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Department of Environment and Natural Resources (DENR) "Dalaw Turo" Program: An Effective Awareness Campaign on Climate Change

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ABSTRACT

This study was conducted to provide information on the changing climate in the Bicol Region and its underlying immediate effects to children's education and encourage the education sector's commitment to spearheading awareness and enhancement campaigns to all concerned sectors in the academe such as the school administrators, teachers and pupils. Specifically, the study aims to determine the effectiveness of "Dalaw Turo" in the climate change education campaign to public city school children. The study is descriptive and used the "Dalaw Turo" program. "Dalaw Turo" is an adopted strategy from DENR which focuses primarily on the education campaign about climate change to the pupils. Pretest and posttest was conducted during the "dalaw turo". The respondents are from the Section one of the Grade V pupils in the Seven (7) City Elementary Schools in Bicol. Results indicate that most pupils were not aware about global warming, the greenhouse effect and its effect on the environment; and the causes of climate change. However, after the "dalaw turo" it shows that there is a significant difference between the results of the pre-test and post-test. This finding noted that "dalaw turo" is an effective strategy to address climate change awareness. On the other hand, the pupils commit to plant trees and separate the biodegradable and non-biodegradable garbage and dispose of it properly in order to save Mother Earth from destruction caused by climate change.

KEYWORDS - Dalaw turo, climate change, awareness

1. INTRODUCTION

The Philippines lies along the western rim of the Pacific Ring of Fire, a belt of active volcanoes and major earthquake faults, and the Pacific typhoon belt. It has a total discontinuous coastline of 32,400 kilometers, the longest in the world and is especially vulnerable to the adverse impacts of climate change. It is one of the world's most natural disaster-prone countries due to a combination of high incidence typhoons, floods, landslides, droughts, volcanoes, earthquakes and the country's considerable vulnerability to these hazards. (Rincón and Virtucio, 2008)

Climate change's impact on the Philippines is most often associated with extreme weather disturbances such as typhoons and floods, which, in turn, affect many other sectors of economic life. With 50.3 percent of its total area and 81.3 percent of the population vulnerable to natural disasters, the Philippines is considered a natural disaster hot-spot. About 85.2 percent of its US$86 billion annual GDP is endangered as it is located in areas of risk (World Bank 2008).The top ten provinces affected by such events are: Albay, Pampanga, Ifugao, Sorsogon, Biliran, Rizal, Northern Samar, Cavite, Masbate, and Laguna. In general, Central Luzon and the Bicol regions rank high to very-high on the risk scale.

Education is an essential element of the global response to climate change. Climate change education helps young people comprehend and address the impact of global warming Gautan, B. et. al.(2021). Knowledge on climate change is perceived as a part of formal environmental education that helps in development of a sense of responsibility through the creation of informed awareness Gautan, B. et. al.(2021). Thus, such awareness is necessary to guide students' behavior towards concerted improving actions (Rahman et al., 2014). Lake, (2015) said "there may be no greater, growing threat facing the world's children – and their children – than climate change", he further elaborated that as the world experiences a steady rise in climate-driven migration, children's lives and futures will be the most disrupted.

Children's role as the hope of the next generations to bring about positive developmental progress to mankind has come to be questioned if this problem will not be addressed at present. The need for better local environmental planning and coordination among various stakeholders led by the education sector should be devised for immediate local implementation. Hence, the present study was conducted to provide information on the changing climate in the Bicol Region and its underlying immediate effects to children's education and encourage education sector's commitment to spearheading awareness and enhancement campaigns to all concerned sectors in the academe such as the school administrators, teachers and pupils.

Climate change is now a big issue being faced in the Philippines today. The earth's climate condition is actually very vital in the daily living of the people, as its impacts and effects on the delivery of quality education in the Philippines particularly in Bicol Region. Since school is the best instrument used for sustainability of awareness and issues concerning global warming, the study was conducted at the City's Central School in Bicol Region. It is the easiest and quite likely effective method for reaching out to the students and their families as part of the community.

The "Dalaw Turo" focuses primarily on the education campaign about climate change to the pupils. This strategy seems to be the most appropriate because it provides humanity the information to analyze and amend their actions and find solutions. Dalaw-Turo (DT) is an adopted strategy from the Department OF Environment and Natural Resources (DENR), conducted at the City's Central School in Bicol Region.

The literal translation of the DT is Teaching Visits, it is an environmental outreach program initiated in the early nineties by the Protected Areas and Wildlife Bureau (PAWB) of the Department of Environment and Natural Resources (DENR) (A. G. Flor, 2011). Peoples' awareness through education is an essential measure to drive active participation at all levels of the community in tackling climate change Ochieng, M.; Koske, J. T., (2013). Agboola, O.S.; Emmanuel, M., (2016) justify the need for awareness and enlightenment on climate change and sustainable development noting that awareness on climate change among the general public is pertinent whilst education is an essential component and catalyst for responding to global climate change. Hence, the present study was conducted to promote awareness to children about climate change particularly in City's Elementary School pupils in Bicol Region.

1.1. OBJECTIVES

1.1.1. General Objectives: To determine the effectiveness of "Dalaw Turo" in climate change education campaign

1.1.2 Specific Objectives: This study sought to answer the following:

1. Assess the level of awareness about climate change among City Elementary Schools Children Bicol through the "Dalaw Turo" program.
2. Determine the effectiveness of "dalaw turo" to children's awareness on climate change in its effect on children's.
3. Determine the adaptation mechanism and solicit commitment pledges to combat climate change from public city elementary school pupils in the Bicol Region.
4. Assess the perception of the city elementary school teachers on the DALAW-TURO methodologies as presented to the school.

1.2. HYPOTHESIS

1. The level of climate change, global warming and greenhouse awareness among city elementary school children is not significantly different.
2. "Dalaw turo" is not significantly effective as strategies as education campaigns about climate change to the school children.
3. The city elementary teachers do not perceive "dalaw turo" as effective methodologies on education campaigns for climate change.

1. 3. OPERATIONAL DEFINITION OF TERMS

Dalaw Turo (DT). Comes from the Filipino words which means "to visit"(dalaw) "to teach" (turo) is an innovative educational tool for teaching and promoting environmental messages on nature conservation. Its Department Environment and Natural Resources (DENR} program focuses primarily on the education campaign about climate change to the pupils (DENR, 1992).

Climate change: measurable shifts in traditional climate patterns of a given place outside the normal range of natural climate variability attributed to anthropogenic factors.

Climate variability: short term fluctuations in elements of climate including rainfall, temperature and humidity attributed to both anthropogenic and natural factors**.**
Climate change education: the type of education targeting attitudes and behavior change towards sustainability, and which is able to help learners understand and interpret impacts of climate change.
Climate change awareness: children common knowledge and understanding of climate change. Climate change perception: children interpretation of climate change as a threat.

2. METHODOLOGY

2.1 Study and Extension Area

This study was carried out in the Cities of Bicol region which is considered as high risk to climate hazards brought about by typhoon (super typhoons, typhoons, tropical storms and tropical depressions) and drought caused by El Niño, projected rainfall change and projected temperature increase (Rincón and Virtucio,2008).

2.2 Procedure

The researcher personally went to the Director of Department of Environment and Natural Resources (DENR) requesting to use the strategies of their Education campaign for Climate the "dalaw turo" program. Fortunately the director permitted the researchers to use the strategies of "dalaw turo", however, the researcher, research assistant and facilitators were required to attend a one day training on the proper way of using the strategies, videos and PowerPoint presentation was also given to the researcher. Dry run of the strategies was conducted to Sangay Central Elementary School. Furthermore, permission to conduct the education campaign for climate change was also requested from the director of the Department of Education Region was also requested.

2.3 Research Design

This study used the descriptive research design. A "dalaw turo" (DT) strategy was used to determine the initial level of awareness of the pupils on climate change. Before the start of "dalaw turo" pre-test was administered to get the level of awareness of the Grade Six pupils in Public City Elementary School in Bicol Region, Philippines. The post-test was conducted in order to compare results obtained from pre-test. Comparisons are necessary in order to determine the effectiveness of "dalaw turo" and the stage of pupils' awareness in terms of the range of the behavior change. Thirty (30) pupils were randomly selected from grade six (6) pupils of seven (7) city elementary public schools located in Bicol Region (Region V) namely: a) the **Naga City Elementary Schoo (NCES)**, b) **the Legazpi City Elementary School (LCES)**, c) **the Masbate City Elementary School (MCES),** d) the **Tabaco City Elementary School (TCES)**, e) **the Sorsogon City Elementary School(SCES)**, , f) the Iriga City Elementary School, and City Elementary School **(ICES)**, g) **the Ligao City Elementary Schoo**l **(LiCES)**, . Ten (10) questions were prepared and each question had 4 choices and there was only one correct answer.

A semi-structured questionnaire was used to collect information on teachers' perception of the teachers on the DALAW-TURO methodologies. Likert Scale was used in this study to measure teachers' perception on "dalaw turo" methodologies. A total of 5 methodologies were designed and responses weighted on a scale of 1-5 where 1 - Strongly not effective 2- not effective 3- effective, 4- moderately effective and 5 - very effective.

2.4 Data Analysis

The researchers used computer aided statistical packages to analyze volumes of information collected using the above mentioned procedures. Specifically, Statistical Package for Social Sciences (SPSS) and Microsoft Excel were used for purposes of data analysis. All the completed test questions and questionnaires were first examined for completeness and consistency.

The analysis involved both simple descriptive methods and detailed statistics. Descriptive statistics including frequency counts, percentages and mean were used to summarize data on the awareness of climate change. Detailed data analysis involved Student-t test and ANOVA the hypotheses were tested at a statistical confidence level of 95%. The data analyzed were presented in tables, charts and graphs. The Likert statements were analyzed as individual items and statements using a summative method to determine the perception of teachers on the "dalaw turo".

3. RESULTS AND FINDINGS

3.1. The Level of Awareness on Climate Change among City Elementary Schools Pupils in Bicol

3.1.1. Awareness on climate change

Table 1.a

Frequency of Correct Score on the Awareness on Climate Change among City Elementary Schools Pupils in Bicol, (N=30/School and Total Number (N=210))

Questions	NCES	LCES	MCES	TCES	SCES	ICES	LiCES	TOTAL	%
What is climate change?	17	6	14	13	17	17	16	100	48%
What causes climate change?	8	14	9	12	18	8	11	80	38%
What are the effects of climate change in the universe?	20	27	19	27	3	20	23	139	66%
What is the effect of Climate change?	11	14	17	11	19	11	12	95	45%
How peoples activities affects in the environment?	2	23	26	30	0	2	27	110	52%
Mean	12	17	17	19	11	12	18	105	50%

Closely related awareness on climate of city elementary school pupils were shown in TABLE 1.a results show that only 50% of the 210 respondents understood climate change. This indicates that not all elementary pupils are aware of climate change. On the question of what is climate change? There were only 6 (20%), 13 (43%) and 14 (47%) respondents who got the correct score in LCES, TCES and MCES respectively. These are the respondents who were able to relate that climate change is long term changes in average weather conditions. The rest of the respondents claimed that climate change simply means rising global temperatures. With regards to the question, what causes climate change? Only 8 (27%) respondents from NCES and ICES got the correct answer. Generally only 38% of 210 respondents were aware of the causes of climate change. It is noted that the majority of the respondents has less knowledge of the causes of climate change.

Likewise only 45% of 210 got the correct answers on the questions of what is the effect of climate change respondents. On the other hand, how peoples' activities affect the environment, sad to note that no or zero (0) respondent got the correct answer, likewise NCES and ICES only 2 (7%) were able get the correct answer. These results indicate that the respondents are not aware of what peoples' activities can affect the environment. Therefore, education is necessary, Article 6 of (United Nation, 1992) stated that the need for education in dealing with climate change, whether formal or informal, has a central role to play in understanding, mitigating and adapting to climate change. (UNESCO, 2009) also states that climate change education should focus on transforming learners into critical thinkers, life-long learners and adoptable. Furthermore, Anderson (2010), teachers are an untapped resource that the world can use to combat climate change. Teachers can use their expertise to disseminate information on climate change in the classroom and beyond the school compounds to help individuals and communities make informed decisions and take sustainable actions to build a climate resilient society (Ochieng, 2010).

Hence, climate change education does not only lead to awareness creation, but also a total change in behavior and attitude towards sustainability. Nevertheless, education is not a 'magic bullet' in tackling the problems of climate change unless coordinated educational interventions are pursued (UNESCO, 2009). Climate change education curriculum should be created and implemented in the country so that it will help learners become responsible citizens, capable of making responsible decisions that can lead to climate change mitigation and adaptation. Unlike in Nepal in 2014 climate change education has been incorporated in school curriculum in different subjects and teaches students about climate change (Ministry of Science, Technology and Environment, 2015). Education programs focused on educators should be developed to ensure that teachers have the capabilities to create awareness on climate change in the classroom.

Table 1.b
Respondents Level of Awareness on Climate Change among City Elementary Schools Pupils in Bicol

Source of Variation	SS	Df	MS	F	P-value	F crit
Between Groups	205.22	4	51.31	0.670	0.615	2.51
Within Groups	4977.066	65	76.57			
Total	5182.293	69				

The level of climate change awareness among city elementary school pupils in the Bicol region was examined using Analysis of variance (ANOVA). In this result, the null hypothesis states that the level of climate change awareness among city elementary school pupils is not significantly different. Since the p-value is .615104, which is greater than the significance level of .05. Hence, the null hypothesis is rejected and concluded that the level of awareness on climate change among city elementary school pupils is significantly different.

These results point out the fact that climate change is not part of the curriculum in the grade school, most likely that pupils' awareness on climate change is different. Since, climate change and global warming have become issues of global concern in the recent decades, teachers' who teach subjects that have topics on weather and climate like Science and Social Studies should allocate more time on climate change awareness.

The results are supported by several studies that have revealed that climate change awareness and perception varies within and across regions (GobeScan, 2006; Pew Research Centre, 2006; Pugliese and Ray, 2009). A review of literature shows that people's level of awareness and perception of climate change is influenced by factors which can be categorized into three, namely: demographic factors including age, gender, and level of education; personal experience including experience of extreme weather events; and access to information including media coverage of the issue and advocacy. Saroar and Routray (2010) reported Age is a critical predictor of individual's familiarity with climate change issues, there is a positive correlation between age and familiarity with climate change/extreme weather events. Likewise, Falaye, F. & Okwilagwe, E. (2016) reported that knowledge of climate change increases with students' ages. Hence, this study enhances the awareness and understanding of pupil's knowledge and perception on climate change and also informs Department of Education (DepEd) policy planners in Bicol.

3.1.2. Awareness on global warming and greenhouse effect

Table 1.c
Frequency of Correct Score on the Awareness on Awareness On Global Warming And Greenhouse Effect **among City Elementary Schools Pupils in Bicol, (N=30/School And Total Number (N=210)**

Questions	NCES	LCES	MCES	TCES	SCES	ICES	LiCES	TOTAL	%
What is Global Warming?	5	12	5	5	25	5	9	66	31
In every rising of temperature from 1-1.5°C, what the possible change in our climate?	15	21	25	26	15	**15**	**18**	135	64
What is greenhouse effect?	10	4	9	8	22	10	15	78	37
What are the consequences to the environment of the greenhouse effect?	6	19	18	31	9	6	18	107	51
Where does plant and trees get carbon dioxide?	13	21	19	17	13	13	24	120	57
Average	10	15	15	17	17	10	17	101	48

Climate change is often used interchangeably with global warming. Yet global warming simply refers to a sustained increase in the average atmospheric temperature, which is capable of causing changes in the global climate system. Available scientific evidence shows that the earth experienced an average warming of approximately 0.6 °C during the 20th Century (IPCC, 2001) and is expected to warm by about 2-3 °C by the end of the 21st century (IPCC, 2007). According to Holdren (2006), the last 50 years of the 20th Century were the warmest in 600 years.

In the final knowledge questions, respondents were asked more specific questions related to global warming and greenhouse effect (TABLE 1c). The result shows the majority or 25 (83%) pupils from SCES correctly answer the meaning of global warming. While respondents from NCES, MCES and ICES only 5 (17%) answered correctly with regards to the meaning of climate change. Similarly, the effect of greenhouse to our environment was identified correctly by less than 50% of respondents. This result indicates that respondents were not familiar with the greenhouse effect. A larger percentage of respondents answered correctly when asked about "In every rising of temperature from 1-1.5°C, what is the possible change in our climate. With regards to the question of "Where do plants and trees get carbon dioxide?" 57% of 210 answered correctly. This result implies that majority of the respondents has knowledge with regards to carbon dioxide.

Table 1d
Respondents Level of Awareness on Global Warming and Greenhouse Effect among City Elementary Schools Pupils in Bicol

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	161.45	4	40.362	0.479	0.7511	2.51
Within Groups	5478.56	65	84.285			
Total	5640.003	69				

The level of global warming and greenhouse awareness among city elementary school pupils in the Bicol region was examined using Analysis of variance (ANOVA). In this result, the null hypothesis states that the level of global warming and greenhouse awareness among city elementary school pupils is not significantly different. Since the p-value is .751102, which is greater than the significance level of .05. Hence, the null hypothesis is rejected and concludes that the level of awareness on global warming and greenhouse among city elementary school pupils is significantly different.

3.2. The Effectiveness of "Dalaw Turo" to Children Awareness on Climate Change

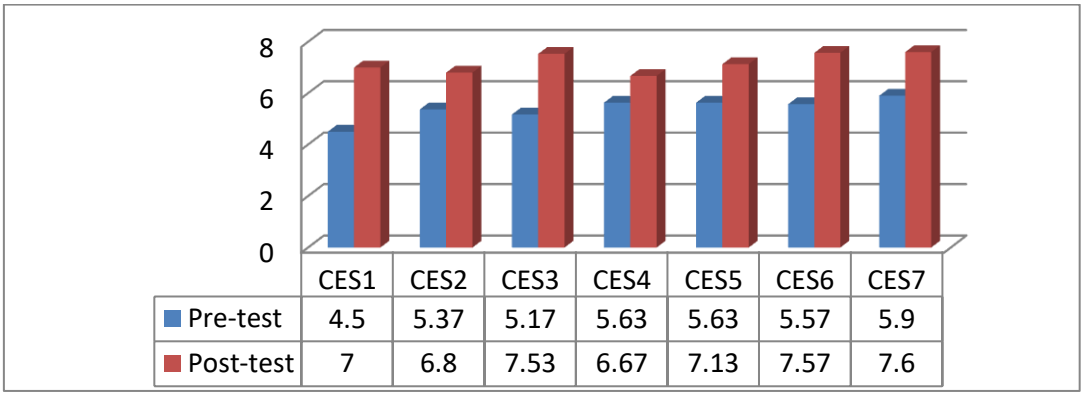

Figure 1. The Mean of the Results of Pre-Test and Post-Test on the Conduct Climate Change Among Public City Elementary Schools Pupils in Bicol

Fig.1 indicates that "dalaw turo" (DT) as educative methodologies about climate change are evidently effective. Particularly it is evidently shown in NCES which is a great difference as compared with the pre-test and post-test. As revealed in Fig.1, the level of climate change awareness is surprisingly low. Hence, DT is an effective strategy as a tool for education campaigns to climate change awareness. Similarly, UNFCCC, (2012); UNFCCC, (2014); OECD, (2009) states that climate change education is seen as a valuable tool to increase climate change awareness and adaptive capacity in society broadly.

Within this context, the DT program of DENR, Philippines must be adopted to improve future knowledge of climate change within a society. However, DENR recommends that researchers, teachers and educators who would like to use DT must undergo training and communicative tools and equipment like, computer, video and instructional material that could attract the pupils and students must be available during the conduct of DT.

Table 2
Performance of the Respondents on the Pre-Test and Post-Test Using the "Dalaw Turo" Methodologies.

Paired Variables	Mean	SD	T	Df	p-value	Interpretation
Pretest	5.57	1.28	-5.605	58	5.39*	HS*
Post-test	7.57	1.49				

***Highly significance (5%)**

Originally, DT was aimed at raising awareness on the importance of biodiversity protection and involving people's participation in its conservation. DT uses various methodologies such as environmental games, skits and lectures. Its primary audience is the school community including the teachers (DENR, 1992). In this study with the permission from the DENR DT was used as the strategy in teaching climate change in City Elementary School in Bicol which aims to assess the level of awareness of the pupils about climate change. Similarly, videos, PowerPoint presentations, lectures and games were used in order to elicit the attention of the pupils.

The effect on the students' performance of the exposure to DT applied in teaching about climate shown in the above TABLE 2. The table presents the mean of the performance and spread of the scores of the students (N=210) during the pretest and post-test. At first glance, one can tell that the strategy gave a significant effect to students' performance. The paired t-test statistics further proved that the difference in the mean performance of the pupils applying DT is highly significant with p-value (5.39) higher than the significance level of .05. This implies that DT that is augmented in the instruction surely boosts pupils' performance in the topics undertaken. However, the process involving DT such as message development and strategies shall further be developed properly to suit the situation and audience of the specific audience (DENR, 2010). Corollary to the mainstreaming of DT if this will be adopted by any interested parties as an IEC strategy for educational campaigns there is a need to capacitate them to be effective in the implementation of this program. Moreover, the researcher recommends developing modules for particular subjects to substantiate the strategies.

3.3 Adaptation Mechanism to Combat Climate Change by Public City Elementary School Pupils in the Bicol Region

One of the strategies to test whether the student is participating during DT, pupils were asked some task to check knowledge gained after the DT and at the same time they were requested to commit to apply their identified mechanism to minimize if not to control this alarming phenomena in the universe. The respondents were divided into 10 groups and were directed to do tasks collaboratively and cooperatively**.**

Table 3
Adaption Mechanism to Combat Climate Change at Home

No.	Responses/Suggestions as Adaption Mechanism	F	Rank
1	Plant more trees	19	1.5
2	Do not burn plastic and other garbage	27	1
3	Practice proper waste disposal	14	3
4	Clean the surrounding	10	4
5	Do Composting	7	7
6	Do not burn rubber and plastics	6	8
7	Reduce the energy consumption	4	9
8	Do the 3 R's (Reuse, recycle, and Reduce)	8	5.5
9	Do not throw garbage anywhere	2	10
10	Clean the drainage canal "	1	12
10	Inform other people on how to prevent climate change	1	12

As shown in TABLE 3 that majority of respondents viewed that the best mechanism to combat climate change at home is to plant more trees, not burning plastic and garbage, and followed by practice proper waste disposal, clean the surrounding and do the 3 R's, (Reuse, Recyle, and Reduce). Interestingly, there was one group regarded that informing other people on how to prevent climate change is one way to prevent the mitigation of climate change. Historically, the public attention on climate change was only captured for the first time by the Blunden Report, Our Common Future, published in 1987 which highlighted a number of environmental problems including climate change. The report stated that the world's climate is on a warming trend being driven by the unsustainable development practices of humankind (UNWCED, 1987). On the contrary, the global concern on the possibility of a changing climate was not triggered by the Blunden Report, but by the unusual heat wave and drought of the summer 1988 (Christianson, 1999). However, his warming trend is blamed on human activities mainly burning of fossil fuel, deforestation, and industrial air pollution (Weart, 2010). All these activities have led to increased concentration of carbon dioxide in the atmosphere thereby enhancing greenhouse effect and hence the rising temperatures. The activities suggested by the respondents in this study support the statements of (Weart, 2010).

Table 4
Adaption mechanism to combat climate change at School

No.	Responses/Suggestions as Adaption Mechanism	F	%
1	Observe proper waste disposal	25	1
2	Clean the surrounding of the school everyday	17	2
3	Do not throw garbage anywhere "	11	3
4	Plant more trees	9	4
5	Join "YES" -Organization	7	5
6	Conduct programs/seminars regarding caring the environment "	6	6
7	Recycle	3	7
8	Put garbage can in different area of the school	2	9
9	Make signs in maintaining the cleanliness of the school "	2	9
10	Use paper when it is needed	2	9
11	Walking in going to school if the house is near	1	12.5
12	Follow the School Regulations regarding the proper waste disposal	1	12.5
13	"Information dissemination on Global Warming	1	12.5
14	3 R's (Reuse, Recycle, and Reduce)	1	12.5

Children are the hope of Mother Earth. Children's behavior and attitudes will change through proper schooling. The problem of climate change must begin with the proper attitude of the people on how to deal with it and how to care for our mother nature. Proper caring of our mother earth must be disseminated properly and the best way is to start at elementary age, the children. This research is one of the starting points of educating children with regards to climate change in our environment. Amusingly, responses of the pupils are leading to save the mother earth, such as: Observe proper waste disposal, clean the surrounding of the school every day, do not throw garbage anywhere, and plant more trees. This result indicates that DT is one of the effective approaches in conducting education to the awareness of climate change.

The role of the pupils or the student does not end in the school. Learning can be accounted for if children really learned if they could apply it in reality. What they learn should be radiated in the community. Hopefully, that the suggestions listed in Table 5 will religiously be followed by the respondent like: Join "Green Work" Program, plant more trees, do practice proper waste disposal, Participate in different program of the government, and clean the environment and do 3 R's (Reuse, recycle, and Reduce). Likewise, following barangay ordinance regarding proper waste management is also one important aspect in combating climate change.

The Philippines will also be affected by the rise in number of extreme events. Sachs (2008) observes that it is generally expected that extreme weather events are likely to intensify as a result of warmer temperatures. While the overall frequency of hurricanes might not change, the energy released seems to be increasing and therefore the frequency of major hurricanes seems to be on the rise. Flooding and droughts are both likely to increase in some parts of the planet.

Table 5
Adaption Mechanism to Combat Climate Change at Barangay

No.	Responses/Suggestions as Adaption Mechanism	F	%
1	Join "Green Work" Program"	23	1
2	Plant more trees	14	2
3	Practice proper waste disposal	15	4
4	Participate in different program of the government like Clean and Green	10	3
5	Clean the environment	6	6
6	3 R's (Reuse, recycle, and Reduce)	5	7
7	Do not burn plastic	4	8
8	Avoid deforestation or cutting of trees	3	9
9	Save water and Power	2	10.5
10	Put garbage can in different area of the school	2	10.5
11	Composting	1	15
12	Avoid use of plastic	1	15
14	Minimize the use of natural resources	1	15
15	Sharing knowledge about compost pit	1	15
16	Recycle	1	15
17	Follow barangay ordinance regarding proper waste management	1	15

There are two approaches to handling the issue of climate change: one is to remove the causes of the change and the other is to adjust to the adverse effects. These responses are referred to as mitigation and adaptation measures, respectively (Tamura. M. and Mimura, N. 2013). Mitigation strategies to reduce greenhouse gas emissions and their role in climate change include energy conservation, development of alternative energy and forest protection and afforestation programs. In contrast, adaptation serve to adjust human and natural systems, on the assumption of ongoing climate change e.g. disaster prevention, changes in cultivated plant species, and breeding new plant varieties (Tamura and Mimura, 2011). The adoption mechanism stated by pupils (TABLE 3-6) supports Tamura and Mimura statement that mitigation adaptation measures.

Table 6
Adaption Mechanism to Combat Climate Change at Nation

No.	RESPONSES/SUGGESTIONS as Adaption Mechanism	F	%
1	Join "Green Work" Program"	23	1
2	Plant more trees	14	2
3	Practice proper waste disposal	8	4
4	Participate in different program of the government like Clean and Green	10	3
5	Do not throw garbage anywhere	7	5
6	Clean the environment	6	6
7	3 R's (Reuse, recycle, and Reduce)	5	7
8	Do not burn plastic	4	8
9	Avoid deforestation or cutting of trees "	3	9
10	Save water and Power	2	10.5
11	Put garbage can in different area of the school	2	10.5
12	Composting	1	15
13	Carpooling	1	15
14	Avoid use of plastic	1	15
15	Minimize the use of natural resources	1	15
16	Sharing knowledge about compost pit	1	15
17	Recycle	1	15
18	Follow barangay ordinance regarding proper waste management	1	15

Conclusive evidence linking climate change to anthropogenic factors emerged from the 1950s when Charles D. Keeling from Scripps Institution of Oceanography started measuring atmospheric CO2 concentration in ice cores. The preliminary results of Keeling's study revealed beyond any reasonable doubt that the concentration of CO2 in the atmosphere was increasing, but with seasonal variations, and this increase had a link to industrial development (Keeling, 1960).

The suggestions by the group respondents as shown in Table 3 to 6 that people must join on Green Work Program, plant more trees and practice proper waste disposal are the major activities that can lessen the concentration of CO2 in the atmosphere, this result shows the DT adopted by the researcher in this study has great impact to the knowledge of the respondent regarding climate change.

3.4 Teacher Perception on "Dalaw Turo" (DT)

Table 7
Public City Elementary Teacher Perception on "Dalaw Turo" (DT)

Methodologies	SE	ME	E	NE	SNE	Mean	D
Lecture	18	10	2	0	0	4.53	SE
Artistic	16	11	3	0	0	4.43	ME
Workshop	22	8	0	0	0	4.73	SE
Role Playing	20	10	0	0	0	4.67	SE
Video/ Film Showing	15	7	8	0	0	4.23	ME

SE- Strongly effective, ME- Moderately Effective, E-Effective, NE- Not Effective, SNE- strongly Not Effective, D-description

Results show that teachers strongly agree that lecture, workshop and role playing were strongly effective as a method used in DT. On the other hand, artistic (4.43) and video and film viewing (4.23) were rated as moderately effective. Generally, teachers support the view that DT methodologies used for DT are effective as an approach in teaching climate change. However, it is not guaranteed that teachers who agree to the DT will be effective if it will be applied in other sectors unless the implementer of the DT is well trained on the methodologies and strategies being used.

4. CONCLUSION AND RECOMMENDATIONS

The preliminary analysis of the data collated in this research identifies that pupils' knowledge of climate change is common with misunderstandings, inaccuracies and in some cases a general lack of knowledge. Interestingly, using "Dalaw Turo" as an innovative educational tool for teaching on climate changes enhances the awareness and understanding of a pupil's knowledge and perception on climate change. However, the process involving DT such as message development and strategies shall further be developed properly to suit the situation and specific audience (DENR, 2010). Moreover, the researcher recommends developing modules for particular subjects to substantiate the strategies.

Apart from enhancing of pupils' awareness' on climate change pupils commits to adapt some mitigation strategies to combat the increasing phenomenon of climate change such pupils commitments are: to join on Green Work Program, plant more trees, practice proper waste disposal, clean the surroundings, do and practice the 3 R's (Reuse, recycle, and Reduce), participate in different program of the government and follow barangay ordinance. These are the major activities that can lessen the concentration of CO2 in the atmosphere, hence, may limit global warming and climate change.

Teacher perception to DT is an effective educational tool for teaching about climate change. However, If DT will be adopted by any interested parties as an IEC strategy for educative campaign there is no assurance that it will be effective unless implementer will be well capacitated on different methodologies and strategies of the DT program.

It is hoped that research such as this, which seeks to link perhaps the greatest challenge of our time in climate change can be effectively merged into perhaps the one true hope for a truly sustainable future – effective, inclusive education not only to DepEd but to other government sectors. Much adaptation should be an extension of good development practice and reduce vulnerability; one of the steps to do this is to invest in education.

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