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Assess the impact of climate change on tourism resources in recent time

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Abstract
Climate change is one of humanity's biggest challenges, having adverse impacts on many areas of life on a global, regional and national scale. Climate change not only causes temperatures to increase and sea levels to rise but also makes extreme weather and climate phenomena more volatile in both space and time, occurring with more frequency and occurring more frequently. more unusual variables. According to a report by the World Meteorological Organization (WMO), the average global temperature reached a record high the period 2010 - 2019. It was the 5th consecutive year with the highest temperature in the past 140 years. Losses caused by natural disasters and climate extremes have increased continuously in recent decades. According to the United Nations Strategic Disaster Reduction (UNISDR), from 1998-2017, the world economy suffered a loss of 2250 billion USD, 250% higher than the previous 20 years. With the current trend of climate change, if drastic measures are not taken to respond to climate change, the damage to the economy by 2050 worldwide due to climate change will be 7900 million USD. The US and 3% of global GDP (Economist Intelligent Unit, 2019), of which Asia's GDP decline is estimated at 2.6%.

Keywords: climate, tourism, resources, WMO

Introduction

1. The impact of climate change in Vietnam

The United Nations Framework Convention on Climate Change, born in 1992, is one of the important international treaties for countries to work together to deal with this challenge. Vietnam joined the Convention on November 16, 1994, and signed the Kyoto Protocol (attached to the Framework Convention on Climate Change) in 1998.

Climate change leads to a change in heat and water regimes on earth. Over the past century, the average temperature of the earth's surface has increased and there has been a shift in climate zones. These are two of the consequences of climate change. Climate change leads to more rain, but rainfall is unevenly distributed over space and time and causes many places on earth to flood, while many areas suffer severe drought.

It is predicted that many cities of coastal countries are at risk of being submerged by sea levels due to sea level rise - a direct consequence of the melting of the North and South Poles. Of the 33 cities with a population size of 8 million in 2015, at least 21 are at high risk of being completely or partially submerged by seawater, and about 332 million people living in coastal and low-lying areas will be affected lost their homes due to flooding.

In Vietnam, in recent years, the evolution of climate also has similarities with the general situation in the world. Climate change affects all regions, regions, areas of natural resources, environment, and socio-economic, in which water resources, agriculture and rural development, health, and coastal areas will be most affected.

Impacts of climate change on water resources Vietnam is classified in the group of countries with water shortage with the total per capita of both surface water and groundwater in the territory of 4,400 m3/person/year (compared to the world average) is 7,400 m3/person, year). In exploiting and using water resources, Vietnam has many unsustainable factors.

The degradation of water resources is increasing in both quantity and quality due to the increasing demand for water, indiscriminate exploitation and use, lack of planning, and especially the alarming decline of the first forest source. Under the impact of climate change, when the average temperature increases, the anomalies of weather, climate, and natural disasters will increase greatly, which will greatly affect freshwater resources in the following aspects:

- Demand for domestic water for people, water for agricultural production, industry, energy, transportation..., all increase. Besides, the amount of water evaporation of water bodies (lakes, ponds, rivers, streams, etc.) also increased. As a result, the degradation of water resources in both quantity and quality will become more serious.
- Changes in precipitation, will lead to changes in river flows and flood intensity, frequency and characteristics of drought, and groundwater availability. It is predicted that climate change will significantly reduce the amount of water in rivers in many regions of the world, including Vietnam.

When the snow and ice at the poles and peaks melt, it will increase river flows and increase flooding. When the mountain ice is dry, the flooding will decrease, but then the flows will also gradually decrease, even drying up. Water shortage will be more serious. This is very typical for Asian countries with river water that is highly dependent on upstream water.

2. Impact of Climate Change on Natural Resources

The most obvious manifestation of climate change is that the average global temperature will increase by 1.5-4.5 0C within the next 100 years. During the last century, the global average sea level has risen by about 15 cm; It is predicted that by 2030, the sea level will rise by another 18 cm. If the current trend of greenhouse gas emissions continues, the sea

level rise in 2100 could reach 65 cm compared to today. Rising sea levels could salinize freshwater supplies for production and livelihoods and threaten island and lowland states.

Sectors such as agriculture, energy, natural resource extraction, transportation, industry, and waste management..., are the sectors that emit a lot of greenhouse gases into the atmosphere. Countries participating in the United Nations Framework Convention on Climate Change have committed to conducting a national inventory and publication of greenhouse gases and applying solutions to reduce greenhouse gas emissions.

Vietnam has joined the United Nations Framework Convention on Climate Change and the Kyoto Protocol has implemented greenhouse gas inventory activities, has had programs to strengthen CO2 sinks such as the program planting of 5 million hectares of new forests, protecting and developing recognized biosphere reserves; widely deployed biogas plants to limit methane emissions, established a National Authority to review and approve projects under the Clean Development Mechanism (CDM). Projects on technological innovation, energy saving, development of renewable energy (hydroelectricity, wind power), methane collection, development of biogas tunnels, a transformation of crop structure, and encouragement of fuel conversion engines… are projects that are encouraged in our country. Natural tourism resources include elements of geology, topography, geomorphology, climate, hydrology, ecosystems, and natural landscapes that can be used for tourism purposes.

2.1 The impact of climate change on natural factors (climate, geology, topography, geomorphology, hydrology, etc.)

Natural disasters and extreme weather events have increased, affecting tourism development activities, and adversely affecting tourism resources. The post-extreme post is the central coastal strip, the North and North Central mountains, the Northern Delta and the Mekong River Delta, specifically as follows:

– Global warming causes changes in atmospheric and ocean circulation, especially monsoon circulation and heat-salt circulation leading to fluctuations in temperature, precipitation, and weather phenomena.

Recent research results show that the average air temperature in our country increases by about 0.1°C/decade. The El Nino phenomenon is increasingly having a strong impact on weather and climate regimes in many regions. Rising temperatures and intense sunshine and drought have affected the water levels of rivers, lake beds, streams, etc., which are used to exploit river tourism or beautiful streams without running water lost tourist landscape.

The high risk of territory shrinking due to sea level rise is China, India, Bangladesh, Vietnam, Indonesia, Japan, Egypt, the United States, Thailand, and the Philippines, respectively.

Sea level rise is also accompanied by saline intrusion inland and salinization of groundwater, adversely affecting agricultural production and freshwater resources. It is predicted that by 2080, an additional 1.8 billion people will face water scarcity, and about 600 million people will face malnutrition due to the risk of reduced agricultural productivity.

In addition, there is a tendency to reduce water quality, biological production, and the number of plant and animal species in freshwater ecosystems, increasing diseases, especially vector-borne diseases. IPCC 1998). In the last 20-25 years, about 30 new diseases have appeared. The patient rate and the mortality rate of many infectious diseases will increase, of which about 400 million more people will face the risk of malaria.

According to Nicolas Stern (2007) - former leading economist of the World Bank, within the next 10 years, the cost of damage caused by climate change to the whole world is estimated at 7 trillion USD; if we do nothing to respond, the annual loss will be about 5-20% of GDP, but if we have positive responses to stabilize greenhouse gases at 550 ppm by 2030, the cost will only about 1% of GDP.

However, climate change, to a certain extent and in certain regions, also has positive effects, which are creating opportunities to promote countries to innovate technology, and develop clean technologies, friendly technologies with the environment and related R&D activities in general; To develop afforestation to absorb CO2 and reduce greenhouse gas emissions; In some temperate countries, when the temperature rises, it will be more favorable to develop agriculture; Energy for heating is also more economical.

Fig 1: The Red River has dried up, unable to exploit the river tourism route

- Increased evaporation on continents and oceans leads to the increased moisture content in the atmosphere and increased convergence of moisture from the ocean to the continent, increasing the possibility of heavy rain on the continent. The storm season is prolonged and the epidemic recedes gradually. In the last months of the year, the orbits of storms also tend to shift towards southern latitudes. The central coastal provinces and cities are affected by about 70% of the total storms that hit our country, of which, 60-65% of storms have strength from level 8 to 12 accompanied by high tide. The consequences for the environment and people's lives are very serious. Heavy rain with thick density caused flooding of sections to tourist sites, causing subsidence, erosion of cave systems, limestone mountains, etc., losing ecological landscape of areas and tourist attractions.
- Monitoring results within half a century at the three stations of Hon Dau, Co To and Hon Ngu, the sea level has risen by an average of 2.5 - 3 cm/decade. Sea level rise changes the topography and sea floor, narrowing and changing the depth of beaches.
- Flood flows have increased in most regions, especially the North and Central Vietnam, while low flows have

decreased in regions with reduced rainfall in the dry season, especially the Central Highlands, the South and the South Pole. Central region, which has a lot of tourism resources, but still suffers from severe drought in the dry season every year. Thus, on both major rivers, the impact of climate change causes the annual flow of the Red River and the Mekong River to decrease. Go. That means the possibility of flooding in the wet season and drying up in the dry season both becomes more severe.

In the coastal area, the phenomenon of estuary intertidal zone widening funnel-shaped (estuary phenomenon) has been clearly seen over large areas. The most obvious is the downstream of the Thai Binh - Bach Dang river system, in the coastal areas of Hai Phong, Quang Ninh and the Dong Nai river system, in the coastal areas of Ba Ria - Vung Tau and Ho Chi Minh City. In the dry season, tributaries and rivers in these areas could not play the role of draining water towards the sea, turning into stagnant rivers and channels with artificial pollution levels affecting the landscape. hazardous to the life of the population areas in the basins of Nhue, Day, Chau Giang in the southwest of Hanoi and the provinces of Ha Tay, Ha Nam, Nam Dinh and Ninh Binh.

Hoi An city has a coastline of about 7km, since 2009 until now the situation of land loss due to sea water intrusion has occurred continuously, especially in Cua Dai beach area, where high-class resorts are concentrated. Au Co coastal road in Cua Dai sea area was more than 200m away from the sea before, but by 2014 the sea water had eroded only about 40m from the road; The waves have washed away many beautiful beaches in this area.

In the Southern region, the extreme rainfall-related indicators show that: Extreme events related to heavy rain have decreased significantly in the Southern region, especially in Vung Tau, Con Dao and Rach Gia. however, extremes related to heavy rain occurred more frequently in Can Tho. For two islands with high value in tourism development, such as Phu Quoc and Con Dao, the reduced rainfall will lead to a decrease in the amount of fresh water, which will greatly affect the daily life and tourism business on the island roads to tourist. destinations, causing subsidence, erosion of cave systems, limestone mountains, ... losing the ecological landscape of the area, tourist attractions

- Monitoring results within half a century at the three stations of Hon Dau, Co To, and Hon Ngu, the sea level has risen by an average of 2.5 - 3 cm/decade. Sea level rise changes the topography and sea floor, narrowing and changing the depth of beaches.
- Flood flows increase in most regions, especially the North and Central regions, while low flows decrease in regions with reduced rainfall during the dry season, especially the Central Highlands, the South and Antarctica. The Central region has many tourism resources, but every year it still suffers from severe drought in the dry season. Thus, on both major rivers, the impact of climate change causes the annual flow of the Red River and the Mekong River to decrease. To go. That means that the possibility of flooding in the rainy season and inundation in the dry season will become more serious.

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Fig 2: Duong Dong Lake – Phu Quoc island also dries up in the dry season

2.2 Impact on ecosystems, biodiversity, and natural landscapes

Under the 2020 climate change scenario, it is estimated that 20-30% of plant and animal species are assessed as being at increased risk of extinction. Accordingly, tourism resources in National Parks, Conservation Areas, and Ramsar Sites have been partially or largely lost, thus reducing their attractiveness to tourists.

According to hydrometeorological experts, in the past 50 years, the frequency of heat waves has increased by 2-4 times. It is likely that in the next 40 years, the number of heat waves will increase 100-fold. If the global average temperature increase exceeds 1.5-2.5 0C, combined with increased CO2 content in the atmosphere, will lead to

fundamental changes in the structure and function of ecosystems, the ecological interactions of species, and their geographical distribution, with major negative consequences for biodiversity learn**.**

Increased temperature affects natural ecosystems, shifts the thermal boundaries of continental ecosystems and freshwater ecosystems, and changes the structure of plant and animal species in some areas. In the region, some species of temperate and subtropical origin have been lost, leading to a decrease in biodiversity.

As temperatures in the ocean and in the atmosphere increase, hurricane speeds have increased. While some parts of the world are experiencing flooding due to sea level rise and hurricanes, many others are experiencing drought. Experts estimate that drought will increase by at least 66% due to a warmer climate. Frequent droughts will narrow water supplies, reduce the quality of agricultural products, and reduce food supplies.

The increased temperature along with drought has increased forest fires in the dry season, losing primary forests and protected areas that can be used to exploit eco-tourism and adventure climbing tourism.

Marine and coastal ecosystems are altered by sea level rise, temperature, and salinity changes along with changes in currents, waves, tidal amplitudes, saline intrusion, and coastal erosion. Coral reefs are very vulnerable to rising sea temperatures because of their poor adaptability. Rising sea surface temperature has caused corals to turn white and die in mass as in Phu Quoc (56.6%). Wetlands along the coast, including marshes and mangroves, will be negatively affected by sea level rise, especially where they are under pressure from shore or starved to death by sedimentation.

Hai Phong and Ho Chi Minh City are two of the 10 most flooded cities in the world under the impact of sea level rise. In Hai Phong, in the past decade, the sea level has increased by more than 20 cm. Some coastal estuaries in Hai Phong have the phenomenon of seawater intrusion, especially strongly in Phu Long, Cat Hai, and Dinh Vu islands, along sea dyke 1 and sea dyke 2. The geology is weak, there are many dangerous vortex areas, and river bank erosion tends to increase, irregularly. In some intertidal areas, there is a clear appearance of sea level rise, unusually high and low tides, etc. The changing natural conditions also cause changes in the liver and reproductive habits of aquatic products. Many marine species have also been severely reduced and reduced in quality and quantity.

Sea level rise has lost a large area of lowland/wetland ecosystems of the largest deltas in the country, the natural habitats of many native species including – nature reserves, Biosphere. The estuary and coastal areas of the Southern Delta from Vung Tau to Ha Tien include the provinces and cities of Ho Chi Minh City, Long An, Tien Giang, Ben Tre, Tra Vinh, Soc Trang, Bac Lieu, Ca Mau, and Kien Giang with a length of over 700km. Along the coastline, there are 23 estuaries, of which especially important are the estuaries of the Mekong River and the estuary of Dong Nai - Saigon, this is a lowland area strongly influenced by the East Sea and West Sea tides.

The phenomenon of coastal erosion on many stretches with the destruction rate of tens, even hundreds of meters inland, occurs frequently in recent years, related to the devastation caused by increasing storms, big waves and changes in marine dynamics in the coastal zone. This phenomenon has formed sand dunes and re-sediment to fill the channel into estuaries, greatly hindering transportation activities in and out of seaports, and causing very expensive dredging works to be carried out quickly disabled.

Fig 3: Thinh Long Beach resort has appeared 4 places of landslides and collapses on the sea embankment and the surrounding area

Vietnam has high biodiversity, but it is being seriously degraded due to various reasons. Climate change, together with its consequences such as floods, droughts, wildfires, erosion, and landslides, will promote faster and deeper biodiversity degradation, especially in ecosystems tropical forest ecology is not intact and the species is endangered by a small number of individuals. As sea levels rise, about half of the 68 wetlands of national importance will be severely affected; Salt water will penetrate deep and inland, killing many species of freshwater animals and plants of this important ecosystem and affecting freshwater sources for general living and tourism in particular.

Table 1: Overview of the impacts of climate change on ecosystems

No	Ecosystem	Impact on the ecosystem	Impact on species
1	**Marine and coastal ecosystems**		
1	The marine ecosystem in shallow and near-shore areas	▪ Changing ecological conditions,	▪ Change/decrease in structure, composition, and stock of seafood/fish
	Mangrove forest ecosystem	▪ The distribution and structure of the community changes	▪ Lower- and middle-layer food creatures
	Coastal ecosystem	▪ Losing or shrinking area	▪ Tropical fish increase, temperate fish (high value) decrease, Passive migration
2	Forest Ecosystem	▪ The residential area is shrinking, losing	▪ Loss of habitat of species, loss of species.
3	Agriculture Ecosystem	▪ residential and farming land	▪ Narrow freshwater creatures ▪ Expansive tropical crops (up and north), ▪ Temperate crops shrinking

2.3 Impact on natural heritage

Climate change has contributed to Phong Nha Cave in Phong Nha - Ke Bang National Park (Quang Binh) flooded in the annual rainy season. Flood water has impacted to reduce the durability of the cave, swirling water, impact causing erosion of the cave bed and excavation of the river bed leading to the cave.

In the past time, together with floods and hot and humid air, it has created favorable conditions for mold, termites, and trees grow parasitically on the works, leading to the destruction of monuments.

Vietnam has a coastline of 3,260km, more than one million square kilometers of territorial sea and more than 3,000 inshore islands and two offshore archipelagos, many coastal lowlands, including over 80% of the Mekong Delta and over 30% of the Red River Delta - Thai Binh has an elevation of less than 2.5m above sea level. The beaches are distributed along the coast, especially Ha Long Bay and a system of nearly 3,000 coastal islands such as biosphere reserves in Can Gio (Ho Chi Minh City), U Minh Thuong (Kien Giang), coral ecosystems, mangroves, tropical forests in national parks, etc., change. Every year, these heritage sites still threaten to be submerged as sea levels rise.

Dong Van rocky plateau (Ha Giang), the system of Rocky mountains and Karster caves..., will be affected by prolonged rains, acid rain causing erosion, faults, subsidence causing loss of natural landscape and architecture natural tourism resources.

3. Impact of Climate Change on Human Tourism Resources

Humanistic tourism resources include cultural traditions, cultural elements, folk art, historical, revolutionary, archeological, architectural, creative human works, and heritage sites. Other tangible and intangible cultural assets can be used for tourism purposes.

3.1 Impact of cultural factors

Climate change, which is manifested by rising sea levels, has caused saltwater intrusion in lowland and coastal areas. Currently, in the Red River Delta region, the flow downstream has decreased, the water level of the Red River is low, and the sea level is rising and the tides are rising, leading to increasingly complex saline intrusion. The results of monitoring and evaluation of salinity measurement data show that in the dry season, water for agricultural and fishery production in Hai Phong, Thai Binh, Nam Dinh, and Ninh Binh has a salinity exceeding the allowable concentration. Therefore, with the famous wet rice civilization as a specific product of the region, it will be lost. In addition, the Mekong river and the water garden system will be similarly affected… On the other hand, sea level rise will destroy the living places of long-standing communities with cultural and traditional features that have been exploited and are being exploited travel.

Climate change increases natural disasters (storms, floods, droughts, landslides) occurring with high intensity and frequency, losing agro-ecosystems such as terraced fields, flower gardens, etc., trees, …

The process of responding to climate change has affected farming practices as well as agricultural production of ethnic minorities, especially in the Northern Midlands and Mountains and the Central Highlands.

Fig 4: Due to drought, many areas of rice cultivation had to be converted to crops

Cultural institutions such as museums, cultural houses, libraries, reading rooms, and cultural facilities are also affected by climate change. When building these works, the designers have not coordinated with the functional sector to thoroughly research the cultural identity, customs, and habits of the ethnic minorities. people. Therefore, many community cultural houses after being inaugurated still could not attract people to live activities.

- Climate change affects the artisans – the owners of cultural expressions and activities. It is to change the way of life, work, and worship of communities and societies in buildings and landscapes, potentially causing people to relocate and give up their heritage.

3.2 Impact on tangible and intangible cultural heritage

Climate change with the manifestation of sea level rise, natural disasters such as storms, floods, and landslides directly affect heritages such as the Complex of Hue architectural monuments (Thua Thien - Hue), Hoi An Ancient Town (Thua Thien - Hue). Quang Nam), Hue Garden House, Cham temple-tower system in the central region. These heritage sites have to receive annual rains, storms, tornadoes, etc., which cause flooding. The architectures are damaged by termites and molds, causing them to be degraded and destroyed. The researchers said that historical and cultural relics, especially architectural monuments, archaeological relics will be degraded and damaged due to prolonged immersion in water or the impact of high temperature and humidity for a long time, collapse, or be completely lost due to the physical impact of extreme weather events, especially in the case of a combination of several phenomena (typhoon combined with tides; cyclone combined with heavy rain, etc.)

Fig 5: Hoi An ancient town is flooded with flood water

Communities that still retain a lot of folklore, especially in high-risk areas, are most vulnerable because of their poor adaptability and dependence on natural resources.

For the world's natural heritage Gong cultural space. Climate change has contributed to changing the habitation of ethnic groups, along with the influence of nomadic cultivation practices, many sacred forests have disappeared one by one. Therefore, the loss of the human ecological environment also means the loss of the gong cultural space and the loss of material vestiges that preserve the values of folklore.

3.3 Impact of climate change on coastal technical infrastructure

Sea level rise, together with increased waves, wind, storm surge, and storm surge, increase inundation and coastal erosion, directly affecting marine and coastal constructions such as tourist ports, gas-fired power plants, power transmission, and distribution systems, wharves, warehouses, industrial constructions, coastal transportation systems, sea dike systems, cities, urban centers, industrial parks industry, which increases the cost of protection, reinforcement, maintenance, upkeep or relocation. Some buildings have been destroyed due to the inability to protect them.

Some coastal resorts, resorts, restaurants, and hotels due to the impact of sea level rise have had to be relocated or disappeared, causing great harm to investors as well as the tourism industry. The level of impact depends on the specific local conditions and the condition of the technical infrastructure works.

Climate change, especially sea level rise, affects the residents of coastal communities, and tourism infrastructure (coastal resorts, hotels) affects people's lives and reduces the attractiveness of resorts and tourism in the high mountains. The above will affect the number of tourists every year, especially in the summer.

3.4 Impact of climate change on the tourism environment

The fresh and cool environment is one of the important factors attracting tourists, so it can be considered an important tourism resource and needs to be protected against the impact of climate change. Queen.

In recent times, the tourism environment in some tourist areas has suffered from negative impacts of climate change.

In the coastal area, the phenomenon of estuarine intertidal zone widening funnel-shaped (estuary phenomenon) has been clearly seen over large areas, especially downstream of the alluvial-poor river systems. Typical is the downstream area of the Thai Binh - Bach Dang river system, in the coastal areas of Hai Phong, Quang Ninh, and the Dong Nai river system, in the coastal areas of Ba Ria - Vung Tau and Ho Chi Minh City In the dry season, tributaries and rivers in these areas were unable to play the role of draining water towards the sea, turning into stagnant rivers and canals that pollute the environment, destroy the landscape, and affect the environment tourism business.

In mountainous areas, climate change is characterized by higher temperatures and shorter winters than before. According to the observed data, the temperature in winter increases faster than in summer. Precipitation and rainy season vary from region to region. As a result, the intensity of storms and floods increases, and droughts, and prolonged water shortages. The 2009 drought, which lasted until 2010 in most of the northern mountainous provinces, caused great damage and increased the risk of forest fires, typically the forest fire in Hoang Lien National Park in January 2010 burned down over 1,000 hectares of forest, directly affecting the tourist landscape and fresh air environment in the National Park.

Increased floods and droughts pose a great threat to the quality of human habitat because storms and floods create an ideal habitat for mosquitoes and parasites, rats, and other disease-carrying organisms to thrive. The mountainous tourist areas and communities with little investment in environmental sanitation and pollution treatment technology will be affected by the above impact, reducing the attractiveness for tourists.

References

1. Institute of Meteorology, Hydrology, and Environment, “Climate change and impacts in Vietnam”;
2. Tourism Development Research Institute, “Adaptation and response solutions, contributing to mitigating the impact of climate change on tourism activities in Vietnam”
3. Hoang Van Dai, Dang Thu Hien, Phan Van Thanh, Hoang Thi Thao, Nguyen Thi Bich, Dang Thi Lan Phuong. Update flood forecasting model on Red - Thai Binh river system and some flood forecasting results year 2012.
4. Tran Dinh Phuong, Hoang Le Nhung, Saltwater intrusion in the dry season in the years 2011-2013 in the Mekong Delta and the saltwater forecasting work of the Southern Regional Hydrometeorological Station.
5. Tran Thanh Xuan, Hoang Minh Tuyen, Luong Huu Dung, Ngo Thi Thuy, Salinity evolution in the Mekong Delta,
6. Dinh Duc Truong, Le Ha Thanh, Phan Thi Anh Dao, Le Xuan Tuan, Quantification of tourism value of Can Gio mangrove biosphere reserve.
7. Mai Van Khiem, Hoang Duc Cuong, Nguyen Dang Mau, Nguyen Thi Binh Minh, Luong Quang Huy, Research on the change of climate extremes in the Southern region in the period 1961-2010.
8. Nguyen Thi Lieu, Huynh Thi Lan. Huong Institute of Meteorology, Hydrology and Environment Science The effect of climate change on seasonality in marine tourism activities in Vietnam.
9. Dang Thanh Binh, Phan Thi Hoan, Climate change and natural disasters in the Central region.
10. Report on Impact Assessment of Climate Change - NCDs on the Mekong Delta up to 2020 and orientation to 2050, VNMC, 2011.