

## Climate Change Awareness and Environmental Management Practices Among Administrators of State Universities And Colleges in Region Xii, Philippines

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**ABSTRACT :** Generally, the objective of the study was to determine the influence of the level of climate change awareness on the level of environmental management practices of administrators of State Universities and Colleges (SUCs) in Region XII, Philippines. Mean was used to describe the level of awareness on climate change and the level of environmental management practices of the administrators. Multiple regression technique was used to test the hypothesis of the study. A total of 201 administrators were involved in the study. Findings revealed that administrators of the SUCs in Region XII were really much aware on the causes and effects of climate change. They also practiced and participated in information drive about waste management and reforestation on their respective colleges and universities. Level of awareness of the administrators on the causes of climate change really contributed to their waste management practices. It means that administrators really practice proper waste disposal like segregation of biodegradable from non – biodegradable materials for they know that if it will not be practiced, it will cause global warming. Administrators of the SUCs’ in Region XII practiced reforestation in their college like regular planting of trees in the school perimeter, avoid cutting of trees if there are no replacement and full support on the log ban programs of the government because they believe that by not doing these activities really affected the environment that resulted to global warming. Adequate information on the causalities, and effects of climate change coupled with positive environmental attitude will probably reduce the adverse impacts of climate change. Environment – centered and conscientious attitude should be enhanced as well as proper and effective implementation of the pro-environmental practices in schools must be sustained.

**KEY WORDS :** Causes of Climate Change, Effect of Climate Change, Waste Management, Reforestation

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### I. INTRODUCTION

Climate change is considered one of the potent phenomena that inevitably occurs on earth. It is a pressing problem around the world in which the place we thrive is not excluded. It is an environmental problem that needs immediate action and intervention to reduce its adverse impact to humanity. Climate change according to Ekpoh (2009) is any long term change in the patterns of average weather of a specific region or the earth as a whole. Evidence showed that global mean temperature increased by 0.60 Celsius during the 20<sup>th</sup> century. This warming of the world’s climate has been linked to higher concentrations of carbon dioxide and other greenhouse gases in the atmosphere from fossil fuel combustion, improper land use, and deforestation. Consequently, it has serious consequences like significant variations in regional climate, recurrent droughts, excessive heat waves, and flashfloods and so on. Research conducted by Pulse Asia last July 2010 revealed that a small majority of Filipinos have sufficient knowledge about climate change, and most Filipinos or 66% experienced a big change in climate in the past three years. Findings further showed that teachers and students climate change awareness is still very low and that misconceptions about the nature of climate change prevailed among them.

According to Gant et.al., (2009) in the past few decades, human activities have raised atmospheric temperature concentrations and greenhouse gases to its highest level in 420,000 years, and a growing body of scientific research predicts raising temperature and large scale alterations in weather patterns that will continue through the 21<sup>st</sup> century. Research also revealed that solid waste disposal, denudation of forest and energy in sufficiency are just some of the major problems faced by the nation today and acted about it, presents a crucial challenge to educators. Educational institutions like schools are effective avenues in raising administrators, teachers and students’ awareness on the causalities and effects of climate change. Teachers are molders of habits and values of students, with their correct understanding about environmental issues and positive attitude, they could easily influence their learners to become stewards of the environment. Thus, proper management of the environment is not an option but deemed as an obligation. Many researchers have found a positive and often significant relationship between the knowledge and attitude in raising levels toward nature conservation. However, it is imperative that this positive attitude should be coupled with sustainable practices imbibed in one’s values such as waste management, ‘green movement’, energy conservation, widest information dissemination and activities helpful to the environment that starts from teachers as effective models of attitudinal change for pro-environment

behavior. With these presented facts, this study would be practical since administrators and teachers are vital agents of change in transferring knowledge and developing to students the attitude of nurturing the environment. As pointed out by Mosothware (1991), teachers can provide vital link in the delivery of environmental knowledge, with its associated problems and solutions. It is in these premises that the researcher was prompted to study the awareness level, environmental attitude and management practices of administrators and teachers that will help reduce the impacts of climate change on humans and the environment in which we live.

### **Statement of the Problem**

This study was designed to find out climate change awareness and environmental management practices of administrators in the State Universities and Colleges in Region XII. Specifically, this study attempted to answer the following questions:

1. What are the level of awareness on climate change among school administrators of State Universities and Colleges in Region XII?
2. What is the level of practice on environmental management among School Administrators of State Universities and Colleges in Region XII? and
3. What is the level of influence of the climate change awareness on the environmental practices of the school administrators in the State Universities and Colleges in Region XII?

**Significance of the Study:** This study opted to determine the awareness of the administrators on climate change and their practices on environmental management such as waste management and reforestation activities that were helpful to the environment. The findings of this study will serve as baseline data on the present environmental practices of administrators in the tertiary institutions; as reported, climatic change has been a primary environmental problem facing the country today as it affects various sectors of the government. This will help government in formulating framework to be implemented in all agencies particularly in educational institutions which would help in building capacity and collaboration at the local level through a participatory development process. It could also be used in the planning programs and policies that will be implemented, not only in school, but to be recommended to the higher local authorities. To the educational planners, this will guide them in curricular planning on climate change. Thus, climate change education could be recommended as a focal subject of the students. The findings of the study will also guide the policy makers and administrators of schools in the formulation on solid waste management, energy conservation, and activities to enhance the awareness and foster pro- environment attitude of the school stakeholders. The readers could also apply practical ways in order to help reduce the devastating effects of climate change. This study will also provide basis for an in-depth and thorough study regarding this problem for the future researchers.

**Scope and Delimitation of the Study:** This study focused on the climate change awareness, attitude and environmental management practices of administrators and faculty of State Universities and Colleges in Region XII for the school year 2011-2012. The significant influence of their awareness and attitude on the environmental management practices in terms of waste management, reforestation, energy conservation, information, and curricular programs and activities were also dealt.

**Operational Definition of Terms:** For the purpose of better understanding on this study, the following terms were operationally defined:

**Administrators.** This refers to the designated deans, head of departments of State Universities and Colleges.

**Climate Change Awareness.** Refer to activities undertaken by the school particularly to lessen the effects of climate change as integrated in the curriculum of the school.

**Environmental Management Practices.** It refers to the activities done by the administrators and teachers to lessen the effect of climate change.

**Manner/practices.** It refers to normal behavior, habit, custom done by the administrators and faculty on environmental concerns.

**Reforestation.** It refers to the act of planting trees on bare or open land which used to be covered with forest growth (DENR-FMB 2003) which and presumed to be done by teachers and administrators.

**Rural residence.** Refers to the place where the respondents live or reside particularly in the countryside that are mainly agricultural-based areas.

**Urban residence.** This refers to the place where the respondents live or reside particularly in the city.

**Waste management.** These are the measures done by administrators and teachers to reduce waste.

**Research Design:** This study employed a combination of descriptive survey and the descriptive – correlation methods. Such design is appropriate for describing the level of climate change awareness and environmental management practices among administrators.

**Locale of the Study:** This study was conducted in the four State Universities and Colleges in Region XII, Philippines. These institutions were Cotabato Foundation College of Science and Technology (CFCST) and University of Southern Mindanao (USM) in Cotabato Province, Sultan Kudarat State University (SKSU) in Sultan Kudarat Province, and Cotabato City State Polytechnic College (CCSPC) in Cotabato City.

**Sampling Procedure:** Complete enumeration of all deans and directors was done to get the number of respondents in the four State Universities and Colleges in Region XII, Philippines.

**Respondents of the Study:** The subjects of the study were the 29 deans of four higher State Universities and Colleges in Region XII, Philippines. There were eight deans coming from CCSPC, six from CFCST, seven from SKSU, and eight from USM.

**Research Instrument :** The survey instrument was based from the study of Ekpoh (2009) with some modifications made to suit the needs and objectives of the study. It is consisted of two parts. Part I elicited the assessment on the level of awareness on climate change in terms of its causes, effects. The instruments were subjected to validation and have resulted to 0.844Cronbach's Alpha value. This was rated using the scale below:

<b>Scale</b>	<b>Description</b>
5	Much aware
4	Aware
3	Moderately aware
2	Less aware
1	Least aware

Part II determined the environmental management practices of the respondents in terms of waste management and reforestation to measure their management practices, the following scale was used:

<b>Scale</b>	<b>Description</b>
5	Highly practiced
4	Practiced
3	Moderately practiced
2	Rarely practiced
1	Very rarely practiced

**Data Gathering Procedure:** The researcher sent letter asking permission from the Office of the Presidents of State Universities and Colleges in Region XII for the conduct of the study. Upon the approval of the request, it was presented to the concern administrators/deans for the administration of the questionnaire.

**Method of Data Analysis:** Mean was used to determine the level of awareness on climate change and environmental management practices of administrators of SUCs. Hypotheses of the study were tested using multiple regression techniques.

**Summary of Findings :** This study was conducted to ascertain the climate change awareness and environmental management practices of the administrators of State Universities and Colleges in Region XII, Philippines. Specifically, it sought to determine the level of awareness on climate change and environmental management practices of the administrators and influence of the climate change awareness on the environmental management practices.

Two sets of measuring tools were used in gathering the necessary data. Part I consists of items that gathered level of awareness on climate change of the administrators and Part II described the level of environmental management practices. The survey instrument was adopted, modified, and validated with Cronbach's reliability test that gained an alpha value of 0.844. Pilot testing was conducted to 20% of the target respondents. Complete enumeration was used to determine the 29 deans in the different SUCs in Region XII as respondents of the study. On the level of awareness on climate change, results indicated that school administrators of the State Universities and Colleges in Region XII were much aware that the causes of climate change which was use of motor cars increases the emitted gases into the atmosphere. However, they were aware that deforestation decreases the carbon stored in the forest; human activities plays a major cause in earth's climate change; there has been an increase of carbon dioxide since the beginning of the industrial revolution; carbon dioxide was the main greenhouse gas; fossil fuel burning like coal, oil, and gas increase the greenhouse gases in the atmosphere; and waste decomposing in the dumps and landfills leads to methane emission into the atmosphere. It can be inferred that majority of the respondents were aware that the use of motor cars where most of the people use today such as automobiles, cars, motorcycle, and public utility vehicles which emit carbon dioxide gas into the atmosphere and fossil fuel burning were the major causes of climate change. This result supported the study of Hassol (2000) and posited that climate change is primarily caused by global warming caused by carbon dioxide from burning coal, oil in power plants, cars, factories and to a lesser extent when forest are cleared.

As stated by Intergovernmental panel on Climate Change (IPCC 2011), evidence of climate change due to human activity, particularly the combustion of fossil fuel since the period of industrial revolution, has been collected for some years. Global emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004. It further revealed that administrators of State Universities and Colleges in Region XII were aware that if Mother Earth will not be protected, climate will change and the effects of that is the sea level will rise as an effect of warmer climate; ice caps in the North and South Poles get smaller in a warmer climate; there will be a rise in the average water level of the oceans; this will result in the loss of crucial wetlands located along seacoasts; seaside communities will experience frequent flooding and damage from increasingly violent storms; impacts of climate change will be extreme floods and droughts; local weather will become extreme; There will be extensive loss of biodiversity and increase in air pollution; Increasing salinity in deltas, estuaries, and other freshwater sources will occur; and there will be erosion and coastal flooding will occur. The finding implies that the administrators were aware of the effects of climate change. This denoted that the consequences of climate change were known by the respondents. The results do not conform to the findings of Ekpoh (2009), that secondary school teachers were generally not aware of the causes, effects and measures needed to adapt and mitigate the effect of climate change. As to level of environmental management practices, It was found out that administrators of the State Universities and Colleges in Region XII practiced waste management like segregation of waste whether biodegradable or non-biodegradable; Recycle used materials or plastics to reduce solid waste; making compost pit in school for the biodegradable waste to be used as organic fertilizer when it is decomposed; using decomposed decayed leaves and animal manure as organic fertilizer; encouraging the recycling of non – biodegradable materials to be used into another form; and emphasizing to students the concept of (3 R's) reduce, reuse, and recycle. It further revealed that administrators were moderately practice burning of plastics and other unnecessary papers at home or in school; and putting waste materials anywhere when trash containers were not available.

It can be inferred that the administrators do not completely or always practice proper waste disposal. As presented, the faculty properly delivers the concept of recycling to the students but it is opposite to their practices such as burning of plastics and other materials sometimes. This implies that that the administrators and faculty observed and likely manage waste, however, sometimes they could not avoid improper waste disposal and incineration of unnecessary waste material that absolutely harm the environment. The result is supported by the survey of Pulse Asia (2011), that 60% of the Filipinos do waste segregation and 62% are engaged in recycling. The waste disposal practices of the respondents could be attributed to the enacted Republic Act 9003 or the Ecological Solid Waste Act. This act mandated the Department of Education (DepEd), Technical Education and Skills Development (TESDA), the Commission on Higher Education (CHED) "to incorporate ecological solid waste management in the school system at all levels". It further indicates that administrators of the State Universities and Colleges in Region XII practice in helping the tree planting activity of the school by planning for regular tree planting activity of the department; planting at least one tree every year at home, in farm or school; looking after the tree planted and nurture it to assure its proper growth and development; encouraging students to plant tree at home or school; avoid cutting of trees particularly if it is not replaced; adopting areas for the school's tree planting extension activity; and favors to the total log ban implemented by the government. There are many ways to slow down the effect of climate change like planting a tree on your own or make donations to help plant trees faraway.

It could be inferred that often but not all the time, administrators help save energy from electricity, water, and support other energy options to lessen dependence on fossil fuel. This conforms to the statement of International Strategy for Disaster Reduction (2008), that one way to deal climate change is to develop new low-energy technologies for industry and transport, switching to renewable energy and lessen consumption of energy-intensive materials.

Finding further revealed that level of climate change awareness among administrators significantly influence the level of practice on waste management ( $F$  – value = 29.007, Probability = 0.000\*\*). Hypothesis of the study was rejected because the probability value is significantly lesser than 0.050 level of significance. Result also revealed that 30.90% of the variation of the level of environmental management practices of the administrators in terms of waste management was accounted by their level of awareness on climate change. The remaining 69.10% was accounted to other parameters not included in the study. Among the independent variables used in the study, level of awareness on the causes of climate change was found to be the indicator of the level of waste management practices of the administrators. It implies that the level of awareness of the administrators on the causes of climate change greatly contributed to their level of waste management practices. It means that the higher is the level of awareness of administrators on the causes of the climate change, the greater is the level of their practices, participation, and implementation of waste management program in their respective colleges. As delineated by Willian (2005), waste reduction is the key to reducing the growing waste mountain, and thus the key to sustainable waste management. Reducing the thickness of plastic bags is a method of reducing waste quantities by reduction in the amount of packaging. Other examples of waste reduction include; waste re-use.

It also revealed that level of awareness of the administrators on climate change significantly influence their level of environmental management practices in terms of reforestation ( $F$  – value = 37.183, Probability = 0.000\*\*). Hypothesis was rejected because probability value is significantly lesser than 0.050 level of significance. However, 42.90% of the variation of the environmental management practices in term of reforestation was accounted by the level of climate change awareness. The remaining 57.10% was accounted to other variables not included in the study. It further revealed that level of climate change awareness particularly it causes and effects found to be the great indicators of environmental management practices like reforestation. It implies that the higher is the level of awareness of the administrators on causes and effects of climate change, the higher also is the level of practices in managing the environment through reforestation. Administrators of the State Universities and Colleges in Region XII were knowledgeable on the statement of DENR-EMB (2003), that reforestation is the act of planting trees on bare or open land which used to be covered with forest growth. It includes ecological reforestation and economic reforestation, new plantings, assisted natural regeneration, and enrichment planting. As mentioned on the latest Global Forest Resource Assessment (2005) of the Food and Agriculture Organization of the United Nations, the total forest area is just less than four billion hectares – about 30% of the total global area. This forest is distributed unevenly across the globe. The conversion of forest for agriculture remains the main aspect of deforestation globally; about 13 million hectares per year. On the brighter side, forest planning, landscape restoration, and natural expansion of forests have resulted in an estimated 7.3 million hectares per year during the period 2000-2005.

## II. CONCLUSION

Environmental problem like climate change is a reality, it should not be taken for granted, foremost, humans have only one Earth the Almighty has entrusted to the humanity and so one must be sensitive and conscientious in restoring it. With the findings of this study, it can be inferred that the administrators are much aware of the causalities and effects of climate change. However, their high level of awareness was not completely practiced as they do not always practice ways and actions to rehabilitate the environment. Thus, the school has also responsibility in strengthening the management practices through formulation of policy and faithful implementation on solid waste disposal and reforestation activities, sending teachers to in-service seminars regardless of specialization and enhancing linkages, and teaching and research capability of the teachers. In a general analysis of the study, higher level of awareness, positive attitude and sustained practices would make a difference to the plight of the environment. Therefore, it is necessary that teachers themselves should have positive attitude towards environment to manifest responsibility towards environment.

**Recommendation :**Based on the findings, the following recommendations are given:

1. There is a need for a more sustained behavioral and attitudinal change essential to effective participation in waste reduction, reforestation and school actions because as the revealed though the awareness level of teachers is high, but they do not completely practice proper management practices.



2. Faculty should pursue higher level of education and equipped themselves through trainings and seminars.
3. In school, environment-helpful practices like recycling of used papers and other materials, proper waste segregation, energy conservation will become a protocol to all students, teachers and administrators.
4. The school could also establish a “Recycling Center “where students are taught to create new materials out of the waste, plastics and dumped materials in school so that this would serve as showcase to the nearby communities.
5. The school through its department should organize seminars and workshops for students, teachers and administrators to update and enhance their strategies in teaching climate change and its consequences and problems. When stakeholders are made aware of their environment unfriendly practices/ behavior and provided with strategies to address them, they are better able to promote environment friendly practices.
6. Faculty who are non-majors of science should also be trained on environmental education so that they could easily and clearly integrate environmental issues and problems to the students.
7. The school management should develop the capability of the teachers and support them in terms of research and strengthen linkages for environmental projects.
8. School administrators and stakeholders should formulate policies and guidelines on environmental practices such as waste management, regular reforestation activities and curricular activities related to the protection of the environment in the school which could be recommended to higher local authorities.
9. An in-depth study should be conducted regarding the implementation of management practices and also considering other variables which were not included in the study.

#### **Literature Cited**

##### **A. BOOKS**

1. **ARCURY, T. et.al.**, 1990. Environmental Worldview in Response to Environmental Problems.
2. **BARUA, A.** 2009. Resource Book on Climate Change. TERI Press. New Delhi, India
3. **GALLUP, G.M.**, 1992. Industry and Environment. New York. Blackbird Graphics, Inc.
4. **GASCON, C.T.** 2006. Agroforestry Systems in the Philippines. University of the Philippines, Los Banos Laguna.
5. **LEGARDA, L.**, 2011. Climate Change Message of Our Times, “Excerpts from Senator Loren Legarda’s Speeches”, Libroni Loren Foundation, Inc., Malabon City
6. **ROBINSON, Z.P.**, Teaching Climate Change in Higher Education; Barriers and Opportunities. Keele University. United Kingdom
7. **TESAR, J. B.**, 1991. Global Warming, New York. Blackbird Graphics, Inc.

##### **8. PUBLISHED THESIS/ DISSERTATION**

9. **IBEGBESAN, AYODEJI.** 2010. Exploring Secondary Students’ Understanding and Practices of Waste Management in Ogun State, Nigeria. International Journal of Environmental and Science Education Nigeria.
10. **ABRAHAM, M. & ARJUNAN, K.K.**, Pro-environmental Knowledge: A study among Secondary School Students. India
11. **ALADAG, E. and UGURLU, N.B.** 2009. Global Climate Change Education in Turkey. Conference Paper. Turkey.
12. **BAULA, E.U.** 2009. School-Based Solid Waste Management Initiative in the Philippines: Lessons and experiences. De la Salle University, Manila
13. **BOON, J.H.**, 2010. Climate Change? Who Knows? A Commission of Secondary Students and Pre-service Teachers. Australia Journal of Teachers Education. Australia.
14. **BOYES, E. & SANISTREET, M.** 1992. High School Students Perception of How Global Environment Effects Might Cause Skin Cancer. Journal of Environmental Education.
15. **Cambell, T. et.al.**, 2009. Exploring science Teachers’ Attitudes and Knowledge about Environment Education in Three International Teaching Communities. International Journal of Environmental & Science Education.
16. **CHAN, K.K.W.**, 1996. Environmental Attitudes and Behavior of Secondary School Students in Hongkong. Hongkong.
17. **CHAN, K.** 1999. Mass Media and Environmental Knowledge of Secondary School Students in Hongkong/ Hongkong.

18. **DINAKARA, S.A.**, Environmental Awareness, Environmental Attitude and Teaching Practices of Elementary School Teachers of Mysore, Department of Education, Mysore University.
19. **EKPOH, U.D.**, 2011. Assessing the Level of Climate Change Awareness among Secondary School Teachers in Calabar Municipality, Nigeria. Implication for Management Effectiveness. University of Calabar.
20. **KAISER, et.al.**, 1999. Environmental Attitude and Ecological Behavior.
21. **KUMAR, K.S. and S.M. PATIL.**, 2007. Influence of Environmental Attitude of the Post Graduate Students.
22. **LAHIRI, S.** 2010. Assessing the Environmental Attitude among Pupit Teachers in Relation to Responsible Environmental Behavior: A Leap towards Sustainable Development. Department of Education, University of Calcutta, India.
23. **LARIJANI, M.**, 2010. Assessment of Environmental Awareness among Higher primary School Teachers. Department of Education, University of Payam, Tehran, Iran.
24. **MCMILLAN, M.**, 2001. Social and Demographic Influences on Environmental Attitudes.
25. **OBHEY, J.** 2009. Efforts to Combat Climate Change. A Speech Delivered by Minister of Environment on 2009 World Environment Day.
26. **PATEL, D.G. & PATERL.**, 1995., An Investigation into Environmental Awareness and its Enhancement in the Secondary School Teachers.
27. **SABHLOK, R.** 1995. A Study of the Awareness an Attitude of Teachers and Students of High School toward Environmental Education, Indian Education Abstract.
28. **SHANAWAJ, N.** 1990. Environmental Awareness and Environmental Attitude of Secondary and Higher Education School Teachers and Students, University of Rajasthan.

#### **29. UNPUBLISHED THESIS**

30. **DE GUZMAN, T.C.**, 2005. Teacher's Awareness of Environmental Issues and Problems and Factors that Influence their Awareness Level, Master's Thesis. CFCST.
31. **GADONG, L.L.**, 2009, Level of Awareness of Indigenous Secondary School Students of Marilog District on Environmental Issues. Master's Thessi. CFCST.
32. **Fernandez, M.C.**, 1999. Teacher's Awareness of Environmental Issues and Problems and Factors that Influence Their Awareness Level, Master's Thesis. Mindanao State University. Bukidnon State University.
33. **SEGUMPAN, M.T.**, The Infusion of Environmental Education Dimension in General Education Curriculum of Selected State Colleges and Universities in Region X. Master's Thesis. Mindanao State University.
34. **TABANO, R.M.** 1997. Environmental Awareness among Baptist Church Memebers of Vaalencia, Bukidnon. Master's Thesis.

#### **35. JOURNAL/TECHNICAL REPORTS**

36. The African Climate Change Fellowship, December 2010, Washington D.C.
37. Climate Change 2001; Impacts, Adaptation and Vulnerability. Intergovernmental Panel on Climate change. 2001. Summary of Policy Makers
38. Climate Change and Disaster Risk Reduction, 2004. United Nations. Geneva, Switzerland.

#### **39. PERSONAL INTERVIEWS**

40. **ABAS, E. M.**, 2012. Division Chairman, Forestry Division, Cotabato Foundation College of Science and Technology.
41. **CABILO, L.D.**, 2010. Dean, College of Arts & Sciences. Cotabato Foundation College of Science and Technology, Doroluman Arakan, Cotabato
42. **Cayabas, M.D.**, 2012, Dean Graduate School. Cotabato Foundation College of Science and Technology, Doroluman, Arakan, Cotabato
43. **Corpuz, O.S.**, 2012. Deputy Director, Research and Extension. Cotabato Foundation College of Science and Technology, Doroluman, Arakan, Cotabato
44. **Galladora, R.A.**, 2012. Diretor for Instruction. Cotabato Foundation College of Science and Technology, Doroluman, Arakan, Cotabato