

CLIMATE CHANGE ADAPTATION AND ATTITUDE AMONGST SECONDARY SCHOOL TEACHERS AND STUDENTS IN ADAMAWA STATE

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Abstract

There are varieties of potential causes for global climate change, including both natural and human-induced mechanisms. Effort have been initiated to improve students' awareness and attitude around climate change adaptation in Secondary schools. Most secondary school subjects allows for the teaching of Climate Change. The study adopted secondary and primary data; the research adopted empirical method of Data Analysis. The sample for the study consists 464 respondents made up of 64 teachers and 396 students drawn from six (6) public secondary schools in Yola education zones in Adamawa State. The data collected from the research questions were analysed using mean and standard deviation, while then null hypotheses were analysed using t-test. Results of the study showed that teachers and students have low awareness level on climate change adaptation. Teachers and students have poor attitude towards climate change adaptation. Teachers and students in rural and urban areas have low awareness of climate change adaptation, although those in urban area had higher mean rating/ there was no significant difference in the mean rating of Teachers and students on awareness of climate change adaptation by school location. Lastly, teachers and students in rural and urban senior secondary students had poor attitude towards climate change adaptation/ there was insignificant difference in the mean rating of teachers and students on attitude towards climate change adaptation in Adamawa.

Keywords: Adaptation, Climate Change, Rural Areas, Students, Subjects, Teacher

1.1 Introduction

A region's climate is produced by the climate system, which has five parts: atmosphere, hydrosphere, cryosphere, lithosphere and biosphere (Thornthwaite, 1948). The climate of a place is affected by its latitude, terrain and altitude, as well as close by water bodies and their movements. Climates can be divided according to the average and the unique ranges of different variables, like temperature and precipitation that may happen due to prolong over long and short timescales from a variety of factors in the climate.

Climate change may refer to a variation in average weather situation, or in a period of change of weather around longer- term average condition (i.e., more or fewer extreme events)

However, the term 'climate change' today is commonly used when indicting the change in our climate which has been noted since the beginning part of the 20th century (Abaje and Giwa, 2007). Climate change is an essential part of the environment that leads to alteration in an ecosystem, if its changes becomes static.

There are four schools of thought about climatic change. One finds records that we are moving into the next Ice Dispensation; another has certainty that the globe is getting warmer; a third upholds that there has been no great change in historical periods, and the fourth is agnostic in such issues (Leiserowitz, Smith and Marlon, 2011). Recent decades have viewed record- high average world-wide surface temperatures. In the previous century, global surface temperature heightened by about 1.4°F. In the past quarter- century, proportional to satellite measurements, the lower atmosphere warmed by 0.22- 0.34 °F per ten years equivalent to 2.3°F per century (Baede, 2015). This properly documented warming trend could result from several factors that influence the earth's climate, some of which are natural, such as changes in solar radiation and volcanic activity.

1.1.2 Literature Review

In Nigeria, many people now recognize climate change as a serious problem that warrants action. This is a major shift in attitude from just a few years ago (Akpodioyaga, 2009). Public attitude to climate change adaptation has to do with the procedures by which, individuals change their practices, or structures to change or eliminate potential damages or intentional pull an advantage of opportunities associated with changes in climate. It is all about changes in attitudes that diminishes the negative impacts of climate change.

Attitude towards adaptation to climate handle greatly with adjustment in natural or people's structures in response to true or expected climatic stimuli or their impacts which cushions danger or take advantage of important opportunities. Attitude to climate change adaptation is the key of thinking and acting towards aligning to the effect of climate change. Therefore, climate change behaviour refer to the way of thinking and acting by persons towards the problem of world-wide climate change. It is the feelings and interest an individual could have relating to climate change.

In researching on the effect and adaptation of climate change in Northern Nigeria Okhimamhe, (2009) discovered that ailments like persistent malaria, hypertension, ulcer, diarrhoea, asthma and diabetes are new diseases that were ushered in by the changing climate, with malaria being the most widespread. The researcher pointed out that thirty years ago, the people of the area relied on local herbs for treating illnesses, but now, they have to go to nearby fairly functional clinics for treatment especially because the herbs are no longer able to stop diseases.

In line with this assumption, Small and Nicholis (2003) opined that where people live (location) determine the how much information and knowledge that gets to them particularly in developing countries like Nigeria. Although, Agiande (2006) found out in a study in Calabar that location is no longer a challenge to students' knowledge of environmental issues (like climate change). Ishaya and Abaje (2008) in a research, in Kaduna also found out that place has no important influence on students' knowledge of the issues of climate change. For instance, Ishaya and Abaje (2008) researched native people's thoughts on climate change and adaptation techniques in senior secondary schools in Jema Local Government Area of Kaduna State. Even though similar studies have been executed in line with secondary school students' climate change awareness and attitude, there appears to be a limited supply on the study on climate change in Adamawa state.

Thus, the present study will determine the climate change awareness and attitude of senior secondary school teachers and students in Adamawa State.

1.2 Statement of the Research Problem

The year 2012 witnessed tremendous drought and floods which led to late planting of crops, poor crop yields, destruction of farmlands and properties, rendering of people homeless as well as deaths, hunger, malnutrition, pests and diseases in many States in Nigeria, especially in Adamawa State. Indeed, similar research have been carried out with respect to secondary school teacher's and learner's climate change knowledge and attitude, there seem to have paucity in the study on climate change adaptation knowledge (awareness) and attitude in Adamawa State. This study aims to find out the adaptive coping and adaptive capacity for specific population groups.

1.3.1 Aim of the Study

The aim of this study is to determine the level of awareness and attitude of climate change adaptation among secondary school teachers and students in Adamawa state.

1.3.2 Research Questions

Specifically, the study will determine the following:

1. To find out climate change adaptation awareness of secondary school teachers and students in Adamawa State.
2. To examine climate change adaptation attitude of secondary school teachers and students in Adamawa State.
3. To find out Teachers and students rating on climate change adaptation awareness by school location in Adamawa state.
4. To find out Teachers and students rating on their attitude towards climate change adaptation by school location in Adamawa state.

1.4 Research Questions

The following research questions guided this study

1. What are the mean ratings of secondary school teachers and students on their awareness of climate change adaptation in Adamawa state?
2. What are the mean ratings of secondary school teachers and students on their attitudes towards climate change adaptation in Adamawa state?
3. What are the mean ratings of biology teachers and students on climate change adaptation awareness by school location in Adamawa state?
4. What are the mean ratings of teachers and students on their attitude towards climate change adaptation by school location in Adamawa state?

1.5 Hypotheses

The study has null hypotheses which was formulated to guide the study and the degree of significance.

HO1: There is no significant difference in the mean rating of teachers and students' awareness of climate change adaptation by place of the school in Adamawa state.

HO2: There is no significant difference in the mean rating of biology teachers and students on their attitude towards climate change adaptation by place of the school in Adamawa state.

1.6 Significance of the Study

The study has practical and theoretical relevance. Theoretically, the research is built on Albert Bandura's Social Learning Theory of 1963. Bandura advocated that learning is a cognitive time line that occurs in locations in a social position and can take place mainly through observation or direct regulations, also the lack of motor reproduction or direct reinforcement. Therefore, interpersonal affairs in school environment can help in developing learners adaptive strenght to climate change. Climate change is a difficult concept embodying the communication of a lot of social and ecological needs.

To instructors, the outcomes of this research could help them enhance on their knowledge and awareness about climate change and the need for adaptation and empower them to establish positive behaviour toward climate change and the need for adaptation.

To other researchers, the results of this research would also assist them to find out the basic areas that calls for advance study about climate change. This might assist to enhance clear adaptation to climate change. The outcomes of this research, could serve as reference document to other researchers embarking on studies on climate change related issues.

1.7 Scope of the Study

This study is on climate change adaptation awareness and attitude among secondary school students and teachers in Adamawa state.

The research was conducted on using Senior Secondary School SS2 students and teachers in Yola Education Zone of Adamawa State. The School location was taken into consideration due to clear available factors in students and teachers' awareness and attitude towards climate change adaptation in Adamawa state.

1.8.1 Design of the Study

The design of this research is mainly much of a descriptive survey design. A survey research design is such in which a team of persons or things which is studied by collecting and analysing data from only a few persons or things regarded to be representative of the entire group.

1.8.2 Area of the Study

The study was carried out in Yola Education Zone of Adamawa State. Yola Education zone made up of five (5) local governments Areas namely Yola, Mubi, Gombi, Ganye and Numan. The choice of Yola Education one is based on the geographical location of the zone in Adamawa State.

1.8.3 Population of the Study

The study population was made up of all five hundred (500) teachers and 3,958 students in sixty- one 61 public secondary schools in Yola Education Zone. Statistics Unit Post Primary School Service Commission (Yola Zone).

1.8.4 Sample and Sampling Technique

The study sample comprised of 464 respondents made up of 64 teachers and 396 students gotten from six (6) selected public secondary schools in Yola education zones in Adamawa State. First, the researcher used Simple Random Sampling Technique (Balloting with replacement), this was used to select one education zones (Yola, education zones) out of the six education zones in Adamawa State. Also, purposive sampling technique was adopted by the researcher to sample two LGAs out of the five LGAs in Yola Education Zone. The requirement for choosing the two LGAs was because they are among the locations that were negatively affected during the 2012\2015 flooding scenarios in Adamawa State. Simple Random Sampling Technique was used to sample three (3) secondary schools each from the two sampled LGAS.

1.8.5 Instrument for Data Collection

The study made use of various instruments, which were used for data collection on the Subject matter of the Study Titled "Climate Change Adaptation Awareness Questionnaire" (CCAAQ), and Attitude to Climate Change Adaptation Questionnaire (ACCQ). Climate Change Adaptation Awareness Questionnaire (CCAAQ), was a questionnaire created by the researcher which measured the knowledge of the respondents on adaptation strategies for reducing the consequences of climate change in the study area.

1.8.6 Method of Data Collection

Short interactive training was given to the research assistants by the researcher on how best to approach the respondents. The researcher and the research assistants were administered and collected back the copies of the instruments on the spot. This was done to ensure maximum return of the instrument.

1.8.7 Method of Data Analysis

The data collected from the study, were sourced from the research questions, was analyzed using Mean and Standard Deviation, while the null hypotheses was analyzed through the use of t-test at 0.05 level of significance ($P < 0.05$). Based on the four-point scale, a criterion mean score of 2.50 was used as the criteria for decision taking. Therefore, any item that has mean below 2.50 was unapproved, while the items, that have a mean of 2.50 and above was approved. Independent samples t-test was used to test all the null hypotheses

1.9.1 Data Presentation and Analysis

Table 1: Mean and Standard Deviation (SD) on Teachers and Students Awareness on Climate Change

S/N	Item Statements	X_i	SD	Decision
Adaptation				
1.	Establishing weather monitoring equipment on school compounds to forecast events in the atmosphere	2.01	.70	Disagree
2.	Knowledge of routine measure of water levels	2.21	.86	Disagree
3.	Strengthening early warning sign	2.13	.79	Disagree
4.	Creating awareness among the citizenry	2.07	.78	Disagree
5.	Switching to early maturing varieties of crops	2.13	.79	Disagree
6.	Tree planting and reforestation	2.23	.84	Disagree
7.	Building of sea banks	2.35	.93	Agree
8.	Encouraging recovery of by-products and scraps for	2.31	.88	Agree reuse
9.	Encouraging recycle of waste materials	2.44	.99	Agree
10.	Planting trees that thrive on erosion lands eg Bamboo tree		2.62	.95 Agree
11.	Decrease the use of old cars	2.53	.98	Agree
12.	Conservation of the remaining forest	1.96	.76	Disagree
13.	Restraining the use of air conditioner	1.87	.72	Disagree
14.	Proper disposal of waste in the environment	1.85	.72	Disagree
15.	Increased use of wind energy	1.82	.67	Disagree
16.	Awareness campaign on climate change	1.85	.70	Disagree
17.	Mapping of risk and disaster areas	1.83	.73	Disagree
18.	Formation of climate change clubs in schools and localities	1.86	.73	Disagree
19.	Mounting awareness campaigns through the radio and television on climate change adaptation	1.81	.77	Disagree
20.	Sticking to master plans of towns and cities	1.93	.89	Disagree
21.	Stop dumping of refuse in the drains	2.03	.97	Disagree

22. Ensure that drains are cleared regularly	1.98	.89	
23. Making policy and programmes that provide opportunities for the displaced communities to earn livelihood	1.90	.87	Disagree
24. Construction of dykes to stop water flooding in low area land	2.11	.84	Disagree of
25. Construction of embankments to keep water back against pollution of the wetland	2.10	.85	Disagree
26. Construct fish ponds in the flooded areas	2.01	.79	Disagree
27. Explore other livelihoods other than agriculture	1.81	.73	Disagree
28. Switch to other crops that can tolerate floods and heavy rainfall	1.78	.73	Disagree
29. Provision of relief materials from good spirited individual and government	1.71	.70	Disagree
30. Free medicine from government to flood victims	1.69	.71	Disagree
31. Rehabilitation of destroyed infrastructure by government	1.80	.79	Disagree
32. Helping people in evacuation areas	1.87	.84	Disagree Disagree
33. Construction of surface dam	1.85	.86	Disagree
34. Control burning of bushes	1.87	.84	Disagree
35. Proper timing of tree planting activities	1.94	.89	Disagree
36. Introduction of drought resistant plant species	1.94	.87	Disagree
37. Planting early maturing varieties of crops and vegetables	1.91	.87	Disagree
38. Use of direct seeding method, which requires less water	1.78	.79	Disagree
Cluster Mean	1.99	.	Disagree 51

Data in table 1 showed that items 7-11, had mean rating more than the mean cut off point of 2.50 while items 1, 2, 3, 4, 5, 6, 12-38, had mean rating below the cut-off point of 2.50. With the cluster mean score of 1.99. It revealed that the students and teachers had low awareness level on climate change adaptation.

Research Question 2: What is the Mean Rating of Learners (Students) on their Attitudes on Climate Change Adaptation?

Table 2: Mean and Standard Deviation (SD) on Teachers and Student's Attitude towards Climate Change Adaptation.

S/N	Item Statements	X	SD	Decision
39.	I do not think that proper environment management could stop the impact of climate change	1.75	.76	Disagree
40.	I am worried at the rate of flooding because it increases the impact of climate change.	1.73	.75	Disagree on the
41.	I often ask questions on Climate Change Adaptation Strategies	1.69	.68	Disagree
42.	I predicate in planting of trees on open fields in order to check the incidence of erosion	1.70	.70	Disagree
43.	I believe that harnessing climate change impact will bring about safe environment.	1.74	.76	Disagree

44. I am mainly interested with the issues on climate change 1.68 .75 Disagree may bring
I am working effectively to impact knowledge on my friends about Climate 1.64 .70 Disagree change adaptation
45. I have joined Climate change adaptation awareness club 1.70 .77 Disagree in my school to help.
46. There is nothing I might do concerning Climate change 1.80 .88 D i s a g r e e adaptation that will make a meaningful difference.
47. I am spreading the news of Climate change 1.70 .77 Disagree
48. I have heard of climate change adaptation before 1.75 .79 Disagree
49. I do not like to listen to news related to Climate change 1.71 .79 D i s a g r e e adaptation
50. I believe that the problem of Climate change adaptation 1.80 .84 Disagree will be easy to handle.
51. I am transmitting information of Climate Change Adaptation in my area 1.86 .85 Disagree my area.
52. I don't mind engaging in any activity to ensure proper 2.35 .94 Agree climate change adaptation
53. Climate change adaptation will benefit only those who 2.48 .96 Agree caused it
54. I think non adherence to Climate change adaptation 2.59 .90 Agree strategies will make a lot of people to lose their job
55. I often grow trees to assist the degree of Climate Change 2.67 .84 A g r e e change
56. I will be happy if the issue of Climate change is taken 2.65 .88 Agree more seriously in my school.
57. I do not think I can do any meaningful thing to make 2.63 .84 Agree difference about climate change
58. I am preparing myself to manage the effects of Climate 2.69 .87 A g r e e change
59. I read any available information on Climate change 2.74 .87 Agree
60. I read any available information on Climate change. 2.76 .91 Agree
61. I encourage my friends to stop bush burning to prevent 2.76 .91 Agree Climate change.
62. I will like the government to make an environmental law 2.75 .95 Agree against anybody who will cause climate change
63. I do not assume that the climate is dynamic 2.74 .95 Agree
64. I do not feel threatened about the problems caused by 2.67 .95 Agree Climate change e.g. flooding, erosion.
- ~~65. I try to manage my classroom to avoid climate change 2.70 .93 Agree effect.~~
Cluster Mean 2.19 .54 Disagree

Note below: The number of respondents for this study is 464 respondents made up of 68 teachers and 396 SSII students.

Data in table 2 showed that items 39-52 had mean rating is low od the mean cut off point of 2.50 while items 53- 66 had mean rating above the cut-off point of 2.50. With the cluster mean score of 2.19. It showed that teachers and students had poor attitude towards climate change adaptation.

Research Question 3: What is the Mean Rating of Teachers and Students on Climate Change Adaptation Awareness by School Location?

Table 3: Mean and Standard Deviation (SD) on Teachers and Students Climate Change Adaptation Awareness by School Location in Adamawa State

Location	Number	Mean	Standard Deviation
Rural	281	2.04	.51
Urban	183	1.93	.52

Data in Table 3 revealed the awareness of teachers and students on climate change adaption by school location which shows that teachers and student in rural area had a mean score of 2.04 while those in urban area had a mean score of 1.93. Based on the mean cut off point which is 2.50, it indicates that both rural and urban areas have low awareness of climate change adaptation, although those in urban area d higher mean rating.

HO₁: There is no Significant Difference in the Mean Rating of Teachers and Students Awareness of Climate Change Adaptation by School Location in Adamawa State.

Table 4: T-Test Analysis on Significant Difference in the Mean Rating of Teachers and Students Awareness of Climate Change Adaptation by School Area

Location	Number	Mean	SD	t	df	p-value	Significance
Rural	281	2.04	.51	1.07	462	.488	NS
Urban	183	1.93	.52				

A reliable sample t- test was carried out to check out the mean ratings of rural and urban area teachers and students on awareness of climate change adaptation. The result revealed that there was a significant difference in the mean rating for rural (R= 2.04, SD= .51) and urban (U=1.93, SD= .52), $t(462) = 1.07, p > .488$ two tailed. The null hypotheses were therefore; not rejected showing that there was no significant difference in the mean rating of teachers and students by school location based on awareness of Climate Change Adaptation.

Research Question 4: What are the Mean Ratings of Teachers and Students on their Attitude towards Climate Change Adaptation by School Location?

Table 5: Mean and standard deviation (SD) on influence of school location on teachers and student's attitude towards climate change adaptation by school location.

Location	Number	Mean	Standard Deviation
Urban	281	2.26	.54
Rural	183	2.10	.52

Data in Table 5 on attitude of and students in climate change adaption by school location which shows that teachers and student in urban area had a mean score of 2.26 which is higher than those in rural area which had a mean score of 2.10. Based on the mean score cut off point of 2.50, it indicates that both teachers and students in Rural and Urban Senior Secondary had low attitude on Climate Change Adaptation.

HO2: There is insignificant difference in the mean rating of teachers and students on attitude towards climate change adaptation by school location.

Table 6: T-test Analysis on Significant Difference in the Mean Rating of Teachers and Students on Attitude towards Climate Change Adaptation by School Location

Location	N	Mean	SD	t	df	p	Significance
Urban	281	2.26	.54	1.55	462	.798	NS
Rural	183	2.10	.53				

An independent sample t- test was conducted to compare the mean ratings of rural and urban area teachers and students on their attitude towards climate change adaptation. The result showed that there was a significant difference in the mean rating for rural (U= 2.26. SD= .55) and urban (R=2.10, SD= .53), $t(462) = 1.55$, $p > .798$ two tailed. The null hypotheses were therefore; not rejected indicating that there was no significant on difference in the mean rating of teachers and students on attitude towards climate change adaptation by school location

1.9.2 Discussion of the Findings of the Study

a. Teachers and Student's Awareness About Climate Change Adaptation

Result of the research showed that the students and teachers had low awareness level on climate change adaptation. The result of this finding could be as a result of the fact that teachers and students were not exposed to adequate instructions regarding climate change adaptation or because they paid a lazier affair attitude towards the instructions given to them. It could also be because they don't listen to news on television or radio giggles or read newspapers where climate change awareness and strategies on climate change adaptation are been showcased or because they do not have access to internet materials to read and be aware of climate change adaptations. As a result of these reasons, they have low awareness on climate change adaptation. The finding agrees with Ishaye and Obaje (2008) who discovered in their research that SS1-SS3 learners in in Jema local government area of Taraba State that the students have little awareness of Climate Change Adaptation.

b. Teachers and Student's Attitude towards Climate Change Adaptation

The result of the study showed that teachers and students had poor attitude towards climate change adaptation. This finding could be as a result of ignorance of some strategies on climate change adaptation or because the respondents feel that it is not their business to ensure positive attitude towards their environment and this makes them to show nonchalant about it. It could be that they are not exposed to materials on climate change adaptation. This research finding agrees with Oruonye (2011) who discovered in his study, that higher institutions students have poor behaviour towards climate change adaptation.

c. Teachers and student's awareness and attitude towards climate change adaptation by school location

The result of the research found out that teachers and students in remote areas (rural) and city areas (urban) have low awareness of climate change adaptation, although those in urban area had higher mean rating, test of hypothesis showed that there was insignificant difference in the mean rating of teachers and students on awareness of climate change adaptation by school location. The inadequate sensitization and inadequate behaviour towards Climate Change Adaptation especially for those in rural area might be due to inaccurate information about climate change and its adaptations provided to them.

1.9.2 Summary of the Findings

1. Teachers and learners have poor attitude towards climate change adaptation.
2. Teachers and students in rural and urban areas have low awareness of climate change adaptation, although those in urban area had higher mean rating/ there was no significant difference in the mean rating of teachers and students on awareness of climate change adaptation by school location.

3. Teachers and students in rural and urban senior secondary biology students had low attitude towards climate change adaptation/ there was no significant on difference in the mean rating of subjects, teachers and students on attitude towards climate change adaptation by school location.

1.9.3 Conclusion

On the basis of the outcomes of the research, the researcher presents the conclusions arrived at:

1. The Senior Secondary learners and teachers had low awareness to climate change adaptation.
2. Senior secondary learners and instructors possess low attitude towards climate change adaptation
3. Senior secondary teachers and students in urban areas had higher awareness level on climate change than those in rural area, though there was insignificant difference in their mean rating of teachers and students in urban and rural area on the level of awareness on climate change adaptation
4. Senior secondary teachers and students in urban areas had higher positive attitude towards climate change than those in rural area, though there was no significant difference in their mean rating of teachers and students in urban and rural area on their attitude towards climate change adaptation.

1.9.4 Educational Implication of the Study

The findings of this study have implications to curriculum planners, science teachers and students, educational administrators and textbook writers.

To curriculum planners, it shows that the current curriculum is not adequate in addressing the environmental issues in our society, hence there is need to infuse some of the issues into the curriculum to create awareness about climate change adaptation. Again, this study has implication for teachers and students. The findings of the study showed that teachers and students have poor awareness and inadequate behaviour about climate change adaptation. Therefore, there is need for adequate enlightenment program for teachers and students to get them informed on the best practices towards ensuring adequate environmental management and mitigate incessant occurrence of climate change and be able to adapt well in cases of climate change occurrences. The finding of this study has implication also for school administrators. The school administrators can organize workshops and seminars for teachers on the need to integrate climate change adaptation into their teaching and learning using topics that lend themselves to environmental issues.

1.9.5 Recommendations of the Study

Based on the findings of the study, the following recommendations were made:

1. Governments and private entities could enhance that sound knowledge-based routines are embarked out in urban places are obtainable in rural areas. To realize this, there is the basic need to ensure that sound instructors are recruited to teach in remote places. Rural areas should be properly structured with fundamental instructional and learning structures to ensure effective and efficient learning.
2. Governments and non-governmental organizations should help by organizing workshops, seminars and conferences for teachers and students to exposed them to proper knowledge of climate change adaptation. This could enhance or improve their degree of knowledge and behaviour on climate change adaptation.
3. Secondary school curriculum planners should infuse more contents that could help the teachers and learners to comprehend the reasons and impacts of climate change as well as the necessary adaptive measures to take, into the relevant subjects more especially in Upper Secondary Schools Subjects.

1.9.6 Limitations of the Study

1. The sample size of this study is small, therefore, the result gotten may not be generalized to a large population.
2. Most students did not understand some of the information on the questionnaire which made the researcher to spend much time as required in explaining these items to them.
3. Problem of absentees of the teachers and students elongated the duration for this study.

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