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Examining Fisherman Perception towards Climate Change Impacts and Fishery Agencies

^{1,2}Norsida, M., ¹Mohd. Fauzi, F. & ²Muhammad Aliff, Y.

¹Institute for Social Science Studies, Universiti Putra Malaysia, ²Faculty of Agriculture, Universiti Putra Malaysia

Abstract

Fish product is one of the contributors for balance diet, profit and attraction for tourist. That is why today fishery farming have become important in human daily life. Fishing and aquaculture sector have been reported to employ over 36 million people directly, this show the importance of fishery sector. Regardless of this fact, climate change have become the result for fishery farming to gain low income due to low quantity of fishing. In order to face climate change impact, there are several government agencies such as Fishery Department and LKIM that involve with fishermen which can assist them to adapt with the risks and issues in climate change. This research aims to understand the perception level of respondents toward climate change impact and to identify the role of government agencies' extension activities toward climate change adaptation. This research was conducted in Pekan, Pahang with participation of 150 fishermen as respondents. The result shows the perception of respondents towards extension agent's organisation and activities are high. It is also recorded that the perception of extension service toward climate change is on high level.

Keywords: Fisherman, Fishery Agencies.

Introduction

The agricultural industry in micro-economic perspective is able to generate wealth and reduce poverty, particularly among those from rural areas. It is also one of the key sectors of international trade for its importance in supplying foods to the world's population if this sector been examined using macro-economic perspective. Crops, fishery and livestock and all other related activity were categorized under agriculture sector in Malaysia. There are two (2) group of crop which are plantation crops and food crops, both types of crop have economic value in commercial agriculture. The third engine of economic growth in Malaysia has been identified as agriculture sector, this sector stands behind manufacturing and service sector.

There are four (4) agriculture policy that have been implemented to develop agriculture sector's growth in Malaysia until today. The first policy is First National Agricultural Policy (NAP1, 1984-1991), then the second policy is Second National Agricultural Policy (NAP2, 1992-2010), the third

policy is Third National Agricultural Policy (NAP3, 1998-2010) and the last policy is National Agro Food Policy (NAFP, 2011-2020).

The driver of economic activities towards the Malaysian Economic Growth which is National Key Economic Areas (NKEA) focuses on potential high growth sub-sector such as agriculture (Jabatan Perdana Menteri, 2010). Aquaculture, seaweed farming, swiftlet's nest, herbal product, fruits and vegetables as well as premium process food are included in agriculture sector. NKEA would give the chance to Malaysia to penetrate large global markets with those high growth potential while maintaining a strategic sub-sectors such as paddy and livestock to ensure national food security. This situation has shown the importance to understand more about the people that involve in the agriculture sector including fisherman. There is a mounting need for understanding fisherman's adaptation ability, but the existing number is still frustrating. The concept of adaptation in climate change discourse is still facing problem regarding relation between fisherman and government agency towards facing climate change issue. It has been stated in Swedish Government Official Reports (2007) that negotiation should be appointed between government and stakeholders towards facing climate change, but this doesn't happen in Malaysia. So this situation raised question weather fisherman and government agency relationship is important in adaptation concept?

Although there are some local studies conducted on fisherman but most of these studies are focusing on the scientific based results rather than perception aspect of climate change among fisherman (Mohd. Fauzi et al., 2017). There have also been several study regarding adaptation on climate change, but researcher still failed to find any research that talk about the need and strategy of fisherman and government agency to worked together to faced climate change. This situation drives this study to aim on examining fisherman perception towards climate change. The study is expected to produce new knowledge on clear understanding about factor of the fisherman perception towards climate change impacts.

Fishery Sector in Malaysia

Based on statistics obtained from the Department of Fisheries (2013), production of fisherman contribution came mostly from Peninsular Malaysia and the rest is from Borneo. It has been reported that Perak is the most landing of marine fish while Negeri Sembilan are the least (Refer to Table 1).

Table 1: Landings of Marine Fish by Month and State in 2013 from August-December and Total Landings

Month	August	September	October	November	December	Total
State						
West Coast						
Perlis	9,443	8,570	8,281	7,427	7,545	99,592
Kedah	9,766	9,683	9,378	9,524	8,206	112,876
Pulau Pinang	5,159	3,741	4,056	2,334	2,660	58,201
Perak	27,430	28,415	27,378	22,830	24,109	307,186
Selangor	8,587	8,102	7,603	7,066	6,849	105,560
Negeri Sembilan	56	51	40	40	32	568
Melaka	142	123	160	145	199	1,790
Johor Barat	2,737	2,673	3,333	2,871	2,551	29,911
Sub- Total	63,321	61,357	60,230	52,236	52,150	715,684
East Coast						
Kelantan	4,696	6,519	6,283	4,096	4,478	57,111
Terengganu	5,698	9,580	8,047	6,419	3,034	72,224
Pahang	9,747	10,953	11,053	7,430	6,331	107,348
Johor Timur	8,909	14,706	13,389	9,336	3,410	1,013
Sub- Total	29,051	41,758	38,773	27,282	17,253	337,695
Malaysia						
Peninsular	92,372	103,115	99,002	79,518	69,403	1,053,379
Sarawak	13,866	15,355	12,288	10,805	9,258	159,826
Sabah	18,977	19,074	17,059	16,153	13,498	196,522
Wilayah Labuan	4,485	4,955	6,051	6,735	5,530	73,173
Grand Total	129,700	142,498	134,401	113,210	97,690	1,482,900

It has been reported that Malaysia now are among the top countries consume fish with 56.5 kg of fish per person each year (Aruna, 2014). Mackerel, squid, shrimp, tilapia and catfish are the favourite species consumed in Malaysia. Fish is consumed more compared to chicken and beef. RM 100 per month is spent on fish and seafood among average consumers in Malaysia, this show just how important is the fishery sector in Malaysia in order to provide fish to the people.

Most of the big company involves in fishery industry doesn't have sustained level of commitment and active participation to develop the industry and that is why smallholders in the fish farming sector is important in Malaysia (United Nation, 2014). Most of the big company only involve in other aquaculture activities. It has been recorded by the Department of Fisheries (2015) that smallholders in fishery farming in Malaysia has contributed 97,153 mt of fishery product. Most of these smallholders are local fishermen from all around Malaysia, Department of Fisheries (2013) had reported that the highest states that supply fisherman in Malaysia came from Perak with a total number of 12,293 fishermen. The lowest states that supply fisherman in Malaysia came from Perlis with a number of 2,117 fishermen. Even though this number gives a perception

that most of the fisherman in Malaysia came from Perak, but this number still can be argued because the statistic only shows local fishermen with fishing vessels licensed. The truth is there is more local fisherman without fishing vessels licensed works on the sea, the problem is they can't get the licensed because of quota, management or any other reason (Sinar Harian, 2015). Most of the local fishermen are Malay with a total reported number of 49,370 fisherman. This a natural to happen because most of the Malay community lived in the rural area, so they have to find job around them like fishermen or farmers.

Table 2: Numbers of Local Fishermen according to Fisheries District

Fisheries District	Local Fisherman				
	Bumiputra	Chinese	India	Others	Sub-Total
PERLIS	2,051	66	-	-	2,117
Kuala Perlis	2,051	66	-	-	2,117
KEDAH	9,631	507	3	-	10,141
Langkawi	3,801	35	3	-	3,839
Kedah Utara	2,436	336	-	-	2,772
Kedah Selatan	3,394	136	-	-	3,530
PULAU PINANG	3,739	2,661	433	-	6,833
Timur Laut/P.Pinang	817	775	14	-	1,606
Barat Daya/P.Pinang	1,085	791	9	-	1,885
Seberang Prai Utara	874	416	23	-	1,313
Seberang Perai Tengah	378	61	17	-	456
Seberang Prai Selatan	585	618	370	-	1,573
PERAK	4,181	7,755	357	-	12,293
Kerian	1,482	2,684	12	-	4,178
Larut&Matang	819	2,245	2	-	3,066
Manjung	1,374	1,377	271	-	3,022
Hilir Perak	506	1,449	72	-	2,027
SELANGOR	3,626	4,660	77	83	8,446
Selangor Utara	1,028	1,568	-	10	2,606
Selangor Tengah	1,091	1,214	2	8	2,315
Pelabuhan Kelang 1	400	700	-	24	1,124
Pelabuhan Kelang 2	751	460	2	1	1,214
Kuala Langat	259	594	55	38	946
Sepang	97	124	18	2	241
NEGERI SEMBILAN	261	227	39	-	527
Port Dickson	261	227	39	-	527
MELAKA	1,100	199	1	90	1,390
Melaka	1,100	199	1	90	1,390
JOHOR	6,993	1,893	1	388	9,275
Muar	1,148	285	-	27	1,460
Batu Pahat	950	477	-	8	1,435

Pontian	1,095	549	-	4	1,648
Johor Bharu-Barat	416	40	-	149	605
Johor Bharu-Timur	440	72	1	186	699
Kota Tinggi Utara (Tg.Sedili)	730	106	-	-	836
Kota Tinggi Selatan (Pengerang)	341	101	-	14	456
Mersing	1,873	263	-	-	2,136
PAHANG	5,087	694	4	71	5,856
Kuantan	2,046	264	-	43	2,353
Pekan	1,634	112	4	-	1,750
Kuala Rompin	1,407	318	-	28	1,753
TERENGGANU	8,600	8	-	-	8,608
Kemaman	1,487	1	-	-	1,488
Dungan	1,141	2	-	-	1,143
Marang	1,266	-	-	-	1,266
Kuala Terengganu Utara	1,001	-	-	-	1,001
Kuala Terengganu Selatan	1,218	-	-	-	1,218
Besut	1,293	-	-	-	1,293
Setiu	1,194	5	-	-	1,199
KELANTAN	4,101	-	-	-	4,101
Kota Bharu	935	-	-	-	935
Bachok and Pasir Putih	1,530	-	-	-	1,530
Tumpat	1,636	-	-	-	1,636
Total	49,370	18,670	915	632	69,587

Number of Local Fishermen Working on Licensed Fishing Vessels by Fisheries Districts, 2013

Climate Change, Fishery Sector and Fishery Extension Agency

Climate change can be understood as an attributed to human activities which solely as a human-caused phenomenon (Muhammad Aliff, 2016), this understanding were developed based on United Nation (UN) framework Convention on Climate Change (United Nation, 1992). That framework defines climate change as '*...a change of climate which is attributed directly or indirectly or indirectly to human activity that alters the composition of global atmosphere and which addition to natural climate variability observed over comparable time periods*'.

Climate change today are phenomena that been acknowledge globally, that is why today there is many research that can prove the impact of climate change on aquaculture and fisheries can change the landscape of world economies. The correlation between climate change and world economy can be traced when world temperature rises dramatically, suddenly the number of fisherman caught decline and increase of price in the market of fish product. Fiji, Solomon Islands, Vanuatu and Timor-Leste now have become a focused for researchers to conduct research for assessing the impact of climate change adaptation strategies (European Union, 2017).

Homes, businesses or other valuable assets are the hardest and expensive thing that needs to be secured from climate change. The way to face this problem as been discuss in most research is by using insurance as the protection mechanisms (Zeckhauser, 1996; Malamud & Turcotte, 2006; RMS, 2006; Slijkerman, 2006). Most of the property that are losses due to climate change happen when weather are frequency and intensity increase to become extreme weather events such as heat waves, droughts and floods. The phenomenon of climate change which already been affected place all over the globe has developed interest among insurance agent to supply availability and affordability of insurance. It has been reported about variability in the type and location of climate change disaster, this situation brings losses to the people, which then increase the need for an insurance policy (Munich Climate Insurance Initiative, 2013).

Other than an insurance policy which can help local fisherman to face and adapt to the impact of climate change, there are also authorities which play their role in Malaysia context. One of these authorities is the Department of Fisheries (DOF) which is under the Ministry of Agriculture Malaysia. This department was given a mandate to develop, manage and regulate the fisheries policy as well as taking action of those who are against the fisheries law.

This department history can be traced in 1894 when they initiated the Colonial Fisheries Unit, which was later put under the Lower Secretary's Office for Southern States in the era of the British colonial. At that time the Colonial Fisheries Unit created by the British Government under the administration of the Lower Secretary for United Malay States and the Straits. There are three main objectives of DOF which is to increase the national fish production, manage the fisheries resources on a sustainable basis, develop a dynamic fisheries industry, intensify the development of fish-based industries and the maximizing the income of the fishing industry. Other than that DOF are responsible for providing extension agent for fishery sector and development of aquaculture in Malaysia.

The authorities also developed Fishery Research Institute (FRI) which placed in each state of Malaysia to help the fishermen to face climate change impacts. This institute vision is to be a centre of excellence in the Tropical Research Centre. In order to achieve that vision FRI is committed to carrying out research in conformity with the requirement of the department and industry, especially in aquaculture field, capture fisheries, fishery product processing, conservation of the aquatic environment, improve the quality and aquatic life based on ethical standards and working practices. The specific department under FRI which reach out for fisherman for extension in aquaculture is The Extension and Transfer of Technology Division.

The other organization that was developed by authorities to help fisherman facing the climate change impacts is Lembaga Kemajuan Ikan Malaysia (LKIM), this body of authorities committed to become an organization that is of quality and always equipped with the capability of providing services of excellent attribute. It has been set for each member of LKIM to focus on advancement and welfare of the fishermen in our Malaysia fisheries industry. There is a lot of contribution have been done by LKIM towards the fishermen community in Malay and one of it is supervising the fish Complexes or Landing Ports throughout the country and certifying at least minimum compliances accorded to as a fish landing port. Another contribution that worth to be mention

of LKIM is implementation of Good Handling Practice in all Complexes or Landing Ports to ensure the supply of fresh and high quality processed fishes which are safe for consumption of Malaysian people. LKIM have been granted the power to determine the market access for fish products. In order to do their duty efficiently, which is ensuring the export market access for the country's fish produce are not obstructed due to the Sanitary and Phytosanitary (SPS) issue, LKIM have collaborated with the Ministry of Health and Malaysian Fishery Department. The most significant achievement of LKIM is when they established Persatuan Nelayan Kawasan (PNK) in each state of Malaysia, the main objective of this association is to enhance the fishermen socioeconomic standing by focusing on the elevation of income and develop as well as the expand of the country's fish industry.

The last body that was developed by authorities to help the fishermen to face climate change impacts is National Fishermen's Association of Malaysia (NEKMAT) since 1985 which involved in fisheries business. This agency is entrusted to handle manufacturing and marketing of fish-based frozen products like fish burger, fish finger, fish ball, fish nugget, squid ball, prawn ball and etc. NEKMAT was also entrusted with three other responsibilities which is first: uplifting the economy and social well-being of the fishermen community, second: increasing yield and income of the fishermen community through increase in production, skills and initiatives and third: give the tranquillity to the members and develop a progressive, independent, united and dedicated fishermen community.

Methodology

This research was conducted at Pekan, Pahang because it is the largest marine fish landing state in Malaysia. There were 150 respondents among the fisherman from various experience, age and others in Pekan, Pahang chose to participate in this research. 50 questions designed in the questionnaire according to Respondents' Profile, Fishing Background and Perception of Respondents towards Climate Change. Malay language has been used in the questionnaire so that the respondents can understand it better. Descriptive analysis and chi-square analysis were used to analyze the data in this research. Demographic of the respondents were analyzed using descriptive analysis. Independent and dependent variables relationship were analyzed using correlation analyses and chi-square analysis were used for Likert questions.

Fishermen's Perception on Climate Change

The frequency, percentage, means and standard deviation is shown in Table 3 for each of the variables in perception towards climate change. The highest mean on climate change is about vigilantly towards the sea statement with 4.47 and the lowest mean is about the difficulty of adaptation statement with 2.66.

Table 3: Perception towards Climate Change

Statements	Frequencies (%)					Mean	S.D
	1	2	3	4	5		
Changes in weather/natural disaster may affect the career and income as a fisherman	0 (0.0)	30 (20.0)	0 (0.0)	33 (22.0)	87 (58.0)	4.18	1.165
I find it difficult to adapt to climate change	0 (0.0)	83 (55.3)	35 (23.3)	32 (21.3)	0 (0.0)	2.66	0.810
Changes in weather/natural disaster suddenly caused me to have to be vigilant when it comes down to the sea	0 (0.0)	0 (0.0)	0 (0.0)	80 (53.3)	70 (46.7)	4.47	0.501
With unpredictable weather conditions now will affect fishing activities	0 (0.0)	0 (0.0)	25 (16.7)	46 (30.7)	79 (52.7)	4.36	0.753
I am confident that with the experience and knowledge available, I can cope with climate change now	0 (0.0)	0 (0.0)	28 (18.7)	79 (52.7)	43 (28.7)	4.10	0.683
Total Average Mean						3.95	0.782

Note: 1: strongly disagree, 2: disagree, 3: uncertain, 4: agree, 5: strongly agree

Table 4 shows that 3.95 is the total average mean for is perception towards climate change. Majority of the respondents' perception towards climate change is high which is 52.7% and the rest which is 47.3% is moderate. Not a single respondent has a low level perception towards climate change.

Table 4: Perception towards Climate Change

Level	Frequency	Percentage	Mean	S.D
High (3.67-5.0)	79	52.7	3.95	0.562
Moderate (2.34-3.66)	71	47.3		
Low (1-2.33)	0	0		
Total	150	100		

The frequency, percentage, means and standard deviation for each of the variables in the level of interest in adapting to climate change is shown in Table 5. The highest mean is about technologies and method statement with 4.50 and the lowest mean is about willingness to spend money statement with 2.60.

Table 5: Level of Interest in Adapting to Climate Change

Statements	Frequencies (%)					Mean	S.D
	1	2	3	4	5		
I like to learn new skills (other than fishing)	0 (0.0)	0 (0.0)	0 (0.0)	82 (54.7)	68 (45.3)	4.45	0.499
To learn new skills is not difficult for me	0 (0.0)	11 (7.3)	33 (22.0)	66 (44.0)	40 (26.7)	3.90	0.880
I am interested to know about fishing technologies and methods appropriate for this climate change	0 (0.0)	0 (0.0)	0 (0.0)	75 (50.0)	75 (50.0)	4.50	0.502
I am interested to learn more about climate change/disaster (cause, effect on the environment, marine life and the community)	0 (0.0)	0 (0.0)	0 (0.0)	99 (66.0)	51 (34.0)	4.34	0.475
I am willing to spend money to learn to deal with changing weather/natural disasters.	49 (32.7)	0 (0.0)	63 (42.0)	38 (25.3)	0 (0.0)	2.60	1.187
Total Average Mean						3.96	0.709

Note: 1: strongly disagree, 2: disagree, 3: uncertain, 4: agree, 5: strongly agree

Table 6 shows the total average mean for the level of interest in adapting to climate change which is 3.96. Majority of respondents' perception towards level of interest in adapting to climate change is high which is 70.7% and the rest is on moderate level which is 29.3%. Not a single respondent has a low level perception towards level of interest in adapting to climate change.

Table 6: Level of Interest in Adapting to Climate Change

Level	Frequency	Percentage	Mean	S.D
High (3.67-5.0)	106	70.7	3.96	0.314
Moderate (2.34-3.66)	44	29.3		
Low (1-2.33)	0	0		
Total	150	100		

Table 7 shows the frequency, percentage, mean and standard deviation for each of the variables inability to cope with climate change/natural disasters. The variable of stress has the highest mean which is 4.19 and the variables of savings have the lowest mean which is 3.45.

Table 7: Ability to cope with Climate Change/Natural Disasters

Statements	Frequencies (%)					Mean	S.D
	1	2	3	4	5		
I was able to continue living with family with income as a fishermen although there is climate change	0 (0.0)	0 (0.0)	79 (52.7)	59 (39.3)	12 (8.0)	3.55	0.640
Climate change makes me worry	0 (0.0)	0 (0.0)	55 (36.7)	16 (10.7)	79 (52.7)	4.16	0.935
Climate change brings pressure (stress) to me as it affected catches	0 (0.0)	0 (0.0)	25 (16.7)	72 (48.0)	53 (35.3)	4.19	0.699
I have enough savings to cope with any possibility	0 (0.0)	0 (0.0)	82 (54.7)	68 (45.3)	0 (0.0)	3.45	0.499
I have enough supplies to cope with any changes in the weather/natural disasters	0 (0.0)	0 (0.0)	59 (39.3)	91 (60.7)	0 (0.0)	3.61	0.490
Total Average Mean						3.79	0.653

Note: 1: strongly disagree, 2: disagree, 3: uncertain, 4: agree, 5: strongly agree

Table 8 shows the total average mean for the ability to cope with climate change/natural disasters which is 3.79. The majority of respondents have a high level of perception towards ability to cope with climate change/natural disaster which is 58.0%, the rest of respondents are on the moderate level. Not a single respondent has a low level perception towards ability to cope with climate change/natural disasters.

Table 8: Ability to cope with Climate Change/Natural Disasters

Level	Frequency	Percentage	Mean	S.D
High (3.67-5.0)	87	58.0	3.79	0.338
Moderate (2.34-3.66)	63	42.0		
Low (1-2.33)	0	0		
Total	150	100		

Fishermens' Perception on Fishery Agencies and Extension Activities

Tables 9 represent agencies that involve with respondents. From the result, about 94% of respondents give an answer that LKIM has involve and come to visit them. While about 80.7% of respondent said that the Department of Fishery (DOF) has involve or come to visit them.

Table 9: Agencies involve with Respondents

Agencies	Percentage (%)
Department of Fishery	80.7
LKIM	94.0

Table 10 represents respondents' involvement in Fishery Association. From the result, all respondents were in a District Fisherman Association which comprises 100.0%. Among of them, 25.3% and 38% of respondents joined NEKMAT and fisheries cooperation respectively.

Table 10: Respondents Involvement in Fishery Association

Fishery Association	Percentage (%)
NEKMAT	25.3
District Fishermen Association	100.0
Fisheries Cooperation	38.0

Table 11 represents the number of times fishery officers visit per year. From the result, the number of visit around 1-2 times has a frequency of 63 with 42.0% while the number of visit that is more than 6 times has a frequency of 87 with 58.0%.

Table 11: Number of Times Fishery Officers visit per Year

Number of Times	Frequency	Percent (%)
1-2	63	42.0
>6	87	58.0

Table 12 represents the frequency of contact from fishery officers. From the result, the number of contact once a month has a frequency of 95 with 63.3%. For number of contact 4 times in a year, the frequency is 22 with 14.7%. Meanwhile, for 2 times contact in a year are 33 frequencies with 22.0%.

Table 12: Frequency of Contact from Fishery Officers

Contact	Frequency	Percent (%)
Once a month	95	63.3
4 times a year	22	14.7
2 times per year	33	22.0

Table 13 shows the frequency, percentage, mean and standard deviation for each of the variables in perception on fishery agencies. The highest mean is on "Programs and activities implemented by the fisheries agency is appropriate to the times and the needs of fishermen" statement with 4.47 and the lowest mean is on "Fisheries agency transfer technology quickly to fisherman as soon as they are introduced" statement with 4.12.

Table 13: Perception on Fishery Agencies

Statements	Frequencies (%)					Mean	S.D
	1	2	3	4	5		
Fisheries agencies do their jobs well and effectively	0 (0.0)	0 (0.0)	38 (25.3)	41 (27.3)	71 (47.3)	4.22	0.826
Programs and activities implemented by the fisheries agency is appropriate to the times and the needs of fishermen	0 (0.0)	0 (0.0)	0 (0.0)	79 (52.7)	71 (47.3)	4.47	0.501
Training and visits by fishery officers are conducted regularly	0 (0.0)	0 (0.0)	25 (16.7)	54 (36.0)	71 (47.3)	4.31	0.741
Fisheries agency transfer technology quickly to fishermen as soon as they are introduced	0 (0.0)	0 (0.0)	25 (16.7)	82 (54.7)	43 (28.7)	4.12	0.665
Programs implemented by fisheries agencies have a positive impact on fishermen	0 (0.0)	0 (0.0)	38 (25.3)	41 (27.3)	71 (47.3)	4.22	0.826
Facilities provided in courses and training sessions are sufficient	0 (0.0)	0 (0.0)	25 (16.7)	38 (25.3)	87 (58.0)	4.20	0.777
Total Average Mean						4.25	0.722

From the Table 14, the total average mean perception on fishery agencies is 4.25. There are 78.0% of respondents perceived in high level, 22.0% of respondents perceived in moderate level and no one of the respondent perceived in low level. Therefore, the majority of the perception level of respondents are in high level towards perception on fishery agencies.

Table 14: Perception on Fishery Agencies

Level	Frequency	Percentage	Mean	S.D
High (3.67-5.0)	117	78.0	4.25	0.645
Moderate (2.34-3.66)	33	22.0		
Low (1-2.33)	0	0		
Total	150	100		

Table 15 shows the frequency, percentage, mean and standard deviation for each of the variables in opinion on fishery agency in helping respondents. The highest mean is on “I am satisfied with the assistance of the fisheries agency.” statement with 4.58 and the lowest mean is on “There are no specific provisions to help fishermen” statement with 3.10.

Table 15: Opinion on Fishery Agency in Helping Respondents

Statements	Frequencies (%)					Mean	S.D
	1	2	3	4	5		
I am satisfied with the assistance of the fisheries agency.	0 (0.0)	0 (0.0)	0 (0.0)	63 (42.0)	87 (58.0)	4.58	0.495
Fisheries agencies working in earnest to help the fishermen.	0 (0.0)	0 (0.0)	63 (42.0)	0 (0.0)	87 (58.0)	4.16	0.990
There are no specific provisions to help the fishermen	0 (0.0)	25 (16.7)	97 (64.7)	16 (10.7)	12 (8.0)	3.10	0.766
Total Average Mean						3.94	0.750

From the Table 16, the total average mean for opinions on fishery agency in helping respondent is 3.94. There are 58.0% of respondents perceived in high level, 42.0% of respondents perceived in moderate level and no one of the respondent perceived in low level. Therefore, majority of the perception level of respondents is in high level towards the opinion on fishery agency in helping respondents.

Table 16: Opinion on Fishery Agency in Helping Respondents

Level	Frequency	Percentage	Mean	S.D
High (3.67-5.0)	87	58.0	3.94	0.671
Moderate (2.34-3.66)	63	42.0		
Low (1-2.33)	0	0		
Total	150	100		

Table 17 shows the frequency and percentage of helping level of fishery agencies. There is 66.7% respondent agreed that fishery agencies are helpful while 25.3% state that fishery agencies are half helpful. On top of that, 8.0% of the respondent state that fishery agencies are not helpful.

Table 18: Helping Level of Fishery Agencies

Helping Level	Frequency	Percent (%)
Help	100	66.7
Half Helpful	38	25.3
Not Helping	12	8.0

Table 19 shows the contribution of fishery agencies and extension program. There are 100% of respondents with statement "It gives me access to important information". Other than that, 30.7% of respondents responded on the statement of "It provides an interactive training session" while 70.0% responded on the statement of "It provides information easier". Never the least, 15.3% responded on the statement of "It creates space for verification of information and feedback with ease".

Table 19: Contribution of Fishery Agencies and Extension Program

Contribution Agencies and Program	Percentage (%)
It gives me access to important information	100
It provides an interactive training session	30.7
It provides an information easier	70.0
It creates space for verification of information and feedback with ease	15.3

Table 20 shows the frequency, percentage, mean and standard deviation for each of the variables in perception on fishery extension service. The variable of “Fisheries agencies provide support for any activity or program carried out by fishermen” has the highest mean (4.76), and the variable with the lowest mean (4.09) is “Activities provided quite interesting and not boring” statement.

Table 20: Perception on Fishery Extension Service

Statements	Frequencies (%)					Mean	S.D
	1	2	3	4	5		
Fisheries agencies provide information on programs or activities that they run	0 (0.0)	12 (8.0)	0 (0.0)	79 (52.7)	59 (39.3)	4.23	0.814
Fisheries agencies make programs and activities regularly	0 (0.0)	0 (0.0)	25 (16.7)	38 (25.3)	87 (58.0)	4.41	0.761
Fisheries agencies implement programs and activities successfully and effectively	0 (0.0)	0 (0.0)	38 (25.3)	25 (16.7)	87 (58.0)	4.33	0.855
Fisheries agencies monitor the activities and programs implemented	0 (0.0)	0 (0.0)	25 (16.7)	49 (32.7)	76 (50.7)	4.34	0.855
Agency fisheries make an assessment of the program or activity that has been made	0 (0.0)	0 (0.0)	25 (16.7)	35 (23.3)	90 (60.0)	4.43	0.763
Fisheries agencies provide support for any activity or program carried out by fishermen	0 (0.0)	0 (0.0)	0 (0.0)	36 (24.0)	114 (76.0)	4.76	0.429
Activities provided quite interesting and not boring	0 (0.0)	0 (0.0)	25 (16.7)	87 (58.0)	38 (25.3)	4.09	0.644
Courses are given appropriate for my fishery problem	0 (0.0)	0 (0.0)	0 (0.0)	63 (42.0)	87 (58.0)	4.58	0.495
Training courses have helped me solve some of the problems in this sector	0 (0.0)	0 (0.0)	0 (0.0)	92 (61.3)	58 (38.7)	4.39	0.489
Total Average Mean						4.39	0.678

From the Table 21, the total average mean for is 4.39. There are 83.3% of respondents perceived in high level, 16.7% of respondents perceived in moderate level and no one of the respondents perceived in low level. Therefore, the majority of the perception level of respondents is in high level towards perception on fishery extension service.

Table 21: Perception on Fishery Extension Service

Level	Frequency	Percentage	Mean	S.D
High (3.67-5.0)	125	83.3	4.39	0.441
Moderate (2.34-3.66)	25	16.7		
Low (1-2.33)	0	0		
Total	150	100		

Table 22 shows the frequency, percentage, mean and standard deviation for each of the variables in opinion on fishery extension service related to climate change. The highest mean is on “Fisheries agencies implement programs on climate change/natural disasters effectively” statement with 4.25 and the lowest mean is on “Fisheries agencies provide exposure through the use of flyers” statement with 1.88.

Table 22: Opinion on Fishery Extension Service related to Climate Change

Statements	Frequencies (%)					Mean	S.D
	1	2	3	4	5		
Fisheries agencies give a clear explanation of climate change/natural disasters	0 (0.0)	0 (0.0)	38 (25.3)	65 (43.3)	47 (31.3)	4.06	0.753
Fisheries agencies hold regular programs and activities because of climate change/natural disasters	0 (0.0)	0 (0.0)	84 (56.0)	38 (25.3)	28 (18.7)	3.63,	0.782
Fisheries agencies provide exposure through the use of flyers.	112 (74.7)	0 (0.0)	10 (6.7)	0 (0.0)	28 (18.7)	1.88	1.580
Fisheries agencies implement programs on climate change/natural disasters effectively	0 (0.0)	0 (0.0)	0 (0.0)	112 (74.7)	38 (25.3)	4.25	0.436
Fisheries agencies provide support for any activity or program for climate change/natural disasters	0 (0.0)	0 (0.0)	0 (0.0)	112 (74.7)	38 (25.3)	4.25	0.436
Courses are given appropriate in the circumstances and issues about climate change/natural disaster	0 (0.0)	0 (0.0)	46 (30.7)	28 (18.7)	76 (50.7)	4.20	0.882

Training courses and help solve some problems about climate change/natural disasters	0 (0.0)	0 (0.0)	84 (56.0)	17 (11.3)	49 (32.7)	3.77	0.915
Total Average Mean						3.73	0.826

From the Table 23, the total average mean for opinions on fishery extension service related to climate change is 3.73. There are 61.33% of respondents perceived in high level, 38.7% of respondents perceived in moderate level and no one of the respondents perceived in low level. Therefore, the majority of the perception level of respondents is in high level towards opinion on fishery extension service related to climate change.

Table 2.14: Opinion on Fishery Extension Service related to Climate Change

Level	Frequency	Percentage	Mean	S.D
High (3.67-5.0)	58	61.3	3.72	0.713
Moderate (2.34-3.66)	92	38.7		
Low (1-2.33)	0	0		
Total	150	100		

Conclusion

Based on the result, the fishermen are interested to learn more about climate change and can adapt if necessary. This situation occurred because most of the fishermen know about climate change or disaster and the effect of it would cause them trouble. The result also shows that socio demographic profiles of respondents give negative relationship to respondents' perception towards climate change. All of this data have open a portal for government and NGO to collaborate with fishermen to find adaptation methods and fishermen themselves are more than ready to received assistants so they can adapt to climate change. This research also concluded that the perception of respondents towards extension organization and activity are high. The results also show that extension agents' work efficiently and they satisfied with the training provided by the Department of Fishery extension agents. The result shows that the respondents really think that programs and activities given by DOA had solved some of their fishery farming problems. It is fair to say that this research have developed discourse on adaptation in Malaysia context, from the result of this research a further strategic planning on joint venture between fisherman and government agency can be arrange. As the final conclusion, the major finding of this research show that perception respondents toward extension service in term of climate change is in high level which shows that agencies are concern toward well being of fishermen in Pekan.

Recommendation

This research have raised the question of importance of relationship between fisherman and government agency. This question have been answered with claim by the respondents regarding improvement of extension officers to increase their visits in order to understand the perception that has been faced by fisherman towards climate change. This action will affect fishermen potential with receiving new knowledge which directly affects fishery product and live quality. Department of Fisheries (DOF) plays important roles to assist the fishermen in managing their fishery product because most of the fishermen are depending on their guidance. However, there

are some respondents said that they had no chance to joined training, courses and extension activities provided by DOF as an extension agent. The issue of time, place and information restriction played it roles to restrained fisherman from receiving training from DOF. Extension agents should think of some mechanism to tracked fisherman that have the problem of getting training or information from DOF. Further research is needed to investigate and evaluate the satisfaction of respondents towards quality of extension and advisory service provided by DOF included problem faced by DOF towards their extension program.

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