

## Carbon Trading and its Impact in Bangladesh

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**Abstract:** With the start of industrial revolution in the middle of the 19<sup>th</sup> century, carbon dioxide emissions in our atmosphere have increased steadily and dramatically. It has a dramatic impact on our climate, both warming our climate and altering our weather with more droughts and more very extreme weather events. To control the carbon emission and environment pollution, carbon trading plays a very important role. Carbon emissions trading is a market-based approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants. This paper mainly depends on the secondary data. Different published reports of different journals mainly supported in providing data in this paper. This paper is completely a review paper. Carbon emissions trading have been steadily increasing in recent years. According to the World Bank's Carbon Finance Unit, 374 million metric tons of carbon dioxide equivalent (tCO<sub>2</sub>e) were exchanged through projects in 2005, a 240% increase relative to 2004 (110 mtCO<sub>2</sub>e) which was itself a 41% increase relative to 2003 (78 mt CO<sub>2</sub>e). Carbon trading helps to reduce the emission of carbon and manage energy cost. In December 1997, Bangladesh along with 160 other countries, completed negotiations at the third session of Conference of Parties (COP3) at Kyoto Japan to finalize a protocol subsequently known as the Kyoto Protocol. The carbon trading, which has taken for reducing carbon emission is not better for Bangladesh as it has emitted only 0.3% and its yearly emission is 46527 thousand per metric ton. Only the developed countries are benefited and they have not reduced their emission to keep their living standard high and to keep the faster growth of industrialization in a stable condition.

**Key words:** CO<sub>2</sub> · COP3 · Kyoto Protocol · Bangladesh

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### INTRODUCTION

Climate change is real, we are all responsible for it and we all must be part of the solution of it. Since the Industrial Revolution started in the middle of the 19<sup>th</sup> century, carbon dioxide emissions in our atmosphere have increased steadily and dramatically from the burning of fossil fuels, namely coal, oil and gas and to a lesser degree from methane and industrial gases. This increase in CO<sub>2</sub> from roughly 280 parts per million (ppm) prior to the Industrial Revolution to about 392 ppm today is having a dramatic impact on our climate, both warming our climate

and altering our weather with more droughts and more very extreme weather events. Our sea levels are rising and entire countries are at risk of disappearing. If the Greenland glaciers fail, global sea levels could rise by 20 feet, swamping low level areas around the world, including Florida and Manhattan, causing global catastrophe. The cause of climate change is manmade. And we must solve the problem by reducing our emissions by 50-85% globally by midcentury. Breaking down the problem, this does not need to be an insurmountable task. Reducing our emissions just 2% per year would do it. Carbonfund.org helps individuals and

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businesses understand climate change and develop practical and cost-effective solutions to slow, stop and reduce our climate crisis. They have introduced a program to reduce carbon emission that is called carbon trading. According to the economists is cost effective also. Considering the above facts, the present study was undertaken to know about the carbon trading, to be acquainted with the effect of carbon trading and to know the present scenario of carbon trading and its impact in Bangladesh.

## MATERIALS AND METHODS

Scientific approach requires a close understanding of the subject matter. This paper mainly depends on the secondary data. Different published reports of different journals mainly supported in providing data in this paper. This paper is completely a review paper. Therefore no specific method has been followed in preparing this paper. It has been prepared by Internet search, comprehensive studies of various articles published in different journals, books and proceedings. Valuable information has been collected through personal contact with respective resource personnel to enrich the paper. It compiled the all related information to prepare this paper.

## RESULTS AND DISCUSSION

**Basic Concept of Carbon Emission Trading:** Carbon emissions trading is a market-based approach used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants.

A central authority (usually a governmental body) sets a limit or *cap* on the amount of a pollutant that may be emitted. The limit or cap is allocated or sold to firms in the form of emissions permits which represent the right to emit or discharge a specific volume of the specified pollutant. Firms are required to hold a number of permits (or allowances or *carbon credits*) equivalent to their emissions. The total number of permits cannot exceed the cap, limiting total emissions to that level. Firms that need to increase their volume of emissions must buy permits from those who require fewer permits.

The transfer of permits is referred to as a trade. In effect, the buyer is paying a charge for polluting, while the seller is being rewarded for having reduced emissions. Thus, in theory, those who can reduce emissions most cheaply will do so, achieving the pollution reduction at the lowest cost to society.

There are active trading programs in several air pollutants. For greenhouse gases the largest is the European Union Emission Trading Scheme, whose purpose is to avoid dangerous climate change. In the United States there is a national market to reduce acid rain and several regional markets in nitrogen oxides. Markets for other pollutants tend to be smaller and more localized.

**Kyoto Protocol and Carbon Trade:** As the Intergovernmental Panel on Climate Change (IPCC) reports came in over the years, they shed abundant light on the true state of global warming and they gave support to the environmental effort to address this unprecedented problem. However, the same discussions that started decades back had never ceased and the crusade for a tangible solution to global climate change had gone on all the while. In 1997 the Kyoto Protocol was adopted. The Kyoto Protocol is a 1997 international treaty that came into force in 2005. In the treaty, most developed nations agreed to legally binding targets for their emissions of the six major greenhouse gases. Emission quotas (known as "Assigned amounts") were agreed by each participating country, with the intention of reducing the overall emissions by 5.2% from their 1990 levels by the end of 2012. The United States is the only industrialized nation that has not ratified the treaty and is therefore not bound by it. The IPCC has projected that the financial effect of compliance through trading within the Kyoto commitment period will be limited at between 0.1-1.1 percent of GDP among trading countries.

The Protocol defines several mechanisms ("flexible mechanisms") that are designed to allow countries to meet their emission reduction commitments (caps) with reduced economic impact [1].

Under Article 3.3 of the Kyoto Protocol, some parties may use GHG removals, from afforestation and reforestation (forest sinks) and deforestation (sources) since 1990, to meet their emission reduction commitments.

Those parties may also use International Emissions Trading (IET). Under the treaty, for the 5-year compliance period from 2008 until 2012, nations that emit less than their quota will be able to sell assigned amount units to nations that exceed their quotas. It is also possible for these countries to sponsor carbon projects that reduce greenhouse gas emissions in other countries. The project-based Kyoto Mechanisms are the Clean Development Mechanism (CDM) and Joint Implementation (JI).

**Economics of Carbon Trading:** Emissions trading works by setting a quantitative limit on the emissions produced by emitters. The economic basis for emissions trading is linked to the concept of property rights.

**Cost and Valuation of Carbon Trade:** The economic problem with climate change is that the emitters of greenhouse gases (GHGs) do not face the full cost implications of their actions. There are costs that emitters do face, e.g., the costs of the fuel being used, but there are other costs that are not necessarily included in the price of a good or service. These other costs are called external costs. They are "external" because they are costs that the emitter does not face. External costs may affect the welfare of others. In the case of climate change, GHG emissions affect the welfare of people living in the future, as well as affecting the natural environment. These external costs can be estimated and converted in a common (monetary) unit. The argument for doing this is that these external costs can then be added to the private costs that the emitter faces. In doing this, the emitter faces the full (social) costs of their actions.

**Market Trend of Carbon Trade:** Carbon emissions trading have been steadily increasing in recent years. According to the World Bank's Carbon Finance Unit, 374 million metric tons of carbon dioxide equivalent (tCO<sub>2</sub>e) were exchanged through projects in 2005, a 240% increase relative to 2004 (110 mt CO<sub>2</sub>e) which was itself a 41% increase relative to 2003 (78 mt CO<sub>2</sub>e). The increasing costs of permits have had the effect of increasing costs of carbon emitting fuels and activities. Based on a survey of 12 European countries, it was concluded that an increase in carbon and fuel prices of approximately ten percent would result in a short-run increase in electrical power prices of roughly eight percent. This would suggest that a lowering cap on carbon emissions will likely lead to an increase in the costs of alternative power sources. Whereas a sudden lowering of a carbon emission cap may prove detrimental to economies, a gradual lowering of the cap may risk future environmental damage via global warming. In 2010 Chicago Climate Exchange (CCX) has ceased its trading of carbon emissions.

**Business Reaction of Carbon Trade:** With the creation of a market for mandatory trading of carbon dioxide emissions within the Kyoto Protocol, the London financial marketplace has established itself as the center of the carbon finance market and is expected to have grown into a market valued at \$60 billion in 2007. The voluntary offset market, by comparison, is projected to grow to about \$4bn by 2010. Twenty three multinational corporations came together in the G8 Climate Change Roundtable, a business group formed at the January 2005 World Economic Forum. The group included Ford, Toyota, British Airways, BP

and Unilever. On 9 June 2005, the Group published a statement stating that there was a need to act on climate change and stressing the importance of market-based solutions. It called on governments to establish "clear, transparent and consistent price signals" through "creation of a long-term policy framework" that would include all major producers of greenhouse gases. By December 2007, this had grown to encompass 150 global businesses. Business in the UK has come out strongly in support of emissions trading as a key tool to mitigate climate change, supported by Green NGOs.

**Effect of Carbon Trade:** The gradual warming of Earth due to growing concentrations of greenhouse gases like carbon dioxide in the atmosphere could bring about dramatic ecological and environmental changes. Floods in some areas, desertification in others and a loss of coastal land area due to sea level rise are just a few of the possible consequences of a warmer Earth. To head off possible disaster, politicians the world over have contemplated various programs, including a carbon trading system, aimed at reducing carbon output from factories, power utilities and the transportation sector. However it has both positive and negative effect:

**Reduction Of Carbon Emission:** The goal of carbon trading systems is to first cap allowed emissions at a certain level determined by various government agencies and study groups. These allowances can either be given for free or auctioned to heavily polluting industries. In order to comply with the cap, big emitters must either upgrade systems and equipment to operate more cleanly, or purchase carbon credits on an open exchange to cover the variance. The system is meant to create a disincentive to pollute by making it more expensive than cleaning up the operation. Companies that move early on cleanup efforts will have excess carbon allowances, which they can then sell to dirtier companies on the open market. The Waxman-Markey bill, passed by the U.S. House of Representatives in June 2009, relies on this system to reduce carbon emissions by 17 percent in 2020 and by 83 percent in 2050. The bill is formally known as the American Clean Energy and Security Act.

**Marginal Increase in Energy Cost :** The United States' Republican Party issued dire warnings prior to the passage of Waxman-Markey that the bill would raise energy costs for families by \$3,100 per year, a claim rated "pants on fire" by Politick, a nonpartisan fact-checking organization. The basis for the ratings was that the author

of the 2007 MIT study on which the claim relied disowned that figure and claimed Republicans had misinterpreted his initial findings. The U.S. Environmental Protection Agency concluded that consumers would spend an average of \$80 to \$111 per year in added costs if the bill passed, most of which would be incurred later in the life of the program as free carbon allowances were phased out. The Congressional Budget Office, the nonpartisan department tasked with estimating the cost of legislation, put the number at \$175 per household on average, noting that less affluent consumers would actually save money while the wealthy would bear an additional \$235 to \$340 annually.

**Fraud:** Scandal rocked the European Union in 2009 when it was discovered that perhaps 90 percent of the carbon permit trading was fraudulent, costing EU governments more than \$7 in tax revenue. Carbon credits sold on the market are considered taxable services and subject to the value-added tax, or VAT. The fraudsters perpetrated a scheme that allowed them to purchase and transfer carbon credits to another country, bypassing the VAT, then shuttling those credits back to the original market and selling them through unregulated brokers, according to Europol, the European Union police agency. They collected VAT on the sale, then simply disappeared with the money. This was, according to Europol, a glitch in the function of the carbon market since the time of its beginning until the fraud was discovered.

**Incentives and Allocation:** Emissions trading give polluters an incentive to reduce their emissions. However, there are possible perverse incentives that can exist in emissions trading. Allocating permits on the basis of past emissions ("grandfathering") can result in firms having an incentive to maintain emissions. For example, a firm that reduced its emissions would receive fewer permits in the future. This problem can also be criticized on ethical grounds, since the polluter is being paid to reduce emissions. On the other hand, a permit system where permits are auctioned rather than given away provides the government with revenues. These revenues might be used to improve the efficiency of overall climate policy, e.g., by funding reductions in distortionary taxes.

**Global Carbon Emission:** As is well-known by now, the concentration of so-called greenhouse gases (GHGs) in the earth's atmosphere have increased markedly as a result of human activities since 1750. It is possible to distinguish between four GHGs: (i) carbon dioxide (CO<sub>2</sub>),

(ii) methane (CH<sub>4</sub>), (iii) nitrous oxide (N<sub>2</sub>O) and (iv) F-gases, which during 1970-2004 amounted, respectively, to 76.7 percent, 14.3 percent, 7.9 percent and 1.1 percent.<sup>1</sup> While the concentration of all four types of GHGs has increased in the atmosphere, the focus has been on CO<sub>2</sub>, as it constitutes due to its large share the most important GHG. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change [1] states that the concentration of CO<sub>2</sub>, increased from a pre-industrial value of about 280 parts per million (ppm) to 379 ppm in 2005. This implies an increase of 35 percent in the concentration level. While this increase in the concentration level may not seem to be very large, fact is that relatively small changes in the concentration level of GHGs have significant impacts on the earth's temperature. Looking at the level of emissions instead of concentration levels, global CO<sub>2</sub> emissions nearly doubled in the last 40 years. This is shown in Figure 1 for selected years from 1970 to 2004.

Bangladesh, which is one of the world's poorest countries, emitted about one tenth of the world's CO<sub>2</sub> emissions in 2006, despite the fact that its 160 million people represent about 2.4 percent of the world's population.<sup>2</sup> The reason for Bangladesh's low CO<sub>2</sub> emissions is due to Bangladesh's low energy consumption, amounting in per capita terms to only about one twentieth of the world average per capita electricity consumption, which is due to Bangladesh's low income per capita level of \$470.<sup>3</sup> Though there are many studies projecting global, regional and country-specific CO<sub>2</sub> emissions but there is only one study Azad *et al.* [2] that has provided some simple projections for Bangladesh's future CO<sub>2</sub> emissions.

Azad *et al.* [2] analyzed Bangladesh's energy consumption and estimated its CO<sub>2</sub> emission from combustion of fossil fuel (coal, gas and petroleum products) for the period of 1977 to 1995. They showed that the consumption of fossil fuels in Bangladesh has been growing by more than 5 percent per year during their observation period. The proportion of natural gas in total energy consumption has been increasing, while that of petroleum products and coal has been decreasing. They estimated that the total CO<sub>2</sub> release from all primary fossil fuels used in Bangladesh amounted to 5.07 million tons (Mt) in 1977 and to 14.4 Mt in 1995. They then projected Bangladesh's CO<sub>2</sub> emission based on the 1977-1995 trends, which resulted in a projection of 293 Mt of CO<sub>2</sub> emissions in 2070. While no adjustments have been made for increasing energy efficiency, the projections have assumed that Bangladesh's future electricity

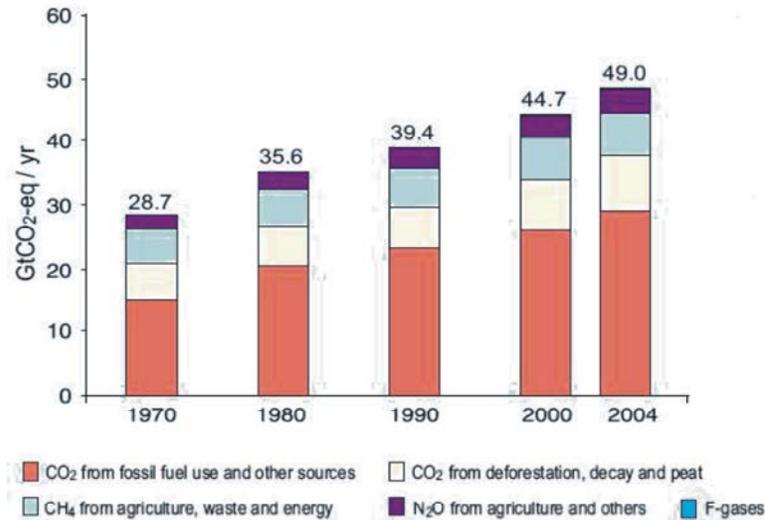


Fig. 1: Annual Global Anthropogenic GHG Emissions, 1970-2004  
Source: Intergovernmental Panel on Climate Change (IPCC, 2007) [1]

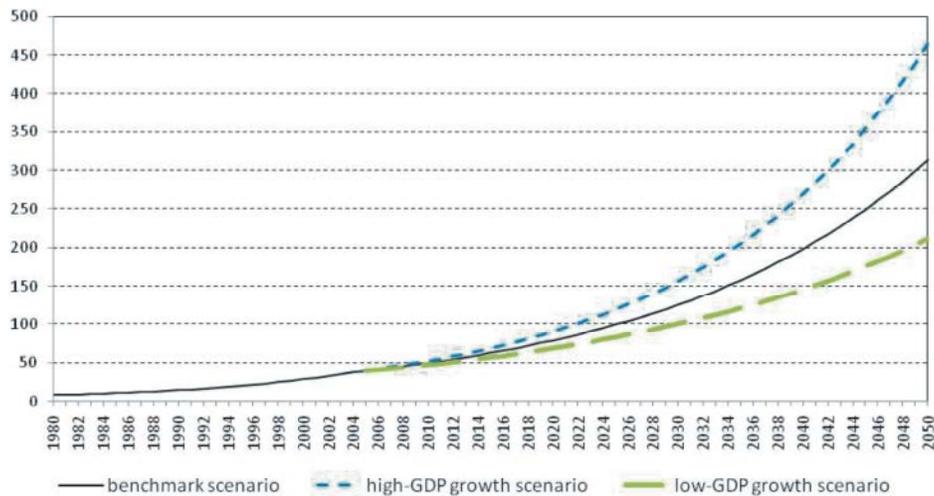


Fig. 2: Past and future trend of carbon emission  
Source: World Bank, 2010 [3]

generation will increasingly be based on natural gas and that the use of petroleum and coal would continue to decrease gradually

**Situation of Carbon Emission in Bangladesh:** Figure 2 provides Bangladesh’s CO<sub>2</sub> emissions for the benchmark, high-growth and low-growth scenarios and the assumptions that there will be no improvements (and no deteriorations) in Bangladesh’s energy efficiency/intensity. As expected, the projections show sharp increases in CO<sub>2</sub> emissions due to a sharply increasing energy demand by the growing and more affluent population.

To give some perspective on these projections:

- The projected 2050 level of the benchmark scenario (628 Mt of CO<sub>2</sub> emissions) is about one tenth of what the United States is currently emitting with an only slightly higher population than what Bangladesh is projected to have in 2050;22
- The projected 2050 level of the high-growth scenario (913 Mt of CO<sub>2</sub> emissions) is about 16 percent of what the United States is currently emitting.
- The projected 2050 level of the low growth scenario (431 Mt of CO<sub>2</sub> emissions) is less than 5 percent of what the United States is currently emitting.

All of our projections imply far higher emission levels than what Azad *et al.* [2] projected based on the 1977-1995 emission trends (293 Mt of CO<sub>2</sub> emissions in 2070). This is mostly due to our far higher assumptions for Bangladesh's GDP growth. The average 1977-1995 GDP growth rate (in constant US\$) was only 3.9 percent, hence about 3 percent below our benchmark scenario.

From the figure we can see that, the trend of carbon emission is gradually increasing. It is a danger sign for us as it is a major reason for climate change. But the trend is not much more dangerous as it is very small portion of total world's emission. For the rapid climate change developed countries are more responsible than small countries like Bangladesh. But they have not reduces their emission yet. They are not agreeing to reduce their emission as it will hamper their industrialization as well as development and will reduce their standard of living. They have not signed in the last Kyoto Protocol also where Bangladesh has played more important role and it shows excellent performance to protect environment as well as our world.

**Carbon Emission from Different Sources**

**Emission from Vehicles:** One of the major sources of air pollution in urban areas of Bangladesh is due to the unburned fuel from two stroke engine vehicles. Dhaka has been rated as one of the most polluted cities of the world. Bangladesh Atomic Energy Commission reports that automobiles in Dhaka emit 100 kg lead, 3.5 tons SPM, 1.5 tons SO<sub>2</sub>, 14 tons HC and 60 tons CO in every day. The contribution of air pollution by different types of vehicle and the amount of pollutants emitted from vehicles in Dhaka city is as follows:

Table 1: Contribution of Air Pollution by Vehicle Type

Type of Vehicle	CO (%)	HC (%)	NOx (%)	PM (%)	Annual Growth
Truk	13.4	8.6	59.7	47.5	7.8
Bus	10.3	9.7	18.5	29.4	2.5
Mini bus	7.3	3.9	6.5	19.1	6.8
Utility	6.3	4.4	2.8	0.7	10.2
Car	38.2	18.2	6.5	1.2	9.4
Three wheeler	10.6	26.9	6.0	1.2	31.0
Motor cycle	14.0	28.3	0.3	1.0	8.1

Source: Country Profile on Environment of Bangladesh by Japan International Cooperation Agency in the Year 1999 [4].

**Total CO<sub>2</sub> Emission from Brick Kilns:** Total annual amount of CO<sub>2</sub> emission for six divisions are presented in this table. It has been found that total annual amount of CO<sub>2</sub> emission for 4 types brick kilns from Dhaka, Chittagong, Rajshahi, Khulana, Sylhet and Barisal are 8.862 Mt yr<sup>-1</sup>, 10.048 Mt yr<sup>-1</sup>, 12.783 Mt yr<sup>-1</sup>, 15.250 Mtyr<sup>-1</sup>,

1, in the year of 2002, 2005, 2007 and 2010, respectively. It shows that, the increasing rate of CO<sub>2</sub> emission in all of those years simultaneously around Bangladesh. The above result concludes that CO<sub>2</sub> emission rate are increasing day by day.

Table 2: Comparison of CO<sub>2</sub> emission from brick kilns in 2002, 2005, 2007 and 2010

Location	Years			
	2002	2005	2007	2010
Dhaka	2.846	3.021	3.65	4.756
Chittagonj	2.046	2.302	2.925	3.925
Rajshahi	1.68	1.97	2.66	2.721
Khulna	1.114	1.175	1.852	1.937
Sylet	0.55	0.97	0.983	1.072
Barisal	0.59	0.61	0.713	0.812
Total	8.826	10.048	12.783	15.25

Source: Imran *et al.* (2014) [5]

**Death of People Caused by Pollution:** Many people died every year in many diseases due to environmental pollution. The death rate in the year 1996 mainly due to environmental pollution is as follows.

Table 3: The death rate in the year 1996 due to environmental pollution

Causes of Death	National Level	Dhaka City
Death: All Ages (%)		
Cardiovascular	7.87	17.5
Asthma	5.2	4.3
Diarrhea	1.66	7.8
Cancer	4.05	5.3
Dysentery	4.05	5.5
Viral Hepatitis	2.14	3.4
Death: Less than One Year Infant (%)		
Anemia	4.77	6.5
Breathing problem	1.87	2.8
Diarrhea	18.96	17.5
Cancer	4.05	5.0
Dysentery	1.66	3.9
Viral Hepatitis	2.14	3.4

Source: BBS, 2001[6]

**Carbon Trading in Bangladesh:** The carbon trading is a way to reduce carbon emission. In December 1997, Bangladesh along with 160 other countries, completed negotiations at the third session of Conference of Parties (COP3) at Kyoto Japan to finalize a protocol subsequently known as the Kyoto Protocol. This protocol includes reduction targets and time table for six greenhouse gases. The gases are: carbon dioxide, methane, nitrous oxide, hydrofluro carbons, perfluoro carbons and sulphur hexafluoride. To reduce the emission the carbon trading has introduced. But it is not much more beneficial for Bangladesh as its emission is very low but the impact of climate change is very alarming.

**Impact of Carbon Trade in Bangladesh:** Bangladesh is a developing country. It is a small country also. Its South portion is surrounded by Bay of Bangle. It possesses thousands of rivers. So it is called land of river. The climate is changing day by day. The reasons for changing climate like, deforestation, emission of carbon, increasing pollution etc. has also increased. The carbon trading, which has taken for reducing carbon emission is not better for Bangladesh as it has emitted only 0.3% and its yearly emission is 46527 thousand per metric ton. The impact that can be seen in Bangladesh may be:

- No gain from carbon trading, as its emission contributes only 16% of total world's carbon emission.
- Its industrial development can be hampered.
- It will not earn any revenue, developed countries become more benefited.

Bangladesh can be benefited in one way that is, for this trading many developed countries may invest in Bangladesh in:

- Afforestation
- Using environment friendly technologies.
- Using better equipment to deplete any resource.

**Criticism of Carbon Trading:** One criticism of carbon trading is that it is a form of colonialism, where rich countries maintain their levels of consumption while getting credit for carbon savings in inefficient industrial project. Nations that have fewer financial resources may find that they cannot afford the permits necessary for developing an industrial infrastructure, thus inhibiting these countries economic development. Other criticisms include the questionable level of sustainable development promoted by the Kyoto Protocol's Clean Development Mechanism.

Another criticism is of non-existent emission reductions produced in the Kyoto Protocol due to the surplus ("hot air") of allowances that some countries have. For example, Russia has a surplus of allowances due to its economic collapse following the end of the Soviet Union. Other countries could buy these allowances from Russia, but this would not reduce emissions. Rather, it would simply be a redistribution of emissions allowances. In practice, Kyoto Parties have as yet chosen not to buy these surplus allowances.

In China some companies started artificial production of greenhouse gases with sole purpose of their recycling and gaining carbon credits. Similar practices happened in India. Earned credit was then sold to companies in US and Europe.

Critics of carbon trading, such as Carbon Trade Watch, argue that it places disproportionate emphasis on individual lifestyles and carbon footprints, distracting attention from the wider, systemic changes and collective political action that needs to be taken to tackle climate change.

**Recommendations:** From my point of view Bangladesh can follow the followings:

- Bangladesh can follow Kyoto' flexible mechanism like Clean Development Mechanism(CDM)
- It can increase the total forest lands which can automatically absorbed carbon dioxide.
- It can use environment friendly techniques in the industries.
- It can recycle the waste than dispose in environment.
- It can stop using tree as fuel by using bio gas.
- It can use Joint Initiative (JI) project.

## CONCLUSION

Carbon trading is very burning issues in the world. It is very profitable for developed countries. It can help to reduce carbon emission in the world. But in practice it has collapsed. As the more victim countries of the climate change are not benefited by it. They have not earned much benefit from it. Only the developed countries are benefited and they have not reduced their emission to keep their living standard high and to keep the faster growth of industrialization in a stable condition.

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