



# CLIMATE BOX

**Climate Education and  
Awareness Programme  
for Schools**

[climate-box.com](https://climate-box.com)

## **A special onboarding webinar to Climate Box educational programme for Southeast Asia**

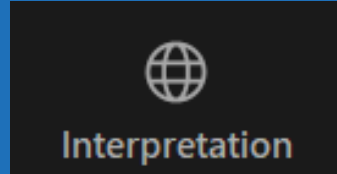
Lao PDR, Thailand and Vietnam

-  Thursday, 27 February 2025
-  14:00–16:00 ICT / Indochina time
-  Zoom Platform

# Housekeeping rules



Online Zoom webinar to be conducted in English language with simultaneous translation into Thai, Lao and Vietnamese.



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One short 5-minute break.

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All materials of the webinar and recording will be shared with the participants after the event.

All ask the participants to stay on mute during presentations. However, we encourage you to ask your questions using a chat / Q&A box. At the end of each session, there will be a dedicated Q&A session for presenters to pick up your questions.

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All registered participants will receive certificates of participation after the webinar.



# Warm welcome to the Climate Box programme!



# International Climate Box Programme Team



**Petra Valastinova**  
Climate Box  
Programme Manager,  
Bratislava, Slovakia



**Yulia Dobrolyubova**  
Technical Advisor, Author of the  
Climate Box Toolkit  
Bangkok, Thailand



**Armine Pogosyan**  
International Climate Education Expert,  
Author of Climate Box Supplements  
Yerevan, Armenia



**Aryanie Amellina**  
Climate Change Specialist, Author  
of Climate Box for Southeast Asia  
Jakarta, Indonesia / Australia



**Elena Malts**  
Climate Education and Teachers  
Engagement Specialist, Author of  
Recommendations for Teachers  
Sochi, Russia



**Danila Sorokin**  
Youth Engagement and Climate  
Projects Specialist,  
Youth Climate Contest Lead  
Moscow, Russia

# Welcome Remarks



## Stanislav Kim

Head of the Regional Team on Climate Change,  
Resilience and Disaster Risk Reduction,  
UNDP Regional Office for Europe & Central Asia

# Key Objectives of the Webinar



**Target audience:** The webinar is intended for educational specialists, teachers, partners and managers of the "Climate Box" programme in the Southeast Asian countries – Lao PDR, Thailand and Vietnam

## Objectives:

1. Familiarisation with the "Climate Box" programme and a new Southeast Asia toolkit being developed
2. Updating the participants on the most recent climate change science and climate action after the UN climate change conference (COP29) in November 2024
3. Presenting new recommendations and approaches for climate education
4. Hearing about best projects and lessons learnt from the 2024 youth climate project contest to prepare for the new contest in 2025
5. Informing about the programme calendar and key activities in 2025

# Agenda of the Webinar

Time (ICT)	Session	Moderator
14:00-14:10	Welcoming remarks from UNDP Presentation of objectives and agenda of the webinar	Stanislav Kim, UNDP IRH <i>UNDP APAC (tbc)</i>
14:10-14:20	The importance of climate change awareness and education	Armine Pogosyan Climate Education Specialist
14:20-14:40	Presentation of the "Climate Box" programme, toolkit and a new Southeast Asia (SEA) edition	Yulia Dobrolyubova, Technical Advisor, Author of the Climate Box toolkit
14:40-15:10	Presentation on climate change: global context, outcomes and key implications for Southeast Asia Q&A	Aryanie Amellina, Author of SEA Edition
<b>15:10-15:15</b>	<b>Break</b>	
11:15-11:40	Integration of climate education in schools, extra-curricular activities Q&A	Armine Pogosyan Climate Education Specialist
11:40-12:00	Future plans and next steps for SEA Q&A and closure	Petra Valastinova, Climate Box Programme Manager



# The importance of climate change awareness and education

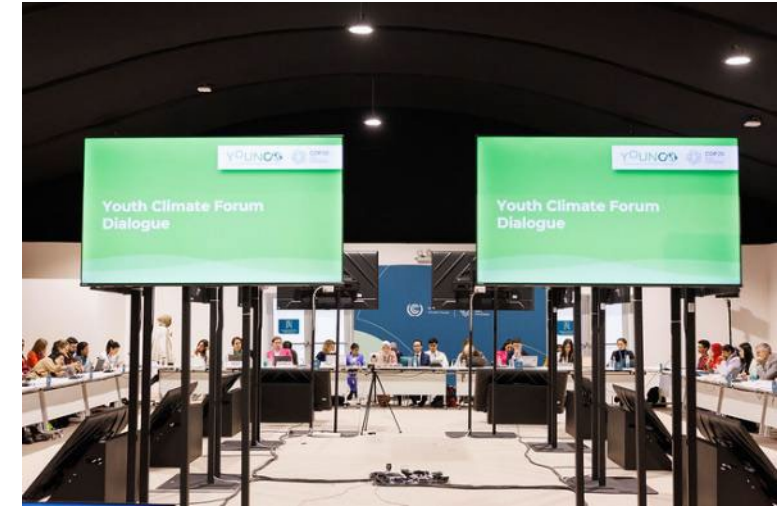
Armine Pogosyan



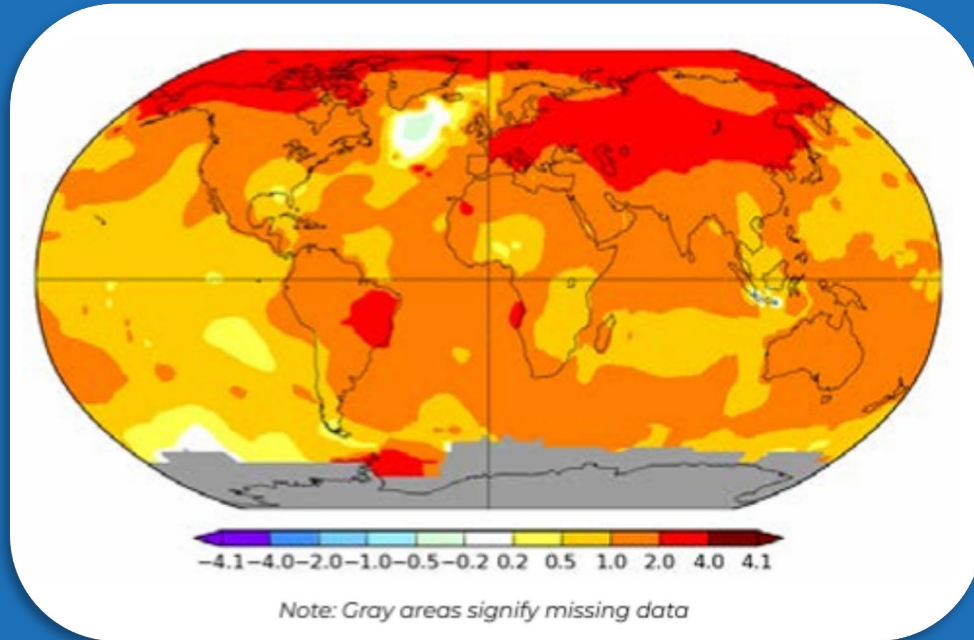
# Youth Taking Action for Climate



Youth delegations to international climate change negotiations



# Climate is changing



Map of observed changes in surface temperature on Earth between 1901 and 2022

## Impacts of Climate Change

**Extreme Weather:** More frequent heatwaves, hurricanes, floods, and droughts.

**Rising Sea Levels:** Threatens coastal communities and small islands.

**Biodiversity Loss:** Species extinction and ecosystem disruptions.

**Food and Water Security:** Crop failures, freshwater shortages, and climate-induced migration.

**Human Health Risks:** Spread of diseases, heat stress, and air pollution-related illnesses.



# United Nations Framework Convention on Climate Change

- Adopted in **1992** at the **Rio Earth Summit** to address global climate change.
- **Objective:** Stabilize greenhouse gas concentrations to prevent dangerous human-induced climate impacts.
- **Parties:** 196 countries and EU committed to international climate action.





# United Nations Framework Convention on Climate Change

## Article 6. Education, Training, and Public Awareness

- i) Development and implementation of education and public awareness programs on climate change and its consequences;
- ii) Public access to information on climate change and its consequences;



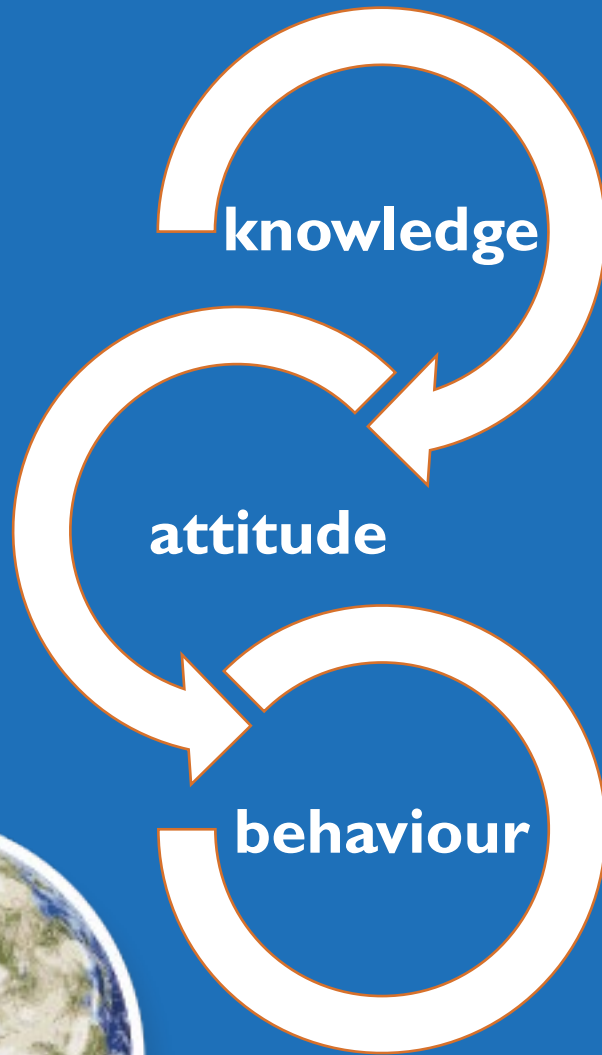
# Climate Change Education

The goals of climate change education include:

- raising awareness of climate issues,
- facilitating the understanding of the scientific aspects of climate change,
- encouraging actions for climate change mitigation and adaptation,
- fostering responsible behavior.



## ... this is why climate education is so important



Climate change educational programme aims not only to increase students' **knowledge** about climate change, but also to influence **attitudes** and **behaviour**, encouraging them to take sustainable and responsible actions in their daily lives.



# Knowledge



Educational programs may include the study of the main causes and impact of climate change, information on various methods of adaptation to climate change, and mitigation measures.

By raising awareness, students gain more detailed information about the consequences of their actions on the environment and, consequently, are more likely to change their behavior.

# Attitude



Discussing the role of human impact on climate change and the importance of actions in addressing this issue shapes attitudes by fostering responsibility, empathy, and a proactive mindset.

It encourages concern for the environment and sustainable habits, empowers individuals to adopt pro-environmental attitudes and take meaningful action.

# Behaviour



Students can be inspired to participate in initiatives aimed at reducing their carbon footprint, such as waste recycling projects, school greening efforts, and the adoption of energy-efficient practices.

By understanding the role they play in climate change, they are more likely to adopt behavioral patterns that reduce carbon emissions.



# Behavior Change Through Climate Change Education



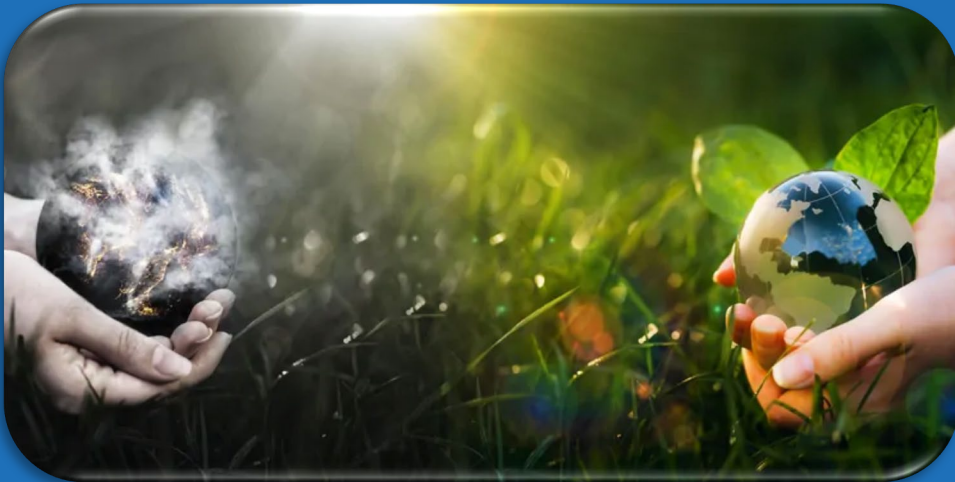
**Personalize:** Help students understand how climate change affects them personally. Use real-life examples to illustrate the connection between individual actions and broader environmental consequences.

**Set Achievable Goals:** Encourage students to set realistic goals. Break large goals into smaller steps and track progress to maintain high motivation levels.



# Behavior Change Through Climate Change Education

**Create Social Norms:** Promote a culture of sustainability by encouraging social norms that prioritize environmental care and resource conservation. Facilitate the exchange of experiences, ideas, and best practices.



**Encourage Behavior Change:** Positive reinforcement helps strengthen desired behaviors and encourages continued action.

# Behavior Change Through Climate Change Education



**Support Collective Action:** Emphasize the importance of collective efforts in combating climate change and encourage collaboration with other schools to support local initiatives.

**We are responsible for current and future climate change.**



- **It is important to educate children on how to tackle these challenges and build a more sustainable future.**
- **Action must be taken today.**





Q&A

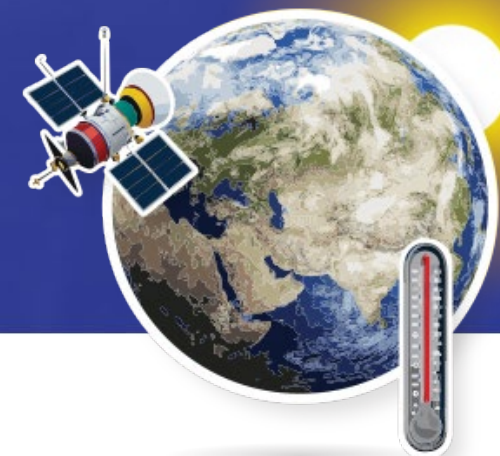
Armine Pogosyan





# About Climate Box programme and toolkit

Yulia Dobrolyubova

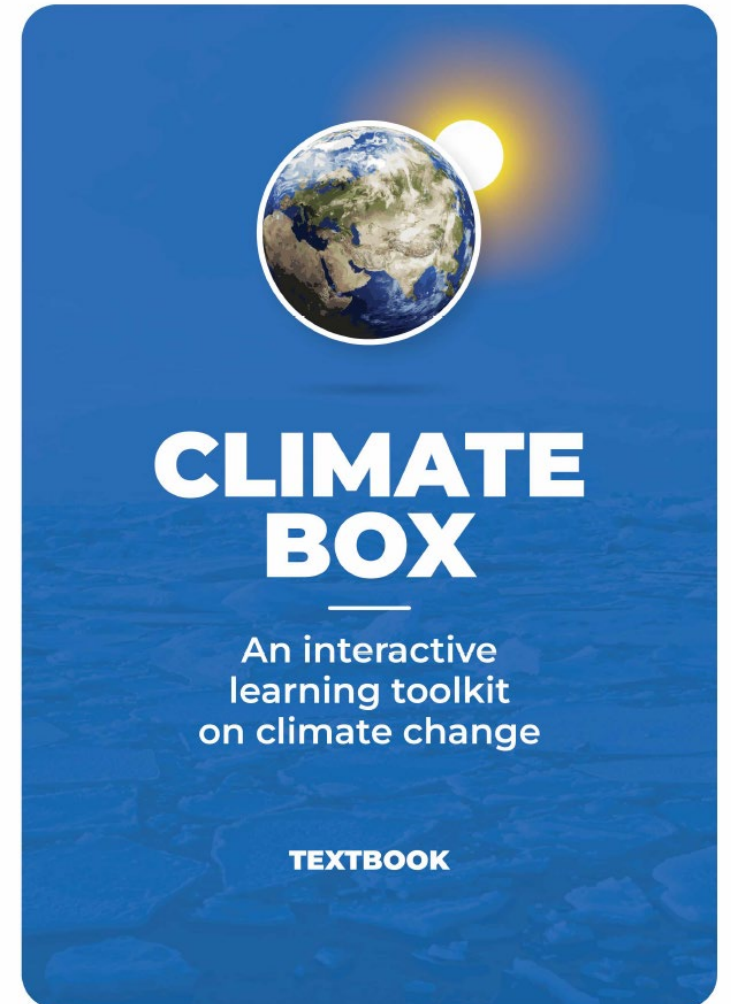


# Climate Box Program

## | What makes this programme unique?



- ✓ The first comprehensive and structured set of materials on the climate change topic for children in UN and national languages
- ✓ Colourful, educational, entertaining and easy-to-learn format
- ✓ A brilliant multidisciplinary team of authors
- ✓ Wide coverage of topics
- ✓ Climate Box can be interesting for any age
- ✓ Recommendations for teachers and leaders of extracurricular activities
- ✓ International coverage and local examples
- ✓ A whole range of activities accompanying the programme: training and exchange between teachers, international contests



# Climate Box Program

## Who is Climate Box for?

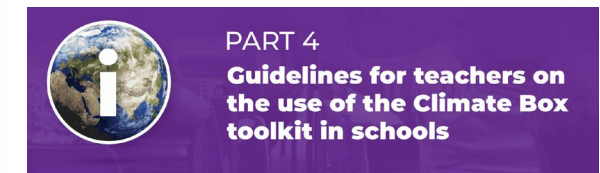
- ✓ **Youth:** learn about the global climate change through interacting, playing, and implementing projects; acquire skills for responsible lifestyle, energy saving and sustainable consumption
- ✓ **Teachers, educators, NGOs:** Access to scientifically sound, up-to-date information on climate change tailored to the national context; receive guidance on how to present the climate agenda to the youth and public.
- ✓ **Governments:** An effective tool to raise public awareness and encourage climate action at the local level.
- ✓ **General public:** Improve knowledge on climate change through participating in the programme activities.



# Climate Box

## Climate education toolkit for schools

1. **Textbook for Students** (8-18 years) and **Teachers + Guidelines for Teachers** how to use the materials at lessons and off-curricula
  2. **Climate Quiz**
  3. **Map** with climate impacts
  4. **Climate mitigation poster** 'How to reduce carbon footprint'
  5. **Climate adaptation poster**
  6. **Teachers' Retraining Module**
  7. **Gender Integration into Climate Education**
  8. **(2025) Workbook with exercises**
  9. **(2025) Youth Climate Project Guide**
- ... [www.climate-box.com](http://www.climate-box.com) website



Guidelines for teachers on the use of the Climate Box toolkit in schools

SECONDARY EDUCATION					
National Curriculum Framework for Science	Reasoning and skills content				
	Physics	Chemistry	Biology	Social Science	History
<b>PART 2: How to support classroom climate change</b>					
<b>22. Climate Change and the Greenhouse Effect</b>	<b>22.1. Climate Change and the Greenhouse Effect</b>	<b>22.2. Climate Change and the Greenhouse Effect</b>	<b>22.3. Climate Change and the Greenhouse Effect</b>	<b>22.4. Climate Change and the Greenhouse Effect</b>	<b>22.5. Climate Change and the Greenhouse Effect</b>
<b>22.1. Climate Change and the Greenhouse Effect</b>	<b>22.1.1. Climate Change and the Greenhouse Effect</b>	<b>22.1.2. Climate Change and the Greenhouse Effect</b>	<b>22.1.3. Climate Change and the Greenhouse Effect</b>	<b>22.1.4. Climate Change and the Greenhouse Effect</b>	<b>22.1.5. Climate Change and the Greenhouse Effect</b>

# Climate Box Textbook

## Three thematic chapters (following IPCC reports themes)

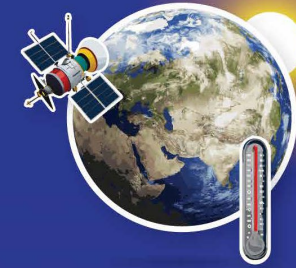
**1. The problem of climate change.** How and why the climate has been changing back in the history and today.

**2 How the climate change affects the natural world and human beings? Can we adapt to climate change?**

- Extreme weather events
- Biodiversity
- Agriculture and water resources
- Coastal regions
- Mountain regions
- Arctic regions
- Cities, human health and other social aspects

**3. How to mitigate climate change?**

- «Green» energy sources, energy efficiency, energy saving
- How to reduce your individual carbon footprint
- Global cooperation on climate change



PART 1

## The problem of climate change



PART 2

## How climate change affects the natural world and human beings

Can we adapt to the inevitable consequences of climate change?



PART 3

## How to prevent dangerous climate change

Each chapter has both general and local content.

# Climate Box Textbook

## Guidelines for teachers

Compiled in the form of tables, where the topics of all parts are projected on the educational programs of the school. The guidelines are adapted for the school curriculum in that country in each national Climate Box.

## Guidelines for teachers are adapted to the national curriculum in each country



## PART 4

### Guidelines for teachers on the use of the Climate Box toolkit in schools

#### PRIMARY EDUCATION

Section in the Climate Box textbook	The World Around Us Programmatic and thematic content			
	1 <sup>st</sup> grade	2 <sup>nd</sup> grade	3 <sup>rd</sup> grade	4 <sup>th</sup> grade
<b>PART 2. How climate change affects the natural world and human beings Can we adapt to the inevitable consequences of climate change?</b>				
<b>2.4. How climate change affects water resources</b>	<ul style="list-style-type: none"> <li>Plants. Plants in the immediate environment.</li> </ul>	–	<ul style="list-style-type: none"> <li>Water. Distribution of water in nature, significance for living</li> </ul>	<ul style="list-style-type: none"> <li>Reservoirs, their diversity (ocean, sea, lake, pond, swamp);</li> </ul>

#### SECONDARY EDUCATION

Section in the Climate Box textbook	Programmatic and thematic content				
	Biology	Physics	Chemistry	Social Sciences	Safety basics
<b>PART 3. How to prevent dangerous climate change</b>					
<b>3.3. Carbon footprint and how I can help the planet by reducing my carbon footprint</b>	<b>11th grade</b> <ul style="list-style-type: none"> <li>Methods of environmental research.</li> <li>Ecological worldview of modern people.</li> </ul>	<b>11th grade</b> <ul style="list-style-type: none"> <li>The culture of using electricity in everyday life.</li> </ul>	<b>8th grade</b> <ul style="list-style-type: none"> <li>Physical and chemical phenomena.</li> </ul> <b>10th grades</b> <ul style="list-style-type: none"> <li>Plastics.</li> <li>Natural and synthetic rubbers.</li> </ul>	<b>6th grade</b> <ul style="list-style-type: none"> <li>The connection between human beings and nature.</li> </ul> <b>7th grade</b> <ul style="list-style-type: none"> <li>Moral assessment of people's behaviour and your own</li> </ul>	<b>8-11th grades</b> <ul style="list-style-type: none"> <li>The influence of human activities on the natural environment.</li> <li>Environmental literacy and rational environmental management</li> </ul>

# Regional and National Climate Box Versions

## Climate Box for Southeast Asia

### | What to Expect for Southeast Asian countries?

- Translation into the national languages
- Regional and local examples of the impacts of climate change and response measures from Southeast Asia and your country
- Localised guidelines for teachers and how climate change topic can be integrated into national Curriculum
- Local support of an educational specialist in the national language
- Onsite workshops and webinars for teachers on the use of the toolkit



# Climate Box

## International Support and Activities

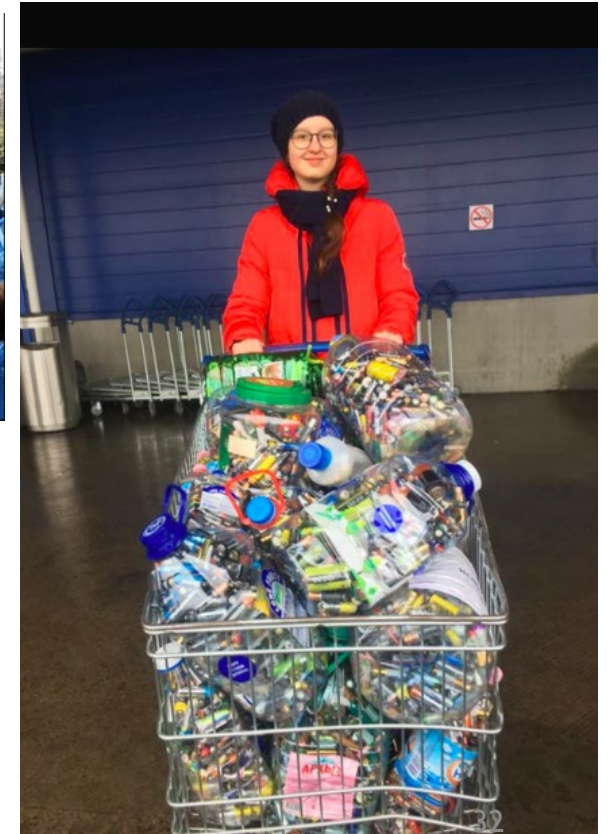


- Training of teachers and educational specialists
- National and international webinars/workshops to exchange experience
- International conferences and contests for educators
- International youth climate project contests
- Climate camps for the youth
- Collaboration with Ministries of Education and Ministries of Environment
- Monitoring and evaluation of impact



# Climate Box Programme results by 2025

- ✓ 13 countries, and 14 languages
- ✓ 3,000 teachers from 2,000 schools
- ✓ 60,000 schoolchildren
- ✓ 3 international conferences
- ✓ 2 youth climate project competitions and festivals
- ✓ >50 best climate projects presented at the international level



# Climate Box

## Climate conference for teachers and youth festival and camp for school children, Almaty, Kazakhstan, November 2024



*... new contests and international conference in November 2025*





# Q&A

Yulia Dobrolyubova

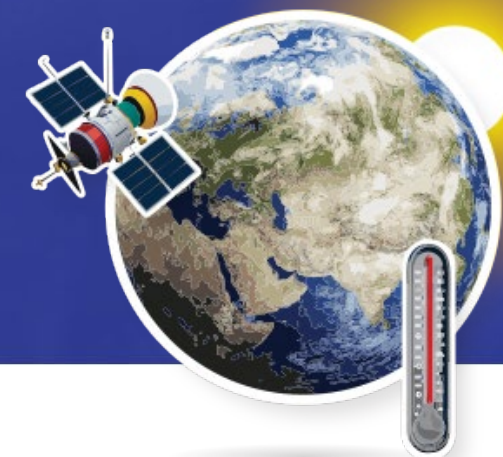




# South Climate Box for Southeast Asia:

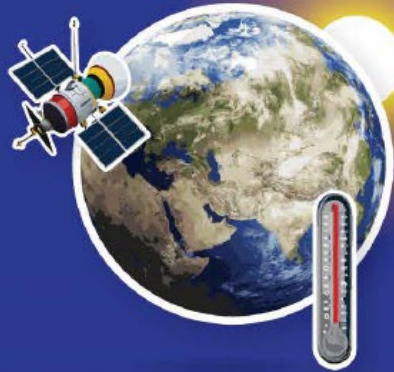
**Latest Climate Science, Implications for the  
Region and Successful Climate Change  
Adaptation and Mitigation Case Studies**

Aryanie Amellina



# Textbook Part 1: The problem of climate change

## How and why the climate has been changing in history and today



### PART 1

## The problem of climate change **11**

<b>1.1</b>	Climate and weather	15
<b>1.2</b>	Types of climate and climate zones	18
<b>1.3</b>	How and why the climate changed in the past	28
1.3.1	Causes of climate change: millions of years	30
1.3.2	Causes of climate change: tens and hundreds of thousands of years	32
1.3.3	Causes of climate change: centuries	35
<b>1.4</b>	Climate change today	40

# Weather and climate



## **WEATHER**

is the state of the atmosphere at a particular place at a particular time or for a limited period (for example, a day or a month).

## **CLIMATE**

is the average state of the weather at a particular place over a long period (several decades).

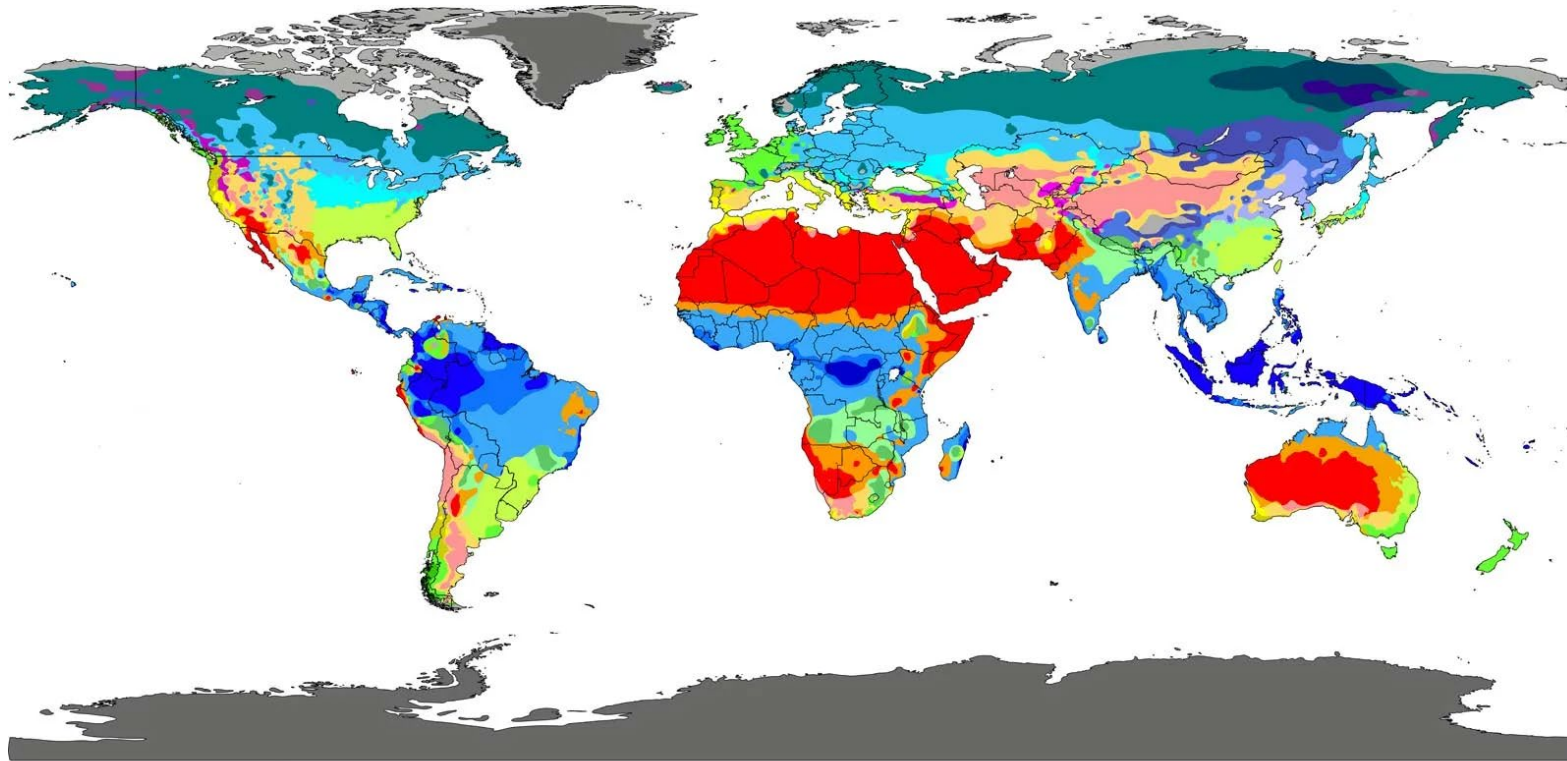


*'Climate is what we expect, weather is what we get'*

Mark Twain

# Types of climate and climate zones

## Köppen-Geiger climate classification



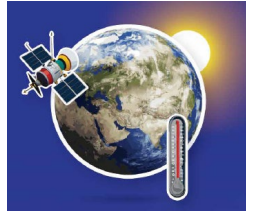
Af	BWh	Csa	Cwa	Cfa	Dsa	Dwa	Dfa	ET
Am	BWk	Csb	Cwb	Cfb	Dsb	Dwb	Dfb	EF
Aw	BSh		Cwc	Cfc	Dsc	Dwc	Dfc	
	BSk				Dsd	Dwd	Dfd	

- **A** – Tropical climates
- **B** – Dry climates
- **C** – Temperate (moist subtropical mid-latitude climates)
- **D** – Continental (moist continental mid-latitude climates)
- **E** – Polar and Alpine (polar climates)
- **H** – Highlands

Characteristics include average monthly temperatures, levels of precipitation, wet and dry periods, vegetation, locations (continents and regions).

# Climate change is not a theory, but a fact

Changes are taking place in all regions of the planet

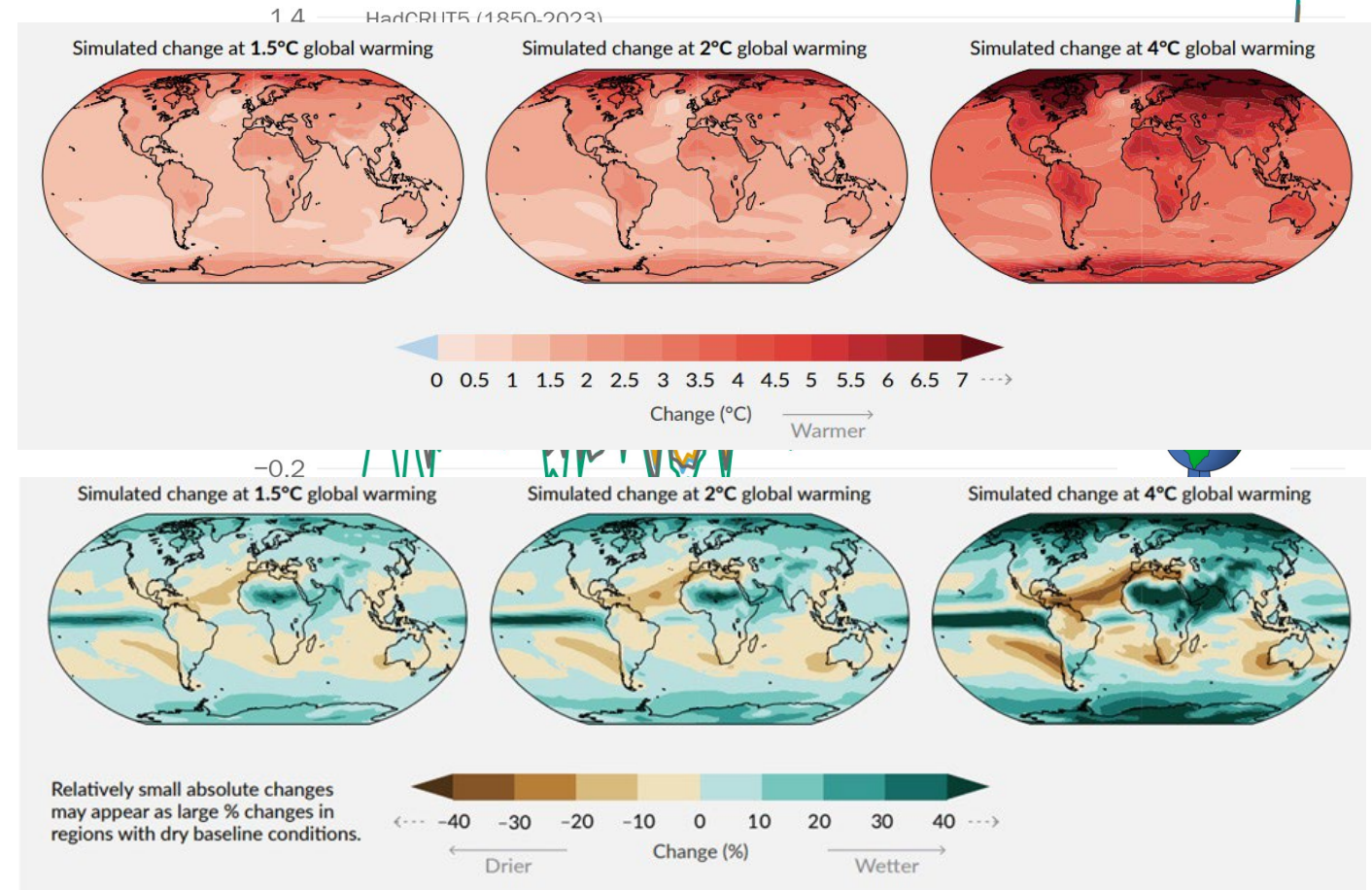


Evidenced by direct observations:  
since 1850, the average  
temperature on Earth has increased  
by 1°C.

2015, 2016, 2017, 2018 and 2019  
were the hottest years on record  
(WMO, 2020)

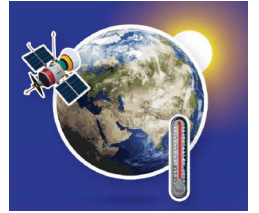
The world community recognizes  
1.5-2°C as a 'relatively safe'  
maximum temperature rise.

We are already halfway there!

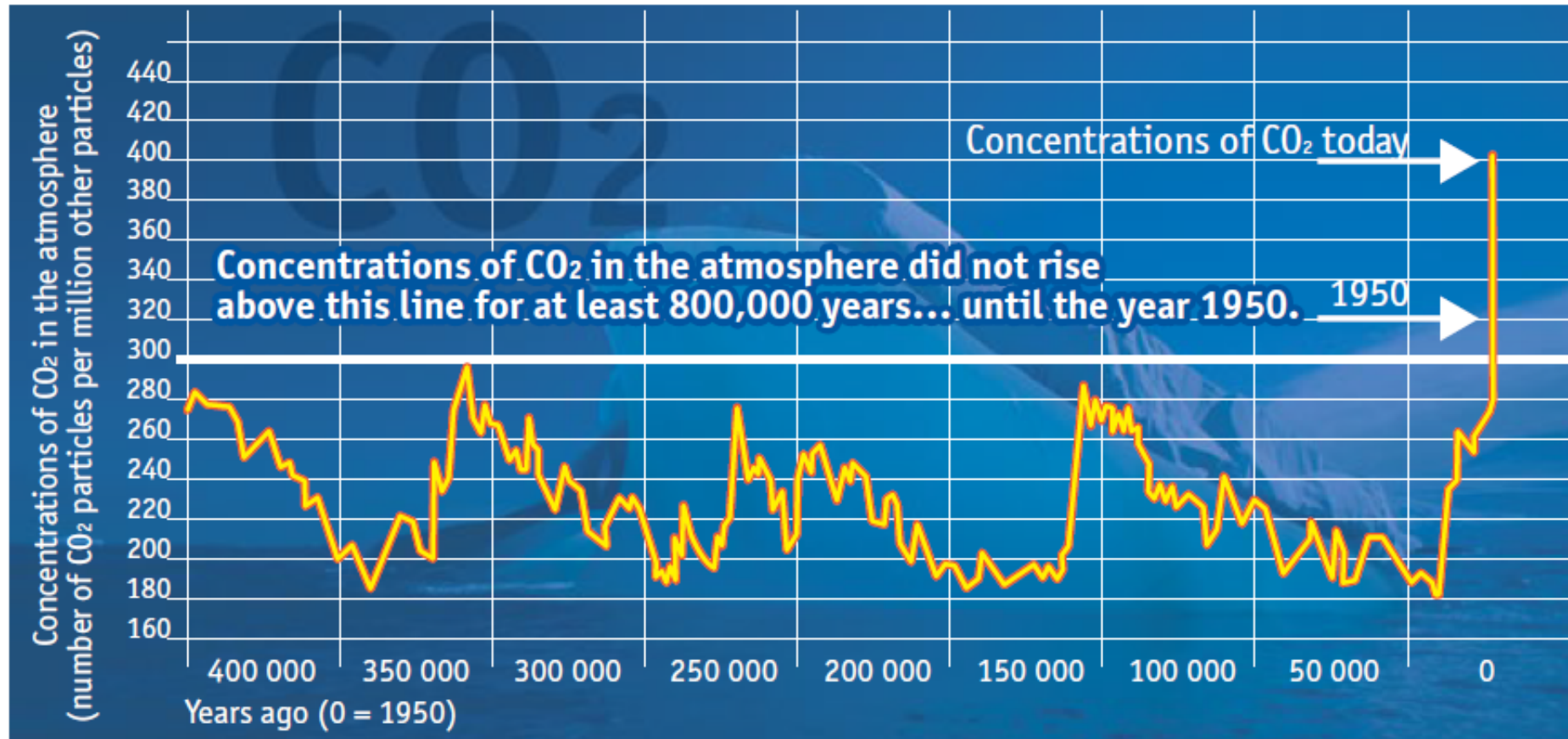


... and forecasts, alas, are disappointing if nothing is done

# Climate change has occurred on Earth before, but ...



The concentration of CO<sub>2</sub> in the atmosphere has never been so high

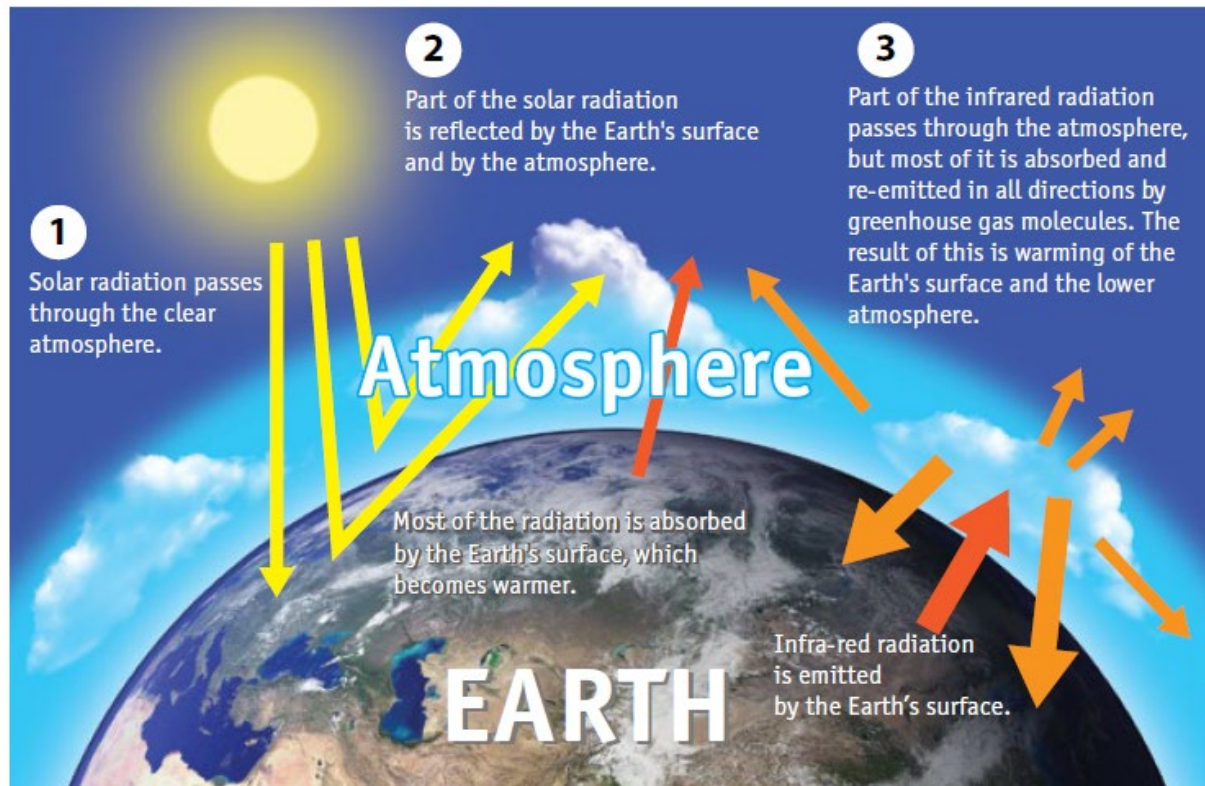


Source, NOAA 2013

# Climate change today: intensification of the greenhouse effect



The greenhouse effect is the process by which gases, dust, water vapor in the atmosphere absorb the earth's heat and prevent it from reflecting from the earth's surface - **the effect is similar to a greenhouse for growing vegetables**. Therefore, the gases responsible for this effect are called 'greenhouse gases'.



## Greenhouse gases are not pollutants!



Unlike pollutants, the role of CO<sub>2</sub> and other greenhouse gases **is not in a direct negative impact** on human health and the ecosystem at the **place of release**.

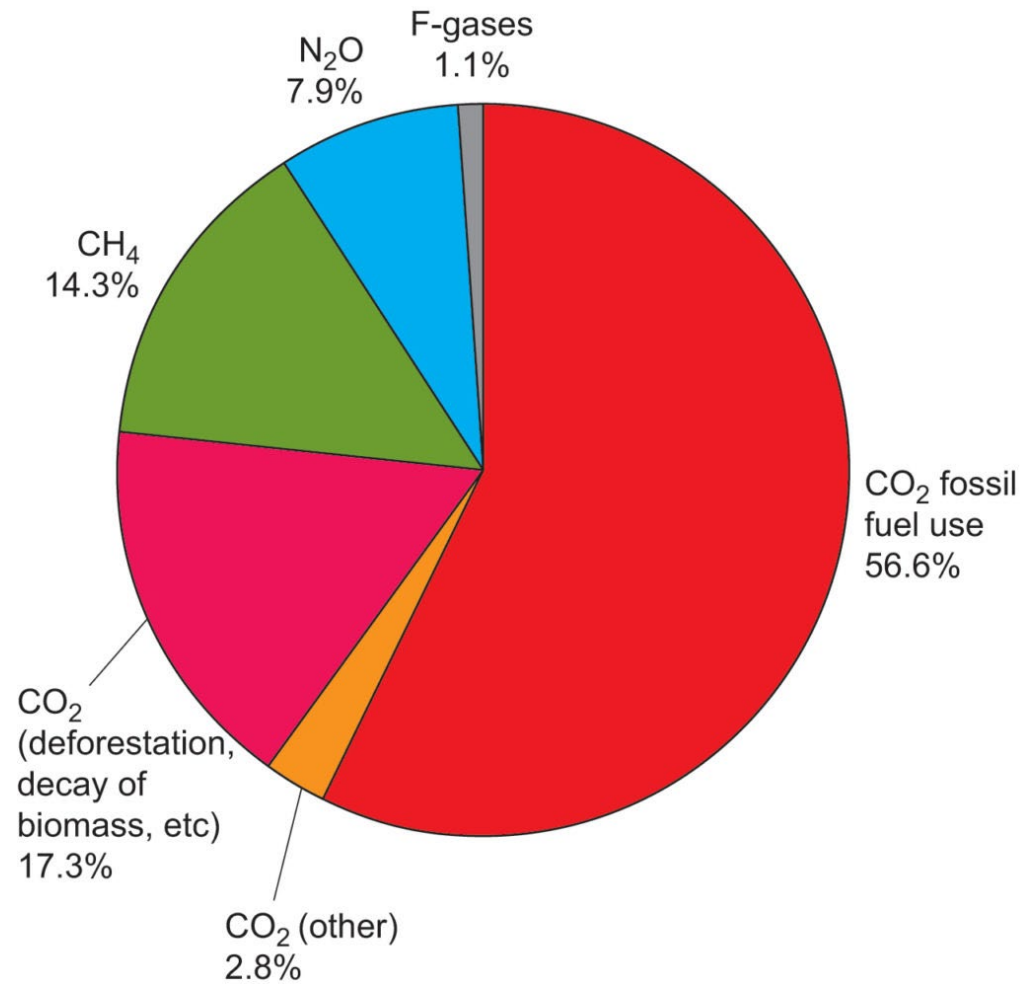
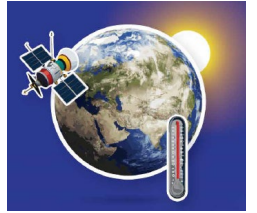


Accumulating in the atmosphere, they enhance the **greenhouse effect**, affecting the rise in temperature. Then the increasing temperature impacts other processes in the climate system, which, in turn, impact humans and ecosystems.



Thus, **we are affected by climate change caused by greenhouse gases, but not by the gases themselves.**

# Greenhouse gases associated with human activities



Source: IPCC, 2014



Extraction and use of energy from non-renewable hydrocarbon resources (oil, coal and natural gas) emit up to 75% of all greenhouse gases associated with human activities.

# How did scientists come to the conclusion about the leading role of humans in the ongoing climate change?



## Intergovernmental Panel on Climate Change (IPCC)



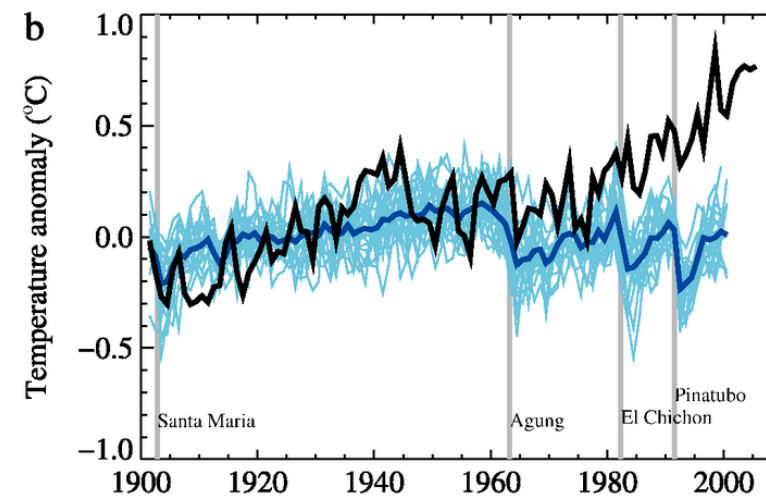
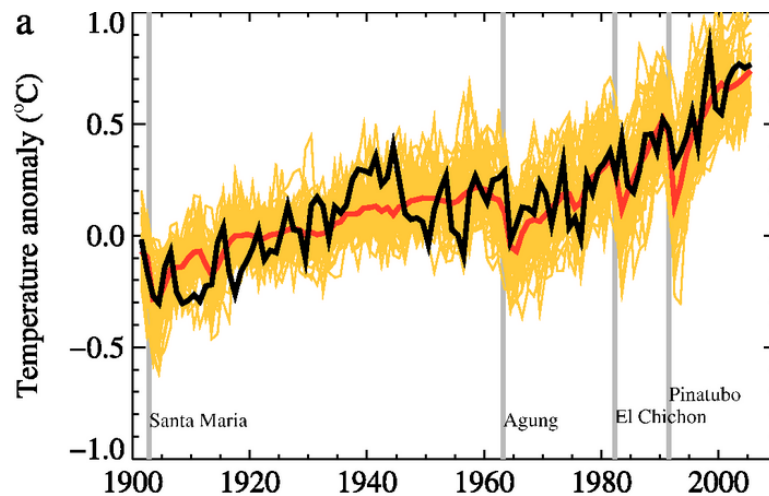
- United Nations organization responsible for assessing and compiling scientific evidence on climate change
- 195 participating countries
- 2,500 scientists and experts and 130 countries
- 30 years of active work
- Periodic detailed reports on the basis of which UN countries make policy decisions
- Awarded the Nobel Peace Prize in 2007 for his contribution to the formation and dissemination of knowledge about the problem of climate change and ways to solve it

# How did scientists come to the conclusion about the leading role of humans in the ongoing climate change?



Models versus direct observation (1900-2007):

a) taking into account human contribution and b) without human intervention



**Black line** - meteorological data

**Orange line** - simulation results taking into account human influence

**Blue line** - simulation results without human influence (natural causes only)

**Conclusion: without human influence, the rise in temperature would not be so significant**



# Textbook Part 2: How climate change affects the natural world and human beings

## Can we adapt?



## PART 2

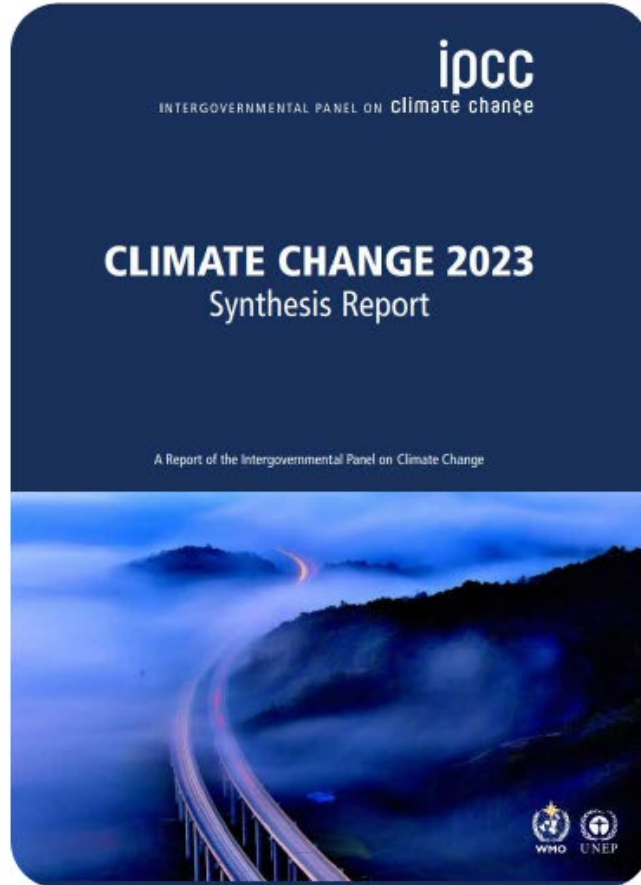
### How climate change affects the natural world and human beings

Can we adapt to the inevitable consequences of climate change?

51

2.1	How climate change affects the weather	59
2.2	How climate change affects plants and animals	72
2.3	How climate change affects forests	93
2.4	How climate change affects water resources	114
2.5	How climate change affects agriculture	125
2.6	How climate change affects coastal regions	132
2.7	How climate change affects mountain regions	143
2.8	How climate change affects the Arctic region	159
2.9	How climate change affects cities and human health	178
2.10	How climate change affects social problems	192

# The evidence is indisputable



**“It is indisputable that human activities are causing climate change, making extreme climate change events, including heat waves, heavy rainfall, and droughts, more frequent and severe.”**

**“The evidence is clear: the time for action is now.”**

You can find more at:

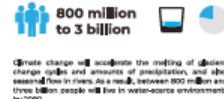
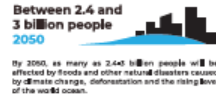
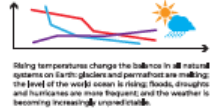
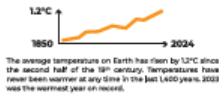
**<https://www.ipcc.ch/assessment-report/ar6/>**

# Examples of the effects of climate change on different regions



## CLIMATE CHANGE

The negative impacts of climate change on the environment and human beings by the end of the 21<sup>st</sup> century unless we do all we can to reduce greenhouse gas emissions



The burning of fossil fuels, widespread deforestation, and the rapid development of transport have led to a record increase in concentrations of greenhouse gases in the atmosphere, which have not occurred on Earth for at least the last 800,000 years. Since the Industrial Revolution (mid-19<sup>th</sup> century), the level of carbon dioxide (CO<sub>2</sub>) has risen by 50%, of methane (CH<sub>4</sub>) by 244% and of nitrous oxide (N<sub>2</sub>O) by 120%.



**THE ARCTIC**

- Shrinkage of sea ice, retreat of glaciers in Greenland, and melting snow cover
- Destruction (partial) of permafrost
- Shrinkage of the tundra
- Widening of permafrost with resulting emission of CO<sub>2</sub> and methane
- Change of flora, animal migration
- Endangered sea animals and animals living in coastal regions
- Threats to local species from species which were not previously present in those regions

**NORTH AMERICA**

- Abnormal patterns of precipitation, floods
- Heat waves
- Shrinkage of glaciers, forest fires, ecosystem changes, new species of animals and plants (in some parts of the continent)
- Water shortages
- Greater frequency and scale of forest fires
- Possible increase in the frequency and power of hurricanes (tornadoes) (in the central part of North America)

**Negative impacts on human beings**

- High costs of adaptation
- Flooding in regions and cities along coasts
- Reduction in the amount of land suitable for agriculture, leading to poorer grain harvests
- Possible change in the direction of the Gulf Stream in the 21<sup>st</sup> century may dramatically cool the climate in Northern Europe and the British Isles

**EUROPE**

- Extended periods of rain, major floods
- Changes in the paths and periods of bird migration, flowering of plants, etc.
- Appearance of new species of plants and animals, including disease-carrying insects
- Retreat of glaciers in the mountains, losses to the winter tourism industry
- Rising sea levels

**ASIA**

- Frequent droughts and water shortages in Central and Western Asia
- Shrinkage of mountain glaciers, permafrost, and snow, and major floods from overflowing glaciers in South Asia
- Major river flooding
- Shrinkage of coastal regions, cities, and land loss due to rising sea levels
- Irregularity of biological migration
- Changes in sea, river and land ecosystems

**Negative impacts on human beings**

- Difficulties in maintaining traditional ways of life for native people

**AFRICA**

- Major droughts, shortage of fresh water
- Decrease in forest cover
- Losses to water temperature in the great lakes of East Africa

**Negative impacts on human beings**

- Reduction in the amount of land suitable for agriculture, resulting in poorer grain harvests
- Mass migration of populations from the most affected regions

**CENTRAL AND SOUTH AMERICA**

- Abnormal patterns of precipitation
- Change of river flow and related problems with electricity generation for many countries (highly dependent on hydroelectricity)
- Threats to the Amazon rainforest and La Plata wetlands
- Shrinkage of mountain glaciers, permafrost, and snow, and major floods due to overflowing glaciers
- Water shortages in some parts of the continent
- Major damage to coral reefs

**Negative impacts on human beings**

- Extreme difficulty for agriculture to adapt
- Food shortages
- Difficulties in maintaining the traditional ways of life for native people
- Mass migration of population from the most affected regions

**SMALL ISLANDS**

- Changes to the ecosystems of some islands, destruction of coral reefs
- Partial or complete disappearance of islands under rising sea levels
- Threats to sea ecosystems from increased acidity and higher ocean temperatures
- Decreasing tourist flows

**Negative impacts on human beings**

- Need for people to resort from flooded areas

**AUSTRALIA**

- Heat waves, droughts, and major forest fires in southern
- Severe floods in northern Australia in the rainy season
- Destruction of coral reefs

**Negative impacts on human beings**

- Shortage of fresh water and lower crop yields

**ANTARCTICA**

- Shrinkage of glaciers in the western part of Antarctica
- Change in living conditions for penguins and other birds, as well as for sea creatures

**Change of temperature by the end of the 21<sup>st</sup> century compared with the pre-industrial era (mid-18<sup>th</sup> century)**



CLIMATE BOX

The map is based on the findings of the Fourth and Fifth Assessment Reports of the Intergovernmental Panel on Climate Change (IPCC), and the Sixth Assessment Report and the Global Warming of 1.5°C Report of the IPCC.



# Comparing risks at different temperature levels on human and natural systems

- Biodiversity loss
- Drought
- Food security
- Fires
- Extreme heat
- Sea level rise
- Floods
- Coral reefs



	1.5°C	2°C	3°C	1.5°C vs 2°C	1.5°C vs 3°C
<b>BIODIVERSITY LOSS</b> Maximum percentage of species at high risk of extinction across forests and land	14%	18%	29%	1.3x WORSE	2.1x WORSE
<b>DROUGHT</b> Dryland population exposed to water stress, heat stress and desertification	0.95B PEOPLE	1.15B PEOPLE	1.29B PEOPLE	200M MORE PEOPLE	340M MORE PEOPLE
<b>FOOD SECURITY</b> Costs for adaptation and residual damage to major crops	\$63 BILLION US	\$80 BILLION US	\$128 BILLION US	\$17B MORE	\$65B MORE
<b>FIRES</b> Increases in burnt area across Mediterranean Europe	40-54%	62-87%	96-187%	1.6x WORSE	3x WORSE
<b>EXTREME HEAT</b> Increase in number of days per year with a maximum temperature above 35°C (95°F)	45-58	52-68	66-87	1.2x WORSE	1.5x WORSE
<b>EXTREME HEAT</b> Increase in annual number of heatwaves in Southern Africa	2-4 TIMES	4-8 TIMES	8-12 TIMES	2x WORSE	3.3x WORSE
<b>SEA LEVEL RISE</b> Global mean sea level rise by 2100	0.28-0.55m	0.33-0.61m	0.44-0.76m	1.1x WORSE	1.4x WORSE
<b>FLOODS</b> Increase in global population exposed to flooding	24%	30%	NO DATA AVAILABLE	1.3x WORSE	NO DATA AVAILABLE
<b>CORAL REEFS</b> Further decline in coral reefs	70-90%	99%	NO DATA AVAILABLE	1.2x WORSE	NO DATA AVAILABLE

# How climate change affects the weather

## Unsettled weather



- Much more extreme weather (globally)
- The number of extreme weather events is constantly growing every year
- Hazardous weather events that used to occur once every 1,000 days now occur every 200-250 days (*Nature* publication)
- Long-term warning of severe weather events is only possible in a very general form by building climate models
- Weather anomalies vs extreme weather



Unusual weather is not equivalent to climate change. For example, one very cold winter does not necessarily mean that the climate has become cooler. Data must be collected over a long period of time, ‘trend’, (about ten years or more) before we can speak of climate change.

Extreme weather events include prolonged heat or extreme cold, very strong wind, hurricanes, tropical storms (typhoons), dust storms, heavy rain, heavy snow, whirlwinds or tornadoes, floods, droughts, avalanches, landslides, etc.

# How climate change affects the weather

## Examples of weather anomalies in the last decade



**Typhoon Yagi 2024:** In September 2024, heavy rain triggered by Typhoon Yagi caused floods and landslides in four provinces in northern Laos. Luang Namtha Province was the worst affected with over 40,000 people impacted in 20 villages. Torrential rains caused rivers to overflow, submerging entire communities and sweeping away homes and livelihoods. Typhoon Yagi also triggered widespread floods in Thailand, Myanmar, and Viet Nam.



**Viet Nam drought 2024:** Between March and May 2024, the Central Highlands of Vietnam, the country's primary coffee-growing region, faced the worst drought in nearly a decade. This extreme heat threatened coffee production, with forecasts indicating a potential 10–16% drop in output for the next season.



**Asia Heatwave 2022-2023:** China was hit by heatwave events that lasted for more than 60 days . The heatwave, combined with anomalies in atmospheric circulation, causes electricity shortages, factory shutdowns, crop failures, and heat stroke cases in China's southeastern and southwestern regions. In 2023, China, Thailand, Vietnam, and Laos had heatwave events that saw the countries reaching record-breaking temperatures of more than 40°C.

# How climate change affects biodiversity



## What is biodiversity?



### **BIODIVERSITY**

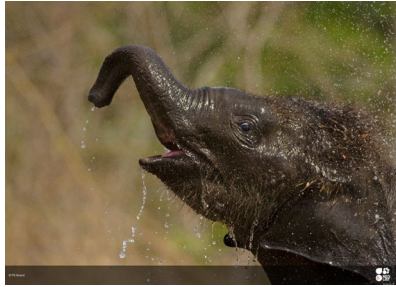
is all the various species of plants and animals, fungi and micro-organisms, as well as the many combinations of environments (landscapes) and the huge number of variants between the genes of similar organisms. In other words, biodiversity is the multiplicity of forms and manifestations of life on Earth.

Scientists distinguish three main types of biodiversity:

- **genetic** – between organisms of the same species;
- **species** – between all of the living beings on the planet;
- **landscape or ecosystem** – between all the combinations of environments where organisms live.

# How climate change affects biodiversity

## Animals



One of the greatest concerns for **Asian elephants** is their dependence on large quantities of fresh water, which is crucial for their daily activities, reproduction, and migration. Droughts and altered rainfall patterns, as a result of climate change, may reduce their access to water and food. They are also under other threats such as habitat loss, human-elephant conflict, and poaching.

In Laos and Vietnam, **Irrawaddy dolphins** inhabiting the Mekong River are under threat from changing water levels caused by climate change and dam construction. Rising temperatures and reduced freshwater flow increase river salinity, affecting the dolphins' habitats and food sources. Their already small population is now at even greater risk of extinction.



Coral reef.

**Corals** are organisms very sensitive to environmental changes. Too warm or too cold water, lack of light, excess of impurities - all this slows down the growth of corals or completely stops it. Microalgae, which assimilate the energy of sunlight for coral polyps, are highly dependent on water temperature. In many areas of Australia's Great Barrier Reef, scientists have noted algae death and coral bleaching that occurs when the reef dies.

# How to preserve biodiversity?



## National parks, reserves, sanctuaries and natural monuments

**National park** is a protected area that can be visited by tourists, but where human activity is limited by definite rules. National parks are usually created in places where there are many different landscapes (both typical and unique), rare or endangered animals and plants, and unique geological or water phenomena.



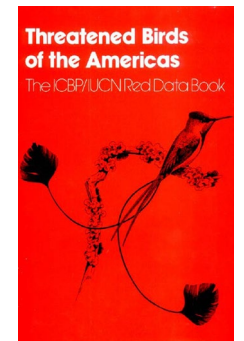
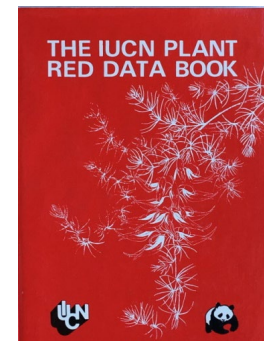
All biosphere reserves participate in the Man and the Biosphere Programme, run by UNESCO, which supports long-term studies of the environment. Studies are now being carried out in many reserves of the impact of climate change on plant and animal life.

## Ecotourism

**Ecotourism** is the opportunity to see the environment in its untouched, natural state, to understand how diverse it is, how vulnerable to human activity, and to ponder the question: 'What can I do for my planet?'

## Red Book

**The Red Book** is a list of rare and endangered species of animals, plants and fungi published by the International Union for Conservation of Nature and Natural Resources (IUCN). The colour red reminds us of the risk to these species and the urgent need to protect and preserve them.



# How to preserve biodiversity?

## Sanctuary and protection policy



The **Thungyai-Huai Kha Khaeng Wildlife Sanctuaries** in western Thailand is the largest nature sanctuary in mainland Southeast Asia. Spanning over 600,000 hectares in area, it preserves, waterfalls, two river systems, and wetlands, providing a shelter to 77% of large mammals, 50% the large birds and 33% of the land vertebrates in the region, including around 28 threatened species, and acting as a carbon sink.

This UNESCO World Heritage site has a strong legal protection and public funding, but research on this area suggests stronger restriction of access from new agriculture, dam, and mining projects close to this area that have led to animal poaching and deforestation of buffer zones.



# How do forests affect climate?

- Photosynthesis
- Retain moisture in the soil and affects evaporation
- Snow cover remains longer in the forest
- Carbon pool

The life of the forest and its geographic distribution depend on climatic conditions, especially air temperature and the amount of precipitation. Relief, soil quality, water bodies and human activity are also important for determining forest cover.

If we want to use forest to prevent climate change, we need to:  
1) plant new young forests, where there was no forest before;  
2) take good care of existing forests.



*Fig. 2.3.11. The wood in tree trunks is the biggest part of the phytomass carbon pool.*



*Fig. 2.3.12. Dead trees are part of the dead wood carbon pool.*



*Fig. 2.3.14. If soil is dark, it contains a lot of carbon.*



# How do the disappearance of forests affect climate?

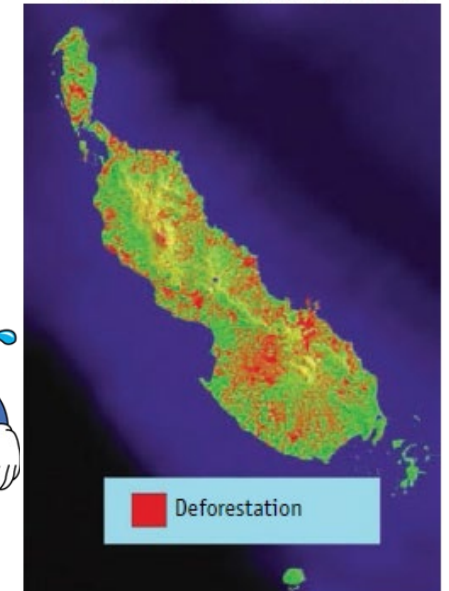
Tropical rainforests play a very important role in regulating the Earth's climate. The disappearance of tropical forests leads to the loss of fertile topsoil, loss of biodiversity and disruption of the ecological balance over large areas of the planet.

Today tropical rainforests cover only 5% of the Earth's surface compared with 12% a hundred years ago. An area of forest larger than the whole of England (130,000 km<sup>2</sup>) is being cut down or burnt each year.

A project in Lao PDR aims to halt deforestation and improve forest management in Laos, focusing on the Central Annamites Landscape area in Salavan and Sekong provinces and parts of Vietnam. This area hosts some of Asia's most intact forests with high endemic biodiversity, with Xe Sap National Protected Area as the key focus in Lao. The programme also promotes community participation to ensure sustainable benefits for forest-dependent communities.



Fig. 2.3.18. Loss of forest cover on the island of Bougainville (Papua New Guinea), 1972-2002.



# How climate change affects water resources

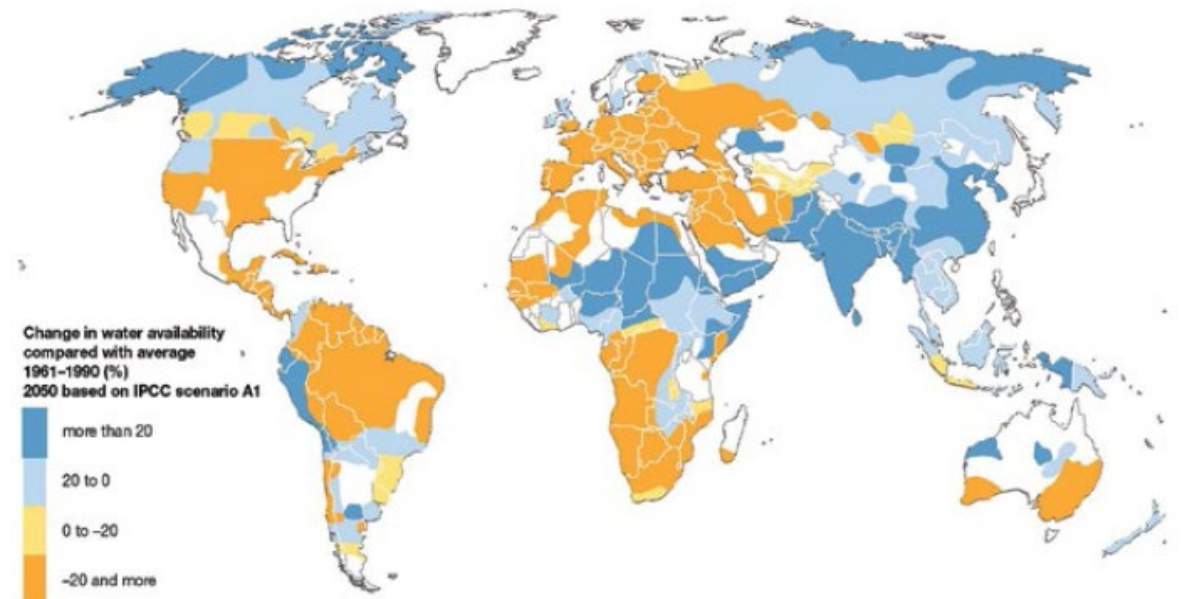
Water shortage problems have become worse because of global climate change and the increasing demand for food and hygiene from the world's growing population.

Warming of the climate in many parts of the world may increase the frequency of heavy rains, causing disastrous flooding. In other areas, on the contrary, precipitation is expected to decrease, so that extreme droughts will happen more frequently.



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*Fig. 2.4.2. Water availability change by 2050 compared with average 1961–1990.*



Water shortages due to climate change will particularly affect arid regions of the world, most notably the Mediterranean countries, the western United States, Southern Africa and northeast Brazil.

## How climate change affects water resources

How can the risks be reduced?

- Steady improvement of weather forecasting.
- Use technology and engineering solutions that can reduce risks to people and infrastructure, carefully.
- Reduce water consumption. This can be done, for example, by using rainwater or by using the same water twice for different needs.
- Desalinate sea water. Such installations already exist.



*Fig. 2.4.9. A seawater desalination plant in the United Arab Emirates.*



# How climate change affects agriculture

Agriculture is threatened by such effects of climate change as:

- rise of temperatures;
- changing rainfall patterns, rise of sea levels (affecting coastal lowlands);
- frequent droughts and floods, especially in areas that are prone to natural disasters.

Experts of the International Food and Agriculture Organization believe that crop yields in many parts of the world will decline after 2030 due to climate change.

Agriculture is the main source of income for one third of all working people in the world. In some countries in Asia, more than half of the population is engaged in agriculture.



# How climate change affects coastal regions

Coastal zones are highly vulnerable to the effects of climate change:

- rising sea levels;
- more intense storms;
- flooding and shore erosion;
- increase in the frequency of extreme weather events.

The level of the world ocean has been rising steadily for over 100 years. It rose by 17 cm in the course of the 20th century.

## Two causes of rising sea levels:

1) the melting of glaciers in Greenland and Antarctica, which pours extra water into the world ocean;

2) thermal expansion of water. As temperatures increase, water expands and takes up more space.

## Flooding of coastal regions

Fig. 2.6.1. Forecasts of coastal flooding on different continents, assuming a rise of sea levels by 5 m.



Venice



Jakarta



Bangkok



Ho Chi Minh City

# How climate change affects coastal regions

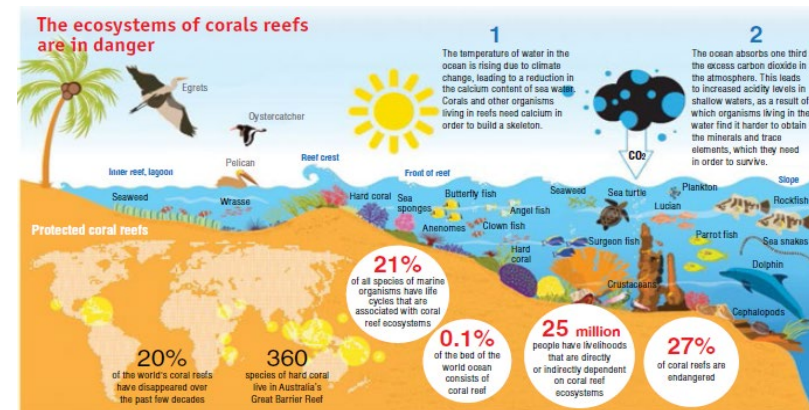
## Erosion and destruction of coastline

Erosion and destruction of coastline by the sea is another consequence of rising sea levels. Erosion is a particularly serious problem along Arctic coastline, which was previously protected by ice, but is now losing ground rapidly as the ice cover has lessened and storm weather has become more frequent. The coast in the Arctic is retreating by as much as 10–25 m or more each year in some places.



## Risk to ecosystems

- **Mangrove forests** will be affected by rising ocean levels.
- Ocean warming poses significant threat to **coral reefs**.
- **Salt marsh** ecosystems are also threatened by ocean warming.

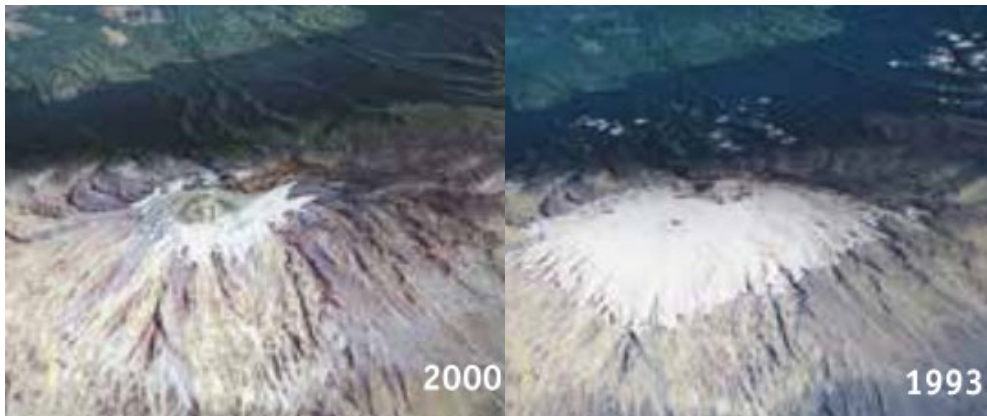


As well as its impact on people and the economy, the rise of sea levels also affects both sea and land ecosystems along the coast.

# How climate change affects mountain regions

## Mountain glaciers retreat

The main 'indicator' of climate change in the mountains is glaciers, which decrease or increase their mass as the temperature gets warmer or colder.



**The African volcano, Kilimanjaro**, has suffered perhaps the worst of all: its famous ice cap, which was immortalized in Ernest Hemingway's novel 'The Snows of Kilimanjaro' has almost entirely disappeared.



*Fig. 2.7.6. The Gangotri glacier.*



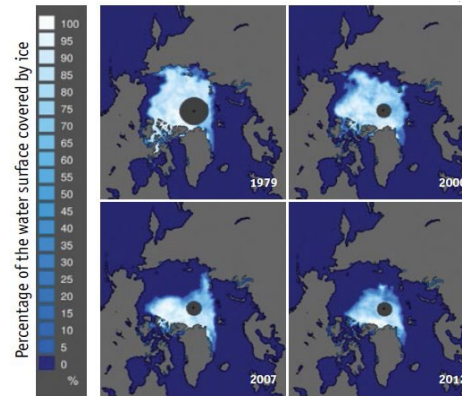
**Glaciers in the Himalayas** are retreating by an average of 10–15 m per year. The Gangotri glacier, which is the source of the River Ganges, is melting particularly fast, retreating by 30 m each year. Gangotri is one of the main sources of water for the 500 million people who live along the Ganges River.

# How climate change affects the Arctic regions

The Arctic is getting warmer faster – ice is disappearing

## Threats to the animals

The melting of ice in polar regions has major impact on marine animals, including the ‘king’ of the Arctic – the **polar bear**.



The Barents and Kara seas are the habitat of the **Atlantic walrus**, which is listed in the Red Book. Because of the melting ice, the rookeries of these animals are reduced and their migration is hampered.

The survival of **harp seals** in the White Sea is facing challenge. Seals cannot live on the coast, and the ice continues to melt.

## Melting of the permafrost

Another large-scale problem is the **melting of permafrost**.

Another important point is that large amounts of greenhouse gases are released from the tundra soil in the process of permafrost melt, increasing the greenhouse effect and speeding up global warming.



# How climate change affects cities and human health

Half of the world's population live in cities

Since the end of the 19th century there has been a major influx of population to towns and cities (urbanization).

Cities are unique environmental hot spots on our planet (heat island), taking the word 'hot' quite literally!

Fig. 2.9.4. Air temperature distribution over a city (urban heat island).

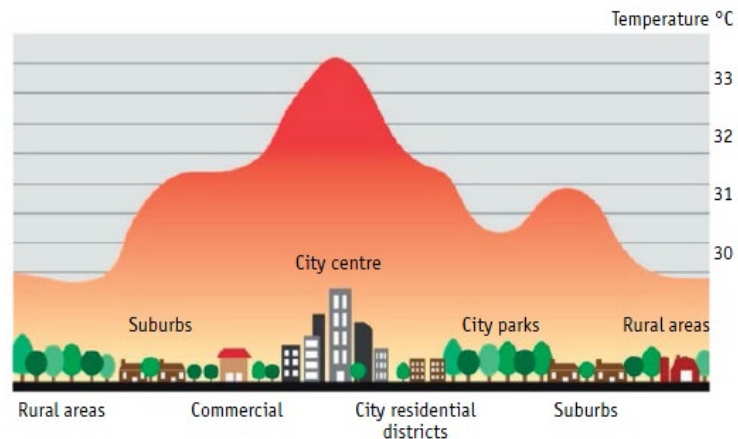
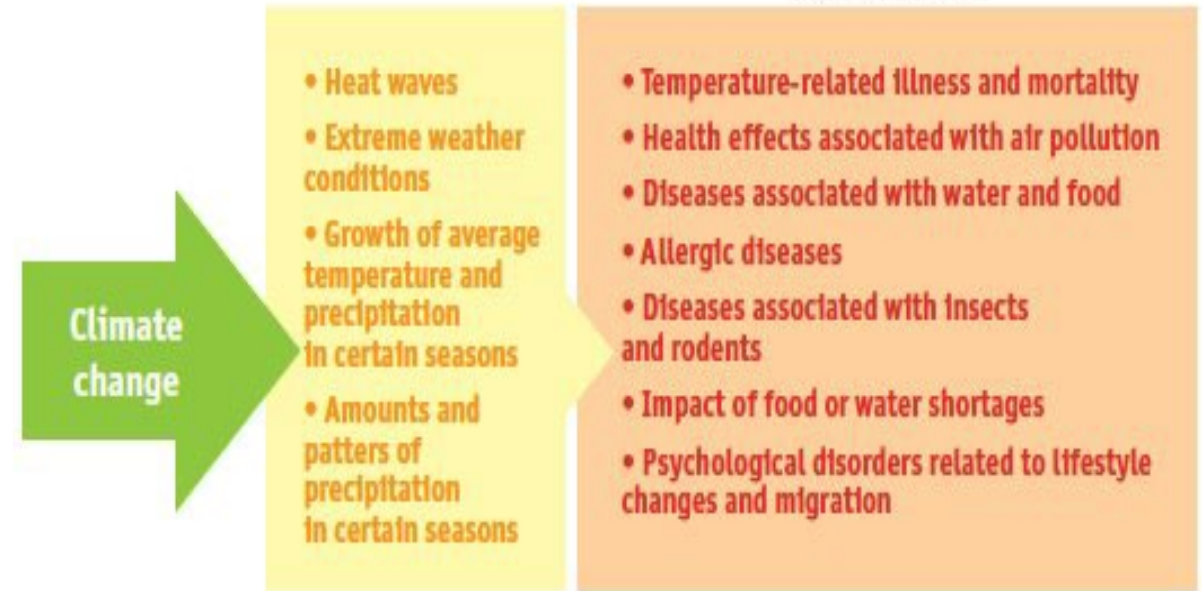


Fig. 2.9.6. Impacts of climate change on human health.



Climate change has negative impacts on human health. Dangerous infectious diseases, such as encephalitis, malaria, and dengue fever, spread to areas where they were not previously present, and the period of the year when there is danger of infection becomes longer.

# What are the adaptation solutions based on ecosystems?



# Textbook Part 2: How to prevent dangerous climate change



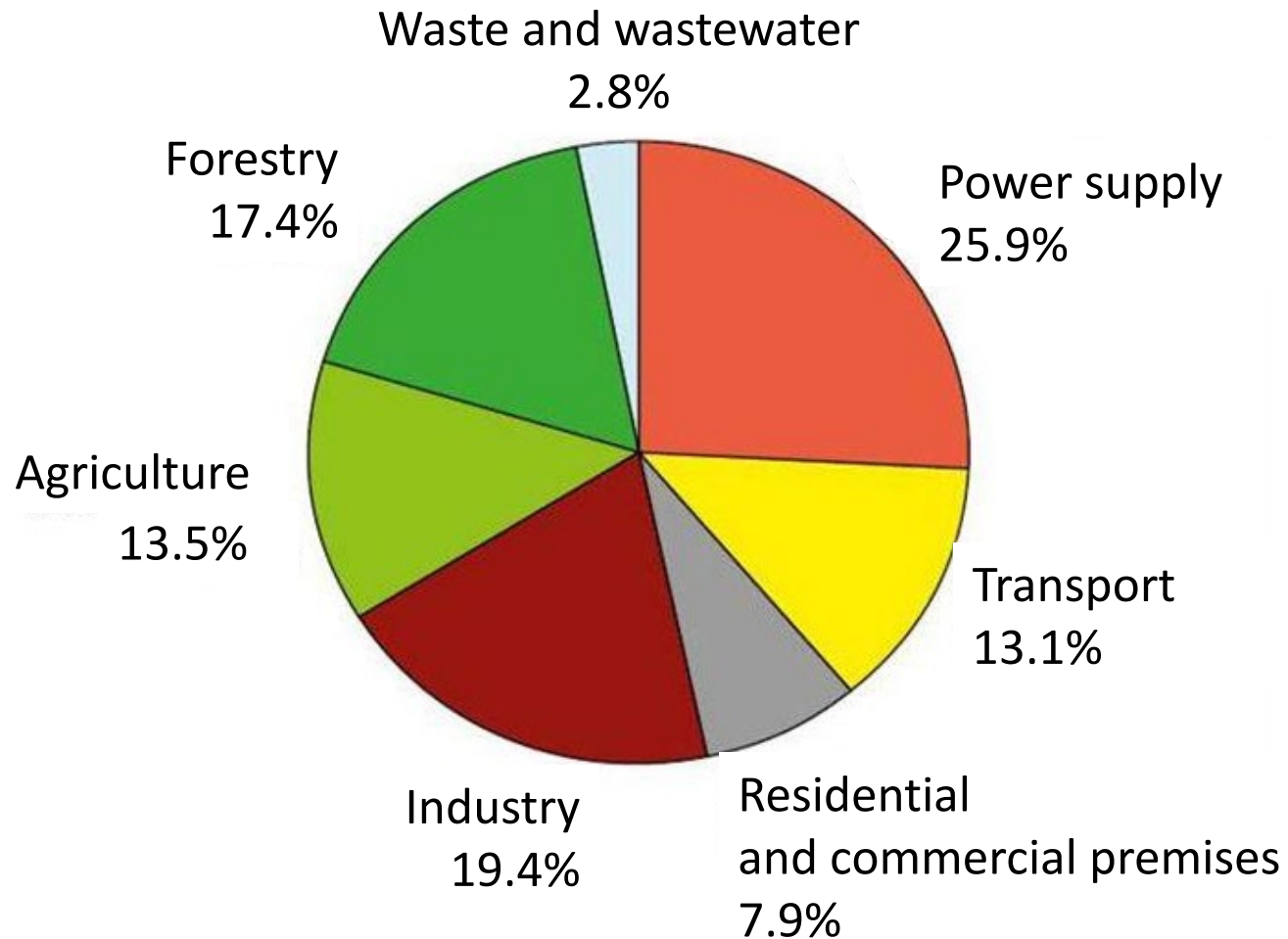
## PART 3

### How to prevent dangerous climate change

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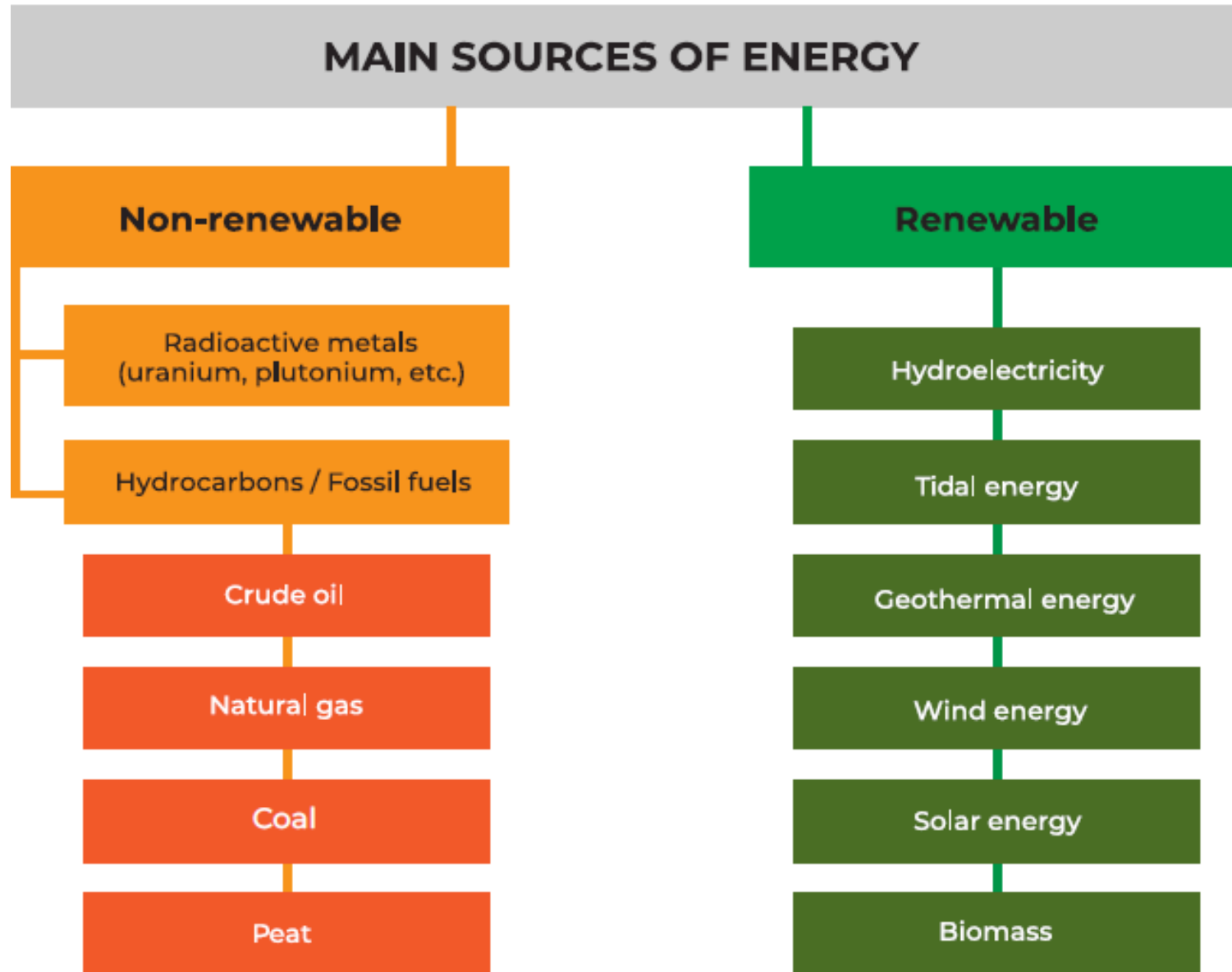
# Sources of greenhouse gases (our carbon footprint)



About 75% of these emissions are directly or indirectly related to the production or consumption of energy from hydrocarbon sources.

Source: IPCC 2014

# Main sources of the energy we use



## Solution 1: switching to renewable energy sources

### Solar energy: hot water and electricity

**Solar collectors** capture the heat of the sun. Water flows along tubes inside the collector and becomes warm (air or antifreeze is sometimes used instead of water). Such collectors can be used for heating buildings and to provide hot water.



**Photovoltaic cells** are another much-used way of collecting and storing solar energy and solar energy storage. Photovoltaic cells can be used on roofs and facades of buildings, for various vehicles or for large power plants - 'solar farms'.

### Energy of water

The most common are **powerful hydroelectric power plants**, during the construction of which a **dam** is built, and all the power of the river is directed to the rotation of the generator blades. The construction of such a dam upsets the natural life of the river: it may alter the river's microclimate, destroying or harming the animals and plants that live there. So the construction of a hydroelectric power plant must be approached very carefully, paying due attention to environmental balance.

Damless hydroelectric generators are called **mini-hydroelectric** power plants and **micro-hydroelectric** power plants. They are installed on small rivers and collect the energy of the flow into the battery. Their capacity is small, they are suitable for providing energy to small farms.

**Wave power stations** use the energy of waves in the ocean. **Tidal power plants** use the extraordinary phenomenon of tides.

# Solution 1: switching to renewable energy sources

## Wind energy

Modern wind turbines use a principle analogous to ancient windmills. Most often they are placed in coastal areas where strong winds constantly blow. A large wind farm can consist of several hundred windmills spread over a vast area - up to several hundred square kilometers.

Wind turbines are built not only on land, but also in the sea - the so-called **offshore wind farms** - and future



## Geothermal energy

Geothermal energy uses heat produced by the earth. Evidence of the heat contained in the earth is visible in areas of volcanic activity, where hot underground water sometimes rises through cracks in the earth's surface and occasionally bursts upwards in the form of jets of water and steam. A borehole can be drilled to hot underwater lakes and their water can be used for heating or electricity generation, and also as a supply of hot water (if the chemical composition of the water is suitable).

## Biomass

The simplest and most common way to produce energy from biomass is by burning it. However, plant fiber can not only be burned, but also produced from it a universal fuel - biofuel, which is easier to transport and use in traditional devices and devices.

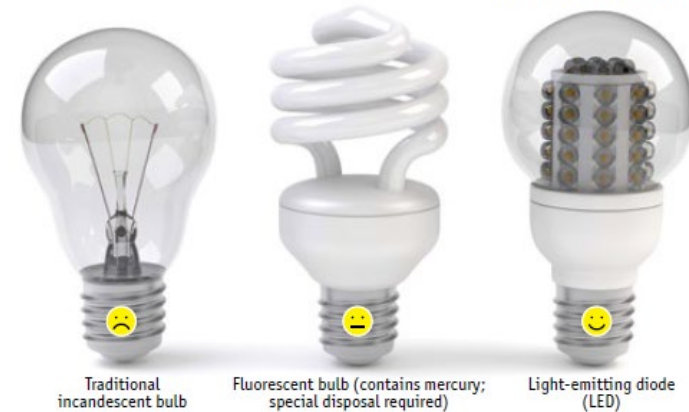
## Solution 2: Energy efficiency and energy saving

In most cases, we don't need to invent anything to save energy, we just need to change our habits and stop wasting energy!

**Energy efficiency and energy saving are very important.**

- **For families** they mean savings on gas and electricity bills.
- **For electricity companies** they mean reduction of fuel costs, giving cheaper electricity.
- **For the country** they mean spending less on resources, and making industry more productive and competitive.
- **For the climate** they mean a reduction of greenhouse gas emissions into the atmosphere.

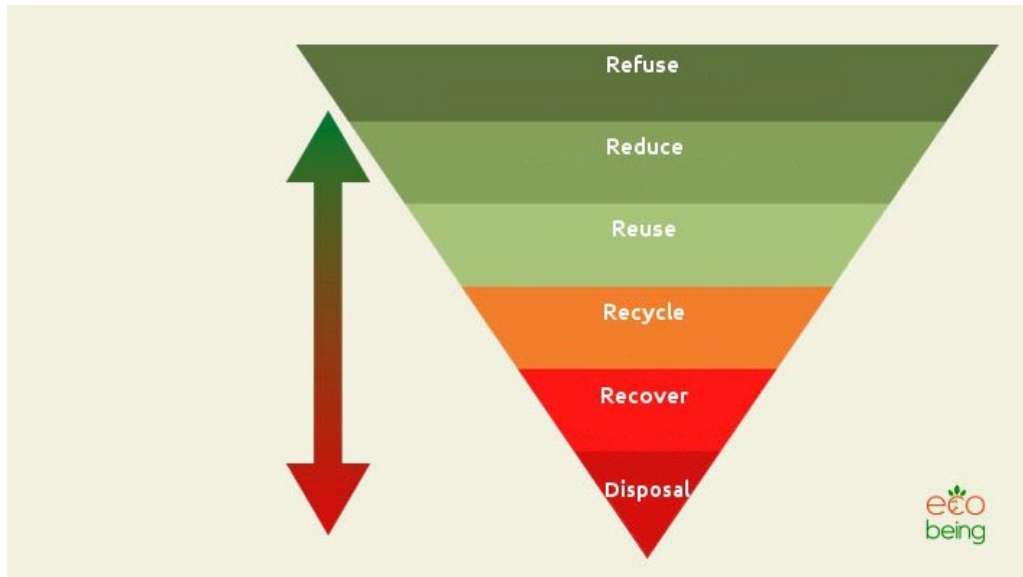
Fig. 3.2.1. Comparison between the energy efficiency of different lamp bulbs.



## Solution 3: Waste management

### Waste management hierarchy

The pyramid in the figure is a generally accepted waste management hierarchy - from prevention (high priority) to disposal without further use.



Recycling not only avoids landfill gas emissions, but also saves energy for production compared to using primary raw materials.



## Solution 4: Environmentally friendly transport and green cities

What can be done to reduce the city's climate impact?



# Reducing your carbon footprint

## Climate Change

How to reduce your carbon footprint

**GOING TO SCHOOL, ON HOLIDAYS AND TRAVELLING**

- Walk and cycle more often.
- Use public transport.
- Take a train, not a plane, when you go to another city.

CO<sub>2</sub>MBAT climate change!

**AT SCHOOL**

- Put this poster on the wall at school.
- Pass on these recommendations to your friends.

CO<sub>2</sub>OPERATE to stop climate change!

**EVERYDAY TIPS**

- Turn off the tap when you don't need water.
- Look after things and they will last longer.
- Save paper, use a printer only when you need to.
- Sort and recycle your rubbish.
- Choose things that have been recycled and things that can be recycled

CO<sub>2</sub>NSERVE resources!

**SHOPPING**

- When you go shopping with your parents:
  - take your own bag, don't use a new one from the store;
  - buy energy-efficient appliances;
  - buy local food and goods to reduce carbon emissions from the transportation.

CO<sub>2</sub>MBAT climate change!

**SAVING ENERGY AT HOME**

- Insulate your apartment or house, so you don't need extra heaters in the winter.
- Turn off the lights when you don't need them.
- Use energy-efficient light bulbs.
- Disconnect mobile phone chargers when you are not using them.
- Don't leave the computer, TV and other appliances in sleep mode – switch them right off or disconnect them.
- Wash clothes on a 30–40 °C cycle.
- Think what you need from the fridge before you open it.
- Don't boil more water than you need.
- Cover the saucepan when you are cooking food – it reduces energy use by 2.5 times.

CO<sub>2</sub>NSERVE resources!

**Carbon footprint** is the total amount of emissions that people produce by the things they do, events they take part in and products they consume directly or indirectly.

**CO<sub>2</sub> (carbon dioxide)** is the main greenhouse gas emitted by humans that impacts the climate. It is released into the atmosphere mainly by the combustion of fossil fuels (oil, coal and natural gas) to produce energy. So you can reduce emissions of CO<sub>2</sub> and help the planet by reducing your daily use of energy and resources. Now! Read the advice – CO<sub>2</sub>NSERVE! CO<sub>2</sub>MBAT! CO<sub>2</sub>OPERATE!

**CONSERVE!**  
**COMBAT!**  
**COOPERATE!**

Bikes are cool!

Shopping with my stylish reusable bag – no more plastic bags!

Paper that you don't need can be recycled. Recycle paper, save forests!

Plant trees – they absorb carbon dioxide!

plastic Paper Bio

Store

Climate Box

U N I T 2



**Q&A**

Aryanie Amellina



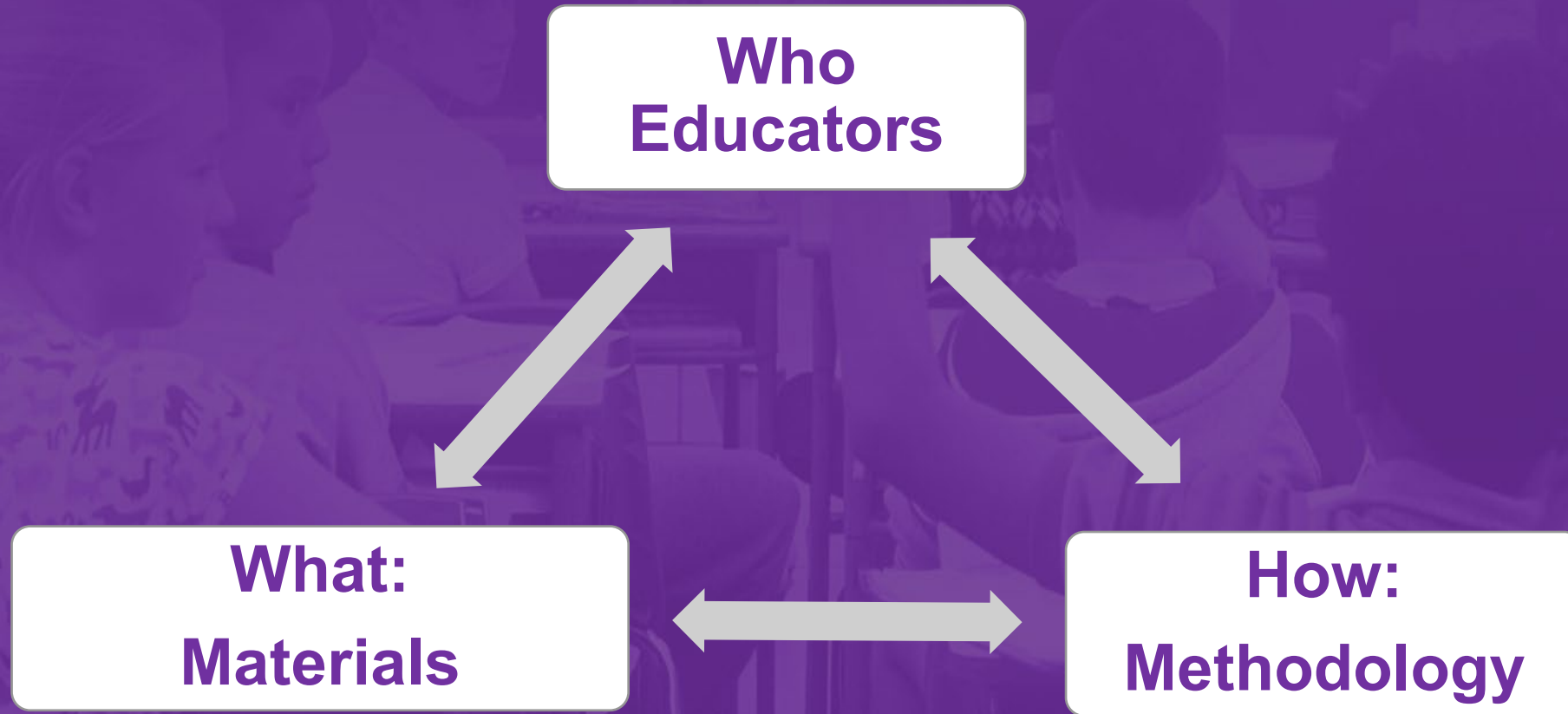


# Integration of climate education in schools, extra-curricular activities

Armine Pogosyan



# Climate Change Education effectiveness is ensured by:



# Climate Box Toolkit



1

**The problem  
of climate  
change**



2

**How climate change  
affects the natural world  
and human beings**

Can we adapt to the inevitable  
consequences of climate change?

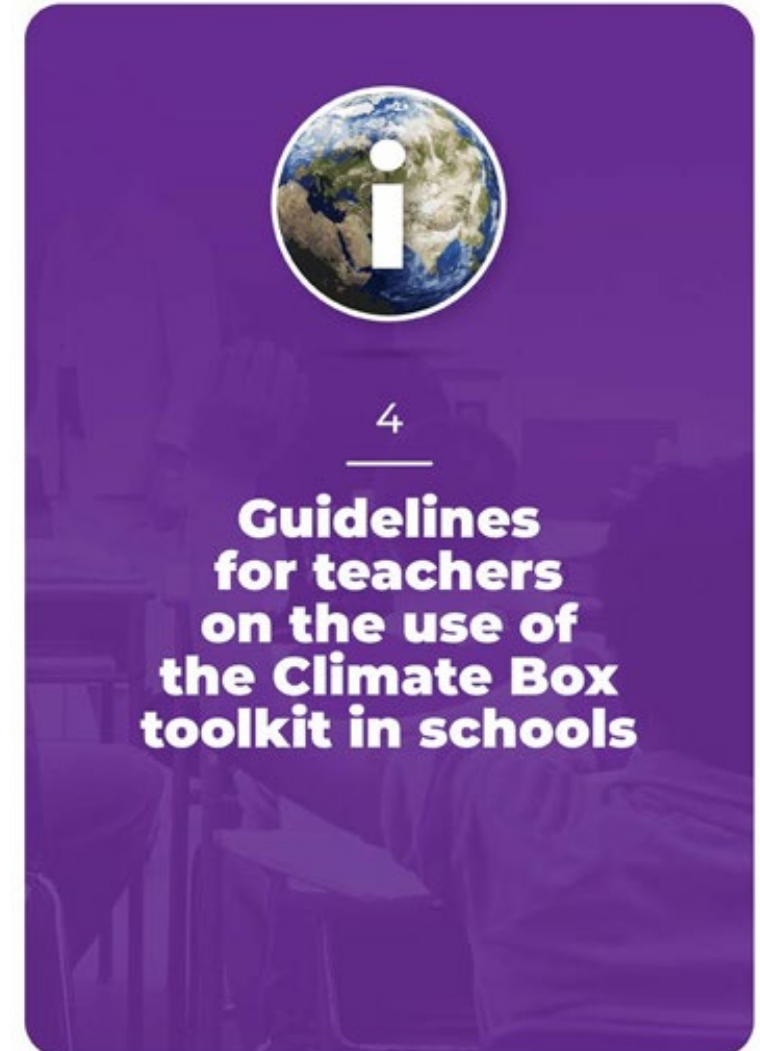


3

**How to  
prevent  
dangerous  
climate change**

# PART 4: Teacher's Guide and Curriculum Integration

- **Methodological Recommendations** – Guidance for teachers on using Climate Box in schools.
- **Curriculum Alignment** – Topics mapped to primary and secondary education programs.
- **Flexible Use** – Can supplement specific subject areas.
- **Structured Overview** – Includes a table showing topic alignment for different education levels.



# Practical Use of the “Climate Box” Toolkit

- **Incorporating Climate Change Topics into Subject-Specific Educational Programs**
- **Integrating climate change topics into extracurricular activities**
- **Development and implementation of climate change projects**

# Incorporating Climate Change Topics into Subject-Specific Educational Programs

- **Biology** – Impact of climate change on ecosystems, biodiversity, and human health.
- **Chemistry** – Greenhouse gas composition, pollution, and chemical processes in the atmosphere.
- **Physics** – Energy balance, heat transfer, and the greenhouse effect.
- **Geography** – Climate patterns, natural disasters, and regional climate impacts.
- **Mathematics** – Climate data analysis, statistics, and predictive modeling.
- **Civics/Social Studies** – Climate policies, global agreements, and environmental justice.



## PRIMARY EDUCATION

Section in the Climate Box textbook	The World Around Us Programmatic and thematic content			
	1 <sup>st</sup> grade	2 <sup>nd</sup> grade	3 <sup>rd</sup> grade	4 <sup>th</sup> grade
<b>PART 1. The problem of climate change</b>				
<b>1.1. Climate and weather</b>	<ul style="list-style-type: none"> <li>Monitoring the weather in your region. Weather and thermometer. Determination of air (water) temperature using a thermometer. Observing seasonal changes in nature.</li> </ul>	<ul style="list-style-type: none"> <li>How does the Earth differ from other planets? Living conditions on the Earth.</li> </ul>	<ul style="list-style-type: none"> <li>Properties of air. The importance of air for plants, animals, and humans.</li> </ul>	<ul style="list-style-type: none"> <li>The Sun is the closest star to us, a source of light and heat for all life on Earth.</li> <li>The rotation of the Earth around the Sun and the change of seasons.</li> </ul>

## SECONDARY EDUCATION

Section in the Climate Box textbook	Geography Programmatic and thematic content					
	5 <sup>th</sup> grade	6 <sup>th</sup> grade	7 <sup>th</sup> grade	8 <sup>th</sup> grade	9 <sup>th</sup> grade	10 <sup>th</sup> grade
<b>PART 2. How climate change affects the natural world and human beings. Can we adapt to the inevitable consequences of climate change?</b>						
<b>2.1. How climate change affects the weather</b>	–	<ul style="list-style-type: none"> <li>• Natural phenomena in the atmosphere, methods of observation and protection.</li> </ul>	–	<ul style="list-style-type: none"> <li>• Dangerous and adverse meteorological phenomena.</li> </ul>	–	<ul style="list-style-type: none"> <li>• Natural hazards, climate change.</li> </ul>
<b>2.2. How climate change affects plants and animals</b>	–	<ul style="list-style-type: none"> <li>• Biosphere.</li> <li>• Diversity of flora and fauna. Adaptation of living organisms to their habitat in different climate zones.</li> <li>• Research and environmental issues.</li> </ul>	–	<ul style="list-style-type: none"> <li>• The wealth of flora and fauna in our country: species diversity, factors that determine it.</li> <li>• Features of the flora and fauna of various natural and economic systems of our country.</li> <li>• Specially protected natural areas of our country and our region. UNESCO World Natural Heritage Sites; plants and animals listed in the Red List of your country.</li> </ul>	–	<ul style="list-style-type: none"> <li>• Specially protected natural areas as one of the objects of sustainable development goals.</li> </ul>
<b>2.3. How climate change affects forests</b>	–	<ul style="list-style-type: none"> <li>• Natural environment.</li> <li>• Protection of nature.</li> <li>• Specially protected nature areas.</li> </ul>	–	<ul style="list-style-type: none"> <li>• Forest industry and the environment. Problems and prospects for development.</li> </ul>	–	<ul style="list-style-type: none"> <li>• Forest reserves of the World.</li> <li>• Deforestation - its causes and affected areas.</li> </ul>

## SECONDARY EDUCATION

Section in the Climate Box textbook	Programmatic and thematic content				
	Biology	Physics	Chemistry	Social Sciences	Safety basics
<b>PART 3. How to prevent dangerous climate change</b>					
<b>3.2. Energy efficiency and energy saving</b>  <b>3.2.1. Environmentally friendly transport</b>  <b>3.2.2. Household appliances and electrical devices</b>	–	<b>8<sup>th</sup> grade</b> <ul style="list-style-type: none"> <li>• Electrical circuits and consumers of electrical energy in everyday life.</li> <li>• Use of electric motors in technical devices and transport.</li> </ul> <b>10<sup>th</sup> grade</b> <ul style="list-style-type: none"> <li>• Electric heating and electric lighting devices – technical design and practical application.</li> <li>• Technical devices and practical application: internal combustion engine, household refrigerator, air conditioner.</li> </ul> <b>11<sup>th</sup> grade</b> <ul style="list-style-type: none"> <li>• The culture of using electricity in everyday life.</li> </ul>	<b>9<sup>th</sup> grade</b> <ul style="list-style-type: none"> <li>• Natural sources of hydrocarbons and products of their processing (gasoline), their role in everyday life and industries.</li> </ul>	<b>10<sup>th</sup> grade</b> <ul style="list-style-type: none"> <li>• Worldview, its role in human life.</li> <li>• Rational economic behaviour.</li> <li>• Economic activities and sustainable development.</li> </ul> <b>11<sup>th</sup> grade</b> <ul style="list-style-type: none"> <li>• Environmental legislation.</li> <li>• Environmental violations.</li> </ul>	<b>8-11<sup>th</sup> grades</b> <ul style="list-style-type: none"> <li>• The influence of human activities on the natural environment.</li> <li>• Environmental literacy and rational environmental management.</li> </ul>

# Vietnam: Integrating Climate Change into School Subjects

Grade Level	Subject	Topic	Climate Change Integration
Grade 6	Geography	Climate and Weather Patterns	Discuss how climate change is increasing extreme weather events like typhoons in Vietnam.
Grade 8	Geography	Water Resources and Rivers	Study the impact of rising temperatures and rainfall on the Mekong Delta, leading to saltwater intrusion and reduced agricultural yields.
Grade 10	Physics	Energy and Heat Transfer	Explore how the greenhouse effect works and conduct an experiment to simulate global warming using heat absorption in different materials.
Grade 9	Chemistry	Air Pollution and Gases	Investigate the role of CO <sub>2</sub> and methane in climate change.
Grade 7	Biology	Ecosystems and Biodiversity	Examine how deforestation and rising temperatures are affecting Vietnam's mangroves, leading to biodiversity loss and coastal erosion.

# Thailand: Integrating Climate Change into School Subjects

Grade Level	Subject	Topic	Climate Change Integration
Grade 7	Geography	Landforms and Mountains	Investigate how rising temperatures are affecting Thailand's northern mountain regions, leading to shifts in plant and animal species.
Grade 9	Geography	Coastal and Marine Ecosystems	Study the effects of ocean acidification and coral bleaching on Thailand's tourism and fishing industries.
Grade 11	Physics	Electricity and Energy	Analyze how renewable energy sources (solar, wind, hydro) can reduce Thailand's carbon footprint.
Grade 10	Chemistry	Carbon Cycle and Greenhouse Gases	Conduct a lab experiment on CO <sub>2</sub> absorption and discuss its role in climate change.
Grade 8	Biology	Water Cycle and Living Organisms	Explore how changing rainfall patterns are affecting Thai agriculture and food security.

# Lao: Integrating Climate Change into School Subjects

Grade Level	Subject	Topic	Climate Change Integration
Grade 6	Geography	River Systems and Flooding	Discuss how increased rainfall due to climate change is leading to more frequent floods along the Mekong River.
Grade 9	Geography	Soil and Agriculture	Investigate how climate change affects soil erosion and crop productivity in Laos' upland farming communities..
Grade 10	Physics	Heat and Energy Transfer	Demonstrate the effect of greenhouse gases on heat retention using infrared lamps and CO <sub>2</sub> -filled containers.
Grade 7	Chemistry	Water Quality and Pollution	Analyze how increased industrial emissions and climate change are worsening water pollution in Laos' rivers.
Grade 8	Biology	Diseases and Human Health	Explore how rising temperatures and changing rainfall patterns are increasing the spread of mosquito-borne diseases like dengue fever.



# Integrating climate change topics into extracurricular activities

- **Environmental Initiatives:** Cleanup events, tree planting, and eco-gardens
- **School Clubs:** Ecology clubs discuss human impact on climate.
- **Science clubs** analyze climate data and experiments.
- **Competitions & Events:** Photo and video contests, themed exhibitions, quizzes
- **Guest Lectures & Workshops:** Experts provide insights and inspire student action.
- **Outdoor Activities:** Field trips, nature hikes, and hands-on conservation projects engage students in real-world climate action.



# Development and implementation of climate change projects

- Encourages critical thinking and problem-solving.
- Engages students in real-world climate challenges.
- Promotes collaboration and hands-on learning.



## Examples:

- **Renewable Energy Projects:** Design solar-powered devices or wind energy models.
- **Climate Impact Studies:** Analyze local weather data to assess climate change effects.
- **Sustainable School Initiatives:** Implement waste reduction programs or school gardens.
- **Community Action Projects:** Organize awareness campaigns or tree-planting events.



**Education is a powerful tool for addressing climate change, empowering individuals to create a sustainable future.**

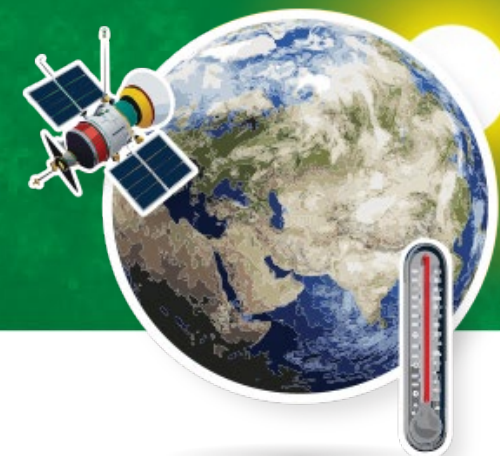
**Q&A**

**Armine Pogosyan**



# Future Plans and Next Steps for Southeast Asia

Petra Valastinova



# Priorities for 2025

For all  
countries



## International activities:

- **Climate Box: Southeast Asia edition**
- **Climate Box: Chinese version**
- **Updated Climate-Box.com website in all UN languages and Thai, Lao and Vietnamese**
- **Animated videos and video lessons, additional supplements**
- **At least four international webinars for teachers**
- **International Teachers' Contest**
- **International Youth Project Festival**
- **International Youth Climate Knowledge Competition**

# Priorities for 2025

## SEA



### Climate Box toolkit in SEA Countries:

- **Adapting Guidelines for Teachers** to SEA countries curriculum
- Climate Box: Southeast Asia edition – **translation into SEA languages, design and printing**

### Key events and activities in SEA:

- **1.5-day In-person training of trainers** on how to use Climate Box – late March/April
- **Dissemination of toolkits and training for teachers** by local team – from May 2025
- **Teachers Contest** – March-September 2025
- **National Youth Project Competition** – March-September 2025
- **International Conference & Festival in Thailand**, November 2025

**Q&A**

**Petra Valastinova**





**Q&A**

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# Thank you!

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