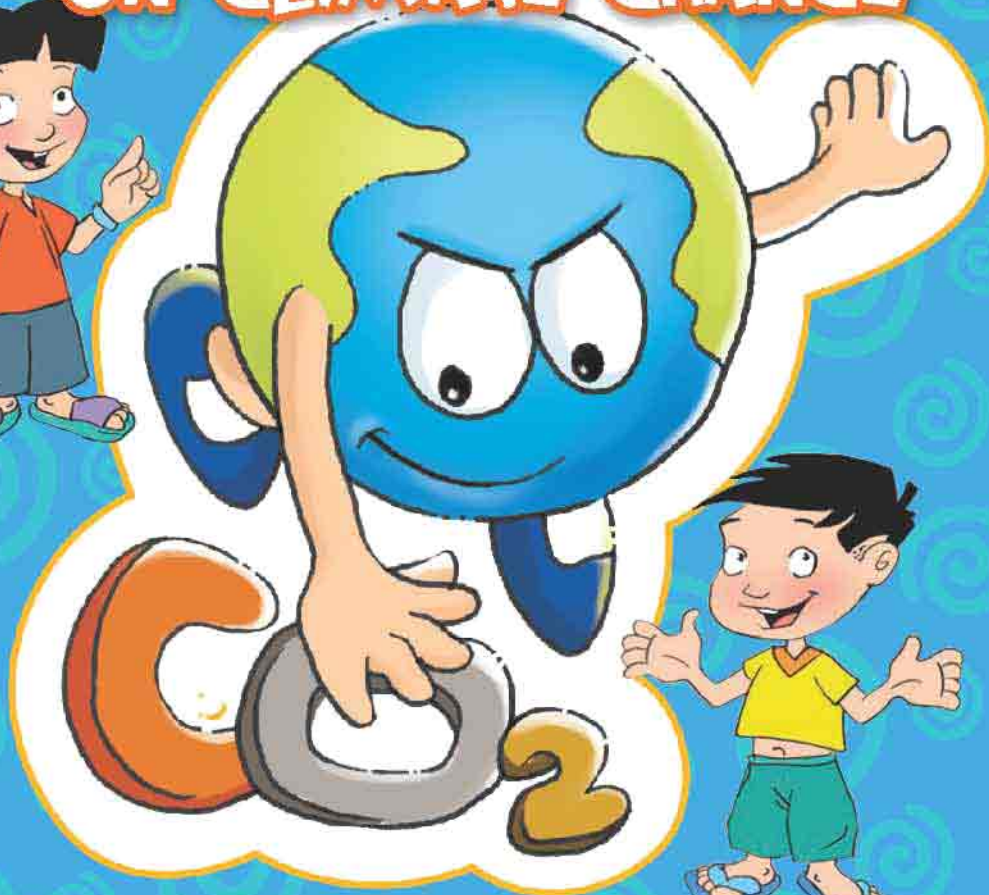


MINISTRY OF EDUCATION AND TRAINING

ABC

EDUCATION BOOK
ON CLIMATE CHANGE





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FOREWORD

In a one-country world inhabited by citizens who shared a concern for the well-being of future generations, climate change actions would be urgent priority

Adapted from UNDP, 2008. Fighting climate change: Human solidarity in a divided world.

We live in a crucial moment in the Earth's history, when climate change is seriously affecting natural systems and human life. "We are all part of the problem of global warming. Let us all be part of the solution..." (Ban Ki-moon). Today, every citizen should learn about climate change, not only to confront current challenges, but also to maintain a sustainable way of life into the future.

The ABC Education book on Climate Change is a guide to help you learn about climate change and take positive action to protect the planet. This book presents scientific information in a simple, understandable way for everyone, from children to adults. Topics such as "What is climate change?" "Climate change impacts" and "What you can do" are illustrated with vivid images and information.

We hope that this book will be a useful guide for students, teachers, families and communities. We look forward to receiving your feedback to improve our activities.

**Ministry of
Education and Training**

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ABBREVIATION

IPCC	Intergovernmental Panel on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change

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WHAT IS CLIMATE CHANGE?



1

THE DIFFERENCE BETWEEN CLIMATE AND WEATHER



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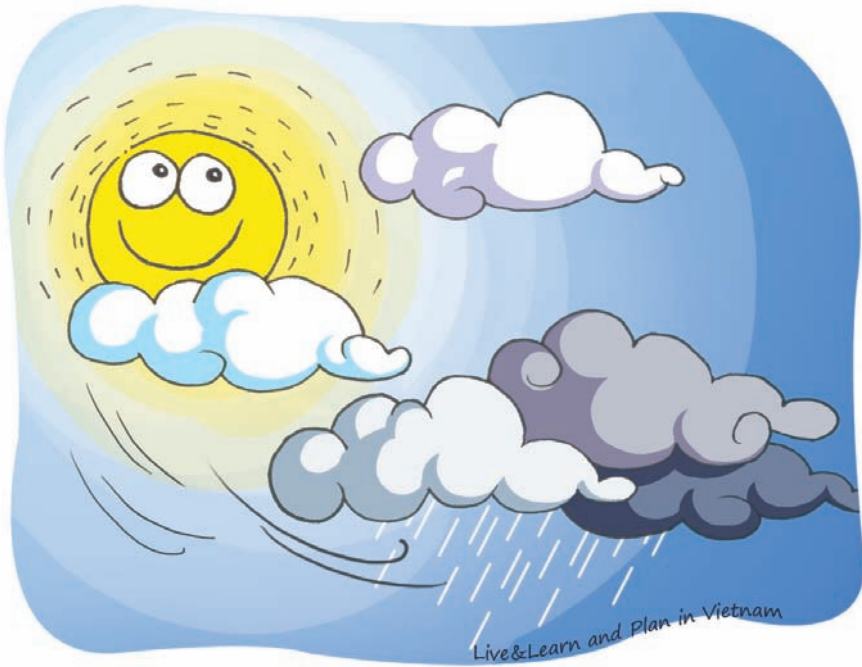
When you wake up in the morning, you may wonder what the weather is like outside. If it's cold, you wear a sweater and if it's warm, you put on summer clothes.

However, climate is not the same as weather. Climate is the average pattern of weather for a particular region. For example, "Vietnam has a hot, humid tropical monsoon climate where there is a cold winter in the North, and a wet season and a dry season in the South and Central Highlands".¹



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So what is the difference between climate and weather?



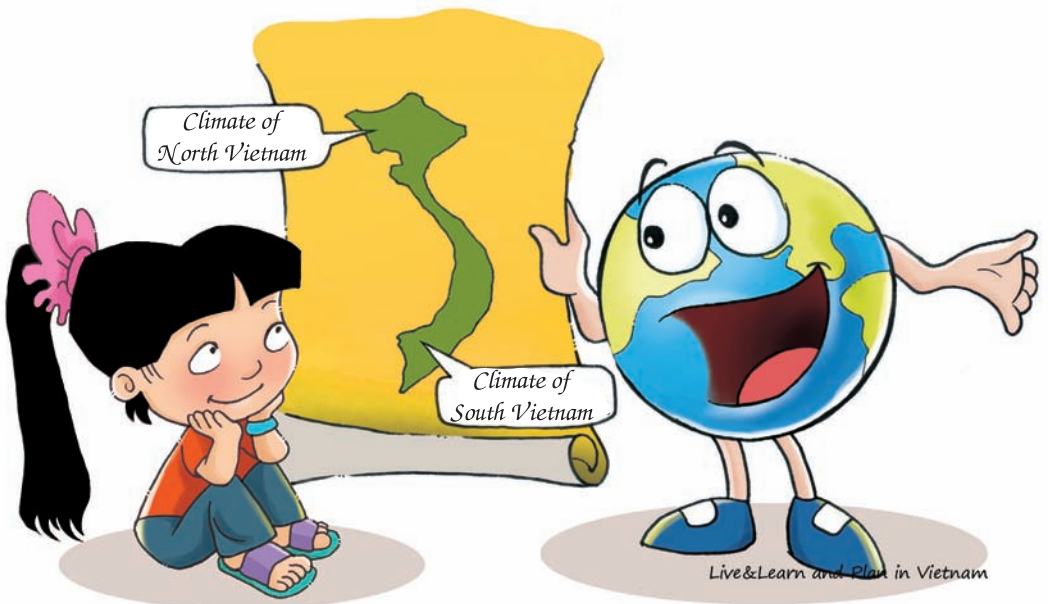
WEATHER

It includes factors such as precipitation, air pressure, temperature, wind, humidity and other phenomena such as hurricanes and thunderstorms, etc.² It changes from hour to hour and day to day. For example, it could be raining for hours then suddenly become sunny.

What is the weather like
where you live?



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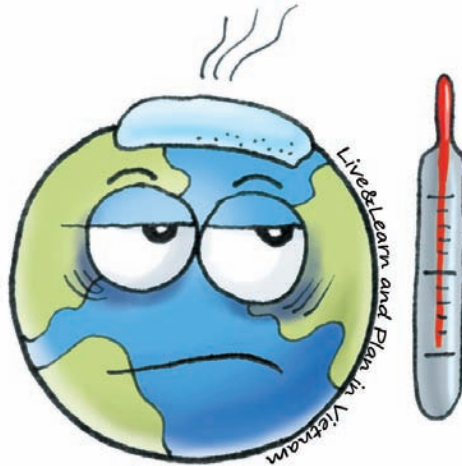
CLIMATE

Climate is the prevailing meteorological conditions that are typical for a certain region. It is the average of the weather over a long period of time (typically 30 years).³ Climate also includes factors such as temperature, moisture, wind strength and patterns, air pressure, cloud cover and solar access. Examples of climatic types include: temperate, tropical, monsoon and arid.

2

SO, WHAT IS CLIMATE CHANGE?

Climate change refers to any significant change in the climate over an extended period of time (decades or longer). Climate change may be caused by natural factors, or human activities (e.g. land-use change, pollution etc.) altering the atmospheric composition.⁴



Climate change generally refers to the long-term changes in climate patterns that have occurred over a long period of time. The climate can become warmer or colder. Annual levels of rainfall or snowfall can increase or decrease. More recent changes are believed to be have been caused by human activities.

Throughout history the climate of the earth has changed many times. The term "climate change" generally now refers to the climatic changes that are a direct result of human activities.

CLIMATE CHANGE HISTORY⁵



BEFORE

70000 YEARS AGO

Some researchers believe that humans were almost wiped out around this time due to volcanic eruptions that emitted huge amounts of volcanic dust into the atmosphere. This dust prevented sunlight from reaching and moderating the Earth's surface.

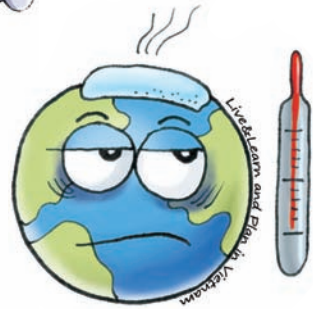
20000 YEARS AGO

During this time the earth was experiencing an Ice Age. Most of the North American and Eurasian continents were covered with ice and sea levels were 120 meters lower than they are today.

10000 YEARS AGO

Following the Ice Age, the earth's climate continued to warm, punctuated with periods where the earth was cooler.





PRESENT

YEAR 1000

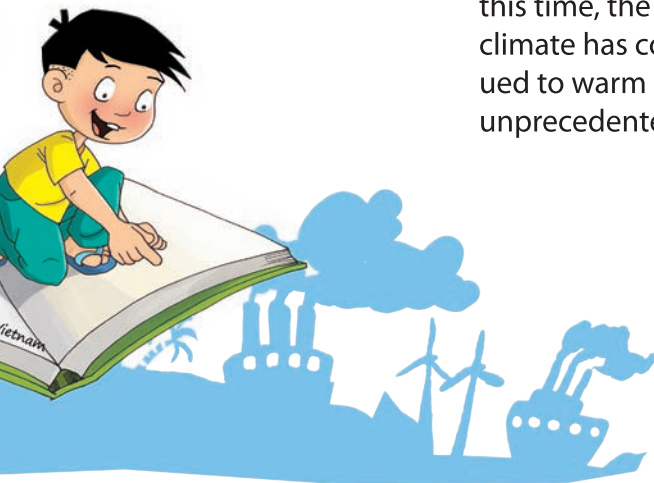
This time is known as the "Little Ice Age". Multiple volcanic eruptions occurred causing the earth's climate to cool.

YEAR 1850

This marks the beginning of the Industrial Revolution when human activities began to affect the global climate system. Since this time, the earth's climate has continued to warm at an unprecedented rate.

YEAR 2000

Scientists studying the climate records of ion ice cores discovered that the earth is warming much faster than it ever has in the past. Rather than slowly warming over several millennia, as it has in the past, the earth's climate is now changing over a matter of years.



3

WHAT CAUSES CLIMATE CHANGE?

The main cause of climate change is the increased concentration of greenhouse gases in the atmosphere.

Let's learn about greenhouse gases and their effect on our Earth.

THE GREENHOUSE EFFECT:



Imagine getting into a car or a bus on a sunny day where the temperature inside the car is warmer than the temperature outside.

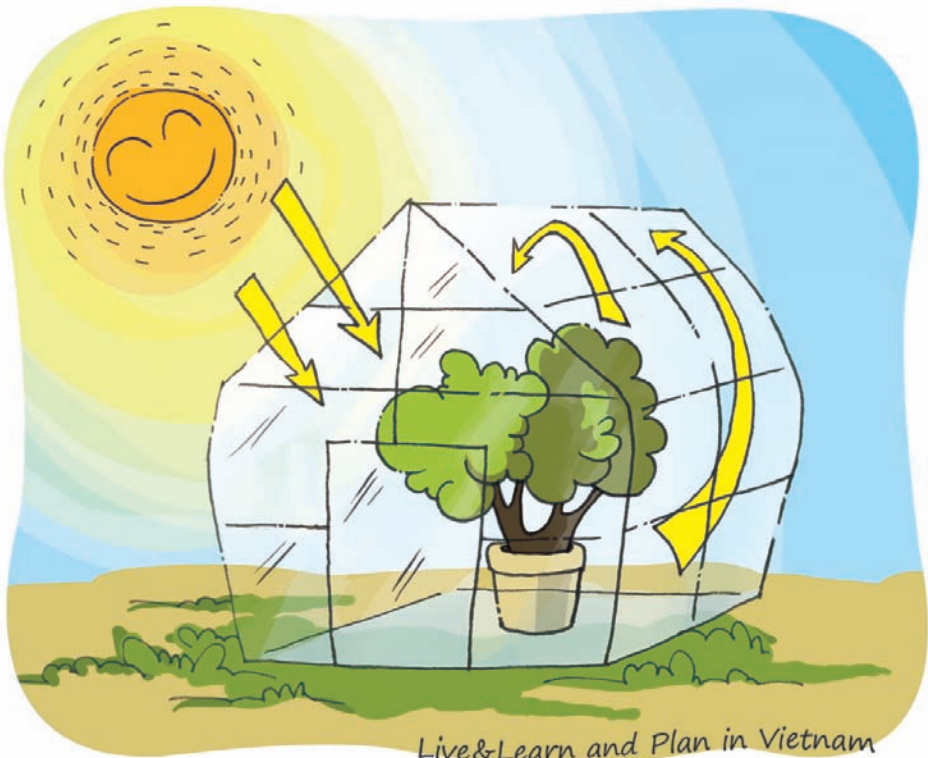


Farmers use nylon pieces to keep seeds warm on cold days.

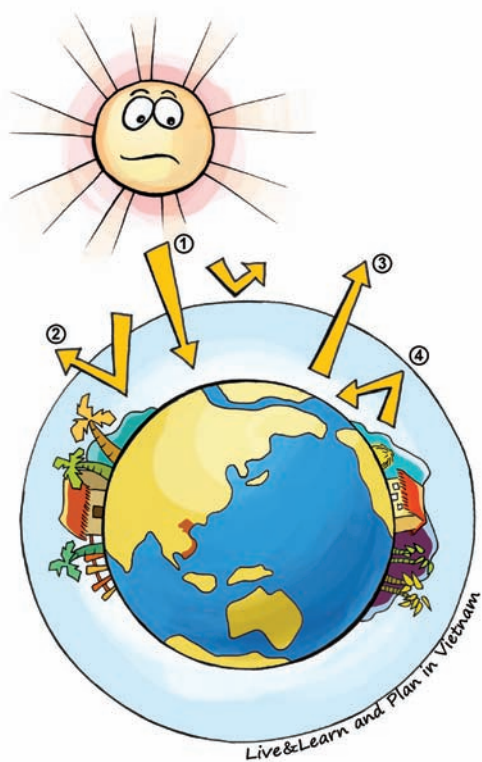
In the above cases, the glass windows/nylon sheet allow solar penetration but they prevent heat from escaping, warming up the temperature inside over time. This makes the internal temperature hotter than the external temperature.

The Earth's atmosphere contains some special gases called greenhouse gases (given their capacity to warm the Earth in the same way that warm temperatures are maintained in greenhouses for plants). Water vapor (H_2O), Carbon dioxide (CO_2), Methane (CH_4), Halocarbons (CFC), Nitrous oxide (N_2O) and Ozone (O_3) are the most common greenhouse gases.

These gases act as a blanket for the earth, maintaining a temperature suitable for human habitation. Without greenhouse gases, all of the earth's energy would escape into space, causing the average global temperature to drop below a temperature that could support life.



“The Greenhouse Effect” is the natural process of the atmosphere letting in some of the energy we receive from the Sun and stopping it being transmitted back out into space.⁶



- 1 Solar energy from the sun passes through the earth's atmosphere.
- 2 Some solar energy is then sent back to space.
- 3 Most solar radiation is absorbed and warms the Earth's surface.
- 4 Greenhouse gases in the atmosphere trap some of the heat. This process is called the 'Greenhouse Effect'.

MAIN GREENHOUSE GASES:

Although nitrogen (78%), oxygen (21%) and argon (0,93%) make up 99,93% of the earth's atmosphere, they play no role in regulating the earth's climate. This role is left to some of the gases in the remaining 0.07%.⁷

As mentioned previously, water vapor, carbon dioxide, methane, nitrous oxide, ozone and halocarbons are the most common greenhouse gases. Some greenhouse gases occur naturally and are emitted into the atmosphere through natural processes, while others are created and emitted solely by human activities.

Which of the following is a greenhouse gas?

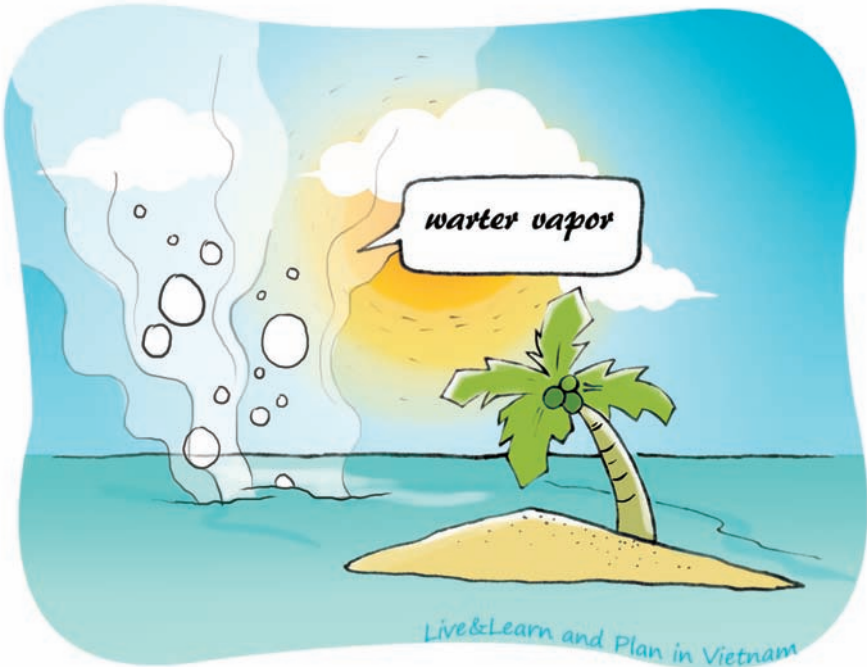
- a Oxygen
- b Carbon dioxide
- c Nitrogen
- d Argon



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Answer: b

WATER VAPOR

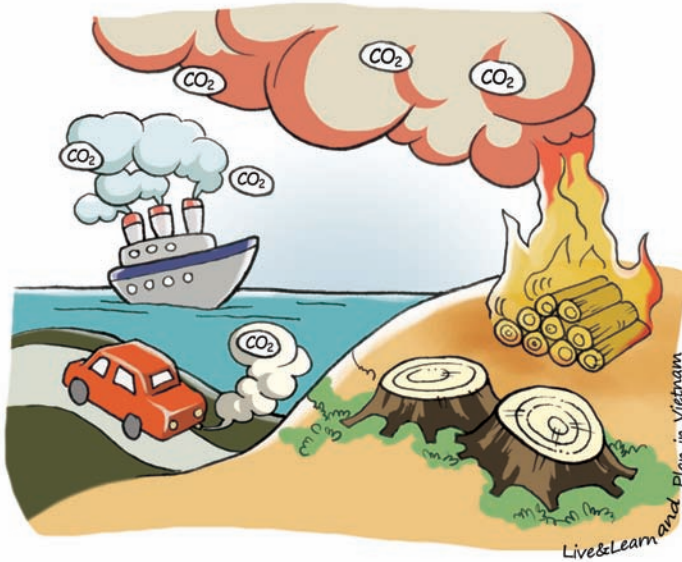


- **Originates from:** the evaporation of water.
- **Atmospheric concentration:** Levels of atmospheric water vapor vary throughout the world. At the poles water vapor levels are very low whereas in the tropics water vapor can account for up to 4% of the atmosphere.
- **Atmospheric lifetime:** 9-10 days.⁸
- **Global warming potential:** largest contributor to the natural greenhouse effect.⁷

Human activities: have only a small influence on the amount of atmospheric water vapor.

As global temperatures rise, the proportion of water vapor in the air increases, thereby perpetuating the greenhouse effect.

CARBON DIOXIDE (CO₂)



- ❁ **Originates from:** animal respiration, plant decay, volcanic eruption, burning fossil fuels.
- ❁ **Atmospheric concentration:** carbon dioxide makes up some hundreds parts per million of the atmosphere.
- ❁ **Atmospheric lifetime:** 5-200 years.⁹
- ❁ **Global warming potential:** major contributor to the enhanced greenhouse effect (an increase in the natural process of the greenhouse effect through human activities).

Human activities: carbon dioxide is produced by such activities as the burning of fossil fuels, land-use change and deforestation.

Deforestation not only releases the carbon dioxide stored in trees but fewer trees also reduce the earth's ability to remove carbon dioxide from the atmosphere.

Since the Industrial Revolution, the concentration of carbon dioxide in the atmosphere has increased by 35%. The atmospheric concentration of carbon dioxide in 2005 is 379 ppm (parts per million).¹⁰

NITROUS OXIDE (N₂O)



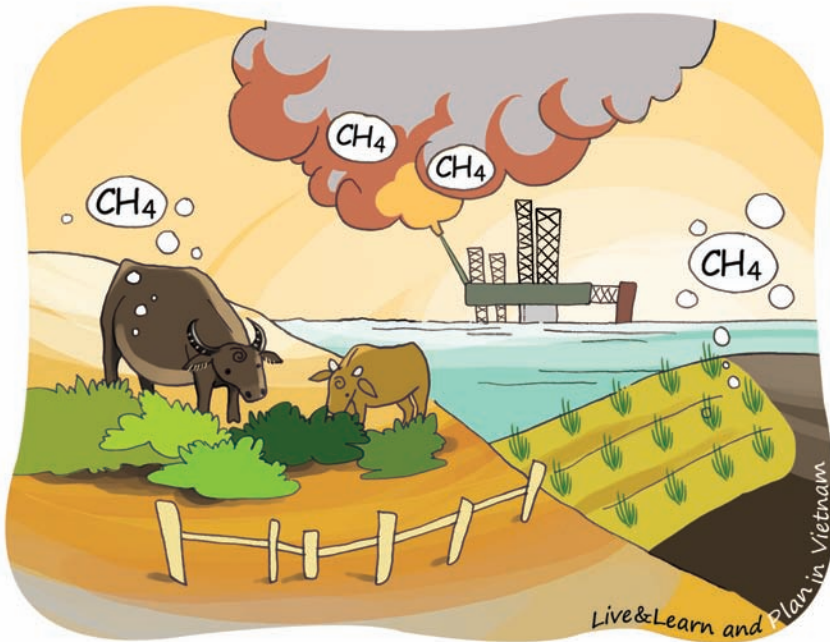
- ✿ **Originates from:** bacterial decomposition of the earth's soils and oceans.
- ✿ **Atmospheric concentration:** less than one-thousandth that of carbon dioxide.
- ✿ **Atmospheric residence time:** 114 years.¹¹
- ✿ **Global warming potential:** responsible for a warming effect 298 times that of carbon dioxide.¹¹

Human activities: land use change (e.g. cutting down trees to make more space for farming), the use of fertilizers and burning fossil fuels increases atmospheric nitrous oxide.

Since the Industrial Revolution, atmospheric nitrous oxide levels have increased by 18%.¹⁰

Due to its long lifespan, nitrous oxide released today will still be contributing to the greenhouse effect for many decades to come.

METHANE (CH₄)

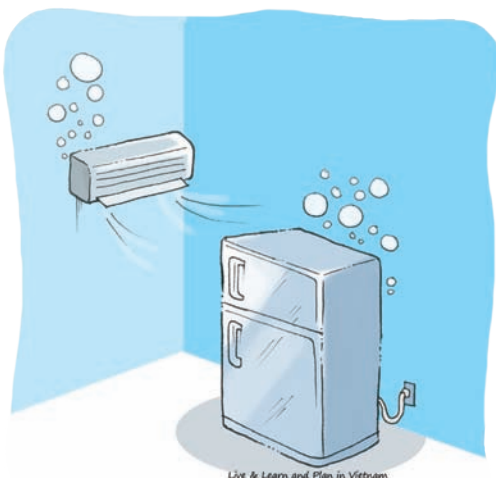


- ❁ **Originates from:** the decomposition of organic material (it is also found in gas and coal mines and in wetlands).
- ❁ **Atmospheric concentration:** exists in the atmosphere at a lower concentration than carbon dioxide.
- ❁ **Atmospheric residence time:** 12 years.¹¹
- ❁ **Global warming potential:** responsible for a warming effect 25 times that of carbon dioxide.¹¹

Human activities: the majority of methane emissions come from activities such as mining (coal, petrol, natural gases) and agriculture (rice cultivation in flooded paddy-fields, and stomach fermentation in animals).

Current atmospheric methane levels are approximately 2.48 times higher than before the Industrial Revolution.¹⁰

HALOCARBONS



Until the mid 1970s, Chlorofluorocarbon (CFCs), a type of halocarbons, were common in items such as spray cans, cleaners and coolants in air conditioners and refrigerators.

From 1987 onwards, governments began to regulate CFCs due to the ozone layer depletion they were causing. This led to the creation of a substitute – Hydro fluorocarbons (HFCs), another type of halocarbons.

- **Produced by:** human activities.
- **Atmospheric residence time:** remains for up to 1700 years in the atmosphere.¹¹
- **Global warming potential:** responsible for a warming effect thousands of times that of carbon dioxide.¹¹

Whilst HFCs do not deplete the ozone layer, they are greenhouse gases and thus contribute to the greenhouse effect. Furthermore, halocarbons that are released today will have a long-lasting impact on our climate due to the fact that they can remain in the atmosphere for up to thousands years.

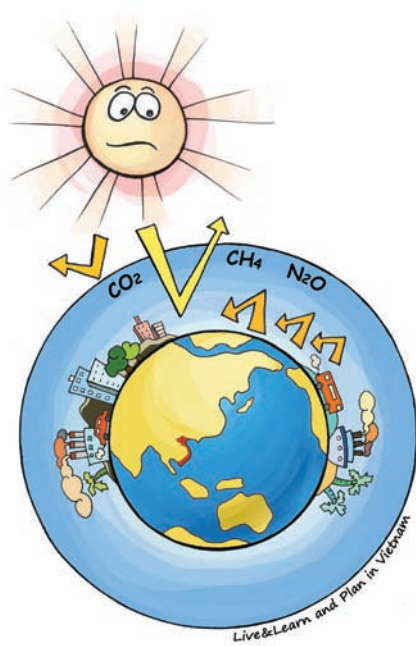
According to scientists, the climate change which has occurred over the past two centuries has mainly been caused by human activities.

Global temperatures were largely stable for the thousands of years prior to the Industrial Revolution. During this time human activities did not generate an excess of greenhouse gases. There was no electricity; there were no telephones, cars, planes, factories or televisions.

During the 1800s, the Industrial Revolution spread throughout the world. This period was marked by significant advances in technology, mining, agriculture, and transportation among others. Consequently, environmental alteration and degradation grew as....

- We started to use machines, powered by fossil fuels, which emitted greenhouse gases into the atmosphere;
- Deforestation and land-use change increased the emission of green house gases, and at the same time, reduced the ability of the earth systems (such as forests and oceans) to absorb greenhouse gases;
- Global population grew at an unprecedented rate, increasing the demand for emissions-generating products and services.





Gases produced by human activities have made the blanket around the Earth thicker and thicker. Consequently, over the past 150 years the Earth has become hotter and hotter, causing the Earth's climate change unnaturally.

CARBON FOOTPRINT

A 'carbon footprint' is the total amount of greenhouse gases produced by an individual in their day-to-day lives. Carbon footprints are measured in tonnes of carbon dioxide equivalent (tCO_2e).

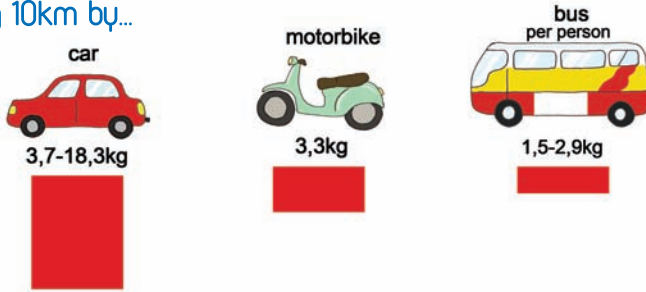
When you drive a motorcycle or car, you emit a certain amount of CO_2e . When you cook using electricity, oil, gas or coal, your activities also create CO_2 . Producing or consuming anything causes a certain amount of CO_2 and other greenhouse gases to be emitted.

Travelling by car will make your footprint bigger than when travelling by bus as it generates more larger greenhouse gases per person.

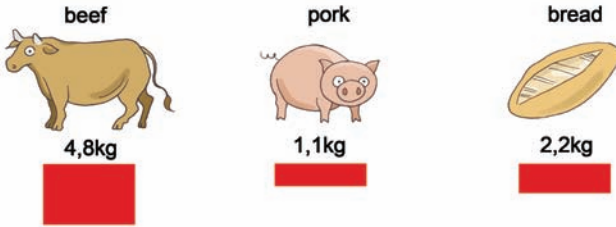


In this picture, you can see how much CO₂ equivalent is emitted by different means of transportation, by food production and in the production of everyday items. Also, you can see how much CO₂ is absorbed by a tree.

Travelling 10km by...



100g of ...



A piece of ...



A tree



(Source: Reference No 12)



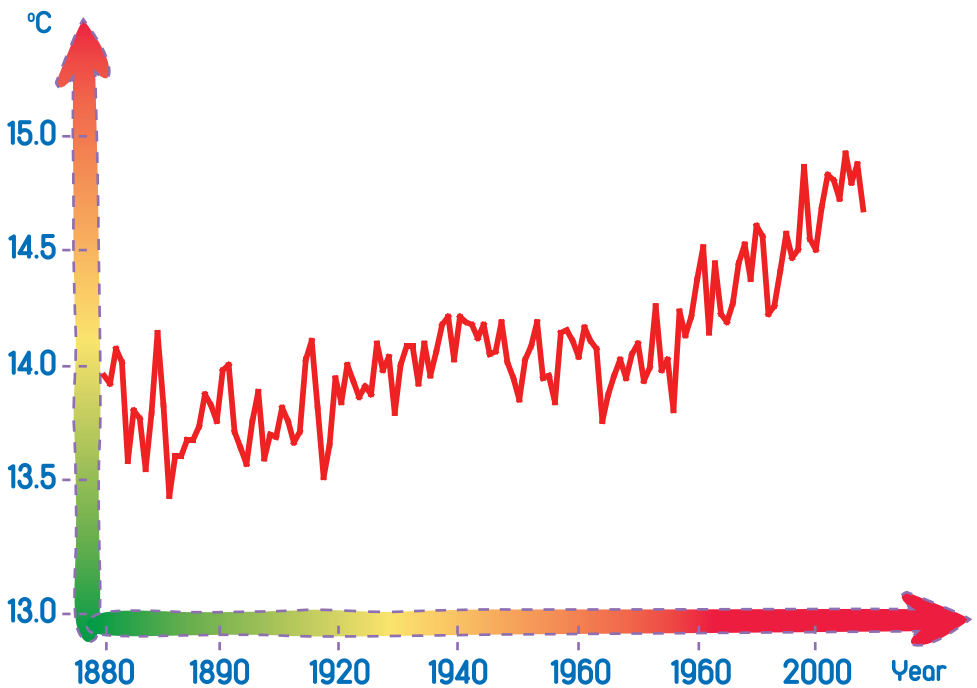
CLIMATE CHANGE IMPACTS



Globally, climate change is rapidly accelerating. We know this because:

- 1 Average annual temperatures are increasing;
- 2 Average rainfall and seasonal distribution is changing;
- 3 Sea level is rising due to the thermal expansion of water and the melting of continental glaciers (especially at the two poles and polar ice caps);
- 4 Natural disasters and extreme weather events (droughts, floods, typhoons, etc.) are occurring more frequently, intensively and unpredictably.

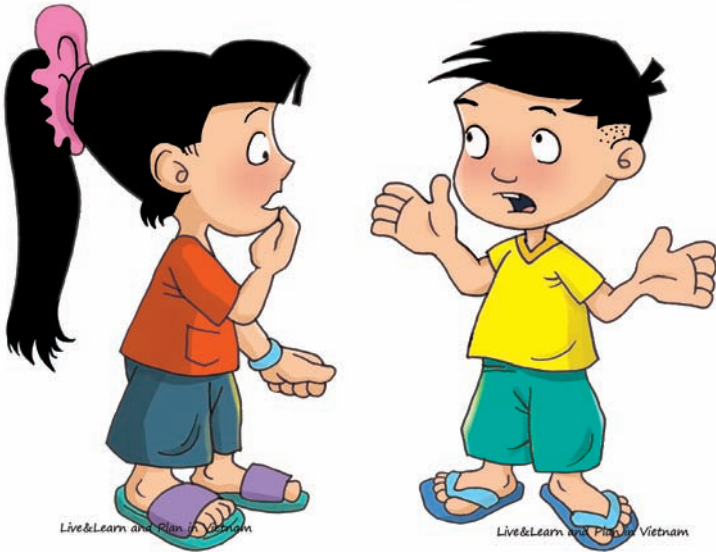
GLOBAL AVERAGE TEMPERATURE, 1880 TO 2008



Source: NASA GISS

Did you know:

- The 1990s was the warmest decade of the last millennium.¹⁰
- The extent of spring and summer sea-ice in the Arctic has decreased by about 10 to 15% since the 1950s.¹⁰
- During the past 50 years (1958–2007), average annual temperatures have increased by about 0.5°C – 0.7°C.¹³



HOW DOES CLIMATE CHANGE IMPACT UPON VIETNAM?



Vietnam is one of the countries most vulnerable to and affected by climate change. Climate change is already having a huge impact on Vietnam. Those sectors of the Vietnamese population most vulnerable to climate change's effects are farmers, upland ethnic minority groups, the elderly, women, and children.

1

SEA LEVELS



- Rising sea levels could lead to
- **Flooded islands, coastal areas and low-lands,** potentially displacing large numbers of people.
 - **Saltwater intrusion** to surface and ground water.
 - **Economic impacts:**
 - **Agriculture:** shrinking arable land due to erosion and/or salinity intrusion.
 - **Forestry:** ecosystem decline.
 - **Aquaculture:** coastal and marine resources would be reduced, salt water will intrude further inland, thereby damaging fresh water organisms.
 - **Transportation:** infrastructure damage from salt water intrusion and flooding.
 - **Tourism:** coastal beaches may disappear.

Observation data over the last 50 years indicates that Viet Nam's average sea level has risen by approximately 20 cm.¹³

According to scientists, one-meter sea level rise will cause 22 million people to become homeless.¹⁴

2

BIODIVERSITY



- Climate change will cause ecosystem boundaries to change:
 - Vietnam's primitive and new-growth forest boundaries may move, expand or shrink.
 - Animals will be forced to migrate to other areas.
- Wildlife will be forced to change their breeding and habitation patterns in order to survive:¹⁵
 - Flowers will blossom earlier;
 - Birds will commence migration cycles early;
 - Insect species will migrate to previously colder climates;
 - There will be increased competition for food and consequently greater crop spoilage due to pest encroachment.

Scientists have discovered that plants in Hoang Lien Son Mountain have moved to higher elevations. For example, the Van San Hoang Lien pine, which, used to appear at 2200m – 2400m, can now only be found at 2400m – 2700m.¹⁶

Increasing numbers of species are at risk of extinction because they cannot adapt to their rapidly changing environment. The resultant decline in biodiversity will result in a loss of rare genetic resources which will threaten ecosystem stability.

Mangroves provide habitat, food and water to many species. They protect land against storms, floods and soil erosion. Sea level rise changes these systems' sediment and salinity. It also damages forested areas and threatens the habitat of marine organisms and in particular the people who depend on them for food and income. Scientists predict that with a one-meter rise in sea level, about 2,500 sq km of mangroves in Asia are likely to be lost.¹⁷



Coral reefs are similarly biodiverse and fragile ecosystems. They also provide vital erosion protection to coastlines and they manufacture sand for beaches. A temperature rise of 1 – 2 degrees could irreversibly damage reef systems. Observation data indicates that, by 2040, 30% of the Asian coral reefs could have disappeared due to climate change.¹⁸

3

NATURAL DISASTERS AND EXTREME WEATHER EVENTS



In Vietnam, natural disasters and extreme weather events (such as flood, drought, typhoons, etc.) are occurring more frequently and are becoming harder to predict.

Over the past 50 years:¹⁹

- There were more typhoons with higher intensity affecting Vietnam. Typhoon are tending to move southwards and the typhoon season is lasting longer. There were more typhoons that followed unusual tracks.
- Temperature rises are causing rainfall patterns to change. The annual rainfall decreased over Northern climate zones while increased over Southern one. The number of heavy rainfall events has increased all over the country.
- The number of cold fronts was reduced remarkably. Abnormal events, however, are taking place more frequently.

Did you know?

In the last ten years (2001-2010), the damages caused by disasters such as floods, storms, Flash Floods, landslides, inundation, droughts and saltwater intrusion has increased: 9500 people have died and gone missing, and Vietnam has lost the equivalent of 1.5% of GDP annually.



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In 2010, there was an unusually high number of rare weather events in Vietnam:²¹

- In the south, tropical low pressures appeared in mid-January even though the rainy season ends at the end of November each year.*
- In the northeast, heavy rain occurred in January, whilst previously rainfall in Hanoi at this time was an average of 18-20mm.*
- Unusually hot days were felt for 10 days throughout the Tet holiday.*



Where we live regularly floods. After each typhoon, we find it very hard to go to school because it takes a long time for the water to drain away; the road is filled with mud and strewn with fallen trees. Often, during a school year we have to miss school 7-10 days longer than children in other areas. Our houses and belongings are damaged. Books are wet and damaged. Sometimes we have to buy new which many of us cannot afford. So we have to wait for aid to continue schooling. Some of us have already left school because of these difficulties



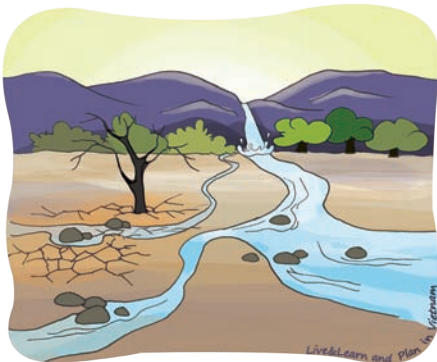
(Students in cluster 37, Hoa Hiep Bac ward, Lien Chieu district, Da Nang city)

4

WATER RESOURCES



- ❁ Rising temperatures increase evaporation rates in ponds, lakes and streams.
- ❁ River flows will be affected by changes in rainfall patterns and human activities. Many areas have already suffered massive floods during the rainy season and extreme drought during the dry season. This severely affects peoples' livelihoods and employment (for example, drought can cause electricity shortages).
- ❁ In coastal areas, if sea levels rise, the salt water could intrude into ground water resources, damaging drinking water and irrigation supplies.



Although Vietnam has extensive natural inland water systems, it is likely to suffer from growing water shortages due to the fact that a larger proportion of the surface water flowing through Vietnam depends on neighboring countries. According to current forecasts, 8.4 million Vietnamese people will be affected by the reduction in flows of the Red River and Mekong River by 2050.¹⁷

5

AGRICULTURAL PRODUCTION AND FOOD SECURITY

Did you know?

Rice yield decreases by 10% for 1 degree increase in temperature.¹⁷

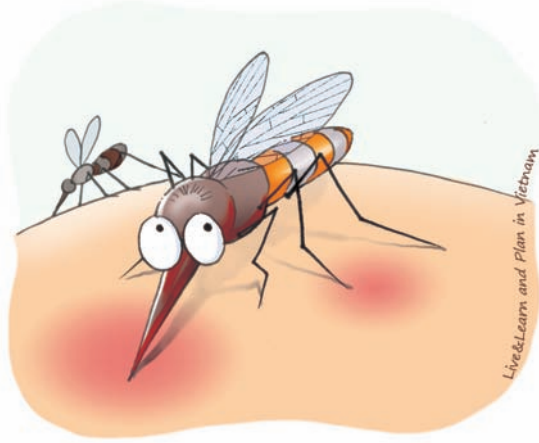


- Rising sea levels will cause soil salinity and erosion, shrinking the total area of arable land.
- Rising temperatures, prolonged drought, an increase in disease epidemics and the spread of climate-mediated weeds and pests, could all cause declining crop yields.
- Cattle and livestock will be at a greater risk of contracting diseases. Some of these animal-borne diseases such as avian influenza can be passed on to humans.
- Pastures are likely to be negatively affected by the shift in growing seasons.
- Rising sea levels and the increase in natural disasters will cause agricultural productivity to decline in many places.

Vietnam is still an agricultural nation with more than 70 percent of the population earning their living from agricultural activities. That agriculture is so vulnerable to the effects of climate change, presents a serious threat to Vietnam's future socio-economic development. For example, the 2008 damaging cold surge, which lasted for 38 days, killed 210,000 cattle.²²

6

HEALTH



- Climate change has powerful impacts, both direct and indirect, on human health. For example, prolonged heat waves can cause potentially fatal illnesses among the elderly. They can also increase the risk of heart disease, mental health difficulties and allergies.
- Climatic conditions affect diseases transmitted via vectors such as flies, mosquitoes, rats, fleas and ticks.
 - Increased temperatures will facilitate the spread of infectious diseases;
 - Higher temperatures will also increase the likelihood of the

reappearance and spread of some tropical diseases (e.g. malaria, dengue fever, diarrhea, cholera, plague and Japanese encephalitis);

- Climate change could also facilitate the occurrence of new infectious diseases (such as SARS, influenza A/H5N1, influenza A/H1N1).²³

The health effects of climate change will be felt most acutely by low-income communities, the elderly, women and children.

A World Health Organisation Report found that, from the mid-1970s to 2000, climate impacts may have caused over 150,000 deaths.²⁴



RESPONDING TO CLIMATE CHANGE



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Climate change is a global issue, and its effects are already being felt. The actions we take today will not only help improve our own resilience to the current and future impacts of climate change, but they will also protect future generations.



Climate Mitigation refers to any actions to reduce greenhouse gas emissions and/or remove greenhouse gases from the atmosphere.

Examples: *Using energy saving devices (such as compact fluorescent lightbulbs); using wind power, solar energy and hydroelectricity; reforestation and sound forest management, protecting forests and preventing forest fires; growing mangroves, etc.*



Climate Adaptation refers to any adjustments to human activities that make us less vulnerable to actual or expected climate change and variability, or exploit beneficial opportunities.

Examples: *Planting species resistant to flooding, drought and increased salinity; reinforcing the sea dykes and growing mangroves, building stronger houses for people in flood affected areas; improving farming and irrigation systems; educating and communicating climate change to the community; teaching women and children how to swim; changing your diet, etc.*

Every country should take action to both mitigate and adapt to climate change.

Quiz:

Which of the following solutions are examples of climate adaptation and which are examples of climate mitigation?

- a** Early warning systems for responding to natural disasters
- b** Use of energy-saving devices in the home
- c** Planting drought and flood-tolerant crops
- d** Including more vegetables and less meat in our diets



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Answer:
• Climate adaptation solutions: a-c
• Climate mitigation solutions: b-d

1

INTERNATIONAL EFFORTS

1896

Svante Arhenius reports that the emission of carbon dioxide from burning fossil fuels causes the earth to warm

1988

The Intergovernmental Panel on Climate Change (IPCC) was established to evaluate the scientific evidence surrounding climate change

1992

The United Nations Framework Convention on Climate Change (UNFCCC) was signed by 155 countries at the Rio Earth Summit, with the aim of stabilizing atmospheric greenhouse gas concentrations to prevent global warming

1994

The Government of Vietnam ratified the UNFCCC

1997

UNFCCC members sign the Kyoto Protocol



- ✿ The United Nations Framework Convention on Climate Change (UNFCCC) - took effect on March 19th 1994; it promotes measures to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
- ✿ The Kyoto Protocol (took effect on February 16th 2005 and expires in 2012): it supports sustainable development in developing countries and requires developed countries to reduce their greenhouse gas emissions.

2

VIETNAM'S EFFORTS:

2002

Vietnam signs the Kyoto Protocol

2005

Kyoto Protocol takes effect

2008

Vietnam approves the National Target Program to respond to Climate Change

2011

Vietnam approves the National Climate Change Strategy



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- National Target Program to respond to climate change: approved in December 2008. Sectors and localities develop measures to respond to climate change, integrating these issues into their socio-economic development strategies and plans. The

program is implemented from 2009 to 2015.

- Law on Energy efficiency and consumption: approved in June 2010. It is the “skeleton legislation” for all energy consumption and energy efficiency activities.
- National Climate Change Strategy: approved in December 2011. It contains 10 strategic tasks, including the task group of adaptation, the task group of mitigation, and steps to ensure the activities are effective, efficient and practical.

3



WHAT YOU CAN DO

Governments, business, non-government organisations and communities all around the world are already taking leadership in mitigating and adapting to climate change. Addressing climate change, however, requires contributions from all of us. Below are some things that you can do to make a difference:

EDUCATE YOURSELF: Keep yourself informed of the latest technology and your government's policies and laws for addressing climate change. This will help you to develop an appropriate and targeted idea of how you can contribute to the resolution of this pressing issue.

BE THE CHANGE: Taking action on climate change starts with you. Our greenhouse gas emissions are a direct result of our activities – our energy use, transportation choices and shopping habits. However, you have the power to act and reduce your emissions. At home and at work, in the street and when shopping, you can use your awareness of climate change to reduce your emissions, and encourage others to reduce their emissions too. Here are some simple tips to help you save energy in your home:

AT HOME:

-  **Lights:** Use natural light whenever you can during the day. At night, use energy saving light bulbs.
-  **Electronics:** Unplug your TV, your computer and your mobile phone charger. They still use power even when they are not in use. Unplugging these



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devices helps both to save electricity and lengthen their lifespan.

- **Hot water:** Turn the water-heater to medium rather than high and be aware that water-heaters consume a lot of electricity. Where possible, install solar water heaters.
- **Air conditioning:** Avoid using air conditioning on cooler days – use fans and natural ventilation wherever possible. If you do use air conditioning, set it at 26°C or warmer. Air conditioning is the fastest growing use of energy in Vietnam, often contributing to power failures in hot weather.
- **Keep your house green:** Refrain from using chemicals harmful to your health and that of the environment. Replace these with plant-based products and environmentally friendly alternatives.
- **Change your diet:** Include more vegetables in your meal. This is both better for your health and helps reduce greenhouse gas emissions.
- **Reduce waste:** When it breaks down, waste releases methane. Use recyclable packaging and buy long-lasting products. Compost organic waste or use it as fertilizer.



ON THE STREET:

- **Go Green:** Walking or cycling short distances saves fuel and helps to reduce greenhouse gas emissions.
- Share rides with friends and colleagues (to work or go out, etc), where possible.

AT SCHOOL/WORK:

- ✿ **Cut down on paper:** Paper currently accounts for 70% of office waste. Only print if necessary. If you do have to print or photocopy, remember to do so double-sided.
- ✿ **Create a green culture:** Create signs reminding people to save water and electricity in wash-rooms, classrooms and workplaces. Let people know how much energy and water they can save through these simple changes.

WHEN YOU SHOP:

- ✿ **Don't use plastic bags:** as they can take decades to break down and accumulate in the environment, choking waterways and damaging wildlife. Always remember to bring your own shopping bag.
- ✿ **Choose energy-saving devices:** Many electrical appliances such as refrigerators, air-conditioners and computers now carry energy-saving labels.
- ✿ **Buy locally produced products:** The things we buy, from food to clothes and electronics, all result in greenhouse gas emissions. By purchasing locally produced goods you support local industries and reduce transport emissions.



WITHIN YOUR COMMUNITY

- ✿ **Plant trees and help to protect forests and oceans.** Trees help to slow climate change because they absorb carbon dioxide. Oceans also absorb large quantities of carbon dioxide.
- ✿ **Teach children and women to swim** because it will help them protect themselves during rainy seasons.
- ✿ Learn about and **apply climate change adaptation activities** in your local area. Support vulnerable groups and areas.



- Keep yourself informed to ensure you are equipped to respond to any sudden weather changes.

GREEN YOUR JOB: Find out how to apply sustainability principles to your work, for example, if you are an architect, design and build environmental friendly houses using local materials and with closed loop waste management systems.

EDUCATE OTHERS: Share your ideas and knowledge with friends, family and teachers to promote environmental friendly behaviors.

VOLUNTEER: Contribute your knowledge, skills and labour to environmental activities. Your involvement has the potential to profoundly impact upon local communities' sustainable development efforts.

CONNECT AND MOBILIZE COLLECTIVE ACTIONS FOR POSITIVE CHANGE.



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TOGETHER WE CAN
CHANGE
THE WORLD

REFERENCES

1. Trần Công Minh, 2007. Primer on Climate and Meteorology, National University Publishing House, pp.242.
2. Institute of Dictionary and Vietnam Encyclopedia. Vietnam Encyclopedia. [internet] <http://dictionary.bachkhoatoanthu.gov.vn/default.aspx?param=1F31aWQ9MjM0JmJmYy3VwaWQ9JmtpbmQ9JmtleXdcvcmQ9dGglZTElYmllOWRpK3RpJWUxJWJhJWJmdA==&page=1>, last retrieved 20/3/2012.
3. Vietnam Institute of Meteorology, Hydrology and Environment. 2011. Assessment guide of climate change impact and identification of adaptation measures. Vietnam Natural Resources - Environment and Map Publishing House, pp.2.
4. Ministry of Natural Resource and Environment, 2008. National Target Program to respond to climate change, pp.6.
5. Discovery Channel. Climate Change History. In Global Warming: What you need to know. [internet] <http://dsc.discovery.com/convergence/globalwarming/timeline/timeline.html>, last retrieved 29/02/2012.
6. IPCC, 2007. Frequently Asked Questions. In Fourth Assessment Report: Climate Change 2007. The Physical Science Basis. [internet] http://www.ipcc.ch/publications_and_data/ar4/wg1/en/faq-1-3.html, last retrieved 28/3/2012.
7. IPCC, 2007. Frequently Asked Questions. In Fourth Assessment Report: Climate Change 2007. The Physical Science Basis. [internet] http://www.ipcc.ch/publications_and_data/ar4/wg1/en/faq-1-1.html, last retrieved 13/3/2012.
8. US Geological Survey. Water cycle (Trần Thục, Trần Văn Phúc và Phùng Thị Thu Trang – translated). [internet] <http://ga.water.usgs.gov/edu/watercyclevietnamese.html>, last retrieved 20/3/2012.
9. IPCC, 2001. Climate Change 2001: Synthesis Report. A Contribution of Working Groups I, II, and III to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Watson, R.T. and the Core Writing Team (eds.)]. Cambridge University Press, Cambridge, United Kingdom, and New York, NY, USA, pp 38.
10. IPCC, 2007. Summary for Policymakers. In Fourth Assessment Report: Climate Change 2007. The Physical Science Basis. [internet] http://www.ipcc.ch/publications_and_data/ar4/wg1/en/spm.html, last retrieved 13/3/2012.
11. Brandenburg University of Technology Cottbus, Department of Urban Planning and Spatial Design & enda Vietnam, 2011. How to respond to climate change impacts in urban areas. A handbook for community action.
12. IPCC, 2007. Errata. In Fourth Assessment Report: Climate Change 2007. The Physical Science Basis. [internet] http://www.ipcc.ch/publications_and_data/ar4/wg1/en/errataserrata-errata.html, last retrieved 13/3/2012.
13. Ministry of Natural Resource and Environment, 2009. Climate change, sea level rise scenario for Vietnam pp.4-6.
14. UNDP, 2008. 2007/2008 Human Development Report. Fighting climate change: Human solidarity in a divided world, pp.105.
15. Võ Quý, 2009. Climate change and biodiversity in Vietnam. Hanoi National University's newsletter no. 219.
16. Forest Inventory and Planning Institute-Vietnam Forestry Department. Vietnam's forests suffer severe recession. [internet] <http://fipi.vn/?u=nws&su=d&cid=305&id=341>, last retrieved 13/3/2012.
17. ADB, 2009. The economics of climate change in Southeast Asia: Regional review, pp.4-6.
18. UNDP, 2007. Climate change in Vietnam – Strategic direction of UNDP. National workshop on Climate change and Disaster management in Vietnam, 22 November 2007.
19. Ministry of Natural Resource and Environment, 2011. Climate change, sea level rise scenario for Vietnam pp.22-25.
20. National climate change strategy. Decision number 2139/QĐ-TTg dated 05/12/2011 signed by Prime Minister, pp.6.
21. Department of Hydrometeorology and Climate Change. Anomalous weather 2010. [internet] <http://dmhcc.gov.vn/index.php/Tin-bien-doi-khi-hau/bin-ng-ln-v-thi-tit-nm-2010.html>, last retrieved 20/3/2012.
22. Hồ Quang Phương. Searching solution for cattle died from the cold. Steering Committee to adapt to climate change-the Agriculture and Rural Development. [internet] <http://occa.mard.gov.vn/Content/Can-co-bien-phap-cham-dut-canh-trau-bo-chet-vi-gia-r%C3%A9t/2011/2/13/29096.news>, last retrieved 28/3/2012.
23. Phạm Xuân Ninh. Climate change and Health. Institute of Tropical Biomedical. [internet] <http://suckhoedoisong.vn/201003241025252p0c19/bien-doi-khi-hau-va-suc-khoe.htm>, last retrieved 28/3/2012.
24. WHO. Climate change and health. Fact sheet, July 2005. [internet] <http://www.who.int/globalchange/news/fsclimandhealth/en/index.html>, last retrieved 28/3/2012.



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