

# Educators' Perspective towards Climate Change: A Case of Batangas Province, Philippines

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**Abstract:** The study aimed to determine the educators' perspective towards climate change. It utilized descriptive method of research to gather data from 357 educators in Batangas Province. The study used inferential and descriptive statistics for data analysis. Majority of the respondents were 21 to 40 years old, female, married with units in master's degree. They strongly agreed that education sector has great role in educating the community people with a weighted mean of 3.60. They agreed to stay tuned to local radio and television and cooperate in the advocacy on climate change with a weighted mean of 3.61 and 3.54, respectively. There is no significant difference in the educators' assessment on their responsiveness to climate change. There is a significant relationship between the respondents' perception about climate change and environmental concerns. The mitigating plan may be presented first to the concerned authority in the Department of Education for their review and suggestions.

## 1 INTRODUCTION

Everything changes except the word change. In this modern world, it is a bare reality that most of the changes do not always bring positivity to people but rather they cause adversity and disturbances once in a while. Circumstances occur beyond the control of every individual. Hence, everyone should be adaptive to various changes in life and learn how to be responsive to all kinds of situation whether they bring harm or favor.

Among the various changes in the usual patterns of circumstances, climate change is one that brings dilemma to almost all of the nations in the world. According to the United Nations Framework Convention on Climate Change, climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. Notwithstanding the efforts poured by different countries to mitigate impacts of climate change, it is an undeniable fact that the effects of this change are detrimental to the environment and to the people's life as well. Several years ago, there were usual patterns in the climate being followed by the folks to determine the natural transition of weather condition. In the modern times, remarkable changes brought about

by the occurrences of natural disasters have become the normal situations in most countries all over the world.

The Philippines is one of the most vulnerable countries to climate and disaster risks due to its geography, geographic location and poverty situation. An international report ranked the Philippines as the third most vulnerable country to extreme events in 2013 - the year when Typhoon Haiyan (Yolanda) devastated the Visayan region. (<http://www.nowph.org/>). As a province that is part of CALABARZON region, Batangas is never isolated among the places which are drastically affected by climate change. In most cases, some of the municipalities in the province belong to the areas that are usually hit by natural disasters brought about by changes in the climate. Coastal areas and hilly communities are the places which often need attention in terms of risk reduction and mitigation planning. Depending on the types of disasters, the impacts of such occurrences can neither be underestimated nor taken for granted. Aside from the destruction of life and properties, education sector is one of the most affected aspects of climate change.

The occurrence of different natural disasters is inevitable but the extent of its effects could be effectively managed to lessen such losses in life and properties. Education plays a lot in the great steps toward risk reduction and mitigation of damage that

people may have come across. Protection of life and properties, prevention of possible hazards, or even mitigation of losses and casualties requires adequate knowledge on climate change which is commonly acquired from schools. Since information dissemination is largely tasked to educators, it is quite imperative that they are equipped with proper knowledge and skills in order to perform their mission of educating their clientele and the entire community about climate change.

The great steps in fighting against the impacts of climate change require the possession of knowledge on how it could be strategically addressed. In doing so, the tasks of educators are very much needed being the prime movers of such endeavor of educating students who constitute mostly of the greatest number of community members. The educators' duty is to provide students with proper knowledge and techniques to combat the effects of climate change. In performing such specific functions, the educators will need support and training in order to deliver quality education consequently attain adequate knowledge to respond to the climate change specifically focusing on the aspects relative to social and political perspective and local environment that will meet in the broader scope of educational goals and target objectives relative to proficiency and skills with regard to numeracy and literacy that will lead to employability.

Relative to the observed scenarios, the proponents of this study deemed it necessary to conduct an investigation to determine the responsiveness of educators in Batangas Province to climate change with the end in view of designing a mitigating plan in order to lessen the effects of climate change in the target locale.

## 2 MATERIALS AND METHODS

### 2.1 Brief Review of Literature

Climate change is already having a significant impact on ecosystems, economies and communities. Rising average temperatures do not simply mean balmy winters. Some regions will experience more extreme heat while others may cool slightly. Flooding, drought and intense summer heat could result. Violent storms and other extreme weather events could also result from the increased energy stored in our warming atmosphere. One of the most serious impacts of climate change is how it will affect water resources around the world. Water is intimately tied to other resource and social issues such as food sup-

ply, health, industry, transportation and ecosystem integrity (davidsuzuki.org, 2014).

While children are among the most vulnerable to climate change, they should not be considered passive or helpless victims. Children are powerful agents of change, and studies have found that many children can be extraordinarily resilient in the face of significant challenges. Providing children with empowering and relevant education on disasters and climate change in a child-friendly school environment can reduce their vulnerability to risk while contributing to sustainable development for their communities. Educating girls and women is one of the best ways of strengthening community adaptation to climate change, as shown by recent studies (unicef.org unicef.org, 2014).

Over the longer term, it is forecast that climate change, along with other confounding factors such as the high poverty rate in the region, will combine to create environmental degradation, a subsequent deterioration in livelihoods, and put pressure on populations to migrate. Research suggests that in all instances such effects are likely to disproportionately affect children, their well-being and care, and their ability to participate in good quality, equiFigure education. Disruptions to existing agricultural practices, another secondary effect of climate change, will lead to more widespread malnutrition because of higher food prices (worldbank.org, 2014).

The immediate response needed entails a better general understanding of the concept of climate change, as well as an awareness of its impact at a regional and local level, both of which will allow policy-makers to better climate-proof education systems and will help school communities be better prepared in the event of weather-related disasters. What 'climate-proofing education' means in practical terms includes, for instance, reviewing existing infrastructure to ensure that it is safe should serious weather hit and having a school disaster risk management plan in place. For new schools, it means carrying out better risk assessments when making decisions about school location and selecting more suiFigure infrastructure, designed to withstand severe weather events. At the same time, it would also be possible to incorporate features that are more adapted to the evolving climate of the region, with buildings that are more energy efficient, that rely on the abundant regional potential of solar power for example, that capture rainwater for reuse, and so on. In these ways, the physical infrastructure of education systems would become more climate-resilient (worldbank.org, 2014).

While building up the resilience of education systems, it will be critical to focus on the role education

itself plays in adapting to climate change. Indeed, Article 6 of the United Nations Framework Convention on Climate Change, called the New Delhi work program (2002-2012), proposes that education, training and public awareness are integral to climate change responses. There is currently a rich and evolving debate about what role education should actually play to encourage sustainable development and combat climate change (worldbank.org, 2014).

Climate change denial is already threatening the integrity of science education in formal and informal education settings. In the public schools, such threats are primarily due to laws adopted or considered at the level of state government, policies adopted or considered at the level of the local school district, and actions adopted or considered at the level of the individual classroom, where teachers may either deny climate change themselves or encounter pressure from climate change deniers in the community (ncse.com, 2016).

According to UNEP.org, (2009) climate change has long-since ceased to be a scientific curiosity, and is no longer just one of many environmental and regulatory concerns. It is the major, overriding environmental issue of the time, and the single greatest challenge facing environmental regulators. It is a growing crisis with economic, health and safety, food production, security, and other dimensions. Shifting weather patterns, for example, threaten food production through increased unpredictability of precipitation, rising sea levels contaminate coastal freshwater reserves and increase the risk of catastrophic flooding, and a warming atmosphere aids the pole-ward spread of pests and diseases once limited to the tropics.

Climate Change Mitigation refers to efforts to reduce or prevent emission of greenhouse gases. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behavior. UNEP takes a multifaceted approach towards climate change mitigation in its efforts to help countries move towards a low-carbon society (manilastandardtoday, 2016).

Global climate change has already had observable effects on the environment. Glaciers have shrunk, ice on rivers and lakes is breaking up earlier, plant and animal ranges have shifted and trees are flowering sooner. Effects that scientists had predicted in the past would result from global climate change are now occurring: loss of sea ice, accelerated sea level rise and longer, more intense heat waves. Scientists have high confidence that global temperatures will continue to rise for decades to come, largely due to greenhouse gases produced by human activities (cli-

mate.nasa.gov, 2016).

## 2.2 Research Methods

The descriptive research design was employed that incorporated triangulation method using a mixture of both quantitative and qualitative method of study. Quantitative method involved the collection of data using field survey and validated structured questionnaire while qualitative methods included the interview and focus group discussions among the educators in Batangas Province. The incorporation of triangulation method offered the various prospects of enhanced confidence involving the result of the study based on the gathered data. The subjects of the study were educators referring to teachers of public secondary schools in Batangas Province and the cities namely, Batangas City, Lipa City, Tanauan City. Purposive sampling was utilized in the study in distributing the research instrument to the respondents of the study. Krejcie and Morgan Figure was used to determine the total number of samples with 357 respondents.

With regard to gathering relevant data and information, this study utilized a self-made survey questionnaire. This main instrument served as one of the main tools in collecting pertinent information with the aid of interview and focus group discussion. The researchers engaged themselves in several library readings to gather the concepts of the study at hand. The researcher prepared the questionnaire after identifying the statement of the problem. Several books, dissertations, unpublished materials, journals, manuscripts and other reading materials were carefully reviewed to gather needed insights for the study. Actual and hands on experiences were also considered in constructing the questionnaire.

The first part of the questionnaire focused on the demographic profile of the respondents as to age, gender, educational attainment, position/designation and length of service. The second part of the tool dealt with the view of respondents to climate change in the society. The third part focused on respondents' general perception about environmental concerns in relation to climate change. The last part of the questionnaire described the effect of climate change with regard to flood, warm temperature, tropical storm and earthquake. The initial copy of the instrument subjected for constructive criticisms, recommendations, suggestions and comments. After doing the revisions and modifications, the self-made questionnaire was then ready for validation.

After incorporating the corrections and refinement extended by evaluators, the final draft of the tool was

approved. The researchers were request the assistance of concerned individuals who are knowledgeable of the concepts of the study in validating the instrument. Copies of the questionnaires were multiplied and distributed to some professors pertaining to the content validation to integrate their recommendations. Pre survey or pilot testing was conducted to check for the credibility and comprehensiveness of the items included consequently improve them by soliciting suggestions, and further comments. After conducting the dry run for among 20 respondents in private schools in Batangas City, the researchers made use of Cronbach's Alpha and Kuder Richardson to validate the tool for its reliability. A statistician was consulted to help the researchers obtain its validity using the formula as one of the suggested treatments of validation.

The researchers personally distributed the questionnaire to the determined respondents. They also sought the assistance of his colleagues in the administration, distribution and retrieval of such instruments among the sample educators- respondents. Furthermore, they explained and clarified the indicators and variables incorporated in the questionnaire. Weights were assigned to the data gathered from the respondents' responses to the distributed tool. Such weights ranged from one as the lowest and five as the highest value using 5 point Likert Scale in the respective questions.

Interview was used to get the supporting data included in the questionnaire. An interview guide was made for this purpose. The researcher interviewed the principals, educators which served as a built in check for the credibility of the study. The researchers conducted a focus group discussion to convene the selected participants to discuss the different variables included in the statement of the problem. The focus group discussion was conducted to assess and validate the information and data gathered. Coding was used after the transcription of the gathered data used analysis.

The following were the statistical tools utilized in answering the questions in this research through the aid of Statistical Package Service Solution (SPSS) package: Cronbach Alpha Reliability Test and Kuder Richardson.; frequency and percentage, weighted mean, Pearson Product Moment of Correlation Coefficient, ANOVA or F-Test and Z-test.

### 3 RESULTS AND DISCUSSION

#### 3.1 Profile Variable of the Batangueño Educators

##### 3.1.1 Age

Majority of the respondents were at the age ranging from 21 to 30 years old and 31 to 40 years of age.

##### 3.1.2 Gender

Most of the respondents were female. Since the teaching is a novel job, most of the educators employed were female. Male teachers comprise the least part of the teaching job.

##### 3.1.3 Civil Status

Most of the respondents or 59.1 percent of the respondents teaching in Batangas Province were married. This means that teachers at the middle age of their service are already married.

##### 3.1.4 Educational Attainment

Majority or 44.3 percent of the respondents had units in master's degree followed by those who were college graduate and graduate of master's degree. There were only few or 7.6 percent of the faculty members had doctoral units and graduates of Doctor of Education.

##### 3.1.5 Length of Service

The data in Figure 5 indicate that majority of the respondents were already in 5 to 9 years length of service. It is followed by 10 to 14 years and the least were those who were below 5 years in service.

##### 3.1.6 Area of Specialization

It could be gleaned from the data in Figure 6 that majority of the respondents had English and Science as their area of specialization. The least responses came from Technology and Home Economics and other area of specialization.

Figure 1 shows the perception of respondents towards climate change in the society. From the results, it could be noted that climate change is a global issue which all people are undeniable responsible which got a weighted of 3.66 interpreted as strongly agree. They agreed that climate change is a problem but it has a local effect in the society which obtained the lowest

Climate Change is...	Weighted Mean	Verbal Interpretation
1. is unavoidable occurrence due to modern society deeds	3.55	Agree
2. is everybody's concern that requires proper education and awareness	3.66	Strongly Agree
3. may be scary and frightening for some individuals	3.40	Agree
4. can only be a normal fluctuation in global temperature	3.21	Agree
5. can be a consequence of modern living and lifestyle of people	3.46	Strongly Agree
6. has something to do with the undesirable human activities	3.50	Agree
7. can be an avenue for each country to have a more improved and accurate weather forecast	3.44	Strongly Agree
8. must be given proper attention particularly by those developing countries to reduce risk and hazards	3.64	Agree
9. should be understood by all people through proper education	3.65	Strongly Agree
10. is a problem but its effect is local	3.07	Strongly Agree
11. should not be taken for granted by all the people in the society	3.57	Agree
<b>COMPOSITE MEAN</b>	<b>3.46</b>	<b>Agree</b>

Figure 1: Respondent's Views about Climate Change in the Society

score. Teachers agreed with their views about climate change in the society with the composite mean of 3.46.

Perceptions on Environmental Concerns	Weighted Mean	Verbal Interpretation
1. Individuals have the right to change the natural environment to fit their needs.	2.94	Agree
2. People are getting obsessive about interaction with the environment.	3.50	Strongly Agree
3. Human beings seem reluctant to exert effort in taking care of the environment.	3.30	Agree
4. The nature of one's work is more significant than protecting the environment.	2.90	Agree
5. The people would rather choose to be unemployed than to do work that destroys the environment.	2.90	Agree
6. People's great dependence on nature has stronger consideration than ensuring its stability and practices.	3.20	Agree
7. The nature can provide the needs of the people through wise and proper utilization of the resources.	3.51	Strongly Agree
8. Plans and actions have the same rights as individuals do in terms of benefits coming from the environment.	3.45	Agree
9. Education sector has great roles to play in educating the minds of community people.	3.60	Strongly Agree
10. The impact of climate change is catastrophic in nature detrimental to life and properties.	3.46	Agree
<b>COMPOSITE MEAN</b>	<b>3.27</b>	<b>Agree</b>

Figure 2: Perception of the Respondents about Environmental Concerns in relation to Climate Change

Figure 2 manifests the perception of the respondents about environmental concerns in relation to climate change. Education sector has great roles to play in educating the minds of community people which got the highest weighted mean of 3.60 and interpreted as strongly agree. On the other hand, teachers agreed that the nature of one's work is more significant than protecting the environment and people would rather choose to be unemployed than to do work that destroys the environment which both got the lowest mean score of 2.90. The composite mean of 3.27 indicates that the respondents agreed with their perception about environmental concerns in relation to climate change.

Item	Weighted Mean	Verbal Interpretation
1. educate the students about the importance of preparedness and responsiveness to calamities like floods to their lives	3.60	To a very great extent
2. contact the proper authority to find out if the location of the school is located in a flood-prone area	3.47	To a great extent
3. learn about the school's emergency plans, warning signals, evacuation routes to inform the students about it	3.60	To a very great extent
4. inform local authorities about any special needs of the school or students	3.50	To a very great extent
5. remind all the students to stay tuned to local radio or television station for updates	3.61	To a very great extent
6. discuss to the students the standard operating procedure (SOP) to be followed before, during, and after the occurrence of floods	3.51	To a very great extent
7. invite a resource person/speaker/trainer to train the students about the proper ways of responding to calamities like flood	3.45	To a great extent
8. monitor the students' departure from school to make sure they arrived home safely	3.55	To a very great extent
<b>COMPOSITE MEAN</b>	<b>3.54</b>	<b>To a very great extent</b>

Figure 3: Extent the Respondents' Responsiveness to Climate Change with regard to Flood

The data in Figure 3 indicate that the educators remind all the students to stay tuned to local radio or television station for updates regarding flood which

obtained a weighted mean of 3.61 and interpreted as to a very great extent. The teachers invite a resource person/speaker/trainer to train the students about the proper ways of responding to calamities like flood got the lowest mean score of 3.45 and interpreted as to a great extent. To sum up, the composite mean of 3.54 indicates that they respond to climate change with regard to flood to a very great extent.

As an educator/teacher, I...	Weighted Mean	Verbal Interpretation
1. initiate concerted efforts to help mitigate the deleterious effects of global warming	3.39	To a great extent
2. outline an active, intensive and sustained tree-planting, tree-growing, and tree-caring activities involving students to minimize excessive heat or warm temperature	3.41	To a great extent
3. enlighten the minds of the students that the government should find ways to develop alternative energy sources that do not release carbon dioxide	3.50	To a very great extent
4. acculturate among the students the civic duty of every citizen like them in helping combat the global warming	3.30	To a very great extent
5. frequently emphasize that each student can reduce his/her contribution to global warming by using less greenhouse gas-producing energy and using solar energy where feasible for water and space heat	3.46	To a great extent
6. let the students know that one great thing they can contribute is to encourage the political and business leaders to institute policies that will save energy	3.43	To a great extent
7. help the community people to preserve existing forests and plant new ones through proper education	3.47	To a great extent
8. participate in the different active organizations preserving the environment and reducing warm temperature	3.43	To a great extent
9. counsel myself to cooperate in the advocacy on climate change and be a model to students in reducing the adverse effects of global warming	3.54	To a very great extent
10. be vigilant and protective of the natural resources that help shield the people from excessive heat or warm temperature	3.47	To a great extent
<b>COMPOSITE MEAN</b>	<b>3.46</b>	<b>To a great extent</b>

Figure 4: Extent of Respondents' Responsiveness to Climate Change with regard to Warm Temperature

Figure 4 manifests the assessment of the respondents regarding the extent of their responsiveness to climate change with regard to warm temperature. The teacher commits to cooperate in the advocacy on climate change and be a model to students in reducing the adverse effects of global warming which obtained the highest weighted mean of 3.54 and interpreted as to a very great extent. Initiate concerted efforts to help mitigate the deleterious effects of global warming got the lowest weighted mean of 3.39 interpreted as to a great extent. The composite mean of 3.46 reveals that the respondents respond to climate change to a great extent with regard to warm temperature.

Item	Weighted Mean	Verbal Interpretation
1. always keep in touch with proper authority regarding the weather forecast or flood advisories	3.60	To a very great extent
2. inform my students about the school's emergency plans, warning signals, evacuation routes, and locations of emergency shelters	3.62	To a very great extent
3. decide on early dismissal based on the official warning signals and orders of the proper authority	3.57	To a very great extent
4. let my class participate in the planning and practice of evacuation with my students and school disaster coordinator	3.60	To a very great extent
5. inform City DRRMC regarding the weather condition in the school location and its emergency assistance needed	3.40	To a great extent
6. ask my students to comply with the school's safety procedure based on evacuation plan	3.62	To a very great extent
7. ensure that my students are in the safest place and I wait for further announcements before sending them home	3.60	To a very great extent
8. leave my students in the school ground before leaving the school premises	3.45	To a very great extent
<b>COMPOSITE MEAN</b>	<b>3.57</b>	<b>To a very great extent</b>

Figure 5: Extent the Respondents' Responsiveness to Climate Change with regard to Tropical Storm

The assessment of respondents on the extent of responsiveness to climate change with regard to tropical storm is manifested in Figure 5. The educators leave no students in the school ground before leaving the school premises obtained a weighted mean of 3.65 interpreted as to a very great extent. Informing City DRRMC regarding the weather condition in the school location and its emergency assistance needed

with a weighted mean of 3.40 interpreted as to a great extent. The composite mean of 3.57 reveals that the respondents respond to climate change to a very great extent with regard to tropical storm.

Profile variables	p-values	Computed F-values	Decision on Ho	Verbal Interpretation
Sex	.34	.964	Failed to Reject	Not Significant
Civil status	.597	.387*	Failed to Reject	Not Significant
Age	.31	.855	Failed to Reject	Not Significant
Educational attainment	.34	1.10	Failed to Reject	Not Significant
Specialization	.03	2.25	Reject	Significant
Length of service	.22	1.41	Failed to Reject	Not Significant

Figure 6: Difference on the Assessment of Respondents to Climate Change in terms of Profile

Figure 6 shows the difference in the assessment of the respondents in their responsiveness to climate change when group according to their profile. The data reveal that there is no significant difference in the respondents’ responsiveness to climate change as to age, sex, civil status, educational attainment, and length of service. The null hypothesis failed to reject which indicates that the demographic profile of the respondents did not affect their assessment on climate change. On the other hand, there is a significant difference in the assessment of the respondents about climate change when it comes to their area of specialization. The null hypothesis is rejected.

Variables	p-value	Computed t-value	Decision on Ho	Verbal Interpretation
Climate change and views on environment concerns	.000	.568	Reject	Significant

Figure 7: Relationship between the Respondents’ Perception to climate and change and Views on Environmental Concerns

It is manifested in Figure 7 that there is a significant relationship between the respondents’ perception to climate change and their views about environmental concerns. The data revealed that there is a significant relationship between teachers’ perception on climate change and their views on environmental concerns. The null hypothesis of no significant relationship is therefore rejected.

Based on the findings of the study, the proponents developed a mitigating plan focusing on the perception of the teachers toward climate change in the society where it is treated as a problem but its effect is locally felt. They also emphasized the educators’ great roles in educating the minds of the community people. One of the areas of concern which was given emphasis in the mitigating plan focused on inviting a resource speaker/trainer to train students about the proper ways in responding to calamities. It also highlighted the efforts to help mitigate the deleterious effects of global warming by means of awareness campaign. Finally, the researchers concentrated on enhancing the information extended to public in cooperation with DRRMC with regard to emergency assistance needed in the school.

## 4 CONCLUSIONS

Based on the results of the study, the following conclusions are drawn:

1. As to research initiatives: most of the number of both completed and ongoing researches are under teaching and learning thematic area and the least researches were conducted under DRRM; researchers have their initiatives to attend training, seminar and workshop, conference/forum/symposium; most of the localized materials are done in area of Mathematics; only few are capable to localize policy, there are numerous numbers of CI projects among schools and schools division offices.
2. Encouragement and support from superior and colleague serve as the reason and motivation to conduct action research.
3. Unavailability of statistical software was recognized as teacher-researcher’s difficulty of finishing research work.
4. The identified strategic interventions focus on proposing research agenda, capacity building, provision of research dissemination, searching for institutional facility to fund internal and external research study, and conduct of empirical studies to better implement basic education programs in the country

## MITIGATION PLAN

The proposed mitigating plan for climate change in Batangas Province was designed to help the educators to strengthen the students’ responsiveness to climate change with regard to flood, warm temperature and tropical storm. Enhancing students’ awareness on natural hazards through various environmental activities and curricular integration and increasing their interest and care for their local environment are about to achieve its academic goals. Improve warnings and forecasts of the events and provide timely communication of threat to disaster officials and the public were also incorporated

## RECOMMENDATIONS

In the light of the findings and conclusions of the study, the following recommendations are offered.

1. The mitigating approach may be presented first to concerned authority in the Department of Ed-

ucation for their review and suggestions before its possible adoption in the field.

2. The extensive application and implementation of the proposed mitigating plan after the approval of the specialists and experts is highly encouraged
3. A similar investigation and parallel study may be conducted emphasizing on other indicators and variables.

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