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## Assessment on Climate Change Awareness Among Elementary Teachers in San Miguel District, San Miguel, Zamboanga Del Sur

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### Abstract

Climate condition is quite alarming to people and to the environment and natural disasters are common and perceivable nowadays. Lectures were being conducted to determine the levels of climate change awareness and risks among purposively selected San Miguel District Teachers and how informed they are or not about the existing environmental issues. The results show that there are significant differences between the results of pre-test and post-test of climate change and risks. Thus, the value of conducting information campaign plays a significant role for public awareness. The knowledge of teachers on climate change is potentials to educate elementary pupils on mitigating measures related to the lingering issue. There should be an intensive information campaign on climate change, its features, impacts, and mitigation measures or launch Information, Education and Communication (IEC) to the localities and different sectors of the society.

**Keywords:** Awareness, climate change, information campaign, risks

### 1. Introduction

Climate change constitutes one of the 21<sup>st</sup> century key challenges to development the world over [1] and is a threat to humanity [2, 3, 4, 5]. Its nature and extent have increased dramatically over many years, to such extent that the environmental problems now constitute a global crisis. It calls the global attention of the people and is evidently proven by the flurry of conferences, campaigns, assessment reports, and researches since the Rio Earth Summit in 1992 such as the annual UNFCCC Conference of Parties, IPCC assessment reports, and the volumes of literature published in journals like International Journal of Climate Change and the WIREs.

Climate change in IPCC usage refers to a change in the state of the climate that can be identified by changes in the mean or the variability of its properties and that persists for an extended period, typically decades or longer. It is a long term measurable change in the elements of climate tending toward extreme [6]. Causes of climate change may be natural but scientific evidences indicate anthropogenic activities caused the global climate changing [7] especially the burning of fossil fuels, industrial pollution, deforestation, land use changes [8, 9, 10, 11], and increased concentration of greenhouse gases (GHGs) in the atmosphere [10, 12, 13, 14, 15] which have contributed to the increased frequency and intensity of natural disasters, rise in sea levels, and global warming [16]. These available evidences show that the earth experienced an average warming approximately 0.6°C during the 20<sup>th</sup> century and is expected to warm by about 2 to 3 °C by the end of 21<sup>st</sup> century [8].

Numerous studies related to raising climate change awareness among the people were documented. In the recent study on the level of climate change awareness and perception among primary school teachers in Kenya [5], respondents revealed low awareness level [17, 18, 19] attributed with significant gaps on their knowledge, therefore suggesting to improve quality of knowledge and develop positive attitudes on environmental issues among the school teachers. Similar outcome was also found in the people of sub-Saharan African countries where the low level of awareness on climate change is attributed to limited awareness campaigns [1, 20]. Another study on teachers' awareness of the causes and effects of climate change and their classroom management strategies in climate change era revealed that teachers were not quite aware on climate change impacts and did not use classroom management strategies needed in the issue [21]. Thus, cited studies showed respondents' climate change information is based only on their personal experiences which are obviously limited [7] in which proven on the research on that the level of awareness of local communities on climate change impacts was still low in the Niger Delta region of Nigeria [22].

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An effective information campaign towards climate change awareness is a dynamic approach in adapting such environmental issues. As stated on the article entitled Effectiveness of public communication campaigns in promoting adaptation to climate change in Africa, “The objectives, strategies, and approaches of effective public communication campaigns can immensely influence the audiences’ knowledge, attitudes, perceptions, and behavior towards climate change adaptation in the region [23]. Furthermore, a research focused on analysis of the teachers’ climate change awareness with an aim to provide information useful for the Turkish teachers on assessing their knowledge and attitudes toward climate change [19]. It launched a professional development program titled “Awareness and adaptation to Climate Change” in which 101 teachers participated the three-day in-service thematic activities such as training, workshops, field trips, and lecture discussions with emphasis on climate change issues. The study showed that more than half of the total respondents were not aware on global climate issues before the lecture but became fully aware after engaging the designed activities. Therefore, disseminating information through direct or first-hand (seminars, lectures, workshops, field trips) and vicarious experiences (film viewing, simulation) were effective in the said study. The experiences they had during the professional development program would be applied by the teachers to raise awareness on people especially the children. In a further study conducted during a 4-week period in the town of Quebrada Ganado, Costa Rica, the result revealed that if children are guided in a proper way, parents and other adults could also benefit from them, thus indicates that awareness can be delivered in a consecutive way from the classroom to the community.

Curriculum implementers should be aware of the global climate change issues and risks for only then they can make the generations aware of it. Therefore, teachers, as key influential actors of climate change awareness campaign, must be knowledgeable in educating and encouraging learners to create positive mitigating, adapting, and resilient community on the climate change issues since promoting youth’s awareness on certain environmental issues is significant. This paves education to provide the solution which is now focusing

on environment, its conservation, and protection in curricular. 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 mitigating and adapting it [5].

This study is an innovative attempt to assess the level of awareness of the San Miguel District teachers about the emergence of climate change and how they apply it to their profession since studies showed low awareness of the students [24, 25]. Specifically, it aims to determine the climate change awareness level of teachers before and after the information campaign and to find out the significance level of climate change awareness and risks of the teachers. It also takes into account the teachers’ role in public awareness especially on students. This would be done on how effective the IEC in disseminating information relevant to the climate change issue and its impact to people and to the environment.

## 2. Methodology

### 2.1 Description of the Study Sites

This study was conducted in San Miguel district, division of Zamboanga del Sur. It is situated in Zamboanga peninsula, Region IX seated about 33 km south-south-west of Pagadian City as capital of the province. This 4<sup>th</sup> class municipality is subdivided into 18 barangays and occupies an area of 181.59 km<sup>2</sup>. On the average, 93.51 people are distributed in one (1) km<sup>2</sup>. The geographical coordinates of the place are 7° 38’ 54’’ N, 123° 16’ 3’’ E. All barangays of the said municipality have established elementary schools. Its boundaries are the municipalities of Guipos (north), Lapuyan (west), Dimataling (southwest), and San Pablo (northeast) [26].

### 2.2 Respondents and Conduct of the Survey

All elementary teachers who are currently teaching during the SY 2012-2013 were considered as respondents (107) of the study. Structured questionnaire, which was administered during the pre-lecture and post-lecture tests, was used as a data collection instrument to elicit information [27] on climate change related cases. The said instrument was on four point scale. The data were subject to appropriate statistical tools which were computed using a related software.



Fig 1: Map of the locale.

### 3. Results and Discussion

**Table 1:** Teachers’ level of awareness on climate change before and after the lecture.

Variable	Lecture	
	Pre-test	Post-test
Global warming	2.91	3.66
El Niño	3.28	3.70
La Niña	2.90	3.65
Greenhouse gas emission	2.74	3.56
Climate Change Adaptation	2.58	3.43
Climate Change Mitigation	2.80	3.46
Reasons for sea level rise	2.60	3.44
Kyoto Protocol	2.31	3.46
Climate Change risks	2.50	3.64
Greenhouse effect	2.28	3.48
Aggregated mean	2.69	3.54
Standard deviation	0.30	0.11
Adjectival equivalent	CA	FuA

**Legend:**

<b>Numerical Rating</b>	<b>Adjectival Equivalent</b>
4 – (3.26 - 4.00)	Fully Aware (FuA)
3 – (2.51 - 3.25)	Conversely Aware (CA)
2 – (1.76 - 2.50)	Fairly Aware (FiA)
1 – (1.00 - 1.75)	Not Aware (NA)

Table 1 presents the level of awareness on climate change before and after the lecture. Based on the result of the pre-test, the teachers (2.69) were conversely aware. Before conducting the lecture, some of them (87.9%) were not quite aware on the current issues brought by the notable climate change. The same finding confirmed recent studies that teachers had no or low awareness [5, 17, 18, 19]. The issues of global warming, greenhouse effects, climate change mitigation, reasons for sea level rise, El Niño, La Niña, etc. were ignored.

The pre-test result revealed that majority of the teachers (87.9%) lacked information on the impact of climate change, thus were not totally educated about the contemporary issue. However, the post-test result after the lecture appeared that teachers (3.54) became fully aware. The session made them to be completely aware about the potential effects of climate change. It means that the launching of IEC regarding climate change awareness, preparedness, mitigation, and adaptation significantly influenced the participants. The data also showed that there is significant difference in the results of the level of awareness with or without the information campaign.

Teachers, being the immediate frontiers of molding the young minds, must have thorough knowledge and information on this issue to understand the climate change and its potential effects to the society. The necessity in disseminating information on climate change must massively practice with the spirit of volunteerism in terms of countering such environmental or ecological issues. Therefore, responsible authorities provide timely and reliable information raises public awareness.

**Table 2:** Teachers’ level of awareness on climate change risks.

Variable	Lecture	
	Pre-test	Post-test
Changes in Precipitation level	2.54	3.47
Increasing Ambient Temperature	2.46	3.56
Increasing Intensity of Storm Surges	2.50	3.30
Declining of Crop yield	2.64	3.48
Increasing crop pests and diseases	2.65	3.47
Emergence of new insects on crops	2.34	3.50
Emergence of new insects on livestock	2.34	3.57
Increasing causes of dengue	2.54	3.61
Increasing causes of malaria	2.55	3.60
Increasing causes of typhoid	2.55	3.64
Biodiversity loss	2.14	3.96
Coral bleaching	2.35	3.52
Declining livestock production	2.43	3.68
Increasing frequency of climate extremes	2.33	3.67
Coastal erosion	2.54	3.64
Water scarcity	2.71	4.11
Supply of potable water	2.71	3.79
Decline in fisheries production	2.74	4.00
Flooding	2.63	3.73
Population displacement due to climate extremes	2.57	3.67
Disaster Risk Management	2.35	3.76
Climate Change Act RA 9729	2.35	3.81
Disaster Risk Reduction and Management Act 10121	2.62	2.53
Saltwater Intrusion	2.48	3.30
Aggregated mean	2.50	3.60
Standard deviation	0.15	0.30
Adjectival equivalent	FiA	FuA

**Legend:**

<b>Numerical Rating</b>	<b>Adjectival Equivalent</b>
4 – (3.26 - 4.00)	Fully Aware (FuA)
3 – (2.51 - 3.25)	Conversely Aware (CA)
2 – (1.76 - 2.50)	Fairly Aware (FiA)
1 – (1.00 - 1.75)	Not Aware (NA)

Table 2 shows the results of pre-test and post-test on the level of awareness on climate change risks among the Teachers. The pre-test result (2.503), interpreted as fairly aware, revealed that majority of respondents (85.4%) are not knowledgeable on the possible risks and hazards brought by the lingering issue. This means that, before the lecture, teachers are not quite conscious on the risks brought about climate change. The finding has a similar result to the previous study on the level of awareness of local communities on climate change impacts was still low in the Niger Delta region of Nigeria [22], majority (60%) of respondents know little or nothing about the threatening issues [21], and 89% of the respondents do not know what climate change is all about, its causes, effects, and possible adaptive or mitigative measures, 81.8% have heard about climate change and 18.2% of them have never heard about climate change before [28].

When the post-test was conducted after the lecture, respondents (3.60) perceived to be fully aware. It revealed that there is significant impact in facilitating a seminar or lecture to raise teachers’ awareness about climatic changes, as also revealed on the analysis of climate change awareness study [19]. Thus, the importance of information campaign such as lectures, seminars, mass and broadcast media, leads to a sustainable society responsive to face various climatic and ecological phenomenon risks [22].

**Table 3:** Summary of aggregated means.

Summary of Aggregated Mean				
	Aggregate Mean (pre-test)	Aggregate Mean (post-test)	P-value	Remarks
Climate Change Awareness	2.69	3.54	1.08E-07	Significant
Climate Change Risk Awareness	2.503	3.6	2.1868E-20	Significant

Since  $P > 0.05$  (level of significance),  $H_0$  is accepted that means are equal.

Since  $P < 0.05$  (level of significance), then  $H_0$  is rejected and  $H_a$  is accepted that at least one is different.

Table 3 presents that the results showed significant difference between pre-test and post-test results on climate change awareness among Teachers ( $P = 1.08E-07$ ). Thus, the conduct of informative lecture regarding climate change should be given priority. There is also significant difference between the pre-test and post-test on climate change risks awareness ( $P = 2.1868E-20$ ). This means that the value of information campaign plays significant role for public awareness in identifying and assessing possible effects of climate change which leads to risk reduction of the people. The findings emphasize that the teachers (86.7%) observed a low awareness on climate change issues but later they (88.7%) appeared to have high awareness level after the information campaign. These findings are in consonance to the study on analysis of the teachers’ climate change awareness. This is an indication that thorough and systematic ways on spreading information can increase individual perceptions and knowledge towards environmental issues [19].

Lack of information on this issue can mislead and create misconception on the real features, causes, effects and risks of climate change that possibly arises. Moreover, Teachers in the Department of Education (DepEd) should serve as front liners in disseminating relative information to their pupils or students. The teachers’ level of awareness is a potential indicator that they can share experiences to their pupils and colleagues about the effective measures in mitigating climate change. As such, there is a need for the development and assessment of planned adaptation initiatives to help manage the risks of climate change. Thus, comprehensive campaigns on climate change as well as the campaign on mitigations and adaptations especially to the rural areas are substantially needed [29].

**4. Conclusion and Recommendation**

The result revealed that majority of the Teachers (87.9%) was conversely aware on climate change before the lecture paper. They lacked information on the climatic changes in our environment. The result on the pre-test level of awareness on climate change risks is interpreted as fairly aware. Majority of the respondents were not knowledgeable before the lecture on the possible risks and hazards brought by the existing climate change. However, the results on the level of awareness on climate change after conducting the lecture became high which resulted to teachers’ full awareness. The data showed that there is significant difference ( $P = 1.08 E-07$ ) with the results on the level of awareness with and without the information campaign. Majority of them were fully aware after the information campaign. Similar result has been observed on climate change risks after the lecture. The post-

test result reveals that facilitating a seminar or lecture on climate change is substantial enough for the teachers to be aware on environmental or ecological issues.

On the other hand, there is also significant difference between the pre-test and post-test on climate change risks awareness ( $P = 2.1868E-20$ ). This is a manifestation that the value of information campaign plays significant role for public awareness in the identification and assessment of possible effects of climate change.

There should be an intensive information campaign on climate change, its features, impacts, and mitigation measures to local community. The established Local Government Unit-Disaster Risk Reduction and Management (LGU-DRRM) program has a crucial role and responsibilities in educating people especially the youth about the physical environmental changes and its impacts to human race.

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