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Negative impacts of climate change on Vietnamese economy and agriculture

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Abstract: Climate change of the Earth is a change of the climate system including the atmosphere, the atmosphere, the biosphere, the lithosphere, and the current and future atmosphere by natural and man-made causes in a single period measured by decades or millions of years. The change may be a change in average weather or a change in the distribution of weather events around an average. Climate change is limited to a certain region or may occur across the globe. In recent years, especially in the context of environmental policy, climate change often refers to the current climate change, collectively referred to as global warming. The main cause of global climate change is the increase in activities that generate greenhouse gas emissions, overexploitation activities of sinks and greenhouse gas tanks such as biomass, forests, other marine, coastal and land ecosystems. Factors that can cause climate change to occur are changes in atmospheric radiation, including processes such as solar radiation changes, Earth's orbit deviations, mountain tectonic processes, and ants. creating continental drift and changes in greenhouse gas concentrations. Many of the different environmental responses on climate change can enhance or reduce initial changes. Some components of the climate system, such as oceans and icecaps, respond slowly to changes in solar radiation because of their mass. Therefore, the climate system may take centuries or longer to fully respond to external changes.
Keywords: Climate change, impact, agriculture, forestry

I. INTRODUCTION

Under the impact of climate change, only in the last 10 years, Vietnam has suffered natural disasters such as storms, floods, landslides, floods, droughts, saline intrusion ... have caused significant damage, killing and missing more than 9,500 people, property damage is estimated at 1.5% of GDP per year [1].The weather in Vietnam in recent years has been increasingly abnormal. Droughts, floods, landslides, storms and storms have complicated changes, seriously affecting the economy heavily dependent on our country's agricultural production. In particular, Vietnam is considered as one of the countries most seriously affected by climate change (CC) due to its long coastline. If the sea level rises by 1 meter, 40% of the Mekong Delta area, 10% of the Red River Delta area will be flooded, directly affecting 20-30 million people. Looking back at 2016 and early 2017, we will see the unusuality of the increasingly severe weather, occurring throughout the country. Specifically, in the 2016 dry season, many places in the South and Central regions were drought due to the lack of rainfall of 30-40%, the flow of water in small rivers led to saline intrusion that came earlier than 1 month in the regions estuaries of the Central region and especially in the Mekong Delta, many places where salty water has reached 80-100 km or more, farmers suffer because of saline drought, lack of fresh water for living and production very seriously. In the Central region, the floods came late but was overwhelming, floods lasted for many days in the last months of 2016, causing great damage to property and people. In the North, the first cold spell came earlier than usual, but people did not feel the cold air in the winter, because alternating cold spells, the days were quite high, causing hot weather. In the 2016-2017 dry season, the South and Ho Chi Minh City also experienced a number of unseasonable rainfall with large amounts, the number of rainy days and the total number of rainy months in the dry season also exceeded the average of many years in the same period. The unseasonal rains cause damage to winter-spring crop production as well as fruit trees. According to meteorological forecasters, there are many causes, most of which due to climate change have changed some natural laws. Meteorological expert said that the weather is now neutral and tends to move to El Nino (often associated with drought), so the rainy season in the South has come earlier than the average for many years. . According to the World Meteorological Organization (WMO), 2016 broke a record of 2015, becoming the hottest year in the history of human existence; The concentration of CO2 in the atmosphere continues to rise, exceeding the danger threshold. Climate change is forecast to have many complicated developments in the coming years, continuing to create many challenges on socio-economic, security and environment. The Asia-Pacific region is assessed as one of the most vulnerable areas, most strongly affected by climate change. Many types of natural disasters, climatic phenomena and extreme weather occur with increasing scale, frequency and severity. Data in 2015 showed that, out of 90 global storms and 344 natural disasters, nearly 50% of them occurred in countries and territories in the Asia-Pacific region. In particular, Vietnam is considered as one of the countries heavily affected by climate change due to its long coastline. According to Vietnam's climate change

scenarios, by the end of the 21st century, there will be about 40% of the Mekong Delta area, 11% of the Red River Delta area and 3% of the local areas. Other coastal areas will be flooded. At that time, about 10-12% of Vietnam's population would be directly affected, with a loss of about 10% of GDP. Especially, HCMC will be flooded over 20% of the city area. At the IPU Asia-Pacific Symposium on "Climate Change Adaptation - Legislative Action to Implement Sustainable Development Goals" held recently in HCMC, Recipes City Party Committee Secretary Nguyen ThienNhan cited the Organization for Economic Cooperation and Development (OECD) and said that Ho Chi Minh City is one of the 10 cities in the world most threatened by climate change. The strongest impacts on the city are temperature, rainfall and storm surge. Inundation in urban areas, saline intrusion is getting deeper into upstream, sea level rise affects production activities, clean water supply, infrastructure and people's life in the city. On a square kilometer, Ho Chi Minh City has the population, domestic waste, water demand and traffic density is 17 times the national average.

Fig .1. Effects of climate change the human life

II. CLIMATE CHANGE IN VIETNAM

Climate change, which is manifested by global warming and rising sea levels, has caused extreme weather events today. This is one of the biggest challenges facing humanity in the 21st century because climate change is directly affecting ecosystems, environmental resources and human life. Sea level rise is due to rising temperatures on the earth. Increasing temperatures cause the ice sheets to melt faster, causing the sea and ocean levels to increase worldwide. Located between Australia and the Hawaiian Islands in the Pacific, most of the territory of Tuvalu (including 9 atolls) is less than 0.9 m above sea level. The highest point of the country is only 4.5 m above sea level. As a result, Tuvalu faces the risk of being submerged by seawater due to global warming.

We easily see the area of glaciers all over the world is gradually shrinking. The tundra (the highlands where trees could not grow and grow) was once covered by permafrost, now under the influence of high temperatures, melting ice and the life of these plants. This land has also appeared.

These studies show that the relationship between the increase in the surface temperature of the earth and the increase in concentration of some species of greenhouse gases in the atmosphere such as CO2, CH4. The atmosphere currently has about 750 billion tons of carbon, the ocean contains 50 times more carbon, the Earth's biosphere is about 3 times more and the continent is about 5 times more than in the atmosphere.Before the pre-industrial period (1750), the atmospheric CO2 content, which was very stable at about 280ppm (parts per million), increased by about 370 ppm in 2000. In Vietnam, industry has not developed so greenhouse gas emissions are mainly in agriculture - forestry and energy use.

Global climate change occurs due to the impact of greenhouse gases through human activities, leading to global warming and many other consequences. According to the IPCC report, the earth's temperature has risen an average of 0.60oC over the past century and is expected to increase by 1.4 to 6.4oC by 2010, precipitation increases unevenly, and many areas with excessive rainfall but many other regions became drier. According to the latest calculations, the sea level may rise from 0.7 to 1.4 m in the next 100 years. El-Nino

phenomenon works stronger both in intensity and frequency. The area of the Northern Hemisphere has decreased by about 10-15% since the 1950s, and may not be as much as 2030. Arctic ice and high mountain peaks will also significantly melt in the coming decades.

Ecosystems on Earth together with all species are a source of economic, environmental and cultural values of humankind. Climate change will shift climatic regions. Species will have to adapt to new climatic conditions.First of all, due to global warming, the thermal boundaries of the continental and freshwater ecosystems will shift towards the poles, while also moving higher, so that tropical plants and animals can growing in higher macroscopy or higher mountain and plateau regions than before. In contrast, cold-loving species have shrunk, or had to migrate elsewhere Some species are more adaptive to climate change while others are not able to adapt and will gradually degrade. Climate change will make the climate more severe causing droughts, floods, and forest fires ... will put the species at risk of falling even more. According to the World Bank's assessment of important natural habitats in Vietnam based on scenarios of sea level rise, every 1 meter of sea level rise can affect 27% of natural habitats, of which 33 % in protected areas, 23% of areas with key biodiversity. These potential impacts are increasing from 1/4 to 1/3 of all key natural habitat areas in Vietnam. These areas are largely protected areas and currently proposed conservation areas of Vietnam, often focusing on islands and coastal areas. It is clear that Vietnam's biodiversity is facing a crisis when sea levels rise. In addition to the aforementioned negative impacts, climate change - rising sea levels will engulf and destroy tourism infrastructure and resources, thereby reducing the number of visitors and directly affecting the livelihoods of millions. people, most of whom are poor.

Agriculture is subject to the direct impact of the climate, the most important of which is solar radiation. Through photosynthesis, the yield of a plant is a function that is homogenous to solar radiation. Global warming is leading to changes in crop structure such as shortening the cold season, prolonging or shortening the rainy season. All these factors will affect seasonality, pests, productivity - output. In general, agriculture is the industry most affected by climate change. Increased temperatures can lead to: Some crops, especially subtropical plants, are likely to disappear, crop and crop structure, livestock in some areas may be changed, decreased grain production in the tropics and subtropics, especially crops or sea level rise, increases saline intrusion affecting crop yields. Climate change with increasing temperature, changes in rainfall will affect forest vegetation in many different directions. High temperatures combined with abundant light will promote photosynthesis leading to enhanced assimilation of greenery. In particular, the increase in CO2 content will contribute to the development of forest ecosystems, but due to increased evaporation, the soil moisture content will decrease, resulting in a decrease in the vitality growth index of forest trees... The danger of genocide of animals and plants increases, some important plants such as Frankincense, Eucalyptus, Redwood, Flower Slices, Mahogany, etc. will probably be depleted. In addition, increased temperatures and drought levels will increase the risk of wildfires, pests and diseases, and diseases that destroy crops.

The salt water intrusion deep into the continent, causing loss of appropriate habitat of some freshwater aquatic species. This narrows the area of mangroves affecting the ecosystems of some brackish and saltwater aquatic species. The ability of the seaweed ecosystem to synthesize organic matter decreases leading to a decrease in the supply of photosynthesis products and nutrients for benthic organisms. As a result, the habitat quality of many aquatic species deteriorates.Increased water temperature causes a pronounced thermal stratification in standing water bodies, affecting biological behavior of the organism. Due to rising temperatures, some species move elsewhere or deeper. In addition, the intensity of heavy rainfall, salt concentration decreases by 10 to 20% over a long period of time, causing brackish and coastal water creatures, especially the 2-piece shell crustal mass to die due to unbearable with varying salt concentrations. Sea level rise makes the physical, chemical and aquatic regimes worse. As a result, the existing biomes have changed their structure and composition, the additional reserves have been seriously reduced.Sea level rise also affects directly to clean water and environmental sanitation. Due to long-term inundation, fertilizers, pesticides, latrines from toilets, animal sheds, and other wastes ... were washed away, into ponds, lakes and rivers floating everywhere, disease outbreaks are difficult to control and people's health will be seriously threatened. Concentrated clean water supply works have been damaged or due to polluted water sources, causing difficulties for water treatment and supplying clean water to people.Industries, especially coastal industrial zones, will be severely affected by climate change. First of all, sea level rise of about 1m by the end of the 21st century will cause most of the industrial parks to be submerged, the lowest is over 10% of the area, the highest is about 67% of the area. Sources of raw materials for industry, especially for foodstuff, textile and garment processing industries, will be significantly reduced because they are not supplied from raw material areas in the Me Kong delta was the most heavily flooded in Vietnam. Thisfurther pressures the restructuring of industries in terms of industry type, percentage of processing industry and high technology. In 24 coastal provinces and cities, there are 266 big and small seaports; is the country with many potential oil and gas in the region. Rising sea levels along with heavy rain and storms will threaten to destroy important infrastructures, flood the coastal railways, airports, destroy

bridges and pipelines and many other works connect other transport infrastructure.

Next, rising temperatures increase energy consumption in industries: increasing ventilation costs, cooling mining pits and reducing the efficiency and output of power plants. Increasing electricity consumption for domestic use and cooling costs in commercial industries also increase significantly as temperatures tend to increase.

A barren ice atop Klimanjaro in Tanzania. 80% of the ice area atop Kilimanjaro has disappeared over the last 50 years. The impact of climate change on Tanzania is happening at an unprecedented speed in history.

In the past 50 years, the frequency of heat waves has increased by 2 to 4 times. Most likely in the next 40 years, the number of heat waves will increase 100 times. According to experts, the heat will increase the number of wildfires, diseases, and the average temperature on the planet in the future will increase as well.

Statistics show that in the last 30 years, strong storms level 4 and 5 have doubled. Warm waters have strengthened the storms. It is the high heat levels in the ocean and in the atmosphere that pushes the storm's pace to frightening levels.

When some parts of the world are suffering from inundation due to sea level rise and storm surges, in many other places drought is raging. Experts estimate drought will increase by at least 66% due to warmer climates.

Frequent drought will narrow the supply of water, reduce the quality of agricultural products, making global food supplies become precarious. Currently India, Pakistan and sub-Saharan Africa are suffering from severe droughts. Scientists forecast rainfall in these areas will continue to decline in the coming decades. The Intergovernmental Panel on Climate Change in Africa says that by 2020, there will be 75-250 million Africans without water, and the continent's agricultural output will also be reduced by 50%.

Increasing temperatures combined with floods and droughts are becoming a threat to global population health. Because this is an ideal habitat for mosquitoes, parasites, mice and many other disease-carrying organisms to thrive.

Floods and losses in agriculture caused billions of dollars in losses. In addition, governments also need large amounts of money to handle and control the spread of disease. In 2005, a historic storm hit Louisiana, reducing residents' income by 15% in the months following the storm, and property damage was estimated at $ 135 billion. While people have to cope with rising food and fuel prices, governments are also suffering from declining revenues from tourism and industrial profits. In contrast, the demand for energy, food, clean water, and cleanup costs after disasters has always increased, accompanied by border instability. According to a prediction by the Global Development and Environment Research Institute at Tufts University, the US, the cost of the fight against climate change by 2100 will reach 20 trillion USD.

Increasing temperatures have pushed many species to the brink of population decline or extinction. If the average temperature increases from 1.1ºC - 6.4ºC, 30% of current flora and fauna species will be in danger of extinction by 2050. The cause of the extinction is due to the habitat of the animals. vegetation is shrinking, desertification, deforestation and water in the oceans are getting warmer, while many species are unable to adapt to these changes in time.

III. SOLUTION TO PREVENT THE IMPACT OF CLIMATE CHANGE

Climate change remedies are urgently important. To protect the environment, protect the lives of people themselves. If any country does not respond promptly to climate change.Will cause difficulties for economy, society and life of people. Climate change is the change in biological and physical environment. Cause harmful effects on the composition, resilience, and fertility of ecosystems in nature. Influencing socio-economic activities and human life. Over the past 200 years, especially in the past few decades, the process of industrialization has increased the amount of greenhouse gas emissions into the atmosphere. As a result, the climate is changed, the surface temperature of the Earth increases, the sea level rises, leading to extreme weather events. From the above situation, there are two issues to be posed: reducing the impacts of climate change (climate change) and adapting to climate change. Based on the opinions of many managers, scientists and from the perspective of a student majoring in environmental management, I would like to summarize the proposed solutions to mitigate and adapt to climate change as follows:

Limiting the use of fossil fuels and finding alternative sources of energy. Fossil fuels (coal, oil ...) are the source of the huge greenhouse effect. People have been looking for environmentally friendly alternative energy sources such as wind, solar, tidal, geothermal energy ...

Efficient and economical use of energy (electricity, petroleum, charcoal, ...) and resources (fresh water, forests, biological resources, minerals ...) in production and daily life. The country now has more than 10 million households using electricity, just need to replace one incandescent or neon light with compact light, each household will save 9W on average, the whole country will save 90MW of electricity at peak time. .

Preventing deforestation, actively planting and tending forests is an indispensable element for the fight

against climate change. Reportedly, deforestation is responsible for 20% of CO2 emissions each year.

Conversion to new production and living models suitable to the new climate, soil and ecological conditions. Using high-salinity tolerance crop varieties, short-term flood avoidance varieties, building flood avoidance models, participating in agricultural and fishery production insurance in the face of climate change disasters queen ...

Improving and upgrading infrastructure. Improvements such as strengthening insulation systems, building environmentally friendly houses ... will save more fuel and reduce greenhouse gas emissions. In addition, roads should also be adequately invested to reduce fuel consumption for vehicles and reduce greenhouse gas emissions into the environment.

Family planning: Every couple should make plans to cut down on consumption (food, clothing, etc.), contributing to reducing greenhouse gas emissions and environmental pollutants. .

Work close to home and use public transportation. Working close to home not to use cars, motorcycles but walking or cycling is both beneficial to the health and the environment. In addition, the use of public transport also significantly contributes to reducing emissions of greenhouse gases into the atmosphere.

Invest in clean technology and apply cleaner production. Enterprises and production facilities must implement and apply a cleaner production technology model throughout the life cycle of the production process from the selection of input materials to the consumption and use of products.

Researching and applying scientific achievements and products adapting to climate change.

Disseminate information, raise awareness about climate change (causes, impacts and emergency response solutions ...) to vulnerable communities.

The Government of Vietnam is deeply concerned about climate and sea level rise, so it signed the United Nations Framework Convention on Climate Change and became a party to the Convention since 2005. It is not a The country must comply with the roadmap to reduce greenhouse gas emissions, but Vietnam is still proactively developing appropriate action plans to avoid possible negative impacts to ensure the sustainable development of the country. . Combating climate change in Vietnam is integrated into the Law on Environmental Protection, and other programs such as Agenda 21, National Strategy for Coastal and Marine Environmental Management, Action Plan National Biodiversity and Climate Change, National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020.

Climate change is considered to be both a short-term and a long-term problem, complicated and related to all industries, on a regional and global scale. Therefore, the development of national programs and their implementation should be studied at all levels: regions, sectors and in all sectors, most importantly energy, delivery. pine, industry, agriculture, forestry, fishery, tourism, natural resources and environment; in all relevant localities, especially the coastal plains. Integrated coastal management is considered an appropriate adaptation solution to cope with climate change and rising sea levels.Coastal area development plans, relocation and resettlement plans must be carefully considered when dealing with sea level rise. In strategic sea dyke plans to cope with rising sea levels, aquaculture development plans need to develop adaptive models and mitigate climate change impacts depending on the region. Effectively manage water resources, regulate, share and balance water resources among basins, have an appropriate plan in managing the operation of upstream reservoirs to regulate the flow for the lower region. Save and limit saline intrusion.

Climate change has really existed and greatly affected the lives of people and creatures in the world and Vietnam is one of the countries most affected by this incident. The impact of climate change is very broad and strong to all sectors and fields of social life. Therefore, adaptation and mitigation of climate change is a very necessary work and requires the cooperation of all people.Every small job like planting trees, saving electricity, limiting the use of disposable plastic and synthetic chemicals, etc. can help in combating climate change and protecting the environment. In addition, to ensure that these can be effectively implemented, the Government's introduction of reasonable laws and sanctions is also a measure to promote human awareness of this urgent issue.In addition, developing clean energies and finding new sources of fuel to replace fossil fuels is also an urgent task. As mentioned, the emissions of fossil fuels are huge, they are the main cause of the greenhouse effect and global warming. Finding clean and environmentally friendly fuel sources will help the environment reduce the amount of emissions it receives each year. In Vietnam, the development of E2 biofuel is a major development as it will reduce the consumption of all kinds made of crude oil and replace it with biofuel. Currently, this type of biofuel is very popular in Vietnam because it is cheaper than gasoline produced from crude oil and more environmentally friendly.Thereby, contributing to changing their behaviors with the environment such as saving and effectively using energy and water resources, protecting mangroves, planting and protecting coastal protection forests.In addition, a separate communication channel is also developed to provide the most comprehensive information on serious climate change issues.Strengthen cooperation with countries, international organizations in the field of climate change and clean development mechanism to reach cooperation agreements. Continue to promote financial and technological cooperation and capacity building in

the post-Ky-post period, actively participate in international seminars, conferences and negotiations on issues related to variables. climate change. Thereby, it requires the developed countries to provide financial support and transfer new, environmentally friendly technologies to serve the goal of sustainable development and be ready to coordinate with developed countries in building and implementing Currently, CDM projects in Vietnam serve sustainable development and reduce greenhouse gas emissions. Develop project lists to call for funding and technology transfer from developed countries. International cooperation in training, capacity building through direct investment, advice and construction of early warning systems. Promote cooperation in developing an Action Program to adapt to climate change and sea level rise in Vietnam.

The fact that big cities like Hanoi and Ho Chi Minh City are changing their bus systems every day from DO diesel-powered vehicles to CNG-fueled cars will also help in protecting the environment. In addition, the skytrain systems are also in the process of finishing and are expected to be operational in 2020. This will contribute to reducing the number of private vehicles entering the city, helping to reduce congestion traffic jam and rush hour. This will significantly reduce the impact of personal vehicle emissions on the air as well as having good effects on the economy as well as transportation.

IV. CONCLUSION

Develop and complete policies to support severely affected areas, especially for the poor.Establishing groups of experts, organizations, research institutes, universities and research centers concerned to carry out climate change research and projects; developing climate change scenarios in Vietnam; develop and evaluate options to reduce greenhouse gas emissions and propose measures to cope with climate change. Invest in research programs and assess the vulnerability of ecosystems in coastal areas; developing scenarios of sea level rise for Vietnam in the period of 2010-2020 connecting with international programs and receiving international assistance. Cooperation in technology transfer ... Exploiting and applying new technologies in fields related to climate change and sustainable development. Re-planning land, water resources, building infrastructure in sensitive and vulnerable areas. Research and find out agricultural varieties adapted to the environment.The purpose of the fund is to serve measures to clean the environment and respond to climate change. There is a mechanism to increase domestic financial resources and expand access to other financial sources, support the implementation of environmental protection activities such as the Green Credit Program by foreign banks. in Vietnam, the Vietnam Environment Protection Fund, the Green Credit Fund sponsored by the Swiss Government, the DANIDA Fund of the Danish Government, the Dutch Government, and the World Bank Global Environment Fund. In addition, there are international cooperation programs and projects mobilized from non-governmental and private sources. It is necessary to diversify forms of lending, capital support, loans with preferential interest rates, grants or repayment loans; mortgage assets to implement programs, projects, pilot projects, applied researches in the field of improving the efficiency of using natural resources, reducing poverty. This is considered an important solution to raise public awareness about climate change in Vietnam to adapt. Communication should be promoted so that people are aware that climate change is an existent issue and a direct threat to human health and life.

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