

IMPACTS OF CLIMATE CHANGE IN BANGLADESH OVER LAST 30 YEARS : A SURVEY BASED ON VISUAL ART

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[ABSTRACT : Climate change is a major concern in Bangladesh, where the impacts are being felt in various ways. Bangladesh has seen a 1.3 degree Celsius rise in average temperatures over the past 30 years, leading to increased frequency and intensity of extreme weather events such as flooding, drought, cyclones, and rising sea levels. This warming has caused significant environmental, economic, and social damage, including displacement of millions of people. Visual artists can play an important role by spreading awareness in people about climate change by their art works because Visual art has the power to influence people very easily. There has been a lot of research on climate change in Bangladesh in the past but none based on visual art - which makes this research stand out from the rest. Based on visual art, this study will focus on analyzing the effects and impacts of climate change on Bangladesh over the last 30 years.]

KEYWORD : Climate Change, Sea-Level Rise, Temperature, Visual Art, Painting, Bangladesh, Environment

INTRODUCTION :

Climate change is a long-term shift in global or regional climate patterns. It is caused primarily by human activities, such as burning fossil fuels and deforestation that increase concentrations of greenhouse gases in the atmosphere. Factors such as frequent natural disasters, lack of infrastructure, high population density as 147 million people living in an area of 147,570 km² (Bangladesh High Commission in Canberra, Australia, 2025), an extractivist economy and social disparities are increasing the vulnerability of the country in facing the current changing climatic conditions. In Bangladesh, climate change is causing increasing

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temperatures, extreme weather events, floods, and rising sea levels. Global warming is a part of climate change and is caused by increasing levels of greenhouse gases in the atmosphere, such as carbon dioxide. These gases trap heat from the sun and cause the planet's average temperature to rise. according to the World Bank, by 2050, Bangladesh is expected to experience an increase in temperature of about 1.5°C. And between 2040 and 2059, annual rainfall is also expected to increase by 74 mm (World Bank, 2021). This causes climate change, which affects weather patterns, ecosystems, and human health. There are several reports that suggest that Bangladesh's climate has changed significantly in the last 40 years. According to the Bangladesh Meteorological Department, the average temperature of the country has increased by 0.6 degrees Celsius in the last four decades. While monsoon is supposed to be at its peak in July, the country witnessed less than half the average rainfall during that month of last year. The average rainfall that July was 211 millimetres – 57.6 % lower than the average July rainfall over the last 30 years, and the lowest since 1981. The average 30-year rainfall was 496mm. In 2020, it was 553mm -- 11.3 % higher than the average, while in 2021, it was 471mm -- 5.1 % lower (Daily Star, 2022).

Bangladesh has seen a 1.3 degree Celsius rise in average temperatures over the past 30 years, with a 0.6 degree increase in sea level. While Earth's temperature has risen by an average of 0.14° Fahrenheit (0.08° Celsius) per decade since 1880, or about 2° F in total. The rate of warming since 1982 is more than three times as fast: 0.36° F (0.20° C) per decade (Lindsey and Dahlman, 2023). The frequency of extreme weather events has also increased significantly in the last three decades. Bangladesh is already a highly vulnerable country due to its geographical position, and climate change is only making it worse. The country has already experienced severe flooding in the past few years, and the impact of climate change is expected to worsen in the future. Visual artists can play an important role by spreading awareness in people about climate change by their art works because Visual art has the power to influence people very easily. There has been a lot of research on climate change in Bangladesh in the past but none based on visual art - which makes this research stand out from the rest. Based on visual art, this study will focus on analyzing the effects and impacts of climate change on Bangladesh over the last 30 years.

REVIEW OF LITERATURE:

Climate change is having a substantial impact on Bangladesh's social, economic and environmental health. Average tropical cyclones cost

Bangladesh about \$1 billion annually. - By 2050, one-third of agricultural GDP may be lost due to climate variability and extreme events – a devastating figure as the agriculture sector represents around half of employment in the country. Bangladesh is highly vulnerable to climate change due to its geography, population density, and reliance on climate-sensitive agriculture and fisheries. Bangladesh is one of the most vulnerable countries in the world to climate-related hazards such as cyclones and floods. UNISDR estimated the average annual losses to disaster at around \$3 billion, or around 1% to 2% of GDP (World Bank, 2021).

The impacts from climate change include increased temperatures, rising sea levels, changes in precipitation patterns, and more extreme weather events, such as floods and cyclones. These impacts are leading to a range of social, economic and environmental issues, such as increased poverty, food insecurity, displacement of people and deterioration of natural ecosystems. The impacts of climate change are expected to worsen in the future, and they will disproportionately affect the most vulnerable members of society. Actions need to be taken to mitigate the impacts of climate change in Bangladesh and to protect lives and livelihoods. The policy implications for climate change in Bangladesh are significant. Adaptation strategies are key to addressing the impacts of climate change in the country, which is already highly vulnerable to extreme weather events. Bangladesh needs to strengthen its resilience to climate change, and this requires investment in climate-resilient infrastructure, modernizing traditional water management systems, and improving the country's capacity to forecast and respond to climate-related hazards. Suitable infrastructural and institutional frameworks can provide a viable alternative, particularly for the urban poor. So it is needed to see, if there is any suitable structure in the policies set for our urban centers. Bangladesh Climate Change Strategy and Action Plan, 2009 -considered urban sector only for the urban drainage. Many other important factors of urban areas are not considered in this action plan (Mahmood, 2012).

The major findings of various studies on the environmental changes that have occurred in Bangladesh over the past 30 years include: 1. Increase in waterlogging and salinity in coastal zones due to sea level rise. 2. Increase in extreme weather events, such as floods, cyclones, and droughts. 3. Decrease in agricultural productivity due to soil degradation and water contamination. 4. Increase in air pollution and soil erosion due to deforestation and industrialization. 5. Decline in biodiversity and wildlife habitat due to urbanization and over-exploitation. 6. Increase in water resources vulnerability due to climate change. The probability of heatwaves that affected Bangladesh this year, has a 30-fold higher chance of recurring. The recent intense heatwave that affected various parts of Bangladesh,

along with India, Thailand, and Lao PDR, has been attributed to human-caused climate change, according to a rapid attribution analysis conducted by World Weather Attribution. During the last two weeks of April 2023, Bangladesh experienced extreme temperatures, with Dhaka recording a historic maximum temperature of 40.6°C on 15 April, the highest in decades. These soaring temperatures are consistent with the current climate, which has warmed by 1.2°C since pre-industrial times due to human activities (Dhaka Tribune, 2023).

In addition, Bangladesh needs to reduce its emissions of greenhouse gases to mitigate the effects of climate change. This includes investing in renewable energy sources, transitioning to cleaner and more efficient production and transport systems, and improving the efficiency of energy use in buildings.

Report by the Intergovernmental Panel on Climate Change warns that global temperatures are likely to rise by 1.5°C above pre-industrial levels by 2040 (The Business Standard, 2023). This rise in temperature will have a significant impact on Bangladesh, and the country is likely to experience increasingly frequent and severe natural disasters, including cyclones, floods and droughts. Sea levels are also expected to rise by up to 1.5m by the end of the century, which could displace millions of people living in coastal areas. According to the IPCC Fifth Assessment Report, the sea-level of the Bay of Bengal is rising at a rate of 1.5 mm per year. Bangladesh with the Bay of Bengal on the South will be directly affected by the sea-level rise because of its low elevation. If the sea-level rises by 45 cm, a permanent loss of up to 15600 square kilometres of land is expected. If one meter rise happens, around 14000-30,000 sq. km land are expected to be flooded, which means more than 20% of Bangladesh will be under water. Scientists predict that rising sea-levels to submerge 17% of Bangladesh's land area will displace 18 million people in the next 40 years by 2050 (Elahi and Khan, 2015). Rising temperatures and sea levels have already had a major impact on the country's agriculture industry, with crop yields decreasing as a result.

A research done by The World Bank named- "Climate Change in Bangladesh: Impact on Infectious Diseases and Mental Health" says, the threats of climate change in Bangladesh have already extended to health in the form of higher incidences of respiratory diseases, vector borne diseases like dengue, along with deteriorating mental health conditions. Changes in weather can cause mood swings. The level of anxiety disorders increases with temperature and humidity. Increase in mean humidity and mean temperature increases the probability of having anxiety by 0.3 % and 0.8 %, respectively. More people suffer from depression during winter.

Increase in temperature lowers the probability of depression by 1.6 % (World Bank, 2021).

Bangladesh has implemented several strategies to reduce emissions and mitigate the impacts of climate change. These strategies include energy efficiency improvements, adoption of renewable energy sources, enhancing forestry and afforestation, improving land use and management practices, and strengthening adaptation strategies. Energy efficiency improvements involve measures such as replacing inefficient lighting and appliances with more energy-efficient models, and using more efficient building designs. Renewable energy sources such as solar, wind, and biomass are being implemented to reduce reliance on fossil fuels and reduce emissions. Enhancing forestry and afforestation involves planting trees and shrubs to sequester carbon and improve air quality. Improved land use and management practices involve techniques like terracing and agroforestry to increase fertility of the soil and reduce soil erosion. Finally, Bangladesh is strengthening its adaptation strategies by investing in research, infrastructure, and technology to better prepare for the impacts of climate change.

On the other hand visual art is a very important and integral part of human life. Art has been contributing to people's lives in various ways for ages. Not only that, history has recorded many art works that created a revolution at that time, played a role in the society as a language of protest. One such painting is 'Guernica', 1937 by famous artist Pablo Picasso. It was created in response to the bombing of the Basque Country village of Guernica in northern Spain by German and Italian warplanes on April 26, 1938, under Spanish Nationalist forces during the Spanish Civil War. Guernica is a town in Spain. When General Franco's Fascist forces were embroiled in a civil war with the Spanish Republic, Franco's warplanes bombarded the small town. All the people died brutally. At the request of the Republic, Pablo Picasso depicted the event as an anti-war protest in a black-and-white oil painting 8 meters wide and 3 meters long.



Pablo Picasso- Guernica, 1937

By war we mean army to army fight. But in that civil war, with brush and paint, Pablo Picasso, in the form of an army of paintings, destroyed the image of fascism in front of the international community. At the time, this painting was so successful that Guernica is considered to be the most powerful and fearsome anti-war painting in the world of painting . Besides painting, almost all forms of visual art have the power to affect people profoundly. One such famous photography is Starving Child and Vulture, 1993 by Kevin Carter. This Pulitzer Prize-winning photography is very controversial and heart touching. As famous for its social impact, as it is for the ethical issues it raised. In 1993 South African photojournalist Kevin Carter travelled to Sudan to photograph the famine. His photography of a collapsed child, with a vulture stalking over her, not only caused public outrage because of the horrific subject, it also stirred up a lot of criticism directed toward the photographer, for photographing the child, rather than helping her. The onslaught and guilt that came after - continued to haunt Carter until he took his own life in 1994 (Hildebrandt, 2022).



Kevin Carter, Starving child and vulture, 1993

There are many examples of visual arts that have been immortalized in history for playing an important role in society. The language of art is universal, therefore an extraordinary medium for awakening or making people aware. That is why visual art can be used as a suitable medium or tool of research. There has been a lot of research on climate change in Bangladesh in the past but none could be found based on visual art - which makes this research stand out from the rest.

IMPACTS OF VISUAL ART IN SOCIAL CHANGES:

Art is an integral part of human life and an important sector of art is visual art. Its role is important in the life of every person. Art is an universal language or a medium of communication - which one doesn't need to be educated to understand. Art is a great medium of expression as well as a language to communicate with others.

Renowned artist Qayyum Chowdhury said-

‘An artist's social responsibility is more than society and numbers. The reason for that is the general activation of the effect by his created action. Can establish doctrine. As he is a leader of red culture in his geographical environment, he will repeatedly turn to the source. Help the countrymen to return to their glorious heritage. In this case, the opposite role gives opportunity to mislead the countrymen.’ He also said- ‘As the artist's responsibilities are greatly increased in a hostile environment - vigilance imbues his creations with human values. He continues to sow the seed of removing adversity in his creations.’ (Prothomalo, 2015)

The same thing we can see in some very historical paintings like Zainul Abedin's -‘Monpura 70’. This painting shows us the backdrop of the terrible flow tide of 1970. It was caused by the terrible cyclone and tidal wave that occurred on Monpura Island on 12 November 1970. He drew this wonderful painting on a 6-foot paper scroll. In this image, human and cow-goat corpses are piled together. It is said that, when Zainul heard that many people's lives had been destroyed by a terrible disaster in Monpura Island, he couldn't stop himself. He quickly reached there and was disturbed by the plight of the people. This is reflected in Monpura 70 (kali o kalam, 2014). This painting is a work of a responsible artist and also it can be used as an archive of a natural disaster.



Zainul Abedin- Monpura 70, 1970

Also there is a famous painting of legendary artist SM Sultan named ‘After the flood’. We are people of flood country. Floods not only destroy the two banks of the river; brings alluvial soil, the possibility of new creation. But sometimes these floods become more destructive. The painting shows the ruins after the flood known as such a natural disaster, the dead bodies of people and cattle and starving people struggling to survive. This is a

painting done in expressionist style. The human bodies lying scattered in the water in the fields represent a post-flood scene, but these bodies are not destroyed or starved. The women, children and men in the painting are rather sultan's trademark wholesome agricultural people; As the people of this country are supposed to be. There is a comfortable thing about them, they are lying in a shallow paddy field. Floods occurred but neither these farmers nor their farming operations were destroyed. The story of this post-flood image is not one of destruction and death, but of a happy and prosperous life in harmony with the flooded nature. The flood depicted by the Sultan is not a deluge that brings death, but a kind of resurrection to live with new vigor.

In this way, various natural disasters have appeared in the paintings of Bangladeshi artists again and again. As these works highlight the characteristics of the environment of this country, they also influence the public mind and create awareness. In this study, therefore, visual art has been chosen as the medium of research.



SM Sultan- After the flood, 1986

Besides, history always reminds us how important the role of visual art is in a society. For example, some artworks created by artists during the liberation war of Bangladesh in 1971. Several famous posters were made during that time. These works of art created a lot of excitement during the liberation war and even inspired the freedom fighters during the war and gave them strength to fight. During the Liberation War, artists thought that

creating public opinion in the country and outside the world through monograms, posters, cartoons, leaflets, banners, designs, etc. is now their main task. One such poster is 'These monsters must be killed' (Ei Janoarder hatya korte hobe) painted by artist Patua Kamrul Hasan. The subject of this poster was a face of Yahya Khan as a violent monster. It is called the most important liberation war poster in the history of the world (Prothom Alo, 2021).



Kamrul Hasan- Ei Janoarder hatya korte hobe, 1971

That means, visual art is an art medium by which people can be influenced very easily, and for this reason, two paintings have been used as survey materials in this study which has focused on analysing the effects of climate change on Bangladesh over the last 30 years. This has included looking into how the changing climate has impacted the perspective of people on climate change, environment, agriculture, population, industries, and other aspects of life in Bangladesh. Additionally, it has also considered looking into the various mitigation strategies that Bangladesh has employed to combat climate change.

OBJECTIVES:

1. Experimenting with science based content through visual art and analysing how visual art can be successfully used as a research medium.
2. Examining the effects of climate change on the environment and ecosystems in Bangladesh through visual art.
3. Exploring people's perspective about climate change through visual art.
4. Exploring ways to mitigate and adapt to the effects of climate change in Bangladesh through visual art.

METHODOLOGY OF THE STUDY:

This study has been organised with the help of a pre-set questionnaire comprising both closed and open-ended questions. The validity of the questionnaire was evaluated using face validity. It assesses the practicality, readability, uniformity of style and formatting, and clarity of the language used in the questionnaire's appearance. In other words, face validity refers to researchers' subjective evaluations of how the measuring instrument is presented and relevant, specifically whether the items in the instrument seem relevant, rational, unambiguous, and clear (Oluwatayo, 2012). The method involves collecting data by asking 30 individuals of same area a series of questions based on their perceptions on seeing two paintings. The questions were mainly asked to rural people because urban people are comparatively more educated and aware. But the researcher wanted to observe whether uneducated people can connect with visual art or not! The data was then analysed to conclusions. To facilitate the respondents' understanding, the questionnaire was developed first in Bengali then it was translated into English. The findings of the data constitute the primary sources of this study while secondary sources in the forms books, journals, response papers and recent discussions on climate change has been used to build an insight into the issue as well as identify the research gap. Newspaper reports and articles have been as a source of useful current information.

This research is based on a survey where two paintings by artist Anindita Habib are used as visual art. A series of questions have been set to test people's common perspective about climate change. Since the study is about the climate change situation in Bangladesh in the last 30 years, these questions were asked to more than 30 people aged 40 years and above to get more relevant information. Role of these two paintings are important here as the questions are based on these images. One of the two paintings shows a look of greenish Bangladesh where the environment is normal- have

enough water, trees, fisherman is fishing and the other shows the effects of climate change- dry environment, hopeless fisherman etc.



The respondents in this study are them who were asked the question 'Do you see any changes between the two pictures?' - and those who answered yes to this question. The following questions were asked to the respondents;

1. Do you see any changes between the two pictures?
2. What kind of changes do you see?
3. Why do you think this change happened?
4. Which picture do you notice the most resemblance to your childhood memories?
5. What are the pros and cons of this change?
6. Does urbanization have anything to do with this change?
7. Do you support this change?
8. Do you know anything about climate change?

RESEARCH ANALYSIS AND DISCUSSION:

Bangladesh is a by born village based country. Rural population in Bangladesh was reported at 60.29 % in 2022, according to the World Bank (Trading economics, Bangladesh indicadores, 2023). In this study maximum respondents are rural people. Only 6.7% of them are from town. All are citizens of Bangladesh aged 40 or above. The educational qualification of 23.3% of the respondents is graduation or higher and the remaining 76% have the educational qualification of Secondary or bellow. 17% of them are completely illiterate. After showing the above two paintings to each of them, these 8 questions were asked –in an interview style. As a result of which, in the last 30 years, various information about the impacts and effects of climate change in Bangladesh has emerged.

Those who answered yes to question 1 are considered as appropriate respondents for this study and the rest of the questions were asked only to them. 100% of the responses to question 2 were summarized as - environmental change.

The answers to question no. 3 yielded various informations. 10% of people think that only humans are responsible for this change. 6.7% people think that this change is due to God's will. 3.3% of people do not know anything about the cause of this change and 80% of people claim that this change is due to climate change.

Different opinions were also received in response to question no. 4. According to 6.7% people, the 2nd image reminds them of their childhood because during that time, crop production was disrupted due to drought, undeveloped technology etc. resulting in food shortages. According to 6.7% people, both the images match with their childhood memories because during that time, summers were dry and in the monsoons nature used to be green and natural. 6.7% people did not answer this question because they do not remember much about their childhood.

In response to question no. 5, various good and bad aspects of this change in the environment emerged from the respondents. According to 66.6%, there is no good aspect of the change in the environment. 33.3% of respondents found both good and bad aspects behind the change. However, there was no respondent who found only positive aspects.

With the exception of 6.7% of respondents, it can be shown that 93.3% of those who responded to question number 6 indicated that there is a connection between urbanization and climate change.

53.3% of respondents to question 7 said that they oppose climate change. The remaining 46.7% claim they concur since further work is required. So there is no other option except to cut the tree. But it was observed that people with less education answered "yes" more frequently.

Do you have any knowledge of climate change? Was the eighth and final question on the poll. 43.3% of people are aware of it. The remainder, or 56.7%, are unaware of it.

The majority of respondents are not well-informed on climate change and its effects. Their knowledge of climate change and how it affects their life is insufficient. Theoretically, the respondents provide their opinions from positive and negative perspectives. Some respondents provide their answer on the basis of ongoing economic development, which is given below:

- Financially benefiting like cutting down trees and selling wood, creating factories creates employment for many people.
- Due to the construction of various infrastructure, the area is being modernized, and things like power plants are helping the internal development of this country by meeting the demand for electricity.
- Fuel demand is met from tree wood.

- Due to the development of science and technology, food production has increased, resulting in reduced food availability.
- Cities are developing from villages, and the education rate of children is increasing.

Most of the respondents think that climate change has negative impacts on their lives, as shown below:

- The environment is losing its balance as forests are being deforested.
- Various natural disasters are occurring.
- Fishermen are unable to catch fish because the reservoirs are drying up; farmers are unable to produce moderate crops due to a lack of water; their unemployment is increasing; and poverty is increasing. Increasing poverty is causing social degradation among people.
- Rainfall is occurring, and seasonal variation is being lost. Many regions experience unbearably cold winters and unbearably hot summers, which is increasing health risks.
- The amount of carbon dioxide in the environment is increasing.
- Sea levels are rising, making coastal areas vulnerable.
- Ecosystems are getting damaged.
- More people are getting sick, and many of them are dying from strokes because they can't handle the heat.

RECOMMENDATIONS:

Some urgent actions that Bangladesh needs to take to combat climate change. Implementing comprehensive climate change education programs in educational institutions to raise awareness, promoting sustainable practices and equipping people with the knowledge to tackle climate related challenges is the most important need now. Renewable energy sources like solar, wind, hydroelectric power should get more investment. It can reduce reliance on fossil fuels and for that in the future greenhouse effect will decrease. Implementing stricter laws and regulations to reduce air pollution and encourage more sustainable agricultural practices can help. Improving infrastructure and urban planning is also very important because it will help to mitigate the impact of extreme weather events such as floods or cyclones. Foster community participation through awareness campaigns, workshops to encourage people to adopt sustainable practices can be arranged. This could involve promoting tree planting initiatives and recycling programs. Preserving forests and wetlands can help to absorb carbon dioxide from the atmosphere which is needed to protect biodiversity. The government should invest in research and development to identify new solutions to reduce the effects of climate change in Bangladesh. However, an important roll can be

played by the visual artists through their artworks because any kind of visual art has the power to influence people very easily. And the artists can spread awareness among the general people by their artworks.

CONCLUSION:

The most vulnerable and underprivileged populations will be most affected by climate change. Bangladesh suffers annual losses from tropical cyclones of roughly \$1 billion and by 2050, 13 million people may migrate within their own country due to the climate, and a third of the agricultural GDP may disappear (World Bank, 2022). Impacts of climate change in Bangladesh and the people over last 30 years is huge. Involving local community with visual art in this study, it was very clear that visual arts have the power to convey emotions and experiences in a way that scientific reports or data may not be able to as the language of art is universal. Also visual arts could act as a powerful tool for advocacy and policy influence. By portraying the human and environmental impacts of climate change through artistic expressions, the study could foster empathy and understanding among viewers, encouraging them to connect with the issue on a more personal level. The study could bring attention to the specific climate change challenges faced by the respondents as very good response was received from them.

To reduce the negative roll of climate change in Bangladesh most importantly the people of this country should be educated about this issue otherwise they will not stop doing harmful things which can accelerate the rate of climate change effects. Government and the responsible people should work together in this matter. However, this type of study always helps in uncovering new information. And this information helps to understand what measures need to be taken.

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