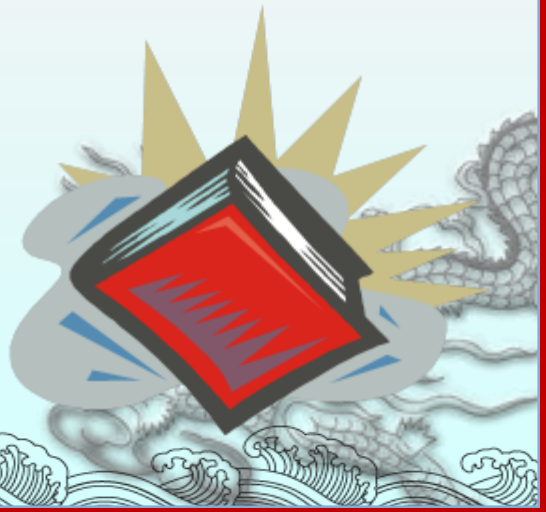
Biodiversity, Climate Change and Economics of Adaptation

Assem A. A. Mohamed, PhD.
Senior Researcher, CLAC
November 19, 2019



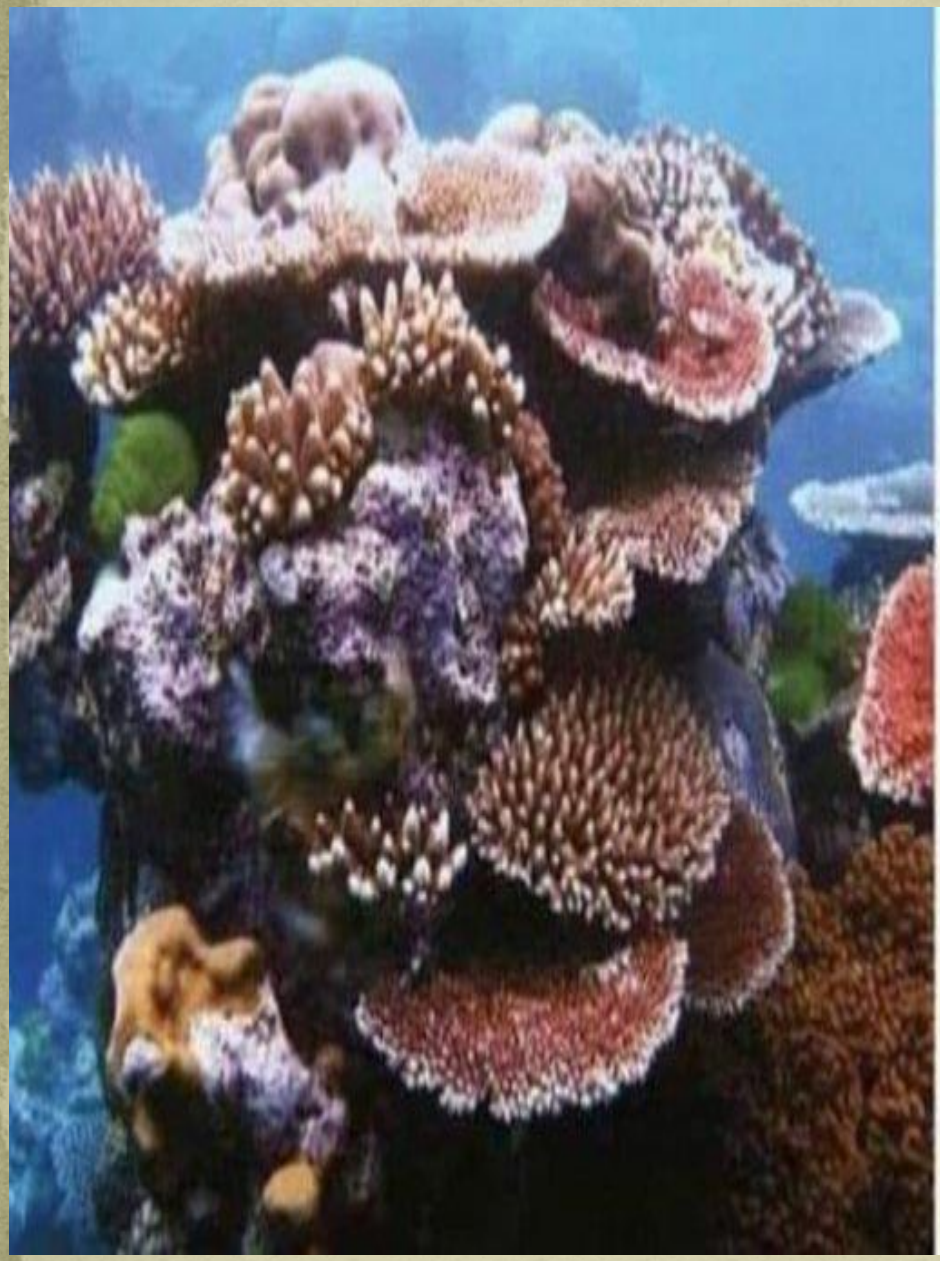

Our generation grew up in a world with climate change and biodiversity loss.
Our choices affect the world future generations will inherit.

Learning objectives

At the end of this unit, you will be able to:

- Explain the concept of biodiversity and ecosystem services, climate change and adaptation;
- Identify environmental conventions;
- Recognise the role of IPCC & IPPES; and
- Analyse the causes of the loss of biodiversity
- Definition of adaptation economics.


#10YearChallenge
2009
2019



1. Acronyms

CBD = Convention on Biological Diversity

IPBES= Intergovernmental Plenary Science and Policy on Biodiversity and Ecosystem Services

IPCC= Intergovernmental Panel on Climate Change

UNFCCC= United Nation framework Convention on Climate Change

2. Introduction

صـــرح وزيـــر الابتكـــار والتكنولوجيـــا الأثيـــوبى Getahun Mekuriaإن الإثيوبيين زرعوا ٣٥٣ مليون شجرة في ١٢ ساعة كجزء من الحملة القومية لزراعة ٤ مليارات شجرة لمكافحة إزالة الغابات وتغير المناخ. وصرح أيضاً بأنه تم تسجيل رقم قياسي عالمي حيث استجاب الإثيوبيون لخطة رئيس الوزراء الأثيوبى Abiy Ahmedالطموحة لدحر سنوات الجفاف ومواسم الأمطار الهزيلة والتي تقول الأمم المتحدة إنها خلفت حوالي ٣,٨ مليون شخص في حاجة ماسة للمساعدة.

3. What is biodiversity

ipbes
Science and Policy
for People and Nature

What is biodiversity?

bio=life

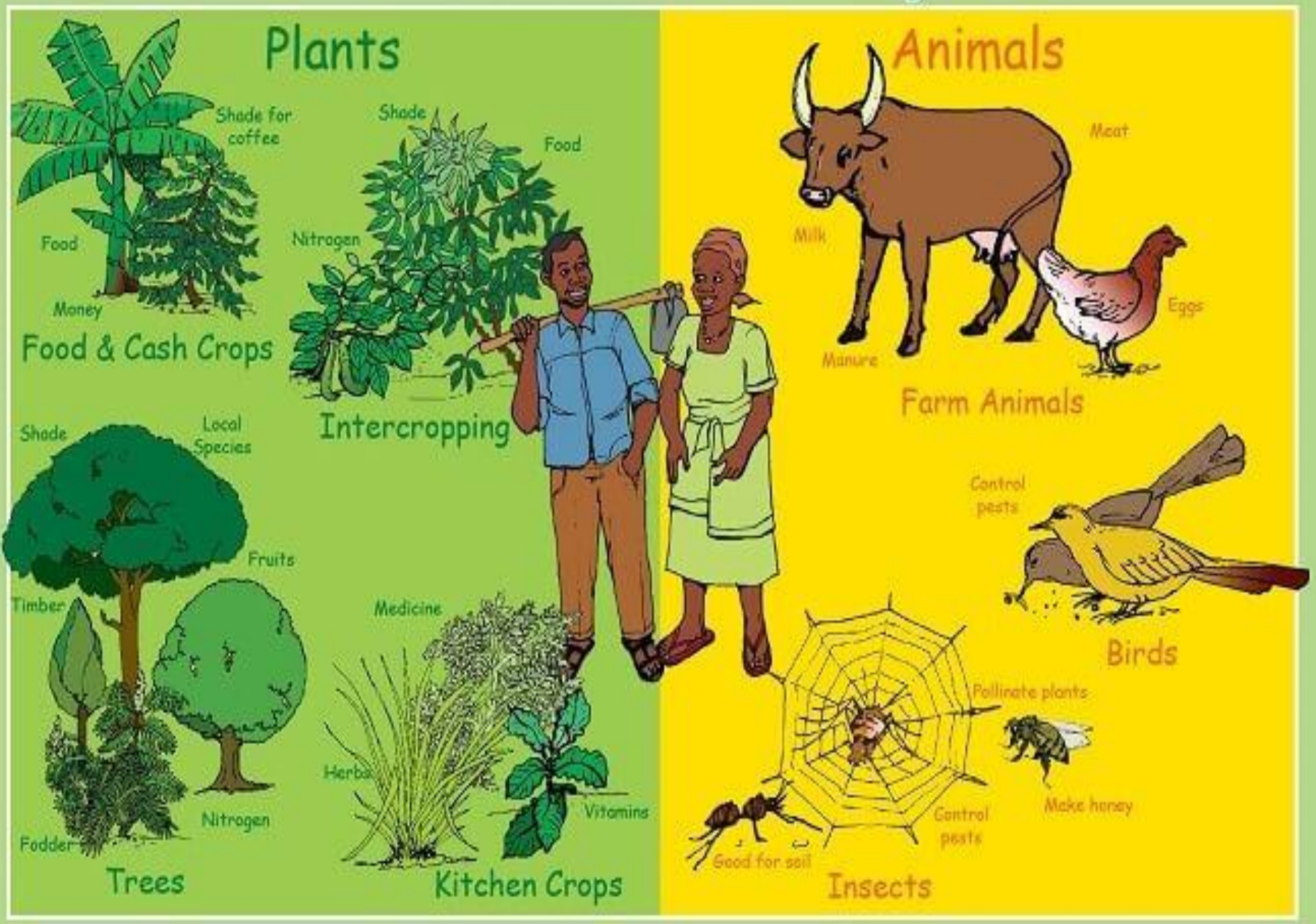
diversity=variety

Biodiversity=variety of life

Biodiversity is US

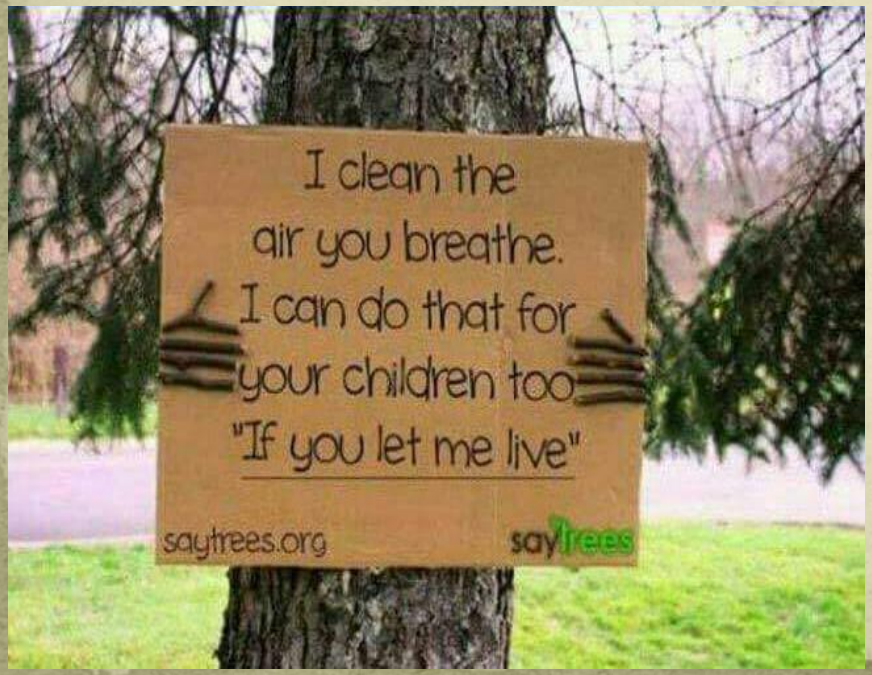
ME and YOU

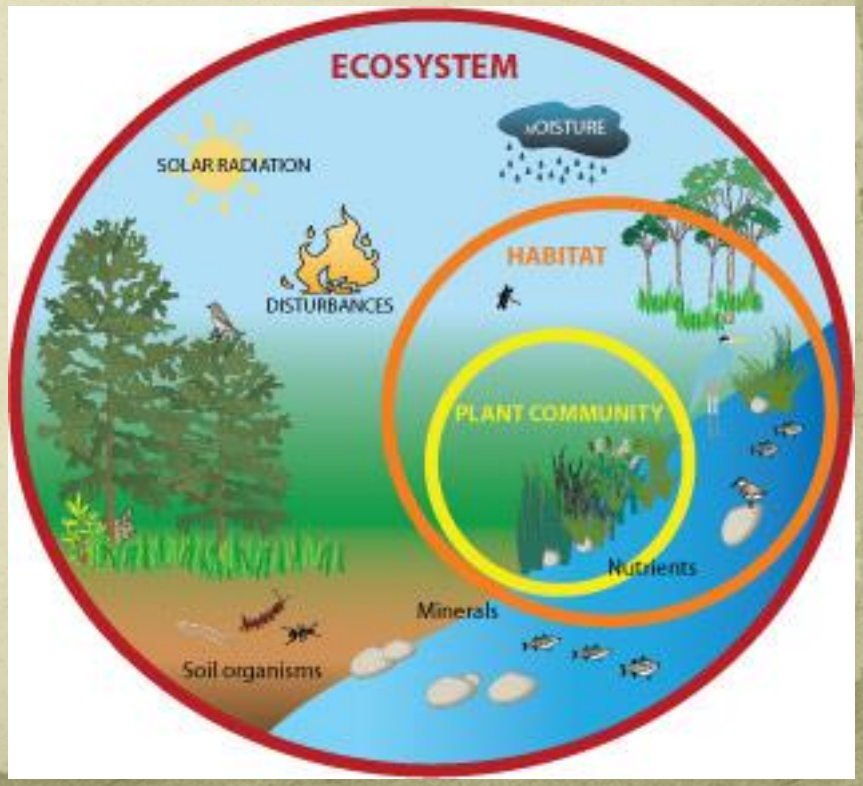
What is biodiversity?



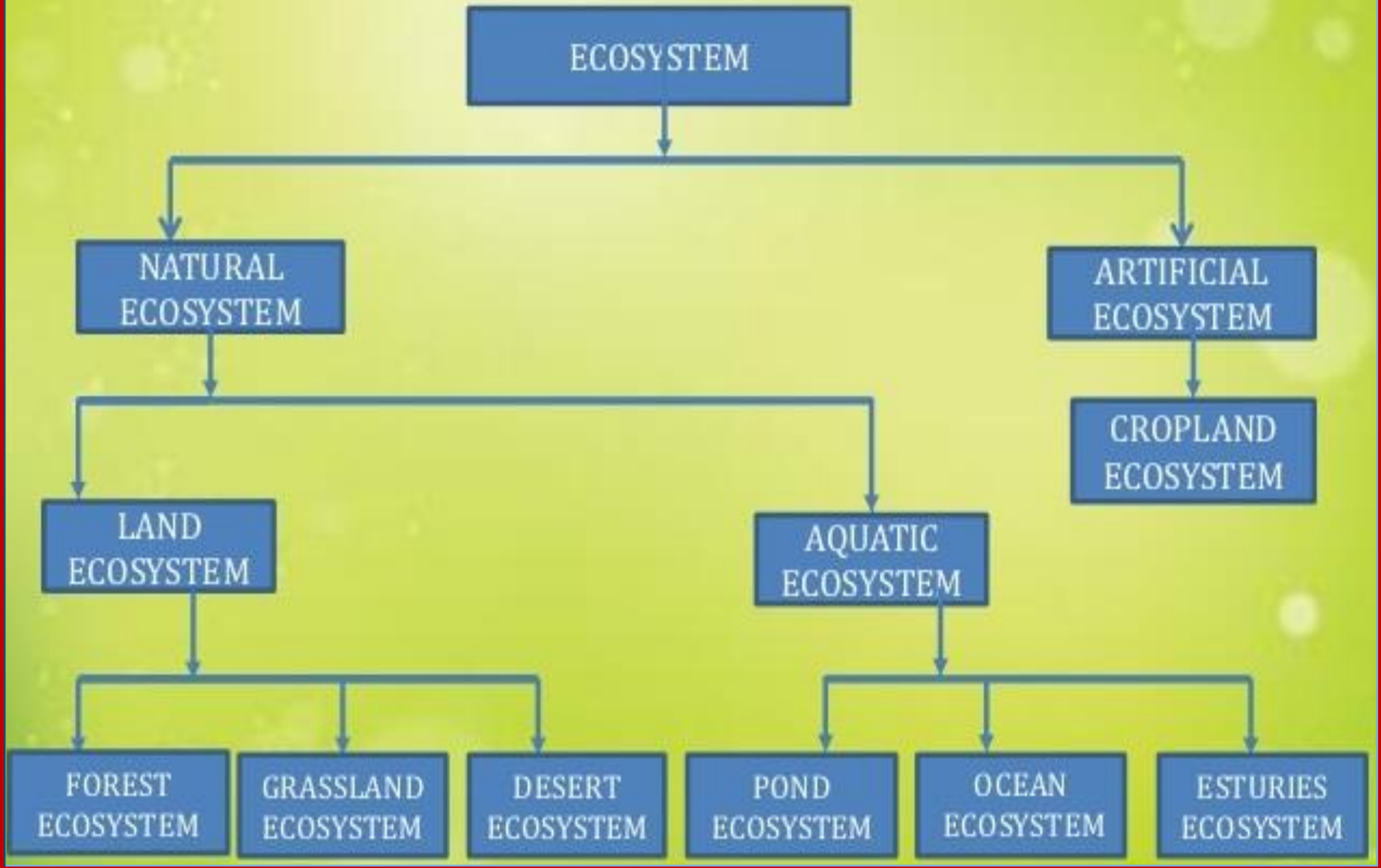
What are ecosystems?

An ecosystem is a dynamic complex of plant, animal and microorganism communities and the non-living environment, interaction as a functional unit.



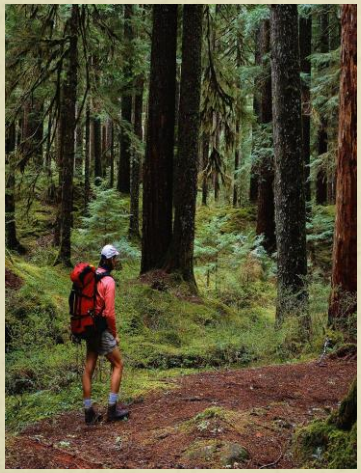


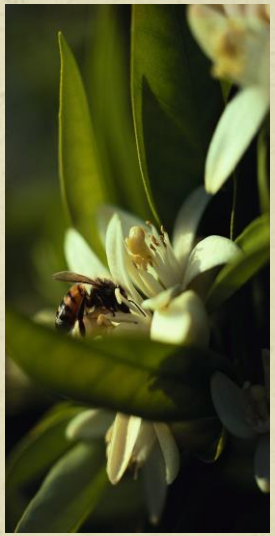
Classification of Ecosystem



What are ecosystem services?

The multiple benefits provided to human society by the ecosystems



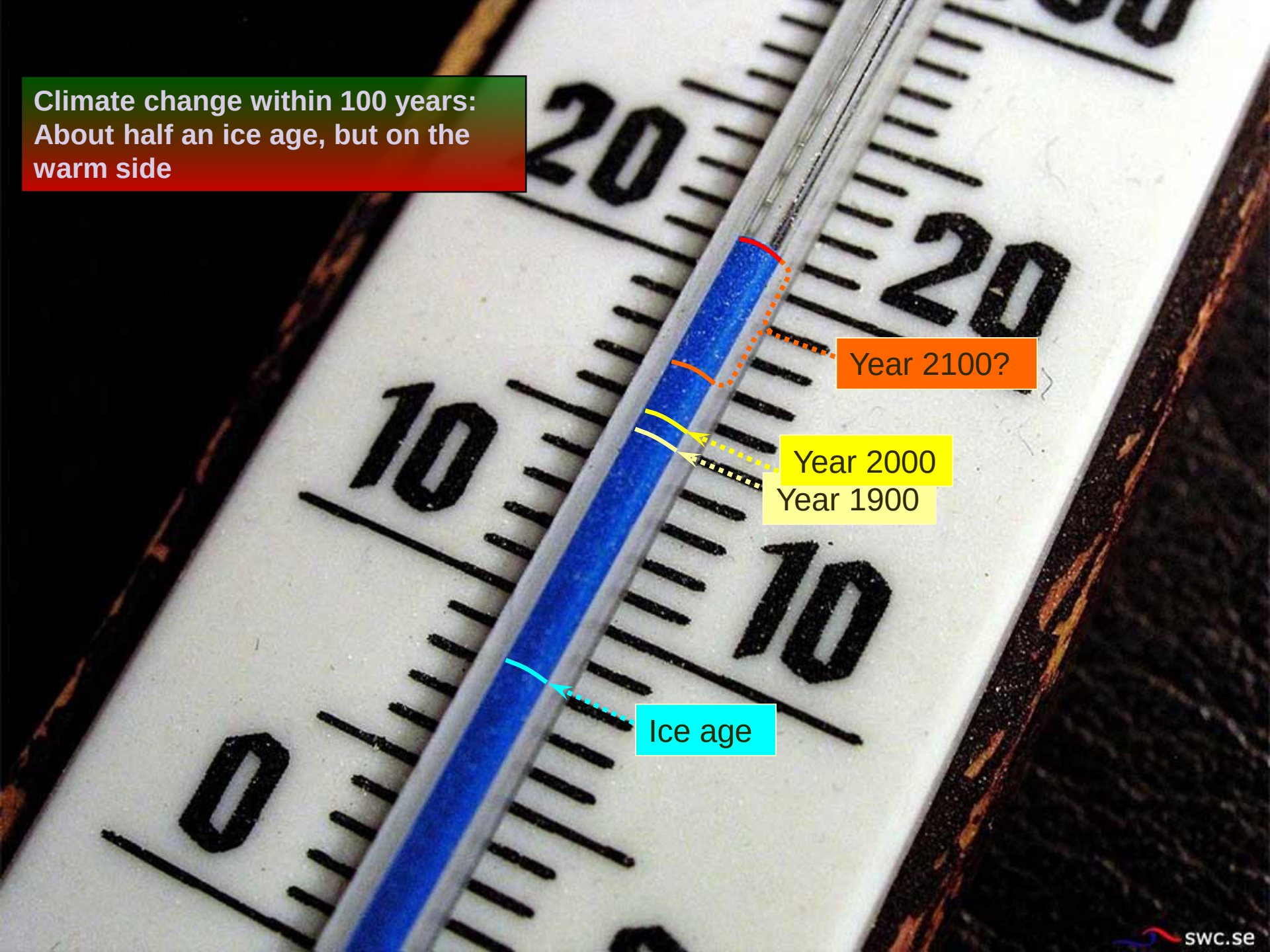



Challenges to biodiversity

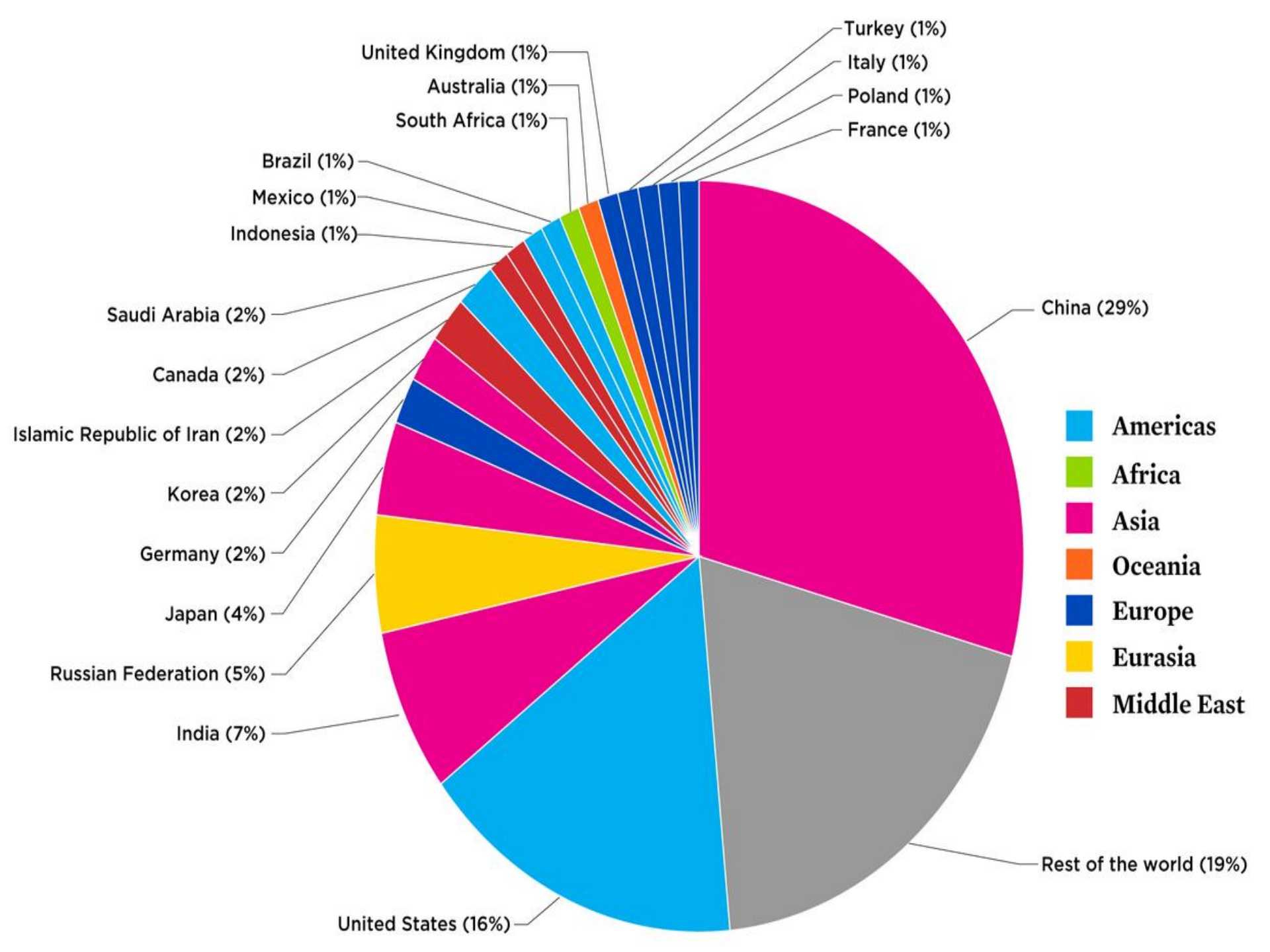
- Human population growth,
- Pollution and diseases,
- Habitat loss and degradation,
- Introduction of invasive alien species,
- Over-exploitation of natural resources,
- Global climate change,
- Energy crisis,

Illustration by David Parkins

4. What is a Climate Change?


Climate change within 100 years:
About half an ice age, but on the warm side
Year 2100?
Year 2000
Year 1900
Ice age
swc.se

Developed countries, with **one-fifth** the population, are responsible for **half** of global emissions. Their refusal to share technologies and financial resources, and the US, with **5%** of the population responsible for **20%** of emissions, pushing for similar obligations under the Paris treaty of 2015 creates an existential crisis for other countries.


Turkey (1%)
Italy (1%)
Poland (1%)
France (1%)
United Kingdom (1%)
Australia (1%)
South Africa (1%)
Brazil (1%)
Mexico (1%)
Indonesia (1%)
Saudi Arabia (2%)
Canada (2%)
Islamic Republic of Iran (2%)
Korea (2%)
Germany (2%)
Japan (4%)
Russian Federation (5%)
India (7%)
United States (16%)
China (29%)
Rest of the world (19%)
Americas
Africa
Asia
Oceania
Europe
Eurasia
Middle East

We have a cloud hovering over our head. It's dramatically serious. Climate change can have a significant adverse effect in the short term. It's no longer about the future; it's the present."

Mario Cerutti,
Green Coffee &
Corporate Relations
Partner, Lavazza

The Climate is Changing

- Temperatures are rising;
- Sea levels are rising;
- The ocean is acidifying;
- Climate change is reflected in water cycle changes and in extreme weather.


UN
DP
Biodiversity Loss
03
It took 55 million years for this landscape to evolve
and we are destroying it in record time.
8 DECENT WORK AND ECONOMIC GROWTH
14 LIFE BELOW WATER
15 LIFE ON LAND
Source
Share


UNDP
Biodiversity Loss
03
Every year, 280,000 hectares of Peru's forests disappear.
1 NO POVERTY
2 ZERO HUNGER
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Source
Share

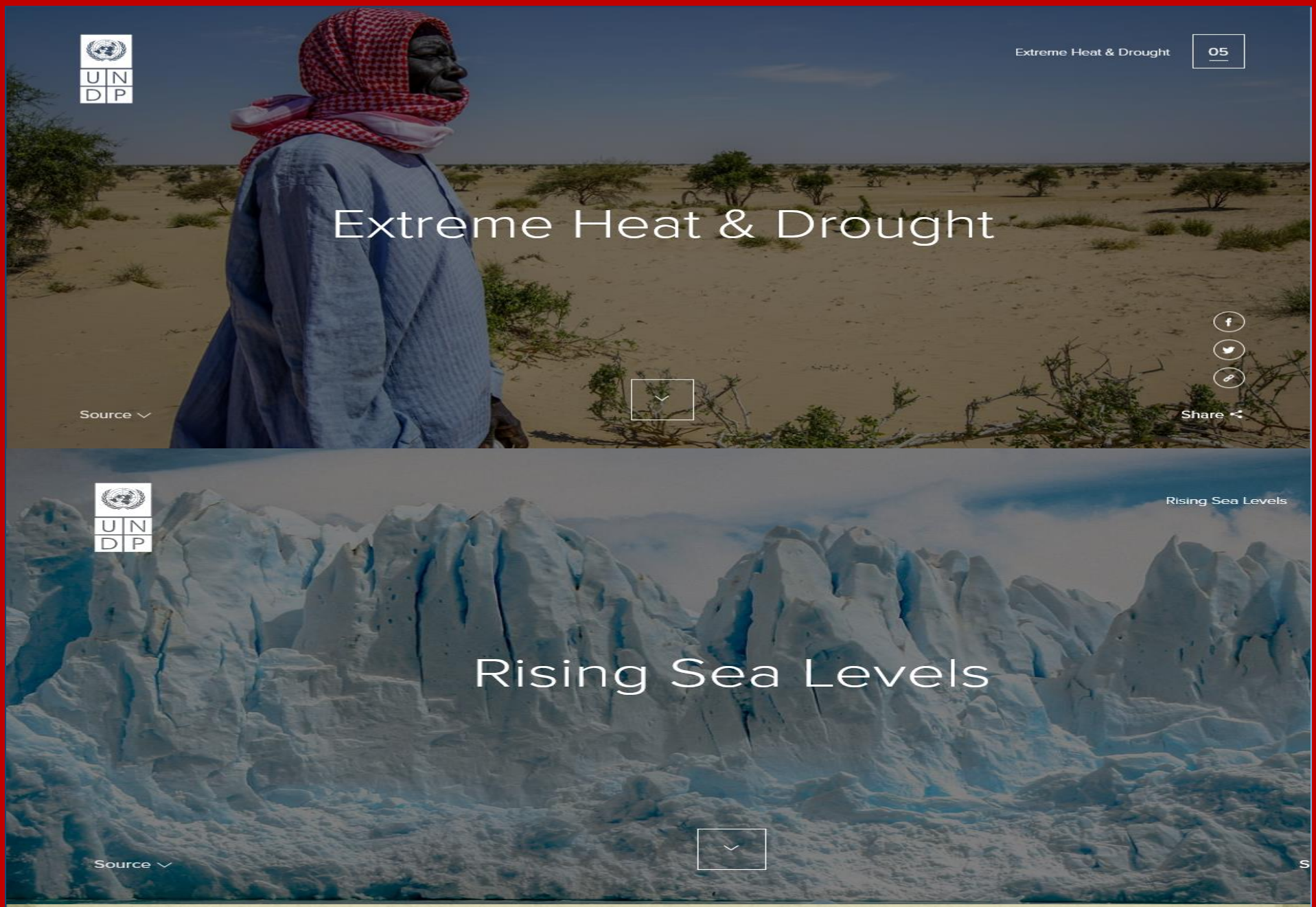


Photo Credit: UNDP Chad / Jean Damascene Hakuzimana

The chain reaction

1	2	3
Extreme heat & drought	Agriculture loss	Food insecurity sparks conflict

The chain reaction

1	2	3	4
Warming temperatures melt ice	Sea levels rise	Coastal loss	Small islands disappear

It's not a pretty picture. Shanghai by 2100

Source: Here's how rising seas could swallow up these coastal cities, NBC News 2018

Adverse Impacts of Climate Change on Egypt

- **Decrease in Crop Productivity;**
- **Desertification**: Including North West coastal areas and Northern areas of Sinai, the fertile land of Upper Egypt, the Delta, Oases of the Western Desert and Southern Remote Desert Areas**;**
- **Sea level Rise:** in the North Coast and the Delta;
- **Deficit of water resources;**

following

- Deterioration of Biodiversity;
- Coral reefs bleaching;
- Affecting tourism & tourist areas; and
- Public Health will be affected.

5. CBD & UNFCCC?

A Brief History of the CBD

- CBD adopted on 22 May 1992.
- CBD opened for signature on 5 June 1992 at the (Rio) "Earth Summit".
- CBD entered into force on 29 December 1993.
- There are currently 196 parties to the convention.
- **Aims to -** promote the conservation of biodiversity,

- The sustainable use of its components, and

- The fair and equitable sharing of benefits arising from the use of genetic resources.

COPs

Convention on Biological Diversity

First Conference of the Parties
28 November - 9 December 1994
Nassau, The Bahamas

UN BIODIVERSITY CONFERENCE
Investing in biodiversity for people and planet
COP 14 - CP/MOP9 - NP/MOP3
Sharm El Sheikh, Egypt, 2018


SUSTAINABLE DEVELOPMENT GOALS
UN BIODIVERSITY CONFERENCE
Investing in biodiversity for people and planet
COP 14 - CP/MOP9 - NP/MOP3
Sharm El Sheikh, Egypt, 2018

COP 14- EGYPT

A Brief History of the UNFCCC

- Negotiations on what became the UNFCCC were launched in December 1990 by the UN General Assembly. An Intergovernmental Negotiating Committee
- UNFCCC adopted on 9 May 1992.
- UNFCCC opened for signature on 5 June 1992 at the (Rio) “Earth Summit”.
- CBD entered into force on 21 March 1994.
- There are currently 197 parties to the convention.
- **Aims to:** stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

UNFCCC

COPs

COP24 · KATOWICE 2018
UNITED NATIONS CLIMATE CHANGE CONFERENCE

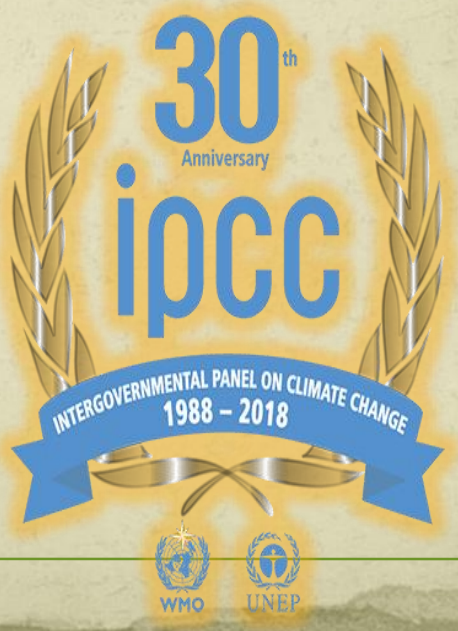
COP 1	1995	Berlin	"Berlin Mandate" (launched KP negs)
COP 2	1996	Geneva	
COP 3	*1997*	*Kyoto*	*Kyoto Protocol adopted*
COP 4	1998	Buenos Aires	Buenos Aires Plan of Action (on rules)
COP 5	1999	Bonn	
COP 6	2000	The Hague	
COP 6 bis	***2000***	***Bonn***	***Bonn Agreements (core elements)***
COP7	*2001*	*Marrakech*	*Marrakech Accords (KP rulebook)*
COP 8	2002	New Delhi	Delhi Declaration
COP 9	2003	Milan	
COP 10	2004	Buenos Aires	Buenos Aires Programme of Action on Adaptation and Response Measures
Kyoto Protocol	*2005*	*-------*	*Entry into Force*
COP 11 /MOP1	2005	Montreal	First Meeting of the Parties to the KP
COP 12 /MOP2	2006	Nairobi	Second MOP – Review of the Protocol
COP 13 /MOP3	2007	Bali	Third MOP – "Bali Action Plan"
COP 14/MOP 4	2008	Poznan	Fourth MOP
COP 15/MOP 5	***2009***	***Copenhagen***	***Post-2012 Agreement - failed***
COP 16/MOP 6	*2010*	*Cancun*	*Post-2012 Agreement?*

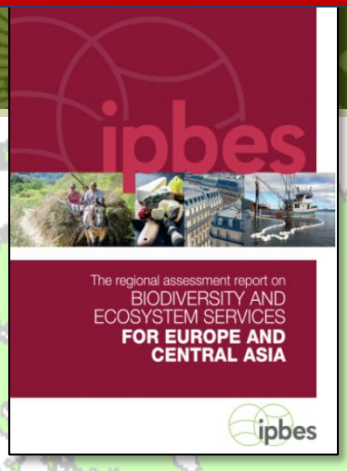
TIME FOR ACTION
COP25
CHILE
MADRID 2019
UN CLIMATE CHANGE CONFERENCE

6. What does an IPBES & IPCC output look like?

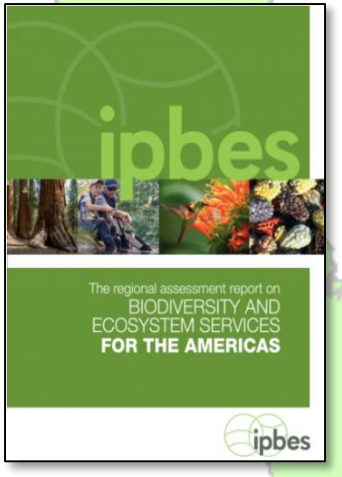
IPBES does for biodiversity what the IPCC does for climate change

IPBES has been described as a second version of the Intergovernmental Panel on Climate Change (IPCC).

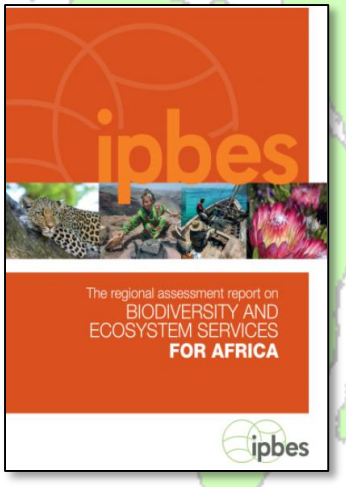




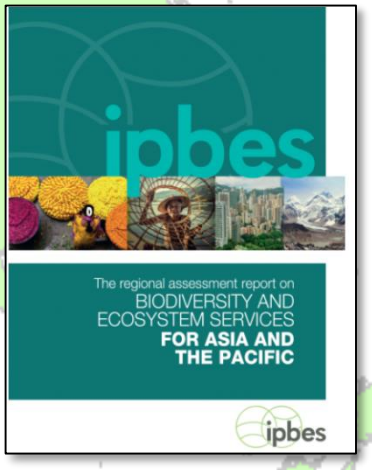
Regional Assessment
for Europe and Central Asia



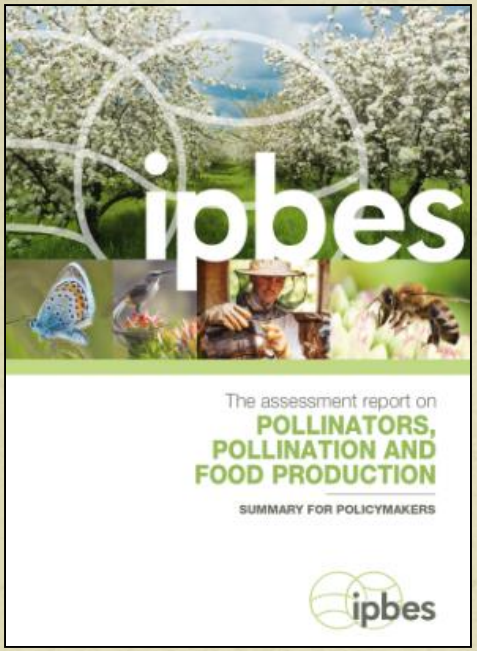
Regional Assessment
for the Americas



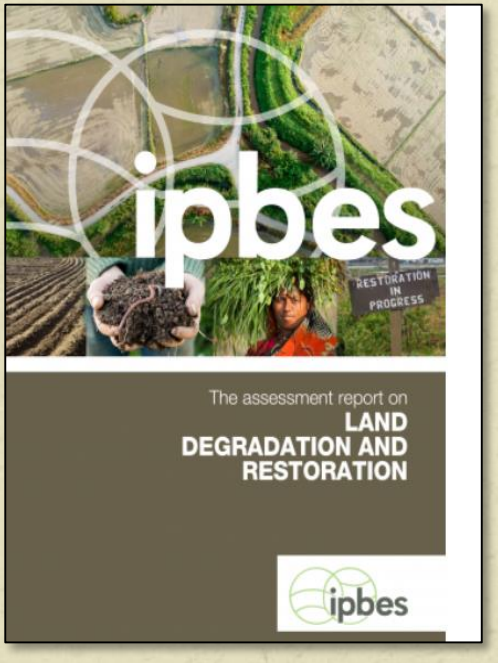
Regional Assessment
for Africa



Regional Assessment
for Asia and the Pacific



The Assessment on Pollinators, Pollination & Food Production



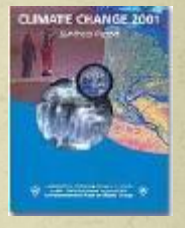
The Assessment on Land Degradation and Restoration

The Global Assessment

1990 - First IPCC Assessment Report (FAR)

1992 - IPCC Supplementary Reports
1994 - IPCC Special Report

1995 - Second IPCC Assessment Report (SAR)
1996 - COP-2, 1997 - COP-3
2001 - Third IPCC Assessment Report (TAR)
2002 - COP-8, 2003 - COP-9



2007 - Fourth IPCC Assessment Report (AR4)

2007 Nobel Peace Prize

2013- 2014 The Fifth Assessment Report (AR5)

The Sixth Assessment Report (AR6) is expected to be finalized in ??????????????????????

7. How climate change has affected biodiversity and ecosystem services?

Causes of the loss of biodiversity

- **Habitat change;**
- **Hunting,**
- **Invasive alien species;**
- **Climate change;**
- **Overexploitation of resources**

Climate Change Is Becoming a Top Threat to Biodiversity.

- **"Land degradation, biodiversity loss and climate change are three different faces of the same central challenge"**

- **IPBES Chairman Robert Watson said in a statement. "We cannot afford to tackle any one of these three threats in isolation—they each deserve the highest policy priority and must be addressed together."**

The International Union for Conservation of Nature (IUCN) reported that:

75 percent of genetic diversity of agricultural crops has been lost, 75 percent of the world's fisheries are over exploited, and one-third of coral reefs are threatened with extinction. The statistics may be startling.

How is climate change affecting biodiversity?

Warmer regional temperatures, have already had significant impacts on biodiversity and ecosystem, including causing changes in species distributions, **population sizes**, the timing of migration events, and an increase in the frequency of pest and disease outbreaks.

Agricultural Shifts

- Good news for farmers, especially in cold areas.
- High temperatures can kill crops.

What Does the Future Hold . . . and What Can We Do?

- An important way for society to help reduce the ecological impacts of climate change is by creating conditions that make it easier for species in ecosystems to adapt—that is, by reducing other human influenced ecosystem stresses.
- **Investment in conservation, sustainable agricultural practices, pollution reduction, and water management** can all help ecosystems withstand the impacts of a changing climate.

Slowing down biodiversity losses:

One way to slow down biodiversity losses is to establish protected areas with the goal of conserving both species and natural systems.

8. Economics of Adaptation

We need to respond through two courses of action

The first is adaptation,

To adjust our behaviour and actions to the changing climate -- which can be thought of as “managing the unavoidable”. **Examples of adaptation** include more efficient use of water resources, introducing new crop varieties to address changes in growing seasons, and building infrastructure to reduce the damage from extreme events such as floods and droughts.

Economics of Adaptation

Economic thinking on adaptation has evolved from a focus on cost-benefit analysis and identification of “best economic” adaptations to the development of multi-metric evaluations including the risk and uncertainty dimensions in order to provide support to decision makers

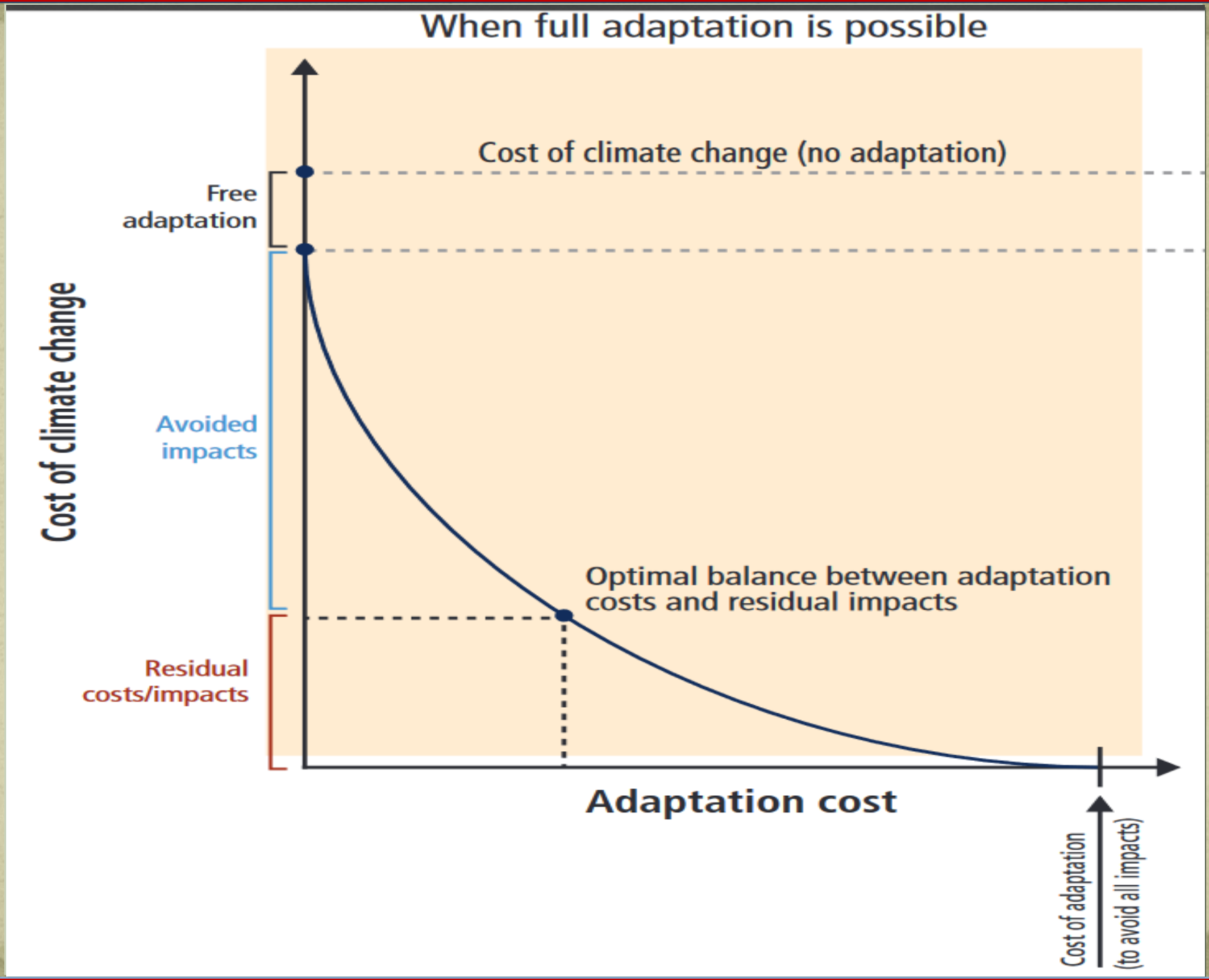
Official Definitions of Adaptation

- Adjustments in natural and human systems in response to actual or expected climate stimuli or their effects, which moderate harm or exploit beneficial opportunities" (IPCC, 2007).
- Process by which strategies to moderate, cope with and take advantage of the consequences of climatic events are enhanced, developed, and implemented" (UNDP, 2005).

Not all adaptation involves investment or is costly. Some adaptation measures involve modification of recurring (periodic) expenditures as opposed to new investments (replacing depreciated equipment with more adapted items). Sometimes adaptation involves changes in behaviors and lifestyles (e.g., due to increased frequency of heat waves).

Economic effect of adaptation measures

- **Crop varieties** that are adapted to climate change have enhanced resistance to droughts and heat and so also raise productivity in non-climate change-related droughts and temperature extreme (Birthal et al., 2011).
- **Better building insulation** that mitigates energy use and associated greenhouse gas emissions also improves adaptation by protecting against heat (Sartori and Hestnes, 2007).


When full adaptation is possible
Cost of climate change (no adaptation)
Free adaptation
Cost of climate change
Avoided impacts
Optimal balance between adaptation costs and residual impacts
Residual costs/impacts
Adaptation cost
Cost of adaptation (to avoid all impacts)


Thank you !
www.ipbes.net

Example

- 7 Million metric tonnes of plastic was send to China for recycling.
- In 2017, China banned foreign plastic waste.
- Now, much of it goes to Malaysia

Plastic waste is good and bad for Malaysia. Here's why

Pulau Indah - ironically, the name means "beautiful island" in Malay - is one of many towns in Malaysia where illegal plastic recycling factories have popped up in recent months as the Southeast Asian nation became the top choice for plastic waste exporters from around the world.

"I understand plastic recycling is quite lucrative. So I am also thinking should we miss this economic opportunity? This is something the committee will study," **Zuraida** told Reuters.

Environment Minister Yeo estimated that the plastic recycling industry would earn Malaysia 3.5 billion ringgit ($841.95 million) this year.

Malaysia's imports of plastic waste from its 10 biggest source-countries jumped to 456,000 tonnes between January and July 2018, versus 316,600 tonnes purchased in all of 2017 and 168,500 tonnes in 2016.

Used plastic is recycled into pellets, which are then used to manufacture other plastic products, but the process comes with pollution risks. Plastic unsuitable for recycling is burnt, which releases toxic chemicals into the atmosphere. Or it ends up in landfill, potentially contaminating soil and water sources.

10-foot (3 metre) tall towers of plastic waste - mostly consumer packaging material from the United States, Britain, France, Netherlands, Germany and Australia - were still piled in the front yard. A large plot of land next to the factory has been turned into a dumping site for scrap.

"The situation is getting worse, especially with more and more illegal plastic recycling factories," **Yeo Bee Yin, Malaysia's minister of energy**, technology, science, climate change and environment, told parliament last week.

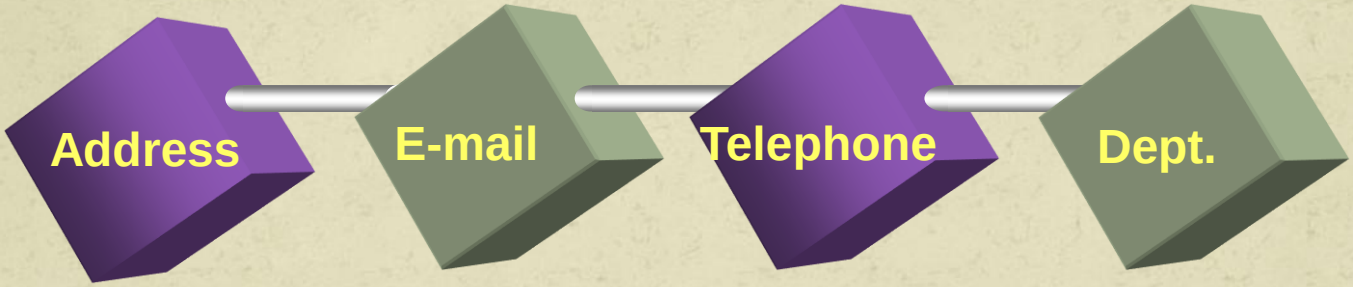
In the nearby district of Kuala Langat, authorities found 41 factories operating illegally, many of them run by Chinese companies, **according to Housing Minister Zuraida**. Around 30 were shut down by authorities in the last three months after residents complained of open burning of plastic and health complications.


10 Billion Tree
Tsunami 2018
Pakistan's LARGEST ever tree plantation drive!

How to contact me?

Assem A. A. Mohamed

PhD, Agricultural Economics



6, Dr. Michiel Bakoum St., El Dokki, Giza, Egypt. 12411

assem20000@yahoo.com

01118849915

Dept. of Agro-meteorological Applications Research