and reliable sources of information. The main reason for this discrepancy is that most of the respondents – fishermen – stated that they still self-monitor weather before proceeding with their fishing operations.

The third point is that users should have realistic expectations as to how the information can be used. Within this study, the information seems to be usable by the community. Fishermen within this study have been found to use it as an early warning before they self-monitor the weather. Housewives on the other hand, use the information to prepare themselves against any threats brought about by the changing weather, particularly strong winds and waves. Based on this discussion, it can be concluded that coastal communities in Malaysia have confidence in weather information in the sense that they have full access to it via numerous channels, and use the information in their daily activities. Nevertheless, it seems that the coastal communities place less confidence in the reliability of the weather information, since they place higher importance on self-checking rather than relying fully on the weather forecast.

### 3.3 Type of weather forecasting required

It seems that information on wind and waves is the main type sought by the respondents. For the fishermen, this information provides valuable information as it determines whether or not they should proceed with their fishing operation.

*We highly need information related to wind and waves, how high [...] the waves [are] and how strong [...] the wind [is]. (R1)*

*For [...] fishermen, information with regard to the temperature or rain is less important, we place our need on the wind information, it is vital for our operation. (R3)*

Similarly, the housewives also demonstrated their needs for information with regard to the wind and waves. This information is crucial as it provides early warnings and enables them to

prepare for any disaster. One of the respondents clarified on this by stating:

*We need information germane to the wind, we need to know how strong it is. (S2)*

The respondent further highlighted the importance of wave information as the community in question is vulnerable towards big waves:

*We need [...] waves information, we [are] afraid of [the waves] as we [live close to] the shore. (S2)*

S1 agreed with S2:

*Yes, we need the wave information [...] because local people here are afraid [of] big waves and strong wind[s] as we are [a] coastal community [that is] highly vulnerable towards these threats. (S1)*

Forecasts of strong winds and waves do attract the coastal communities' attention. This study would like to relate such scenario with the facts that people will seek information that are germane to their daily and economic activities (Shaffril et al., 2012; Selwyn et al., 2003). As big waves and strong winds can endanger fishermen's lives, as well as others in coastal community settlements, weather forecasting is vital and must be considered highly important for them, especially in their decision-making process relating to preparations for changes and whether or not to proceed for their fishing operations. Furthermore, in a local study conducted by Shaffril et al. (2009), who specifically looked at farmers' viewing of agriculture information aired via television and radio, it was concluded that agriculture communities prefer to access agriculture-related information over other kinds, as it assists them in their agriculture routine. In addition, such information was stated to enhance their preparations against weather threats, while enhancing their productivity and income.

### 3.4 Period of time spent viewing television

Fishermen usually gain weather information in the evening and at night, as this is their only time at their home since most of their days are spent at sea. As R2 stated:

*We go out to the sea after dusk and arrive at home at 5.00 pm, sometimes we arrive home at 3.00 pm, so we only watch television late in the evening. (R2)*

R3 expressed his agreement with R2:

*We watch television [during] the evening and night as we are at home by that time. (R3)*

Omar et al. (2012) confirmed that the majority of fishermen watch television at night, and the present study supports this based on the fact that this is the best time for fishermen to gain weather information, as it is when all the free-to-air television channels disseminate weather information via their

primetime news programs. Typically, weather forecasts will be aired between 8.45 and 9.00 pm. The findings of this study are in line with research conducted by Hassan et al. (2011), who concluded that agriculture communities prefer to spend their free time, which is only at night, watching television news programs.

The fishermen then informed us about their particular need for weather information during the monsoon, which is usually November, December, January and February, and the fact that they place less importance on weather forecasts during other months as the weather returns to normal.

*We need the information especially [in] November, December, January and February.* (R4)

*We only need [weather information] during monsoon season, during other season[s] we place our less need on such information.* (R3)

*As [in] November, December, January and February we cannot go out [as] frequently as [in] other months [...] but during [monsoon] season not all days are bad [...] sometimes we can go to [...] sea and the television will provide this information.* (R2)

One of the respondents highlighted the need for weather information during the monsoon season, as it will help determine their income which is significantly reduced during the season.

*If we don't gain weather information during monsoon, we will have no food to eat, our earnings will decrease, from November till February will be tough for us. If we want to go out to [...] sea we need the weather forecast, if it informs the wind is not too strong, then, we will go.* (R3)

For the housewives, they frequently turn on the radio to obtain information and entertainment.

*We listen to Terengganu FM, even while cooking, I'm listening to it.* (S1)

S2 and S3 agreed with S1, stating:

*If THR or Terengganu FM, we will listen it almost every time, from morning till night.* (S2)

*We only listen to radio, we listen to it every day, we start [to] listen to it from 6.00 am.* (S3)

In line with the fishermen group, the housewives also expressed their agreement regarding the need for more weather information during monsoon season.

*I think we need it more now (during monsoon season), now we listen to the weather information everyday.* (S3)

*We listen to the radio more during the rainy [monsoon] season.* (S4)

#### 4. Conclusion

Obtaining accurate and adequate weather forecast information is crucial for coastal

communities, as it assists them in their decision making with respect to whether or not to proceed with their fishing activities and strengthening their preparations against any weather changes, which in turn can save their lives and properties. Without this forecasting, the coastal communities would struggle to cope with threatening weather changes. Based on the data analysed, it can be concluded that their usage of television and radio weather forecasting is hugely affected by individual difference factors. Furthermore, forecasting germane to winds and waves is highly valued by them, particularly during the northeast monsoon season. These findings provide space to explore how coastal communities in Malaysia use weather forecasting in their fishing routines, as well as how they prepare against threatening weather changes, particularly during the northeast monsoon season. In addition, the findings suggest an avenue for future research which specifically focuses on broader coastal communities.

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