

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY: APPLIED BUSINESS AND EDUCATION RESEARCH

2023, Vol. 4, No. 6, 2045 – 2074

<http://dx.doi.org/10.11594/ijmaber.04.06.29>

Research Article

Level of Awareness on the Impact of Climate Change on the Socioeconomic Lite of a Coastal Community in San Salvador Island, Masinloc, Zambales

Myra Liza O. Vizcarra*

President Ramon Magsaysay State University, Masinloc, Zambales, Philippines

Article history:

Submission June 2023

Revised June 2023

Accepted June 2023

*Corresponding author:

E-mail:

mlovizcarra@gmail.com

ABSTRACT

The researcher's interest in their well-being led her to study the level of awareness of the impact of climate change on the socioeconomic life of the coastal communities in San Salvador Island. This study is a descriptive type of research. A descriptive study gives a picture and describes the different aspects concerning a situation to obtain knowledge of nature, states, and development. This current study was conducted at San Salvador Island. It is an island barangay in Masinloc, Zambales, in northwest Luzon. It is an island barangay in Masinloc, Zambales, in northwest Luzon. A 127-hectare fish sanctuary and a nearby Taklobo or Giant Clam Farm are usual attractions to diving enthusiasts. Encourage planting mangroves in the vicinity of the island as part of the extension service of the campus. Conduct a follow-up study on fishermen's vulnerability, resiliency, and mitigation practices. They are considered priority barangay in the Climate Change Awareness joint project of the PRMSU-Masinloc LDRRMP and CENRO-Masinloc to enhance the fishermen's awareness and adaptation. Support from the local government unit by having a store filled with more goods and over-the-counter medicines, especially during rainy seasons. May have a routine check by a professional doctor before rainy seasons. Probable additional livelihood to augment needs, particularly during the rainy season.

Keywords: *Awareness, Coastal community, Climate change, Socioeconomic life*

Introduction

The Earth's climate has changed throughout history. In the last 650,000 years, there have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age about 7,000 years ago marking the beginning of

the modern climate era and human civilization. (Shaftel, et al, 2017)

Today, global climate change is one of humanity's most significant challenges. Within the next fifty (50) years, global warming will increase to the detriment of the world's

How to cite:

Vizcarra, M. L. O. (2023). Level of Awareness on the Impact of Climate Change on the Socioeconomic Lite of a Coastal Community in San Salvador Island, Masinloc, Zambales. *International Journal of Multidisciplinary: Applied Business and Education Research*. 4(6), 2045 – 2074. doi: 10.11594/ijmaber.04.06.29

population. Weather extremities such as droughts, floods, and cyclones will occur more frequently and forcefully, causing insecure living conditions, food shortages, and forced migration. (Müller-Kuckelberg, 2012)

According to the US Secretary of State, Climate change is a global challenge that threatens every nation, whether large or small, wealthy or poor. The threat is severe, it is urgent, and it is growing. Research studies showed its connection to global natural disasters that have tremendous effects (Kabir et al., 2016) on the socioeconomic and related sectors, including water resources, agriculture and food security, human health, terrestrial ecosystems, biodiversity, and coastal zones. (UNFCCC, 2007) The impact is becoming more apparent as the understanding of climate change increases. (Thomas, 2008)

Many countries worldwide are experiencing socioeconomic crises due to the effects of climate change, which is regarded as a significant concern at both the national and international levels. More than 190 countries convened in Doha in 2012 for the Conference of the Parties (COP) to meet and discuss the critical steps needed to combat climate change. It has been stated in many reports how climate change is impacting the planet. (Laila, 2013)

Using 2013 data, the Global Climate Risk Index 2015 named the Philippines the most affected country by climate change. Since the Philippines is located in the western Pacific Ocean, it is surrounded by naturally warm waters that will likely get even warmer as average sea-surface temperatures rise (Haiyan, 2016). Climate change, particularly rising sea levels and more intense storms will significantly change coastal zones in forthcoming years. (Hanson-Easy, 2016). That means substantial shifts in warming and rainfall levels. Droughts will be more extreme and frequent, as will typhoons and flooding. Typhoon Yolanda, the world's biggest typhoon to make landfall in modern history, tore over a significant chunk of the country not long ago. The devastation from that typhoon catapulted the Philippines to the top of the list of the most vulnerable countries to climate change. (Rappler, 2017)

The Philippines is a large coastal community with around 70 million people. The country's coastline is more than 18,000 kilometers long, and its coastal waters span an area of 266,000 square kilometers. Seventy percent of its 1,500 municipalities are located around the coast, home to millions of people. (www.one-ocean.org) Since coastal zones are highly vulnerable to climate change (IPCC, 2007), those living along the coasts are also the most affected. Coastal areas are likely to be more vulnerable to climate change than inland areas because, in addition to changes in flooding, temperature, and precipitation, they will also be affected by a rise in sea level and wave heights and accelerated erosion. (Zsomboky, 2011)

With a coastline of 34 000 kilometers, the Philippines is concerned about the potential implications and reactions to increased sea level rise. Inundation (submergence) of low-lying wetland and dryland areas, erosion, saltwater intrusion, increased danger of floods, and storm damage are all physical repercussions of sea level rise. In turn, these physical changes may cause substantial socioeconomic losses of coastal structures, both natural and artificial, and dislocation of the population and change of livelihood. (Perez et al., 2016)

As climate change poses difficult conditions common to Philippine communities, it is anticipation that small islands are on the frontlines of global climate change and are said to be more vulnerable, like San Salvador, locally known as "Pulo," which encompasses a stretch island parallel to the Zambales mainland. The island is 30 minutes away from the mainland via motorboat. The reef is bordering and distinguished by a somewhat broad, gently sloping reef flat. Fishing (64%), farming (23%), trading (4%), and service-related occupations (9%) support village households. Until now, fishing has remained the leading economic activity. Most inhabitants live along the barangay's shoreline, split into sitios. Within each sitio, occupation, cultural backgrounds, and family ties are relatively homogeneous. Every household head fishes for their families' sustenance, and every household owns at least one motorized or manually driven banca.

For their other needs, they must take a 30-minute journey to buy and avail of medical services on the mainland. Their life is somewhat tricky, especially during rainy seasons when a typhoon becomes more frequent and intense. As observed, the fishermen were most affected during those times. Moreover, Climate Change is one aspect or explanation of how the livelihood of fishermen can be threatened due to extreme heat and heavy rains. Having these unavoidable problems they face, awareness plays a vital role so they can cope. Climate change awareness is concerned with the environment and is a developing issue in countries more concerned with poverty reduction, food insecurity, and other issues. There needs to be more awareness of climate change in developing countries (IPCC, 1996). How they are being affected becomes a concern and a challenge. Awareness and understanding of climate change play a significant role in adapting to these unpredictable but certain phenomena. The researcher's interest in their well-being led her to study the level of awareness of the impact of climate change on the socioeconomic life of the coastal communities in San Salvador Island.

Methods

Research Design

This study is a descriptive type of research. A descriptive study gives a picture and describes the different aspects concerning a situation to obtain knowledge of the nature, states and development of a situation. According to Monly (1984), survey is more realistic than experiment because it investigates phenomenon in its natural setting.

Respondents and Location

One hundred forty three (143) fishermen were employed as respondents of this study. The respondents were randomly selected from the different sitios of the community, namely Cabangon, Daliwriw, Panayunan, Libaba, Dalulak, Mabaklang.

The research was carried out on San Salvador Island. It is an island barangay located in the municipality of Masinloc, Zambales, in northwestern Luzon. Divers are often drawn to a 127-hectare fish refuge and a neighboring

Taklobo or Giant Clam Farm. It is situated in the western outskirts of Masinloc, a municipality in northern Zambales. The island is around 2.5 kilometers from the mainland, or a 20-30 minute pump-boat journey from the coast of the municipal hall. Because of its richness of aquatic resources, it is best known as a scuba diver's paradise. On top of that, San Salvador has the world's sweetest mangoes, as determined by the Guinness Book of World Records for five consecutive years.)

Instrument

As a descriptive-survey type of research, the main tool of this study to gather data was the questionnaire checklist. To be able to prepare a questionnaire that would answer its objectives, the researcher reviewed various literatures and studies, and conducted informal interviews with some of the residents. Their life in the island as well as their livelihood, and their experiences during rainy and dry seasons were the focus of the simple interview. Then the researcher compiled and summarized the result. She also consulted the expertise of professors in the university whose major is on fishery. Comparing the notes derived from the interview and consultations, the researcher then adopted the work from Olutegbe (2015), Carr (2016), Zsamboky(2011).

The questionnaire prepared has four (4) parts. Part I contains the profile of the respondents as to age, sex, civil status, length of stay in the island, household income, number of household members, number of children in the household, number of aged household member, number of women in the household and source of information. Part II, contains ten (10) statement indicators that will determine the level of awareness to climate change. Fifteen (15) statement indicators were used in Part III, that will assess the adaptation practices of fishermen. Part IV identifies the impact of climate change on the livelihood, health & goods and services with eight(8), six(6) and five(5) statement indicators respectively.

The researcher sought the help of a Filipino teacher to check the translation of the instrument to Filipino. In consideration of the educational background, translation was necessary

for comprehension of the fishermen-respondents.

Data Collection

Pilot study was conducted among ten (10) fishermen to test the instrument. There were items included and some removed to conform to the setting and practice of the subjects. After modification, the researcher sought permission from Hon. Aureliano Ermita Ebarle Jr., the Barangay Captain of San Salvador, for the actual study. His support and assistance was sought to gather the respondents for the focus group. When he called for the meeting, only thirty five (35) fishermen came because it was raining. This is twenty-four percent of the respondents. In the succeeding meetings, the focus group discussions was organized with the help of a known resident in the Island. Because of a limited space, four meetings were held in two consecutive days due to a limited or small venue. It also facilitated the discussion. The purpose of the study was explained to them, giving emphasis that it was only for academic use and no promise of support or aid will be given. They were cooperative, and shared their experiences in relation to the content of the instrument. The

target retrieval rate of hundred percent was achieved.

Data Analysis

The data collected were organized, tallied and tabulated in an excel spreadsheet. Statistical tools were used to derive the answers on the research questions for this study, to wit:

1. Percentage

The percentage and frequency distributions was used to classify the respondent’s profile according to age, sex, civil status, highest educational, length of stay in the island, household income, number of household members, number of children household members, number of aged household members, number of women household members and source of information.

2. Weighted Arithmetic Mean

It was used to determine the descriptive nature of the responses of the respondents on their perceptions on level of awareness, adaptation practices and level of impact of climate change to socioeconomic life.

3. ANOVA Analysis of Variance (ANOVA)

This was used to determine if there is a significant difference among the variables in the study.

Source of Variation	Sum of Squares	Degree of Freedom	Mean Square	Computed F
Between Columns	SSB	k-1	$MSB = \frac{SSB}{k-1}$	$F = \frac{MSB}{MSW}$
Within Columns	SSW	k(n-1)	$MSW = \frac{SSW}{k(n-1)}$	

Where:

- F = f – test
- K = number of columns
- SSB = sum of squares between columns
- SSW = sum of squares within columns
- MSB = Mean Square for between columns
- MSW = Mean Square for within columns
- k -1 & k(n-1) = degrees of freedom

Point	Weight Value	Qualitative Interpretation
5	4.20 – 5.00	Strongly Agree (SA)
4	3.40 -4.19	Agree (A)
3	2.60 -3.39	Moderately Agree (MA)
2	1.80 -2.59	Disagree (DA)
1	1.00 -1.79	Strongly Disagree (SDA)

Decision Rule:

If the computed P Value is greater than (>) 0.05 Alpha Level of Significance, Accept the Null Hypothesis and Reject the Alternative.

An r from 0.00 to ± 0.20 denotes negligible correlation.

An r from ± 0.21 to 0.40 denotes low or slight correlation

An r from ± 0.41 to ± 0.70 denotes marked or moderate relationship

An r from ± 0.71 to ± 0.90 denotes high relationship

An r from ± 0.91 to ± 0.99 denotes very high relationship

An r from ± 1.00 denotes perfect correlation

4. Pearson Product Moment coefficient of Correlation.

This was used to determine the significant relationship that exists between level of awareness and the dimension on the level of impact of climate change, and the relationship between level of awareness and adaptation practices.

5. Interpretation of Data

Likert Scale Method was used to provide data interpretation on the level of awareness, adaptation practices and level of impact of climate change.

Interpretation of the correlated values

According to Calmorin (2004), to interpret correlation value obtained, the following classification may be applied:

Table 1. Likert Scale Used to Interpret the Perception Towards Level of Awareness

Point	Weight Value	Qualitative Interpretation
5	4.20 – 5.00	Very Much Aware (VMA)
4	3.40 -4.19	Much Aware (MA)
3	2.60 -3.39	Moderately Aware (MA)
2	1.80 -2.59	Less Aware (LA)
1	1.00 -1.79	Not Aware (NA)

Table 2. Likert Scale Used to Interpret the Perception Towards Adaptation Practices

Point	Weight Value	Qualitative Interpretation
5	4.20 – 5.00	Strongly Agree (SA)
4	3.40 -4.19	Agree (A)
3	2.60 -3.39	Moderately Agree (MA)
2	1.80 -2.59	Disagree (DA)
1	1.00 -1.79	Strongly Disagree (SDA)

Table 3. Likert Scale Used to Interpret the Perception Towards Impact of Climate Change

Point	Weight Value	Qualitative Interpretation
5	4.20 – 5.00	Very Much Affected(VMA)
4	3.40 -4.19	Much Affected (MuA)
3	2.60 -3.39	Moderately Affected (MA)
2	1.80 -2.59	Less Affected (LA)
1	1.00 -1.79	Not Affected (NA)

Results and Discussion

1. Profile of Respondents

1.1 Age

Table 4 presents the frequency and percentage distribution of respondent according to age.

Table 4. Distribution of Respondents' Age

Age (years)	Frequency	Percent
20-below	1	0.69
21-25	7	4.90
26-30	18	12.59
31-35	19	13.29
36-40	23	16.08
41-45	17	11.89
46-50	13	9.09
51-55	8	5.59
56-60	3	2.10
61-65	4	2.80
66 & above	30	20.98
Total	143	100.00
Mean = 44.96		

Out of the 143 fishermen-respondent, there were 30 or 20.98 % under the age bracket 66 & above; 23 or 16.08% under the age bracket 36-40; 19 or 13.29% under the age bracket 31-35; 18 or 12.59% under the age bracket 26-30; and 1 or 0.69 % under age bracket 20-below. The mean age of the fishermen-respondent is 44.96. This is the middle adulthood.

This period is commonly known as “mid-life” or the period between young adulthood and old age. This is a lifespan when many people have acquired a particular vocational ex-

pertise that makes them uniquely more qualified and capable. This is the height of their career, which also means increased job responsibilities. They typically need to simultaneously manage a variety of family issues including children at various ages of development, ill parents and financial concerns and worries.

1.2 Civil Status

The frequency and percentage distribution of respondents according to civil status is shown in Table 5.

Table 5. Distribution of Respondents' Civil Status

Civil status	Frequency	Percent
Single	22	15.40
Married	113	79.00
Separated	1	0.70
Widow	6	4.20
Missing data	1	0.70
Total	143	100.00

Respondents who are Married is 113 or 79.00%; Single is 22 or 15.40%; Widow is 6 or 4.20%; Separated is 1 or 0.70%. There was 1 or 0.70% Missing data. Majority of the respondents is Married.

This implies that settlers in the island are mostly a family. A married status is when a couple living together as husband and wife, legally or consensually. (Ocampo, 2017). The

discussion revealed that the couple are legally living together. The fishermen confirmed that they started living in the island since they were married.

1.3 Sex

The frequency and percentage distribution of respondents according to sex is shown in Table 6.

Table 6. Distribution of Respondents' Sex

Sex	Frequency	Percent
Male	110	76.90
Female	32	22.40
Missing data	1	0.70
Total	143	100.00

Out of 143 fishermen-respondent, there were 110 or 76.90% Male and 32 or 22.40% Female. There was 1 or 0.70% Missing Data. Majority is Male.

Fishing is an activity more popular among men. Literature about fishing practices and fishing communities usually describes men as the central protagonists of this activity. (Ferreira, 2014). The fishermen confirmed that

fishing is what constitutes a majority of activity in the island. This is their primary means to survive since their residence is in the island.

1.4 Length of Stay in the Island

The frequency and percentage distribution of respondents according to length of stay in the island is shown in Table 7.

Table 7. Distribution of Respondents' Length of Stay in the Island

Length of stay in the island (years)	Frequency	Percent
10 and below	8	5.59
11-20	9	6.29
21-30	31	21.68
31-40	33	23.08
41-50	43	30.07
51-60	16	11.19
60 and above	3	2.10
Total	143	100.00
Mean = 36.27		

The fishermen-respondent with a length of stay in the island for 41-50 years is 43 or 30.07%; 33 or 23.08% who have stayed for 31-40 years; 31 or 21.68% who have stayed for 21-30 years; 16 or 11.19% who have stayed for 51-60 years; 9 or 6.29% who have stayed for 11-20 years; 8 or 5.59% who have stayed for 10 years and below; and 3 or 2.10% who have stayed for 60 years and above. The mean length of stay in the island is 36.27 years.

This result implies that the island is already the permanent residence of the fishermen. The fisher folks stated that they are already residing in San Salvador Island since they were born. It is where they studied their elementary

grades, spent their childhood life and that all their activities are centered in the island. They affirmed their peaceful life and enjoyed close ties with their neighborhood. More recent scientific studies that generally those who live in the coast of somewhere beautiful are indeed happier and healthier. Relationship are more thin knit, neighbors help neighbors, and bonds are formed.(Century 21, 2018)

1.5 Highest Educational Attainment

The frequency and percentage distribution of respondents according to the highest educational attainment shown in Table 8.

Table 8. Distribution of Respondents' Highest Educational Attainment

Highest educational attainment	Frequency	Percent
Elementary Level	17	11.89
Elementary Graduate	27	18.88
High School Level	30	20.98
High School Graduate	44	30.77
Post Graduate	2	1.40
Vocational Undergraduate	4	2.80
Vocational Graduate	12	8.39
College Undergraduate	3	2.09
College Graduate	4	2.80
Total	143	100.00

The fishermen-respondent who are High School Graduate is 44 or 30.77%; at High School Level is 30 or 20.98%; Elementary Graduate is 27 or 18.88%; at Elementary Level is 17 or 11.89%; Vocational Graduate is 12 or 8.39%; both Vocational Undergraduate and College Graduate is 4 or 2.80%; College Undergraduate is 3 or 2.09%; and Post-Graduate is 2 or 1.40%. Majority is High School Graduate.

It refers to the formal schooling of an individual from school to the university degree.(Parganiha, 2016) The result indicates that the fishermen are non-degree holders. They claimed that their family were not able to send them to college due to lack of financial resources. So when they have finished high

school, they become helpers in fishing and other household chores. Meanwhile, the degree holders affirmed that they preferred to stay in the island and just help in fishing. According to them, to work elsewhere to practice their degree would entail leaving their family or living in a separate house which would be an additional expense to them. Thus, they decided to stay. These are fisher folks who have other members in the family who are also working and content themselves with what they have.

1.6 Household Income

The frequency and percentage distribution of respondents according to household income is shown in Table 9.

Table 9. Distribution of Respondents' Household Income

Household income	Frequency	Percent
Below 5000	94	65.70
5,001.00-10,000.00	25	17.50
10,001.00-15,000.00	15	10.50
15,001.00-20,000.00	5	3.50
20,001.00-25,000.00	3	2.10
25,001 - 30,000.00	1	0.70
Total	143	100.00
Mean = 5,542.13		

The family with income bracket of below 5,000.00 is 94 or 65.70%; those with income bracket of 5,001.00-10,000.00 is 25 or 17.50%; those with income bracket of 10,001.00-15,000.00 is 15 or 10.50%; with income bracket of 15,001.00-20,000.00 is 5 or 3.50%; with income bracket of 20,001.00-25,000.00 is 3 or 2.10%; and 1 or 0.70 with income bracket

of 25,001.00 above. The mean household income is **5,542.13**.

The result is indicative that the fisher folks are living below the minimum income level, thus, belong to the poverty level. According to the Income Classes in the Income Distribution, the per capita income less than official poverty level is considered poor.(Albert, et al,2015) In

fact, majority have hardly means to survive. The fishermen claimed that the income they derive is dominantly from fishing. The focus group discussion revealed that the family with high income have family members who are working abroad.

1.7 Number of Household Members

The frequency and percentage distribution of respondents according to the number of household members is shown in Table 10.

Table 10. Distribution of Respondents' Household Members

Number of household members	Frequency	Percent
0-1	8	5.59
2-3	41	28.67
4-5	64	44.76
6-7	21	14.69
8 and above	9	6.29
Total	143	100.00
Mean = 4.25		

The fisherman-respondent with 4-5 household members is 64 or 44.76%; 2-3 household members is 41 or 28.67%; 6-7 household members is 21 or 14.69%; 8 and above household members is 9 or 6.29%; and 0-1 household members is 8 or 5.59%. The mean respondents' household member is 4.25.

This implies a small family size. This is the absolute number of members in the household sharing the same economic unit and common

kitchen.(Parganiha,2016). The 2015 Philippine Census recorded that the average household size is 4.4, which is similar to the findings of this study. The typical composition in the family are the parents and two children.

1.8 Number of Children in the Household

The frequency and percentage distribution of respondents according to the number of children in the household is shown in Table 11.

Table 11. Distribution of Respondents' Number of Children in the Household

Number of children in the household	Frequency	Percent
0-1	40	28.00
2-3	72	50.30
4-5	24	16.80
6 and above	7	4.90
Total	143	100.00
Mean = 2.47		

The respondents with 2-3 children in the household are 72 or 50.30%; 40 or 28.00% with 0-1 children in the household; 24 or 16.80% with 4-5 children in the household; and 7 or 4.90% with 6 children and above in the household. The mean respondents' number of children in the household is 2.47.

The findings indicate the presence of children in each family. In the late 1970's, the average mother at the end of her childbearing years had given birth to more than three

children. Since that time, average family size has declined, driven largely by declines in families with four or more children. Now, moms 2.4 children on average – a number that has been fairly stable for two decades.(Livingston, 2015)

1.9 Number of Aged Household Member

The frequency and percentage distribution of respondents according to the number of aged household member is shown in Table 12.

Table 12. Distribution of Respondents' Number of Aged Household Member

Number of aged household member	Frequency	Percent
0-1	30	21.00
2-3	100	69.90
4-5	13	9.10
6 and above	0	0.00
Total	143	100.00
Mean = 2.26		

The fishermen-respondent with 2-3 aged household member is 100 or 69.90%; 0-1 aged household is 30 or 21.00%; 4-5 aged household member is 13 or 9.10%; and 6 and above is 0 or 0.00%. The mean respondents' number of aged household member is 2.26.

This implies that elderly are still considered a part of the family. The position of the elderly in the Philippines and their participation in social exchange are primarily rooted in the kinship system and the values governing interpersonal relations.(Lopez,1991). Filipinos are

generally known to take care of their elderly family members and not leave them to the care of an institution or other people. According to Montenegro (2018), Filipinos showed strong family ties, strong faith and their aspirations are mostly on wanting financial abundance not just for themselves, but for their families.

1.10 Number of Women in the Household

The frequency and percentage distribution of respondents according to the number of women in the household is shown in Table 13.

Table 13. Distribution of Respondents' Number of Women Household Member

Number of women household member	Frequency	Percent
0-1	61	42.70
2-3	76	53.10
4-5	6	4.20
6 and above	0	0.00
Total	143	100.00
Mean = 1.73		

Out of the 143 respondents, there were 76 or 53.10% with 2-3 women household member; 61 or 42.70% with 0-1 women household member; 6 or 4.20% with 4-5 women household member; and 0 or 0.00% with 6 and above women household member. The mean respondents' number of women household member is 1.73

This implies that every family or household has a woman figure. Women are the pioneers of nation. They are the key sustainable

development and quality of life in the family. The varieties of role the women assume in the family are those of wife, leader, administrator, manager of family income and last but not the least important, the mother.(Shuan,2018).

1.11 Source of Information

The frequency and percentage distribution of respondents according to source of information is shown in Table 14.

Table 14. Distribution of Respondents' Source of Information

Source of information	Frequency	Percent
Radio	5	3.50
Seminar	1	0.70
Facebook	1	0.70

Source of information	Frequency	Percent
Television	125	87.40
Extension Agent	3	2.10
Internet	1	0.70
Municipal Worker	7	4.90
Total	143	100.00

Television as the respondent’s source of information got the highest with a frequency of 125 or 87.40%; Municipal Worker with a frequency of 7 or 4.90%; Radio with a frequency of 5 or 3.50%; Extension Agent with a frequency of 3 or 2.10%; Seminar, Facebook and Internet has a frequency of 1 each or 0.70%. Majority has Television as source of information.

Nigatu et al., (2014) also had similar results where, most (63.1%) of the study participants identified electronic mass media (TV and radio) as their most common source of

information about climate change. Although the electronic media served as the major source of information on climate change in his study, the level of discussion on climate change on radio and television is low, and this limits the amount of information relayed to the public (Twum -Barimah et al., 2015).

2. Perceptions on Level of Awareness towards Climate Change

The perceptions on level of awareness towards climate change is reflected in Table 15.

Table 15. Perceptions on Level of Awareness towards Climate Change

Awareness	Weighted Mean	Qualitative Interpretation	Rank
1.I understand the definition of climate change.	4.02	Aware	7
2.I am aware that climate is changing and becoming more unpredictable.	3.93	Aware	9
3.I am aware that climate change negatively affects food and fish production	4.15	Aware	2.5
4.I am aware that climate change results to frequent and stronger typhoons.	4.15	Aware	2.5
5.I am aware that temperatures are rising and are expected to increase over the years.	4.01	Aware	8
6.I am aware that climate change can cause sea level to rise.	4.17	Aware	1
7.I am aware that burning fossil fuels, forest degradation, chemical fertilizer application and animal manure decomposition causes climate change.	4.10	Aware	5
8.I am aware that climate change results to drought in some areas.	4.05	Aware	6
9.I am aware that aerosols and CFC refrigerants cause global warming thus resulting to climate change.	3.72	Aware	10
10.I am aware that climate change brought more flooding.	4.12	Aware	4
Overall Weighted Mean	4.04	Aware	

The fishermen-respondent perceived “Aware” on “ I am aware that climate change can cause sea level to rise,” with weighted mean

of 4.17 and ranked 1st. The least of the indicators is statement number 9, “I am aware that aerosols and CFC refrigerants cause global

warming thus resulting to climate change” with weighted mean of 3.72 and qualitative rating of “Aware.” The computed overall weighted mean is 4.04 with qualitative interpretation of “Aware”. This implies that the respondents have the knowledge or minimal awareness about climate change.

Howe and Leiserowitz (2013) stressed that rural communities. dependent on climate sensitive resources such as fisheries have capacity to recognize changes in local climate. This awareness is also an important starting point to realize that there is a problem that needs to be addressed. However, perception to local climate is subjective in some cases (Howe & Leiserowitz, 2013), and could explain some of the variations in the perceptions among the fishers. As the respondents affirmed, they experience frequent weather changes, though cannot give detailed explanation or reason. They experience the frequent rising of the sea water level. During the study, some expressed how unaware they are that cleaning detergents and chemicals contribute to the warming of the earth. The study of Carr(2016) also presented

similar results wherein the students at the study school have some knowledge and awareness of climate change, but that significant gaps in knowledge exist. Perhaps more importantly, students harbor considerable misunderstandings about climate change.

Education and the general dissemination of climate change knowledge has traditionally been of low priority globally (OECD, 2009). However, more recently, adaptation has come to be considered crucial within the broader context of sustainable development and within this space there has been an increasing recognition of the need to improve climate change awareness and education to enhance the capacity of people and communities to adapt to climate change. (Eriksen et al, 2009; Marshall et al, 2013).

3. Perceptions on Adaptation Practices towards Climate Change

The perceptions on adaptation practices towards climate change is reflected in Table 16.

Table 16. Perceptions on Adaptation Practices towards Climate Change

Adaptation Practices	Weighted Mean	Qualitative Interpretation	Rank
1. Planting of Mangroves along the coasts	4.29	Strongly Agree	1
2. Retrofitting of their houses	3.29	Moderately Agree	8
3. Relocation to higher grounds or elevated areas.	3.45	Agree	6
4. Provision/Availment of subsidy from the local government	3.55	Agree	4
5. Engage in alternative livelihood like farming, stock raising.	3.62	Agree	2
6. Rice supply from the local government	3.56	Agree	3
7. Migration/seeking employment elsewhere	2.48	Disagree	14.5
8. Borrowing from neighbors and relatives	2.90	Moderately Agree	10
9. Apply as household/store helper	2.48	Disagree	14.5
10.Minimizing expenditures.	3.51	Agree	5
11.Use of riprap	3.41	Agree	7
12.Rebuilding of new houses adapted to rising sea levels	3.22	Moderately Agree	9
13.Change in culture system/reduce the number of cultured stock.	2.89	Moderately Agree	11

Adaptation Practices	Weighted Mean	Qualitative Interpretation	Rank
14.Change of cultured species.	2.78	Moderately Agree	12
15.Change in fishing schedule.	2.68	Moderately Agree	13
Overall Weighted Mean	3.21	Moderately Agree	

The fishermen-respondent perceived “Strongly Agree” on “Planting of mangroves along the coasts,” with weighted mean of 4.29 and ranked 1st. The least of the indicators are statement number 7, “Migration/seeking employment elsewhere” and statement number 9, “Apply as household/store helper,” with weighted mean of 2.48 and qualitative rating of “Disagree.” The computed overall weighted mean is 3.21 with qualitative interpretation of “Moderately Agree”. The result indicates that the fishermen are coping up or adapting with the changes through their practices.

According to the fishermen who have been there for more than 20 years, what they continue to do since then are still effective up to now. Despite of the impending dangers they often see on television, they don’t seem to bother for they are used to it. They never planned to evacuate or leave their homes even during typhoons. They claimed how they have coped up through the years so they prefer to stay in the island. They also have “good neighbors” who share with those who do not have. They narrated that they seldom go fishing because of the unpredictable weather, but do not go elsewhere to find work. Instead, they resort to farming in the island. They have learned such system to survive, as they say. Diversification to non-fishery activities could be the most

beneficial as it successfully contributes to improved income, food security and employment for fisher communities (Brugere et al. 2008). Respondents find planting mangroves as beneficial adaptive measure. Mangroves create unique ecological environments that are rich in species diversity (Kathiresan & Bingham, 2001; Lugendo, 2007). Studies conducted in Tanzania have showed that mangrove forests offer major socio-economic benefits to coastal communities and beyond.(Sesabo, 2006)

Adaptation is considered to be the permanent solution to climate change impacts. If appropriate, adaptation can reduce negative impacts and even create benefits from new opportunities provided by changing climate conditions (Ajuaye, 2010). Adaptation depends greatly on the adaptive capacity or adaptability of an affected system, region, or community to cope with the impacts and risks of climate change. Enhancement of adaptive capacity represents a practical means of coping with changes and uncertainties in climate. (Smit and Pilifosova, 2001)

4. Perceptions on Impact of Climate Change on:

4.1 Livelihood

The perceptions on impact of climate change on livelihood is shown in Table 17.

Table 17. Perceptions on Impact of Climate Change on Livelihood

Impact on Livelihood	Weighted Mean	Qualitative Interpretation	Rank
1.Vulnerability to flood risk	2.45	Less Affected	8
2.Disruption in transportation to then mainland	3.69	Much Affected	5
3.Damage of housing	3.51	Much Affected	6
4.Destruction of housing	2.70	Moderately Affected	7
5.Income decreased due to loss of crops / unavailability of fish catch resulting from bad weather	3.83	Much Affected	4

6.Less/Limited species of fish caught & sold	4.62	Very Much Affected	1
7.Decrease in fish catch due to bleaching of coral reefs	4.42	Very Much Affected	2
8.Damage of fishing fleet	3.89	Much Affected	3
Overall Weighted Mean	3.64	Much Affected	

The fishermen-respondent perceived “Much Affected” on “Less/Limited species caught and sold” with weighted mean of 4.62 and ranked 1st. The least of the indicators is statement number 1, “Vulnerability to flood risk” with weighted mean of 2.45 and qualitative rating of “Less Affected.” The computed overall weighted mean is 3.64 with qualitative interpretation of “Much Affected”.

The result imply that the fishermen experience the effect of climate change on their livelihood. The fishermen affirmed the decline in the income they derive from selling

which they attribute to low number to no fish catch at all.

Climate change will impact coastal livelihoods, affecting in particular those depending on the coast for their economic activities. Climate change impacts can also lead to longer-term effects on neighborhoods (Zsomboky, 2011). Livelihoods of fishers are affected when climatic events affect their livelihood components, activities and outcomes (Balgis et al. 2005; Allison et al. 2005). Climate change impacts will have important implications for the commercial fishing industry as a livelihood, for the local economy and in terms of providing a large proportion of jobs (Cabinet Office, 2004).

Changes in the weather, particularly in the seasonal cycle as suggested by Galegos *et al.* (1993) and Gray (1993) is likely to affect availability of these resources to fishers. According to Clay and Olson(2008), fishing com-

munity as considerably dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs. Fisheries and fishing activities are vital contributors to food supply, food security and livelihoods especially in developing countries (Charles, 2008). According to the Food and Agriculture Organization (FAO), fishing activities provide income and livelihoods to the ever-growing number of people around the world, mostly countries in the global south where employment resources are limited. FAO (2012a) estimates that about 200 million people and their dependents worldwide, most of them in developing countries, live on fishing occupations. Graham, et al(2006)

Climate change is expected to have significant effects on fish populations and sustainable harvest levels . Fish have a distinct set of environmental conditions under which they experience optimal growth, reproduction and survival (Natural Resources Canada, 2004). As conditions change in response to a changing climate, fish may be affected both directly and indirectly (Natural Resources Canada, 2004). Climate change may affect water temperatures, water levels, extent of ice cover, and occurrence of extreme weather events and this in turn may affect the fish population levels.

4.2 Health

The perceptions on impact of climate change on Health is shown in Table 18.

Perceptions on Impact of Climate Change on Health

Impact on Health	Weighted Mean	Qualitative Interpretation	Rank
1.High incident of temperature related illness	3.52	Much Affected	1
2.Water and food borne diseases.	3.31	Moderately Affected	2
3.Vector borne diseases (caused by mosquito, flee)	2.71	Moderately Affected	3
4.Rodent borne diseases (caused by rats)	2.11	Less Affected	5
5.Respiratory diseases	2.40	Less Affected	4
6.Mental health effects	2.04	Less Affected	6

Overall Weighted Mean	2.68	Moderately Affected
------------------------------	-------------	----------------------------

The fishermen-respondent perceived “Much Affected” on “High incident of temperature related illnesses” with weighted mean of 3.52 and ranked 1st. The least of the indicators is statement number 6, “Mental health effects” with weighted mean of 2.04 and qualitative rating of “Less Affected.” The computed overall weighted mean is 2.68 with qualitative interpretation of “Moderately Affected”. The result implies that the fishermen experiences the effect of global warming specifically in changing weather conditions.

The fishermen identified these illnesses as cough and cold mostly among the children and elders; too much heat causing too much perspiration. They also experience frequent headaches due to severe hot weather. The fishermen also identified the mental effects on them through stress. According to them, they cannot avoid at times to think how uncertain and unsecured their life is in the island. When asked why they do not leave, they explained how dependent they are on fishing for living, land for their farming and that they have already established their houses in the island. They cannot afford to go and start over again, for that will make their life more unpredictable.

Security is a secure condition or feeling. It is a broad issue that indicates safe status

of the state and its citizen. Barnett (2003) mentioned ‘security in a general sense is the condition of being protected from or not exposed to danger’. And it is the assurance of free enjoyment as Soroos (1997; cited in Barnett, 2003) defined ‘the assurance people have that they will continue to enjoy those things that are most important to their survival and well-being’.

Climate change will adversely affect population health in manifold ways, endangering the lives and wellbeing of billions of people through increased heat stress, floods, frequency of intense storms, under-nutrition, spread of disease vectors and mental ill health (Costello et al. 2009) In particular, extreme heat is currently posing and will continue to pose health risks to individuals in the coastal zone, especially the elderly and chronically ill (Loughnan et al. 2013). According to Ali Khan (2015), the health related problems are common in the local communities due to inadequate medical facilities.

4.3 Goods and Services

The perceptions on impact of climate change on Goods and Services is shown in Table 19.

Table 19. Perceptions on Impact of Climate Change on Goods and Services

Impact on Goods and Services	Weighted Mean	Qualitative Interpretation	Rank
1.Poor water and sewerage services	3.94	Much Affected	1
2.Not enough food	3.41	Much Affected	3
3.Disruption in access of health services (health and emergency)	3.36	Moderately Affected	4
4.Damaged sanitary facility	3.57	Much Affected	2
5.Difficult access to food supply due to high sea level	3.27	Moderately Affected	5
Overall Weighted Mean	3.51	Much Affected	

The fishermen-respondent perceived “Much Affected” on “Poor water and sewerage services” with weighted mean of 3.94 and ranked 1st. The least of the indicators is statement number 5, “Difficult access to food supply due to high sea level rise” with weighted

mean of 3.27 and qualitative rating of “moderately Affected.” The computed overall weighted mean is 3.51 with qualitative interpretation of “Much Affected”. This finding implies the heavy effect of changing climate to the goods and services available to them.

Water is one primary problem to the residents. They can hardly have potable water. What they consume most for drinking and cooking comes from the mineral water they buy. And during rainy season, they have plenty of water on their well, but still unsafe for human consumption. Climate change may affect drinking water supply and lead to reductions in river flow, lower groundwater tables and, in coastal areas, to saline intrusion into surface water and groundwater systems. Climate change could also affect the system itself, including damage to pipelines through erosion caused by unusually heavy rainfall (IPCC 2007). This is possibly due to the threat of saltwater intrusion (through sea-level rise) into coastal aquifers serving as drinking water reservoirs. The level of risk depends on geographical location and thus on the rate of sea-level rise and distance of the drinking water aquifers from the coast. (Klein and Staudt 2006)

Another problem is their access for medical attention. They have a community center manned by health workers to address

immediate and simple sicknesses. But in cases of severe and sudden attacks needing the help of healthcare professionals, it is inaccessible due to proximity. The travel to mainland would take 30 minutes and another 30 minutes to take a patient to the nearest hospital. It is good for them when banca is available anytime to ferry. Research on adaptive capacity and climate impacts in remote and poorly resourced coastal Indigenous communities shows how the impacts will degrade living conditions and imperil basic services – such as water, transport, communications and electricity supply – putting people at immediate risk of disruption and potentially physical danger (Green et al. 2010). Disruptions to these services will most likely have deleterious effects on sanitary and public health conditions.

4.4 Summary of Perceptions on Impact of Climate Change

The summary of perceptions on impact of climate change is reflected in Table 20.

Table 20. Summary of Perceptions on Impact of Climate Change

Impact	Weighted Mean	Qualitative Interpretation	Rank
Livelihood	3.64	Much Affected	1
Health	2.68	Moderately Affected	3
Goods and Services	3.51	Much Affected	2
Grand Mean	3.28	Much Affected	

The respondents perceived “Very Much Affected” on Livelihood with a weighted mean of 3.64 and ranked 1st; “Much Affected” on Goods and Services with a weighted mean of 3.51 and ranked 2nd; and “Moderately Affected” on Health with a weighted mean of 2.68 and ranked 3rd. The grand mean is 3.28 perceived as “Moderately Affected.” This result indicates that the fishermen are also affected by the changing climate.

The fishermen claimed that they are adapting to their environment, but are not exempted from experiencing the untoward effects of climate change. The Asia Foundation’s Climate Change Perception Survey in 2012 had similar

findings. Eighty percent of the surveyed household reported that at the top-most area affected is their means of living, which is agricultural production, loss of houses and domestic animals, loss of income and health hazards are the result of climate change to them.

5. Analysis of Variance on the Difference in Perceptions on Awareness to Climate Change when Respondents are Grouped According to their Profile Variables

The analysis of variance on the difference in perceptions on awareness to climate change when respondents are grouped according to their profile variables is shown in Table 21.

Table 21. Difference in Perceptions on Awareness to Climate Change when Respondents are Grouped According to their Profile Variables

Profile variables	Source of variation	df	Mean Square	F	Sig.	Interpretation
Age	Between Groups	10	0.51	0.56	0.84	Not significant Ho is accepted
	Within Groups	132	0.92			
	Total	142				
Civil status	Between Groups	3	0.32	0.35	0.79	Not significant Ho is accepted
	Within Groups	138	0.90			
	Total	141				
Sex	Between Groups	2	0.72	0.81	0.45	Not significant Ho is accepted
	Within Groups	140	0.89			
	Total	142				
Length of stay in the island	Between Groups	6	1.19	1.36	0.23	Not significant Ho is accepted
	Within Groups	136	0.87			
	Total	142				
Highest educational attainment	Between Groups	8	1.04	1.19	0.31	Not significant Ho is accepted
	Within Groups	134	0.88			
	Total	142				
Household income	Between Groups	5	2.23	2.66	0.03	Significant Ho is rejected
	Within Groups	137	0.84			
	Total	142				
Number of household members	Between Groups	4	1.55	1.79	0.13	Not significant Ho is accepted
	Within Groups	138	0.87			
	Total	142				
Number of children in the household	Between Groups	3	0.52	0.58	0.63	Not significant Ho is accepted
	Within Groups	139	0.90			
	Total	142				
Number of aged household member	Between Groups	2	2.56	2.97	0.06	Not significant Ho is accepted
	Within Groups	140	0.86			
	Total	142				
Number of women household member	Between Groups	2	5.95	7.30	0.00	Significant Ho is rejected
	Within Groups	140	0.81			
	Total	142				
Source of information	Between Groups	6	0.71	0.80	0.58	Not significant Ho is accepted
	Within Groups	136	0.89			
	Total	142				

The computed Significant or P-values of 0.84, 0.79, 0.45, 0.23, 0.31, 0.13, 0.63, 0.06 and 0.58 are greater than (>) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted, hence there is no significant difference in perceptions on awareness to climate change when respondents are grouped

according to age, civil status, sex, length of stay in the island, highest educational attainment, number of household members, number of children in the household, number of aged household members and source of information respectively. Meanwhile, the computed Significant values of 0.03 and 0.00 is lower than (<)

0.05 Alpha Level of Significance, thus, the Null Hypothesis is rejected. There is a significant difference in perceptions on awareness to climate change when respondents are grouped according to household income and number of women household member respectively.

The computed values imply differences on the awareness level of the fishermen household income and number of women household member.

Maponya & Mpandeli (2012) asserted that women play a vital role in supporting households and communities, thus, they are more aware and adapt to climate change through experience gained in agricultural production and the fact that the majority of these women spend most of their time in the field ploughing, removing weeds, monitoring the crops, harvesting etc. Often, women are more vulnerable to climate change than men. This is because they make up the majority of the world's economically poor, do most of the agricultural work,

bear unequal responsibility for household food security, carry a disproportionate burden for harvesting water and fuel for everyday survival, and rely on threatened natural resources for their livelihoods. The situation is also supported by Epule et al. (2012) who emphasized that women are more vulnerable to famine and water scarcity, This high level of vulnerability has been associated to the fact that women have family care responsibilities which ties them more to issues such as providing food and water to their families (Epule et al., 2012).

6. Analysis of Variance on the Difference in Perceptions on Adaptation Practices when Respondents are Grouped According to their Profile Variables

The analysis of variance on the difference in perceptions on adaptation practices when respondents are grouped according to their profile variables is reflected in Table 22.

Table 22. Difference in Perceptions on Adaptation Practices when Respondents are Grouped According to their Profile Variables

Profile variables	Source of variation	df	Mean Square	F	Sig.	Interpretation
Age	Between Groups	10	0.42	0.52	0.87	Not significant Ho is accepted
	Within Groups	132	0.80			
	Total	142				
Civil status	Between Groups	3	0.94	1.22	0.30	Not significant Ho is accepted
	Within Groups	138	0.77			
	Total	141				
Sex	Between Groups	2	0.65	0.84	0.43	Not significant Ho is accepted
	Within Groups	140	0.77			
	Total	142				
Length of stay in the island	Between Groups	6	0.47	0.60	0.73	Not significant Ho is accepted
	Within Groups	136	0.78			
	Total	142				
Highest educational attainment	Between Groups	8	1.24	1.67	0.11	Not significant Ho is accepted
	Within Groups	134	0.74			
	Total	142				
Household income	Between Groups	5	2.91	4.21	0.00	Significant Ho is rejected
	Within Groups	137	0.69			
	Total	142				
Number of household members	Between Groups	4	1.96	2.66	0.04	Significant Ho is rejected
	Within Groups	138	0.74			
	Total	142				
	Between Groups	3.00	1.23	1.62	0.187	Not significant

Number of children in the household	Within Groups	139.00	0.76			Ho is accepted
	Total	142.00				
Number of aged household member	Between Groups	2	1.88	2.50	0.09	Not significant Ho is accepted
	Within Groups	140	0.75			
	Total	142				
Number of women household member	Between Groups	2	0.48	0.62	0.54	Not significant Ho is accepted
	Within Groups	140	0.77			
	Total	142				
Source of information	Between Groups	6	0.38	0.48	0.82	Not significant Ho is accepted
	Within Groups	136	0.79			
	Total	142				

The computed Significant or P-values of 0.87, 0.30, 0.43, 0.73, 0.11, 0.187, 0.09, 0.54 and 0.82 are greater than ($>$) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted, hence there is no significant difference in perceptions on adaptation practices when respondents are grouped according to age, civil status, sex, length of stay in the island, highest educational attainment, number of children in the household, number of aged household members, number of women household members and source of information respectively. Meanwhile, the computed Significant values of 0.00 and 0.04 is lower than ($<$) 0.05 Alpha Level of Significance, thus, the Null Hypothesis is rejected. There is a significant difference in perceptions on adaptation practices when respondents are grouped according to household income and number of household members respectively.

The computed values imply that adaptation practices depends on the family income and the number of members in the household. The influence of household size on adaptation methods can be seen from two perspectives. The first assumption is that households with large families may be forced to divert part of the labor force to activities in an attempt to earn income in order to ease the consumption pressure imposed by a large family (Yirga 2007). The other assumption is that large family size is

normally associated with a higher labor endowment, which would enable a household to accomplish various tasks. Households with a larger pool of labor are more likely use it more intensively because they have fewer labor shortages at peak times (Croppenstedt et al. 2003). It is expected that households with large families are more likely to adapt to climate changes (Deressa et al. 2009). Sorhang & Kristiansen(2011) revealed that larger household size is related to higher adaptive capacity.

Economic well-being is one of the key factors determining the capacity of a household to adapt to environmental stress or climate change through a direct relationship. The poor are often powerless socially, economically and politically with this lack of power reducing access to resources and in turn narrowing the range of options available in times of stress and thus making them more vulnerable.(Mwamba, 2013)

7. Analysis of Variance on the Difference in Perceptions on Impact of Climate Change on:

7.1 Livelihood

The Analysis of Variance on the difference in perceptions on impact of climate change on livelihood when respondents are grouped according to their profile variables is reflected in Table 23.

Table 23. Difference in Perceptions on Impact of Climate Change on Livelihood when Respondents are Grouped According to their Profile Variables

Profile Variable	Source of Variation	Sum of Squares	df	Mean Square	F	Sig.	Decision
Age	Between Groups	14.49	10	1.45	2.68	0.01	Ho is rejected Significant
	Within a Group	71.49	132	0.54			
	Total	85.98	142				
Civil Status	Between Groups	0.45	3	0.15	0.24	0.87	Ho is accepted Not significant
	Within a Group	85.29	138	0.62			
	Total	85.74	141				
Sex	Between Groups	0.59	2	0.30	0.48	0.62	Ho is accepted Not significant
	Within a Group	85.39	140	0.61			
	Total	85.98	142				
Length of Stay in the Island	Between Groups	4.50	6	0.75	1.25	0.29	Ho is accepted Not significant
	Within a Group	81.48	136	0.60			
	Total	85.98	142				
Highest Educational Attainment	Between Groups	3.02	8	0.38	0.61	0.77	Ho is accepted Not significant
	Within a Group	82.96	134	0.62			
	Total	85.98	142				
Household Income	Between Groups	5.53	5	1.11	1.88	0.10	Ho is accepted Not significant
	Within a Group	80.45	137	0.59			
	Total	85.98	142				
Number of Household Members	Between Groups	5.82	4	1.45	2.50	0.05	Ho is rejected Significant
	Within a Group	80.16	138	0.58			
	Total	85.98	142				
Number of Children in the Household	Between Groups	0.29	3	0.10	0.16	0.93	Ho is accepted Not significant
	Within a Group	85.69	139	0.62			
	Total	85.98	142				
Number of Aged Household Member	Between Groups	1.67	2	0.83	1.38	0.25	Ho is accepted Not significant
	Within a Group	84.31	140	0.60			
	Total	85.98	142				
Number of Women Household Member	Between Groups	0.71	2	0.35	0.58	0.56	Ho is accepted Not significant
	Within a Group	85.27	140	0.61			
	Total	85.98	142				
Source of Information	Between Groups	7.24	6	1.21	2.09	0.06	Ho is accepted Not significant
	Within a Group	78.74	136	0.58			
	Total	85.98	142				

The computed Significant or P-values of 0.87, 0.62, 0.29, 0.77, 0.10, 0.93, 0.25, 0.56 and 0.06 are greater than ($>$) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted, hence there is no significant difference in perceptions on impact of climate change on livelihood when respondents are grouped according to civil status, sex, length of stay in the island, highest educational attainment, household income, number of children in the household, number of aged household

members, number of women household members and source of information respectively. Meanwhile, the computed Significant values of 0.01 and 0.05 are lower than ($<$) 0.05 Alpha Level of Significance, thus, the Null Hypothesis is rejected. There is a significant difference in perceptions on impact of climate change on livelihood when respondents are grouped according to age and number of household respectively.

The computed values imply variations on the effect of climate change to the livelihood depending on the age and number of household members. Age is a critical predictor of individual's familiarity with climate change issues. According to a study conducted by Saroar and Routray (2010), there is a positive correlation between age and familiarity with climate change/extreme weather events. It is thus

expected that older people should be more aware of climate change than younger people.

7.2 Health

The Analysis of Variance on the difference in perceptions on impact of climate change on health when respondents are grouped according to their profile variables is reflected in Table 24.

Table 24. Difference in Perceptions on Impact of Climate Change on Health when Respondents are Grouped According to their Profile Variables

Profile variables	Source of variation	df	Mean Square	F	Sig.	Interpretation
Age	Between Groups	10	1.49	1.13	0.35	Not significant Ho is accepted
	Within Groups	132	1.32			
	Total	142				
Civil status	Between Groups	3	0.14	0.10	0.96	Not significant Ho is accepted
	Within Groups	138	1.37			
	Total	141				
Sex	Between Groups	2	1.39	1.04	0.36	Not significant Ho is accepted
	Within Groups	140	1.33			
	Total	142				
Length of stay in the island	Between Groups	6	1.89	1.45	0.20	Not significant Ho is accepted
	Within Groups	136	1.31			
	Total	142				
Highest educational attainment	Between Groups	8	1.42	1.07	0.39	Not significant Ho is accepted
	Within Groups	134	1.33			
	Total	142				
Household income	Between Groups	5	2.07	1.59	0.17	Not significant Ho is accepted
	Within Groups	137	1.31			
	Total	142				
Number of household members	Between Groups	4	1.32	0.99	0.42	Not significant Ho is accepted
	Within Groups	138	1.33			
	Total	142				
Number of children in the household	Between Groups	3	1.18	0.88	0.45	Not significant Ho is accepted
	Within Groups	139	1.34			
	Total	142				
Number of aged household member	Between Groups	2	1.86	1.41	0.25	Not significant Ho is accepted
	Within Groups	140	1.32			
	Total	142				
Number of women household member	Between Groups	2	1.45	1.09	0.34	Not significant Ho is accepted
	Within Groups	140	1.33			
	Total	142				
Source of information	Between Groups	6	4.26	3.54	0.00	Significant Ho is rejected
	Within Groups	136	1.20			
	Total	142				

The computed Significant or P-values of 0.35, 0.96, 0.36, 0.20, 0.39, 0.17, 0.42, 0.45, 0.25 and 0.34 are greater than (>) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted, hence there is no significant difference in perceptions on impact of climate change on health when respondents are grouped according to age, civil status, sex, length of stay in the island, highest educational attainment, household income, number of household members, number of children in the household, number of aged household members and number of women household members respectively. Meanwhile, the computed Significant value of 0.00 is lower than (<) 0.05 Alpha Level of Significance, thus, the Null Hypothesis is rejected. There is a significant difference in perceptions on impact of climate change on health when respondents are grouped according to source of information.

The computed values imply variations on the effect of climate change to health depending on the source of information. Effective communication about climate change impacts is an important step in order to increase the awareness and understanding of impacts and support

appropriate adaptation. Information on climate change comes from a range of sources and messages are often contradictory and confusing. People often get their information from the media, particularly on television as revealed in this study. The lack of robust and believable climate information, lack of understanding of technical information and the fact that predictions change regularly are barriers to effective information. As in the study of Olutugbe and Fadairo(2016) among food crop farmers, they concluded that exposure to information, level of awareness to climate change as well as their perception of climate change and effects influenced their levels of adaptation strategies. This underlines and emphasizes the importance of information at effecting behavioral changes in people.

7.3 Goods and Services

The Analysis of Variance on the difference in perceptions on impact of climate change on goods and services when respondents are grouped according to their profile variables is reflected in Table 25.

Table 25. Difference in Perceptions on Impact of Climate Change on Goods and Services when Respondents are Grouped According to their Profile Variables

Profile variables	Source of variation	df	Mean Square	F	Sig.	Interpretation
Age	Between Groups	10	0.39	0.49	0.90	Not significant Ho is accepted
	Within Groups	132	0.80			
	Total	142				
Civil status	Between Groups	3	0.69	0.89	0.45	Not significant Ho is accepted
	Within Groups	138	0.78			
	Total	141				
Sex	Between Groups	2	0.73	0.95	0.39	Not significant Ho is accepted
	Within Groups	140	0.77			
	Total	142				
Length of stay in the island	Between Groups	6	1.75	2.39	0.03	Significant Ho is rejected
	Within Groups	136	0.73			
	Total	142				
Highest educational attainment	Between Groups	8	0.87	1.14	0.34	Not significant Ho is accepted
	Within Groups	134	0.77			
	Total	142				
Household income	Between Groups	5	0.70	0.90	0.48	Not significant Ho is accepted
	Within Groups	137	0.78			
	Total	142				

Number of household members	Between Groups	4	0.13	0.17	0.96	Not significant Ho is accepted
	Within Groups	138	0.79			
	Total	142				
Number of children in the household	Between Groups	3	0.12	0.15	0.93	Not significant Ho is accepted
	Within Groups	139	0.79			
	Total	142				
Number of aged household member	Between Groups	2	0.55	0.71	0.49	Not significant Ho is accepted
	Within Groups	140	0.78			
	Total	142				
Number of women household member	Between Groups	2	0.85	1.11	0.33	Not significant Ho is accepted
	Within Groups	140	0.77			
	Total	142				
Source of information	Between Groups	6	1.55	2.10	0.06	Not significant Ho is accepted
	Within Groups	136	0.74			
	Total	142				

The computed Significant or P-values of 0.90, 0.45, 0.39, 0.34, 0.48, 0.96, 0.93, 0.49, 0.33 and 0.06 are greater than (>) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted, hence there is no significant difference in perceptions on impact of climate change on goods and services when respondents are grouped according to age, civil status, sex, highest educational attainment, household income, number of household members, number of children in the household, number of aged household members, number of women household members and source of information respectively. Meanwhile, the computed Significant value of 0.03 is lower than (<) 0.05 Alpha Level of Significance, thus, the Null Hypothesis is rejected. There is a significant difference in perceptions on impact of climate change on goods and services when respondents are grouped according to length of stay in the island.

The computed values imply divergence on the effect of climate change to goods and services depending on the length of stay in the island. Those who have already stayed longer years in the island experienced lesser concerns

on matters of goods and services they need. Fisher folks affirmed that the reason could be being accustomed with the system they adopted. Before rainy and stormy seasons, they learned to stock imperishable goods as canned foods to lessen or avoid frequent travel to mainland. Food security is a condition related to the availability of food, and individuals' accessibility and affordability to it. Household food insecurity, is a situation of "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways. It incorporates a measure of resilience to future disruption or unavailability of critical food supply due to various risk factors including droughts.(Bickel, et al.,2000)

8. Relationship Between Perceptions on Awareness and Perceptions on the Impact of Climate Change

The Pearson Product Moment Coefficient of Correlation to test the relationship between perceptions on awareness and perceptions on the impact of climate change is reflected in Table 26.

Table 26. Relationship between Perceptions on Awareness and Perceptions on the Impact of Climate Change

	Livelihood	Fishing	Health	Goods and services
Pearson Correlation	0.158	0.306	0.135	0.242
Sig. (2-tailed)	0.060	0.000	0.108	0.004
N	143	143	143	143

Interpretation	Very weak positive correlation	Weak positive correlation	Very weak positive correlation	Weak positive correlation
	Not significant	Significant	Not significant	Significant

The computed Pearson r –values of 0.158 and 0.135 denote a very weak positive correlation for livelihood and health respectively. The t-test computed values of 0.060 and 0.108 are higher than 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted, there is no significant relationship between the perceptions on awareness and perceptions on the impact of climate change on livelihood and health.

On the other hand, the computed Pearson r –values of 0.306 and 0.242 denote a weak positive correlation for fishing and goods and services respectively. The t-test computed values of 0.000 and 0.004 are higher than 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Rejected, there is a significant relationship between the perceptions on awareness and perceptions on the impact of climate change on fishing and goods and services.

The data implies that the more aware the fishermen are, the more they experience the effect of climate change on their fishing and

goods and services. The relationship between awareness and impact to climate change is direct. According to the respondents, the more they know about climate change, the more they realize the effects it has on their lives. The social impacts of climate change are becoming more apparent as the understanding of climate change increases. (Thomas, 2008) However, increasing people’s awareness on climate change through education is an important measure to persuade people at all levels in the community to play an active role in adapting to climate change.

9. Relationship Between Perceptions on Awareness and Perception on Adaptation Practices

The Pearson Product Moment Coefficient of Correlation to test the relationship between perceptions on adaptation practices and perceptions on the impact of climate change is reflected in Table 27.

Table 27. Relationship between Level of Awareness and Adaptation Practices

Pearson Correlation	0.11
Sig. (2-tailed)	0.19
N	143
Interpretation	Very weak correlation Not significant

The computed Pearson r –values of 0.11 denotes a very weak correlation. The t-test computed values of 0.19 is higher than 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted, there is no significant relationship between the perceptions on awareness and perceptions on adaptation practices. The data implies that the fishermen’s awareness level does not affect their adaptation practices.

On the contrary, the study of Olutegbe and Fadairo (2015) found a significant relationship between respondents’ awareness and their adaptation strategies to climate change. The result is an indication that awareness is an

important factor in the determination of climate change adaptation strategies farmers employ to improve food production. Hence, the more an individual is aware of climate change effects, the higher the likelihood of such to be proactive towards it. Nhemachena and Hassan (2007) stated that raising awareness of changes in climatic conditions would have greater impact in increasing adaptation to climatic conditions. To respond to the threat of climate change, it will be necessary to focus on awareness of climate change and adaptation in order to support local communities in dealing with the impact of climate change. As noted by Lebel (2013), local knowledge, experience and

perspective can provide valuable information in relation to adaptation.

Conclusion

Majority of the fishermen are male, married, in their middle adulthood, a high school graduate and classified as poor. He has been staying in the island for 36.27 years, typically with 4 family members, 2 children, 2 aged household members, 2 women in the household. His major source of information is the television. The fishermen-respondent perceived "Aware" on their level of awareness towards climate change. The fishermen-respondent perceived "Moderately Agree" on adaptation practices towards climate change. The fishermen-respondent perceived "Much Affected" Livelihood and on Goods and Services and "Moderately Affected" on Health. There is no significant difference in perceptions on awareness to climate change when respondents are grouped according to the profile variables except household income and number of women household member. There is no significant difference in perceptions on adaptation practices when respondents are grouped according to the profile variables except household income and number of household members. There is no significant difference in perceptions on impact of climate change on: livelihood when respondents are grouped according to the profile variables except age and number of household members; on health except source of information; and on goods and services, except length of stay in the island. There is no significant relationship between the perceptions on awareness and perceptions on the impact of climate change on livelihood and health; and significant relationship between the perceptions on awareness and perceptions on the impact of climate change on fishing and goods and services. There is no significant relationship between the perceptions on awareness and perceptions on adaptation practices

References

Ajuaye, Adeline (2010). Analysis Of Farmers' Adaptation To Climatic Change In Kilimanjaro Region

Akanda, M.G.R. & M.S. Howlader. (2015) Coastal Farmers' Perception of Climate Change Effects

on Agriculture at Galachipa Upazila under Patuakhali District of Bangladesh, Global Journal of Science Frontier Research: Agriculture and Veterinary Volume 15 Issue 4 Version 1.0 Year 2015

- Akumu, Clement Elumpe, (2011). Assessing The Potential Impacts Of Climate Change On Coastal Wetlands In North-Eastern NSW Using Geoinformatics, Southern Cross University, Southern Cross University Library epubs@scu.edu.au. Publication
- Alamgir, Aamir, aMoazzam Ali Khan*, aS.Shahid Shaukat, bFateh Muhammad Burfat and Khalid Mahmoodc (2015)., Impact of Climate Change on the Socioeconomic Conditions: A Case study of district Thatta , Sindh, Pakistan May 2015
- Albert, J.R., Gaspar R, and Raymundo, M. (2015), *Who are the Middle Class*
- Ali Khan, aAamir Alamgir, aMoazzam, aS.Shahid Shaukat, bFateh Muhammad Burfat and Khalid Mahmoodc (2015).Impact of Climate Change on the Socioeconomic Conditions: A Case study of district Thatta, Sindh, Pakistan Assessment Report On Awareness And Knowledge Level On Climate Change And Adaptation Practices Promoting Climate Resilient Water Management and Agricultural Practices (NAPA Follow-Up), Save Cambodia's Wildlife, June 2012
- Barnett, J., 2003. Security and climate change, *Global Environmental Change* 13, pp.7-17.
- Bast, Joseph L. Seven Theories of Climate Change. Copyright © 2010 The Heartland Institute Published by The Heartland Institute Chicago, Illinois 60603, ISBN-13 978-1-934791- 31-8 www.heartland.org
- Benoit, S. L., Craig, M., David, W., Jianping, Y., (2007). The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis. World Bank Policy Research Working Paper 4136, February 2007.
- Best, John W., Educational Research. Englewood Cliffs, New Jersey; Prentice Hall Inc., 1989
- Bickel, G., Marl N., Price C. Hamilton W., Cook J. (2000), Guide To Measuring Household Food Security (Pdf). Usda Food And Nutrition Service Archived From The Original On Nov 4 2013. Retrieved 1 November 2013.
- Bikila, A.(2013) Farmers' Perception and Adaptation to Climate Change and Variability: The

- Case of Dodota Woreda, Arsi Zone, Oromia Region, Ethiopia
- Bikila, Anbesu. (2013). Farmers' Perception and Adaptation to Climate Change and Variability: The Case of Dodota Woreda, Arsi Zone, Oromia Region, Ethiopia.
- Brugere, C., Holvoet, K. & Allison, E. 2008. Livelihood diversification in coastal and inland fishing communities: misconceptions, evidence and implications for fisheries management. Working paper, Sustainable fisheries livelihoods programme (SFLP), FAO/DFID, Rome.
- Bulletin of Environment, Pharmacology and Life Sciences Bull. Env.Pharmacol. Life Sci., Vol 4 [6] May 2015: 93-101 ©2014 Academy for Environment and Life Sciences, India
- Cabinet Office (2008) *The Pitt Review: Learning Lessons from the 2007 Floods*. London
- Carr, Paul. (2016) Climate Change Awareness Amongst Secondary Level Students and Teachers in A Dar Es Salaam University College Of Education (DUCE) Affiliated School in Urban Tanzania.
- Charles, A. T. (2008). Sustainable fishery systems (Vol. 5). John Wiley & Sons
- Clay, P. M., & Olson, J. (2008). Defining "Fishing Communities": Vulnerability and the Magnuson-Stevens Fishery Conservation and Management Act. *Human Ecology Review*, 15(2), 143
- Climate Action PH: Its Time For The Philippines To Get Serious About Climate Change* Climate Change in Armenia, Stockholm Environment Institute – U.S. Center Tufts University, 11 Curtis Avenue Somerville, MA 02144, www.sei-us.org
- Coastal change in the East Riding...<http://www2.eastriding.gov.uk/environment/sustainable-environment/looking-after-our-coastline/coastal-change-in-the-east-riding/> 2017
- Collins [English Dictionary](#) - Complete & Unabridged 2012 Digital Edition © William Collins Sons & Co. Ltd. 1979, 1986 © HarperCollins Publishers 1998, 2000, 2003, 2005, 2006, 2007, 2009, 2012
- Cooper, P, J, M, Dimes, J, Rao, K, P, C, Shapiro, B, Shiferaw, B, and S, Twomlow, (2008). Coping better with current climatic variability in the rain-fed farming systems of sub-Saharan Africa: An essential first step in adapting to future climate change?,
- Costello, A., M. Abbas, A. Allen, S. Ball, S. Bell, R. Bellamy, and M. Lee, (2009): Managing the Health Effects Of Climate Change. *The Lancet*
- Costello, A., M. Abbas, A. Allen, S. Ball, S. Bell, R. Bellamy, and M. Lee, 2009: Managing the health effects of climate change. *The Lancet* , 373(9676), 1693-1733.
- Croppenstedt, A, Demeke, M, and M, M, Meschi, (2003). "Technology adoption in the presence of constraints: the case of fertilizer demand in Ethiopia", in *Review of Development Economics*, 7 (1) pp. 58 - 70
- Deressa, T, T, Hassan, R, M, Ringler, C, Alemu, T, and M, Yesuf, (2009). Determinants of farmers' choice of adaptation methods to climate change in the Nile Basin of Ethiopia Deressa, T., Hassan, R.M. & Ringler, C., (2008). Measuring Ethiopian Farmers' Vulnerability to Climate Change Across Regional States. International Food Policy Institute.
- Deressa, T.T., R. M. Hassan, And C. Ringler. (2010). Perception And Adaptation To Climate Change By Farmers In The Nile Basin Of Ethiopia.
- Digambar, Singh (2011). Dahal Impact of Climate Change on Livelihood and Biodiversity in Rural Communities (A Case Study of SiddhiGanesh and Nepane Community Forestry User Groups of Sindhupalchwok District of Nepal)
- Epule, T. E., Peng, C., Lepage, L., & Chen, Z. (2012). Poverty and Gender oriented vulnerabilities to food and water scarcity in Touroua, Cameroon, *Journal of Human Ecology*, 38(2), 81-90
- Eriksen, S. E. H., Klein, R. J. T., Hammill, A., Naess, L. O., Tanner, T. M., Robledo, C., O'Brien, K. L. (2007) Portfolio screening to support the mainstreaming of adaptation to climate change into development assistance.
- Fairbank, H. & Jenny Jakeways. (2006) Mapping Coastal Evolution and Risks in a Changing Climate: A Training Pack. Senior Coastal Scientist & Senior Coastal Geomorphologist Centre for the Coastal Environment Isle of Wight Council, UK
- Fariya, Laila. (2013)., Assessment on Social Vulnerabilities to Climate Change– a Study on South-Western Coastal Region of Bangladesh
- Farmers' Awareness, Vulnerability and Adaptation to Climate Change in Adamawa State, Nigeria *British Journal of Arts and Social Sciences*

- ISSN: 2046-9578, Vol.9 No.II (2012) ©British-Journal Publishing, Inc. 2012
<http://www.bjournal.co.uk/BJASS.aspx> 104 A.A.
- Ferreira, Maria Aparecida (2014). "Is Fishing An Exclusive Male Activity?"
- Fothergill, A. And Peek L.A. (2004). Poverty And Disaster In The United States. A Review Of Recent Sociological Findings. *Natural Hazards*, 82, 89-110
- Garces, Len R ,et al (1999), Fisheries Management. International Marine Life Alliance ICLARM-The World Fish Center
- Goulden, M. (2005). Adatation to Climate Variability in East African Lakes and WetLands: The Role of Social Capital in Promoting Resilience.
- Graciano P. Yumul, Jr., Nathaniel A. Cruz, Nathaniel T. Servando and Carla B. Dimalanta "Extreme Weather Events And Related Disasters In The Philippines, 2004-08: A Sign Of What Climate Change Will Mean, *Disasters* 35 (2011) pp. 362-385.
- Graham J. Charles A. & Bull (2006). Community Fisheries Management Handbook Gorsebrook Research Institute, Saint Mary's University (133) ISBN 0-9694095 6-7
- Green, D., S. Jackson, and J. Morrison: 2010: Risks from climate change to indigenous communities in the Tropical North of Australia: A scoping study for the Commonwealth Department of Climate Change. Canberra, Australia: Department of Climate Change. Accessed 22 March 2016
- Gurung, G. B. and Bhandari D. (2009). Integrated Approach to Climate Change Adaptation
- Haiyan, Thelma, Ike, Fengshen, Washi, Durian, Bopha, Trix, Amy, Nina. January 19, 2016. How Is Climate Change Affecting The Philippines?
- Hanson-Easey, Scott and Alana Hansen, (2016) Climate Change Impacts On Vulnerable Communities In The Coastal Zone CoastAdapt Impact Sheet 9, National Climate Change Adaptation Research Facility, Gold Coast.
- Harmonizing Population And Coastal Resources In The Philippines, Published In World Watch Magazine, September/October 2004, Volume 17, No. 5
- Hasan, Zaid (2015). Artisan Fishers' Perception of and Adaptation to Climate Change in the Southeast Coast in Bangladesh
- Hossain, Md. Afjal, Md. Imran Reza, Sania Rahman., Imrul Kayes. (2011). Climate Change And Its Impacts On The Livelihoods Of The Vulnerable People In The Southwestern Coastal Zone In Bangladesh
<https://Prezi.Com/Jxtt5vzm3bhm/San-Salvador-Masinloc-Zambales/> 17 September 2014
<https://www.google.com.ph/>
<https://www.psa.gov.ph./glossary/terms/indicator/details.asp?strIndi=66>
- Idrisa, Y.L. B. O. Ogunbameru1, A. A. Ibrahim1 and D. B. Bawa1 (2012). Analysis of Awareness and Adaptation to Climate Change among Farmers in the Sahel Savannah Agro-ecological Zone of Borno State, Nigeria
- Idrisa, Y.L., et al. (2012), Analysis of Awareness and Adaptation to Climate Change among Farmers in the Sahel Savannah Agro-ecological zone of Borno, State, Nigeria, *British Journal of Environment and Climate Change*
- IPCC (1990) Sea Level Rise: Climate Change: the IPCC Scientific Assessment. Cambridge
- J.T. Klein (2002). Coastal Vulnerability, Resilience And Adaptation To Climate Change: An Interdisciplinary Perspective
Journal of Environmental and Public Health Volume 2016 (2016), Article ID 9654753, 9 page
<http://dx.doi.org/10.1155/2016/9654753>
- Journal of Forest and Livelihood*, Kathmandu: Forest Action Nepal.
- Karfakis Panagiotis, et al. (2012). The Assessment Of The Socio-Economic Impacts Of Climate. Change At Household Level And Policy Implications
- Katon, M, et al Robert S. Pomeroy Len R. Garces, Albert M. Salamanca Fisheries Management Of San Salvador Island, Philippines: A Shared Responsibility
- Klein J, Staudt M (2006) Evaluation of future sea level rise impacts in Pärnu / Estonia. In: Schmidt-Thomé P. (ed), Sea level change affecting the spatial development in the Baltic Sea Region (Seareg). *Geol Surv Finland Spec Pap* 41:71-81
- Klein, Richard J.T. (2002), Coastal Vulnerability, Resilience And Adaptation To Climate, Change: An Interdisciplinary Perspective

- Lebel, L. (2013) Local Knowledge And Adaptation To Climate Change In Natural Resource-Based Societies Of The Asia Pacific. *Mitigation And Adaptation Strategies For Global Change*, 18, 1057-1076
- Leiserowitz, A. (2007). Global public perception, opinion, and understanding of climate change: Current patterns, trends, and limitations. Thematic paper for: Human development report 2007: Climate change and human development—Rising to the challenge. United Nations Development Program.
- Leonardo, Empress., [San Salvador Masinloc](#), Zambales Livingston, Gretchen (2015). *Family Size Among Mothers*
- Lokhande, Murlidhar (2015) Socio- Economic Impact of Climate Change, Volume : 5 | Issue : 8 | August 2015 | ISSN - 2249-555X *Indian Journal of Published Research*
- Lopez, Maria Elena. (1991). "The Filipino Family as Home for the Aged." *Elderly in Asia Report No. 91-7. 1 1991*
- Loughnan, M., N. Tapper, K. Lynch, J. McInnes, and T. Phan, (2016): A Spatial Vulnerability Analysis Of Urban Populations During Extreme Heat Events In Australian Capital Cities. National Climate Change Adaptation Research Facility, Gold Coast, 128pp. Accessed 22 March 2016.
- Loughnan, M., N. Tapper, K. Lynch, J. McInnes, and T. Phan, 2013: A spatial vulnerability analysis of urban populations during extreme heat events in Australian capital cities. National Climate Change Adaptation Research Facility, Gold Coast, 128pp. Accessed 22 March 2016
- Lugendo, B.R. 2007. Utilisation by fishes of shallow-water habitats including mangroves and seagrass beds along the Tanzanian coast. PhD Thesis, Faculty of Science, Radboud University Nijmegen, The Netherlands, 168pp.
- Maponya, P., & Mpandeli, S. (2012). Climate Change and Agricultural Production in South Africa: Impacts and Adaptation options. *Journal of Agricultural Science*, 4(10), 48-60. <http://dx.doi.org/10.5539/jas.v4n10p48>
- Maponya1, Phokele, Sylvester Mpandeli2 & Samuel Oduniyi. (2013) Climate Change Awareness in Mpumalanga Province, South Africa
- Marshall, N. A., Park, S., Howden, S.M., Dowd, A.B., Jakku, E.S. (2013) Climate change awareness is associated with enhanced adaptive capacity. *Agricultural Systems*, 117, 30-34.
- Mboya, Odhiambo Tom (2013). Effects of Weather and Climate Variability on Fishing Activities and Fishers' Adaptive Capacity in Mbita Division-Homa Bay County,
- Kenys Mbwambo, J.S., Ndelolia, D., Madalla, N., Mnembuka, B., Lamtane, H.A., Mwandya, A.W., and Zahabu, E., (2012) Climate Change Impacts and Adaptation Among Coastal and Mangrove Dependent Communities: A Case of Bagamoyo District.
- Miller, G.T., 2004. *Living in the Environment*. Brooks/ Cole-Thomson Learning, USA.
- Montebon, Marivic (2018). Preparedness, Institutional Support Needed
- Muhammad Imzan Hassan and Nurul Hanira Rahmat (2016) The Effect Of Coastline Changes To Local Community's Social-Economic
- Müller-Kuckelberg, K. (2012) Climate Change and its Impact on the Livelihood of Farmers and Agricultural Workers in Ghana
- Müller-Kuckelberg, Kristina. (2012) Climate Change and its Impact on the Livelihood of Farmers and Agricultural Workers in Ghana
- Mwamba, Leonard. (2013) Vulnerability and Adaptability: Modelling the Adaptive Capacity of Rural Households to Environmental Changes National Climate Change Adaptation Research Facility, Gold Coast., 2016
- Natural Resources Canada, 2004. Climate Change Impacts and Adaptation: A Canadian Perspective. Ottawa, Canada.
- Nhemachena C., And Hassan R.,(2007) Mico-Level Analysis Of Farmers' Adaptation To Climate Change In Southern Africa, IFPRI Discussion Paper No. 00714, International Food Policy Research Institute, Washington DC, USA
- Nigatu, A. S., Asamoah B. O., and kloos, H. (2014). Knowledge and perceptions about the health impact of climate change among health Sciences students in Ethiopia: a cross-sectional study *BMC PublicHealth*. 14, 587, Retrieved from, <http://bmcpublihealth.biomedcentral.com/articles/10.1186/14712458-14-587>.
- O'Neill MS, Carter R, Kish JK, Gronlund CJ, White-Newsome JL, Manarolla X, Zanobetti A, Schwartz JD (2009) Preventing heat related morbidity and mortality: new approaches in a changing climate. *Maturitas* 64:98-103
- OECD (2009). Integrating Climate Change Adaptation into Development Co-Operation. OECD Publishing: Paris. Accessed online 15/3/15:

- www.sourceoecd.org/development/9789264054769
- Ogalleh, S.A., et al. (2012), Local Perceptions and Responses to Climate Change and Variability: The Case of Laikipia District, Kenya
- Ogalleh, Sarah Ayeri, et. al. (2012) Local Perceptions and Responses to Climate Change and Variability: The Case of Laikipia District, Kenya,
- Olutegbe N. S.1* and Fadairo O. S2., (2015) Correlates and Determinants of Climate Change Adaptation Strategies of Food Crop Farmers in Oke-Ogun Area of South-Western Nigeria Online ISSN 2277-1808 Journal's URL:<http://www.bepls.com>
- Ordoñez II, Jose A., (2008), Environmental Biology: Philippine Setting. National Bookstore
- Osman-Elasha, Balgis. (2010) Climate Change Adaptation: Options And Good Practices At Arab Region
- Oven, K., Curtis S, Reaney S., Riva, M., Stewart M., Ohlemuller R., Dunn C., Nodwell S., Dominelli L., & Holden R. (2012). Climate Change And Health And Social Care. Defining Future Hazard, Vulnerability And Risk For Infrastructure Systems Supporting Older People's Health Care In England. *Applied Geography*, 33, 16-24
- Parganiha, Omprakash (2016). Farmers' Perception About Climate Change And Its Impact On Agriculture And Allied Activities In Chhattisgarh Plains
- Parganiha, Omprakash (2016) Farmers' Perception About Climate Change and Its Impact on Agriculture and Allied Activities in Chhattisgarh Plains
- Parry, Martin L., Canziani, Osvaldo F., Palutikof, Jean P., van der Linden, Paul J., and Hanson, Clair E. [IPCC, 2007: Climate Change 2007: Impacts, Adaptation and Vulnerability](#). Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. (eds.]. Cambridge University Press, Cambridge, United Kingdom, 1000
- Paskoff, Roland P. (2010). Effects Of Sea-Level Rise On Coastal Cities And Residential Areas *Lumière University, Lyon, France*
- Perez, Rosa T., et al., (1999) Climate Change Impacts And Responses In The Philippines Coastal Sector
- Perez, Rosa T., Leoncio A. Amadore, Renato B. Feir. (1999). Climate Change Impacts And Responses In The Philippines Coastal Sector. Vol. 12: 97-107, 1999 Published August 27 © Inter-Research 1999. Philippine Atmospheric, Geophysical And Astronomical Services Administration (PAGASA),
- Sango, Ishumael. (2013). An Investigation Of Communal Farmers's Livelihoods And Climate Change Challenges And Opportunities In Makonde Rural, District Of Zimbabwe
- Saroar, M. & Routray, J. K. (2010). Why does climate change awareness differ? Lessons learned from Bangladesh. Paper presented at the 2nd International Conference on Climate Change, Sustainability and Development in Semi-arid regions held between 16-20 August, 2010 in Fortaleza - Ceará, Brazil.
- Sesabo, J. 2006. Marine resource conservation and poverty reduction strategies in Tanzania. *Hamburg studies on maritime affairs* 8: 131pp.
- Shelesky, Stephen., (2016). Examining the Economic Impacts of Climate Change on Colorado Ski Communities Through 2050
- Shuan, I. (2018). Role of Women in the Family and Society. <https://www.yourarticlelibrary.com>
- Sidr and Aila [Russell Kabir](#),¹ [Hafiz T. A. Khan](#),^{2,3} [Emma Ball](#),⁴ and [Kay Caldwell](#), (2016) Climate Change Impact: The Experience of the Coastal Areas of Bangladesh Affected by Cyclones
- Smit, B. and Pilifosova, O. (2001). Adaptation to Climate Change. In: Context of Sustainable Development and Equity. Contribution of the Working Group to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, United Kingdom. pp. 879-912.
- Stanton, Elizabeth A, Frank Ackerman, Flávia Resende, (2009). The Socio-Economic Impact of Climate Change in Armenia, Stockholm Environment Institute - U.S. Center Tufts University, 11 Curtis Avenue Somerville, MA 02144, www.sei-us.
- Tacio, Henrylito D., (2010). Climate Change and Effects On The Philippines U.S. Agency for International Development (USAID). Adapting to Coastal Climate Change: A Guidebook for Development Planners May 2009
- Takepart LLC, What is climate change? (June 17, 2016), Participant Media
- Tenenbaum, Laura, et al. (2017), [NASA's Jet Propulsion Lab](#), [California Institute of Technology](#)

- The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XLII-4/W1, 2016 International Conference on Geomatic and Geospatial Technology (GGT) 2016, 3–5 October 2016, Kuala Lumpur, Malaysia USGS
- Thomas, Darren (2008). Development of a Coastal Community Climate Change Action Plan for Arviat, Nunavut
- Thomas, Darren (2008). Development of a Coastal Community Climate Change Action Plan for Arviat, Nunavut
- Timothy J. Wallington, Jayaraman Srinivasan, Ole John Nielsen, Ellie J. Highwood, (2004), Greenhouse Gases And Global Warming, in Environmental and Ecological Chemistry, [Ed. Aleksandar Sabljic], in Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford, UK, [http://www.eolss.net] www.epa.ie/researchandeducation/
- Twum- Barimah, P., Osei, K.S., and Oppong, D. (2015): Assessment of people 's Knowledge and Perception on Climate Change: A case study of Asunafo North District, Ghana. International Journal of Innovative Research in Science, Engineering and Technology. 4 (1), 18417-18424
- Understanding The Philippine Coastal Environment :An Endangered Coastal Environment http://www.one-ocean.org/about/crmp/where_we_are.html
- Understanding the risk, [Intergovernmental Panel on Climate Change \(IPCC\) Fourth Assessment Report](#), 2007. United Nations Development Program. Gender, Climate Change and Community-based Adaptation: A Guidebook for Designing and Implementing Gender-Sensitive Community-Based Adaptation Programmes and Projects, July 2010
- United Nations Framework Convention on Climate Change. (2007) Climate Change: Impacts, Vulnerabilities And Adaptation In Developing Countries University Press, Cambridge
- USAID, (2009). Adapting To Coastal Climate Change A Guidebook For Development Planners Uz-zaman, Arfan Md. (2014). Impact of Sea Level Rise in the Coastal Areas of Bangladesh: A Macroeconomic Analysis Journal of Economics and Sustainable Development ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online) Vol.5, No.18, 2014
- Vardiman, L. 2008. A New Theory of Climate Change. *Acts & Facts*.
- Warwick, R. A., Barrow, E. M., & Wigley, T. M. L. (1993). Climate And Sea-Level Change: Observations, Projections, And Implications: Cambridge University Press, Cambridge, UK. www.dictionary.com
- Yirga, C, T, (2007). The dynamics of soil degradation and incentives for optimal management in Central Highlands of Ethiopia, Ph.D. Thesis. Department of Agricultural Economics, Extension, and Rural Development, University of Pretoria, South Africa
- Yoskowitz, D.W. James Gibeau, Ali McKenzie, (2009). The Socio-Economic Impact of Sea Level Rise in the Galveston Bay Region June 2009
- Zsamboky, Mary, et al, (2011) Impacts of Climate Change on Disadvantaged UK Coastal Communities