



Learning unit SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE

Co-funded by
the European Union

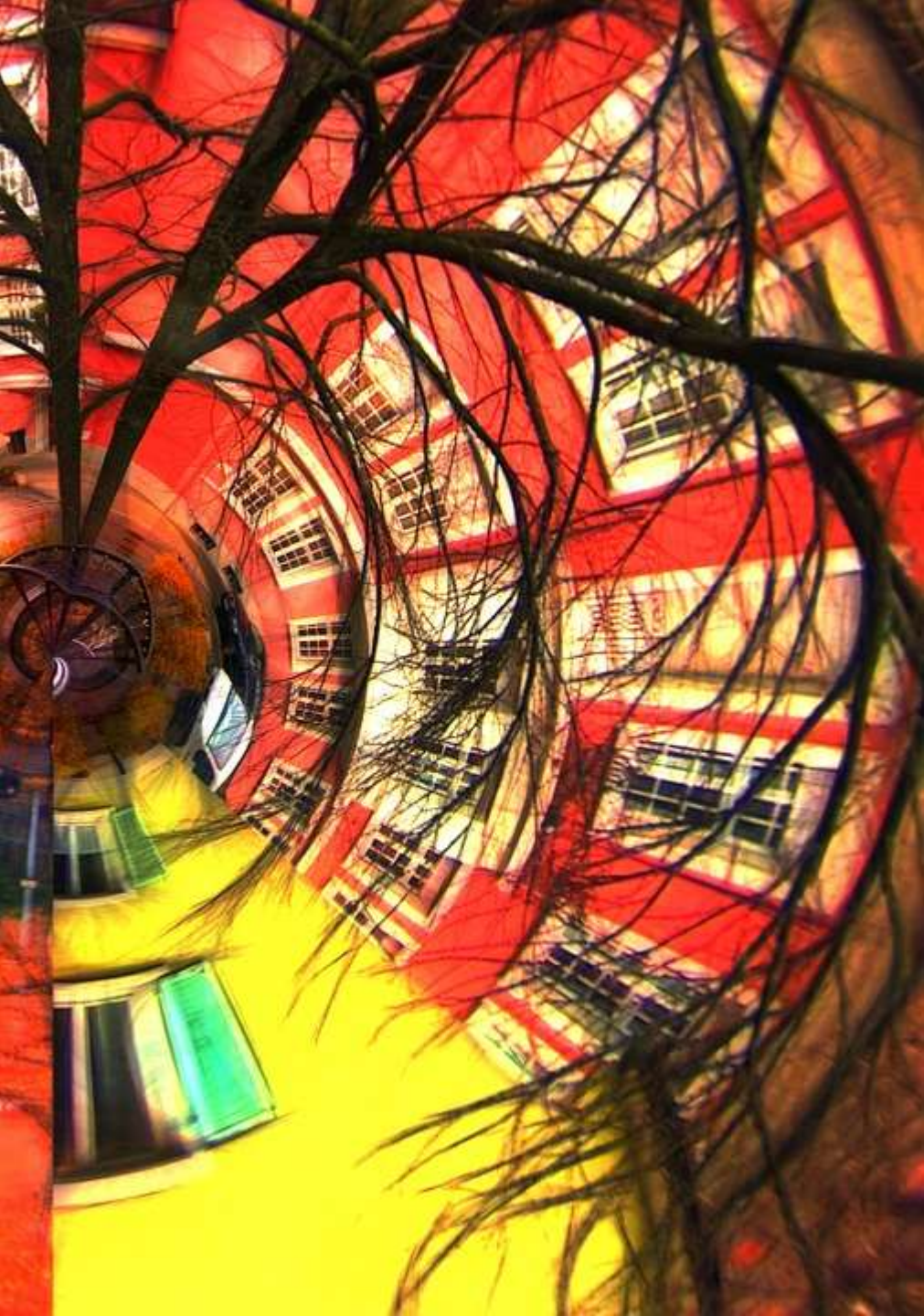


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General objective

To learn the basics of the sustainable development goals, the role of people, the planetary boundaries, the value of renewable energy, sustainable consumption and climate change endeavours.



Competencies to be acquired

1. Introduction to sustainable development

- **Knowledge:**

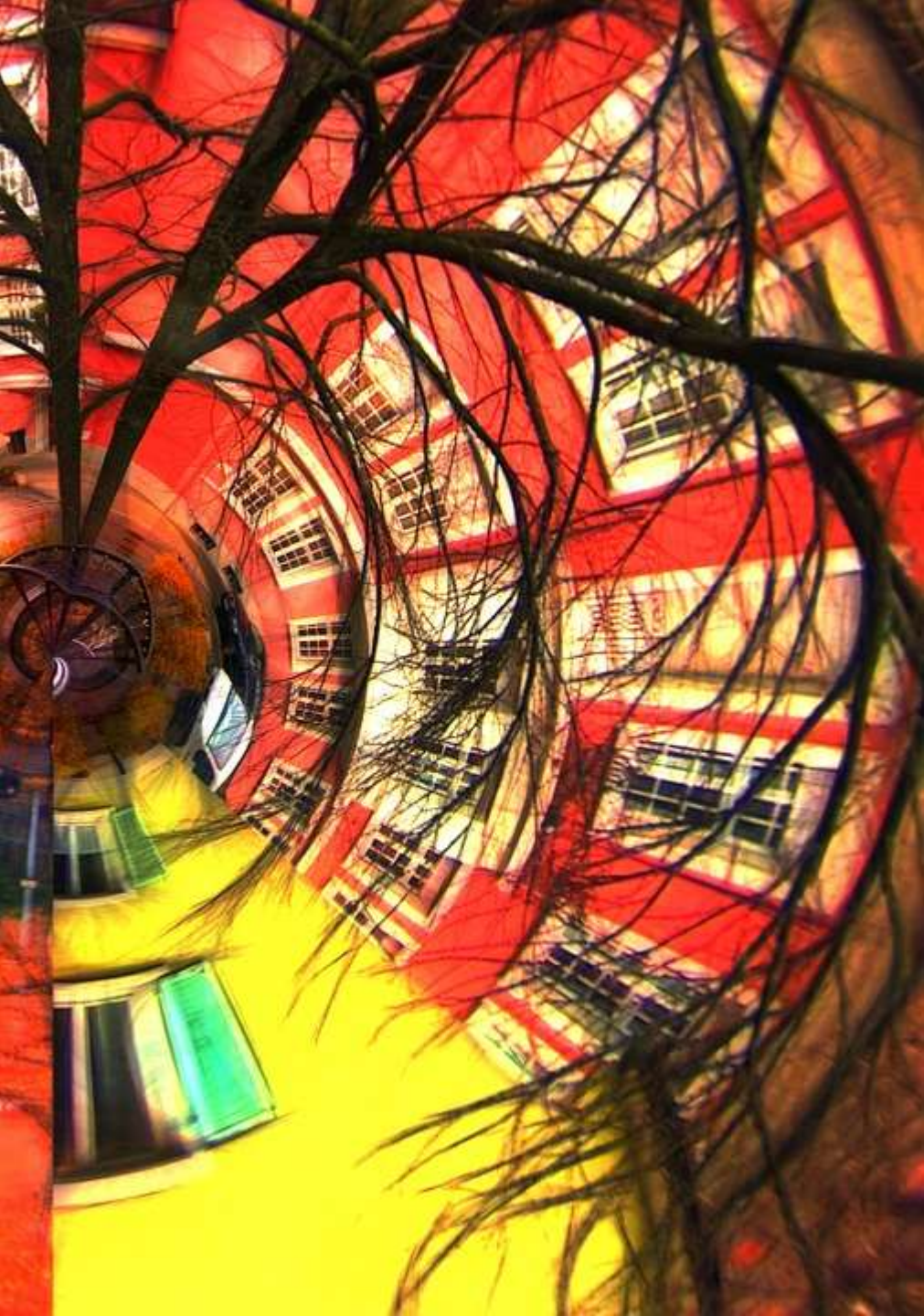
- to understand the sustainable development approach
- to distinguish between sustainable growth patterns and business-as-usual growth patterns
- to identify the consequences of business-as-usual patterns on the environment and society

- **Skills:**

- to define the Sustainable Development Goals
- to identify global poverty regions

- **Responsibility and Autonomy:**

- to articulate and summarize the sustainable development approach



Competencies to be acquired

2. Economic Development – How We Measure It, How It Varies Around the World

- **Knowledge:**

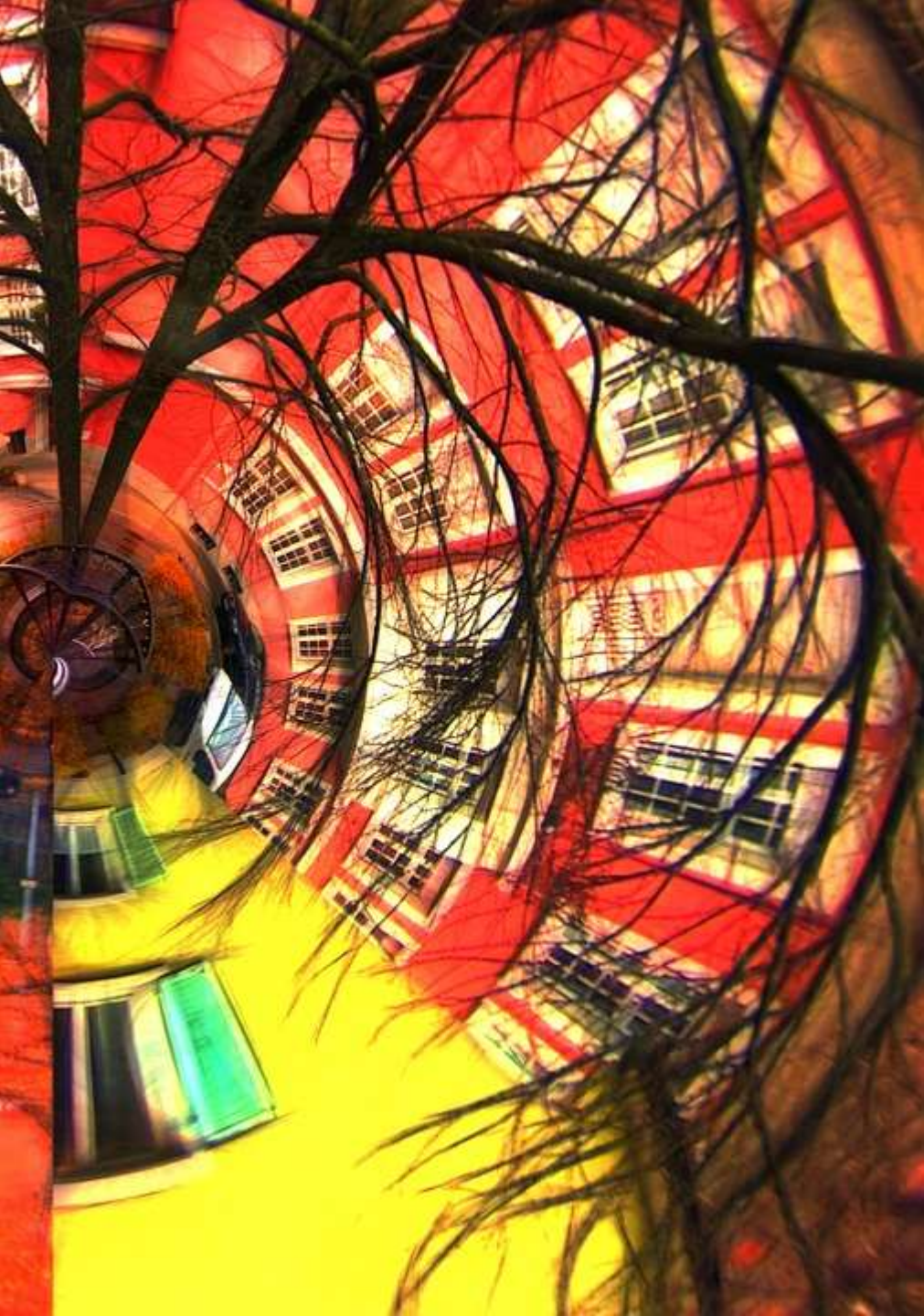
- to understand standard ways of measuring income and economic growth and progress globally

- **Skills:**

- to distinguish between patterns of urban versus rural economic growth

- **Responsibility and Autonomy:**

- to critical analyse the GDP as a metric of economic success in a sustainable development framework
- to identify the driving factors behind urban migration



Competencies to be acquired

3. Sustainable Food Supply and the End of Hunger

- **Knowledge:**

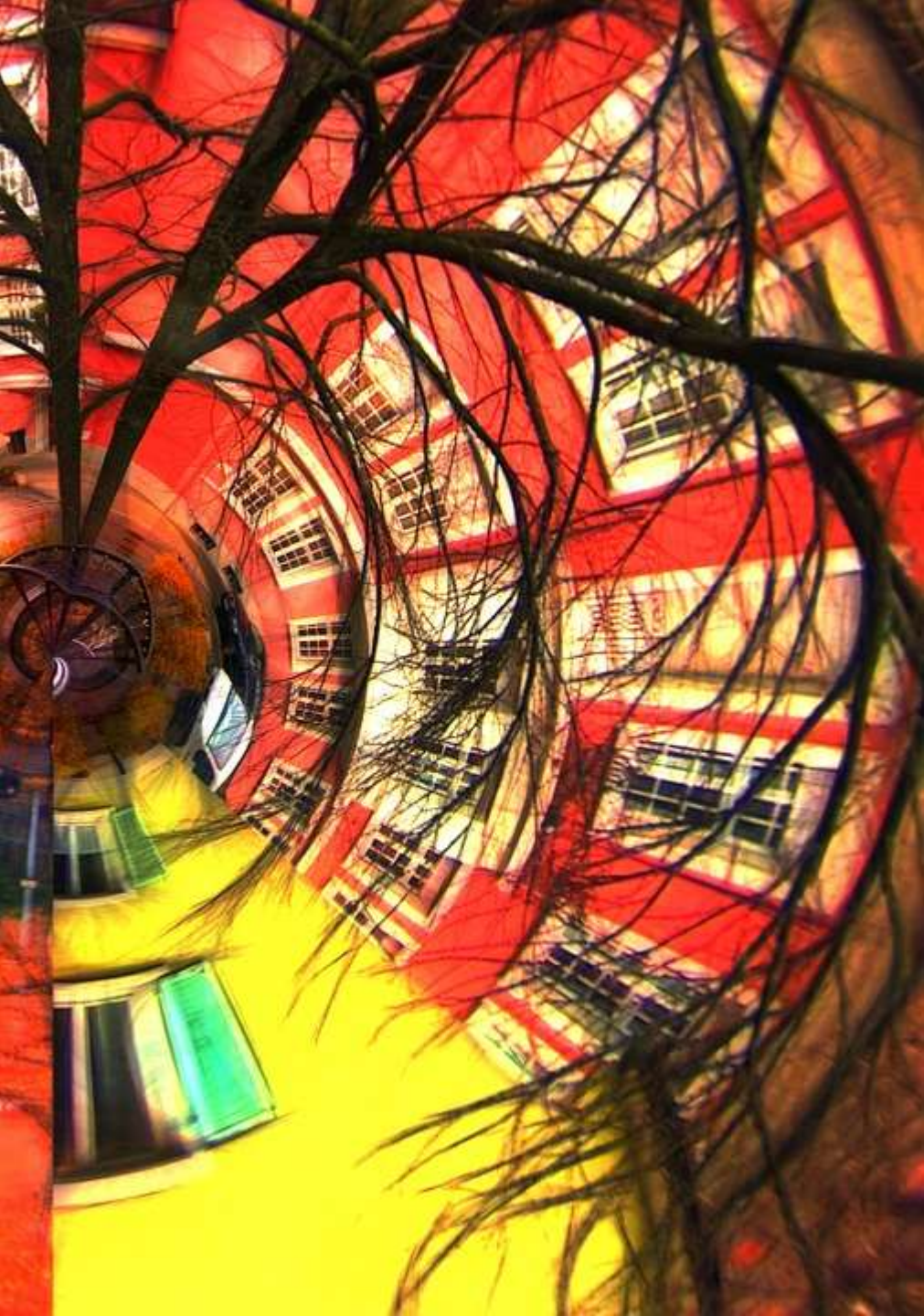
- to understand the complex concept of malnutrition in a global context
- to understand the relationship between climate change and food systems

- **Skills:**

- to illustrate and use key indicators of malnutrition, including stunting, wasting, and obesity

- **Responsibility and Autonomy:**

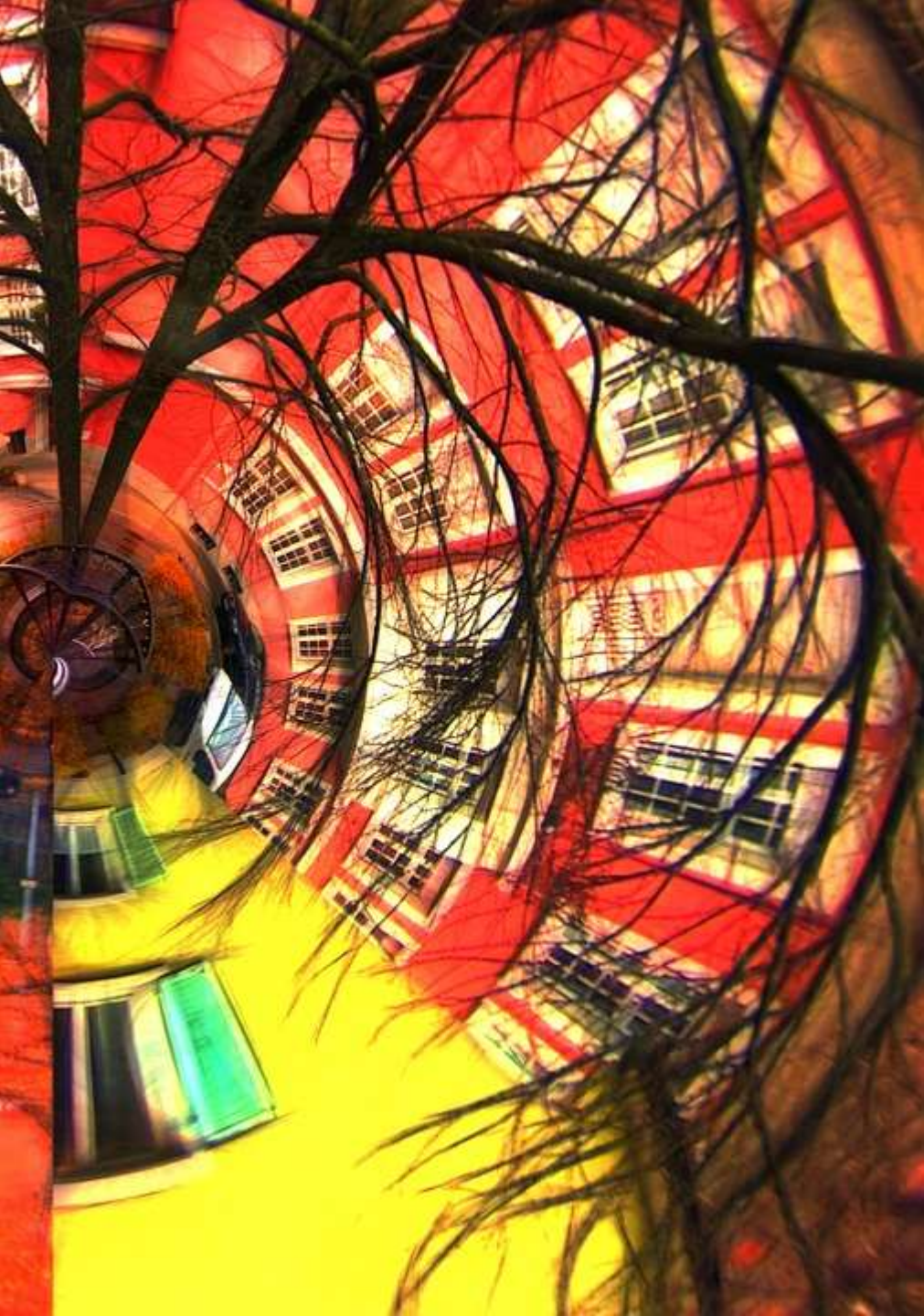
- to interpret the link between agriculture as driver of climate change and climate change as a threat to food systems



Competencies to be acquired

4. Sustainable Cities

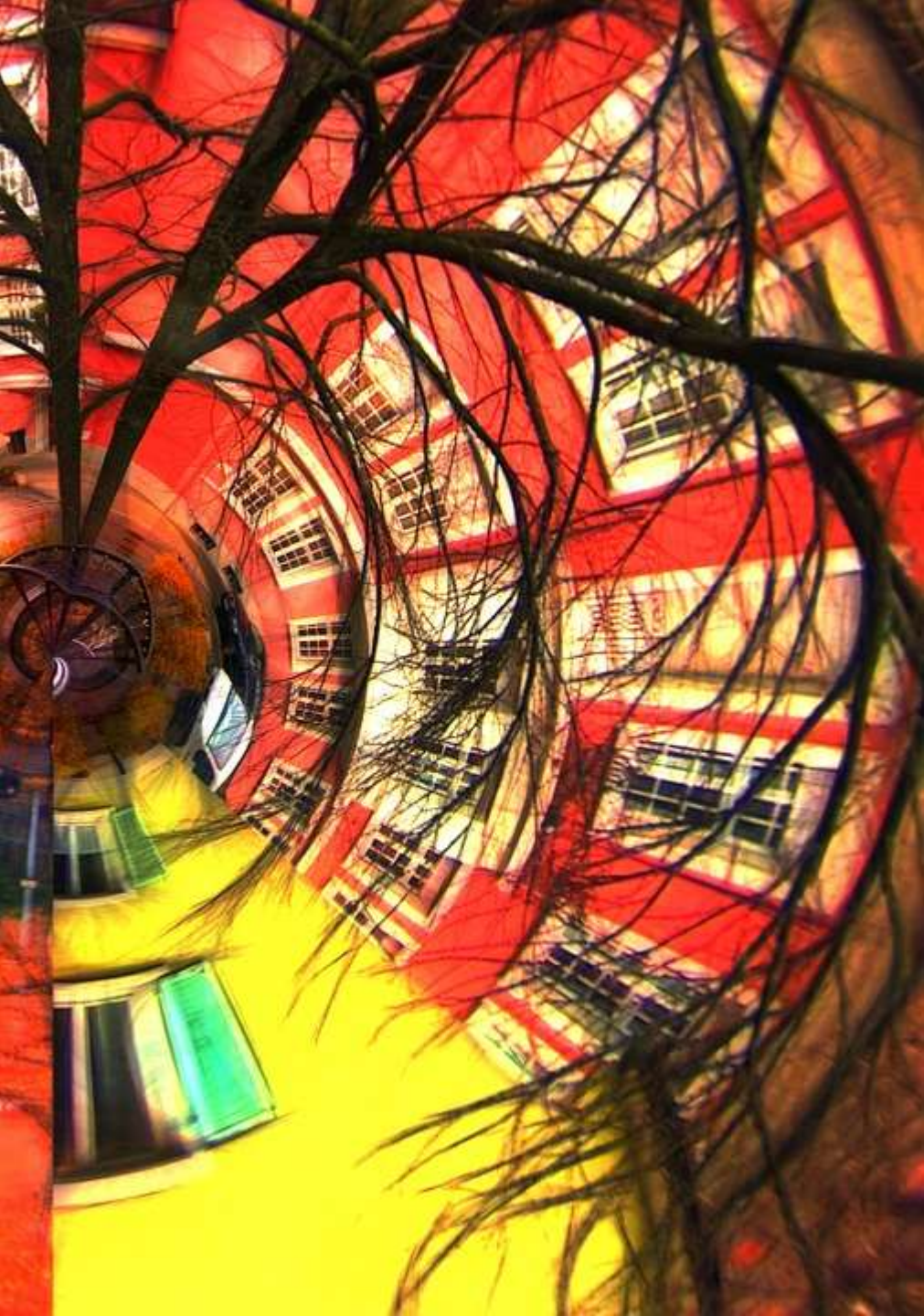
- **Knowledge:**
 - to identify the factors driving urbanization and its consequences
- **Skills:**
 - to relate the consequences of the factors driving urbanization
- **Responsibility and Autonomy:**
 - to justify the relation between the key sectors central to making cities more sustainable



Competencies to be acquired

5. Curbing Climate Change

- **Knowledge:**
 - to identify the human factors driving climate change
- **Skills:**
 - to illustrate and relate the mechanisms behind anthropogenic climate change
- **Responsibility and Autonomy:**
 - to identify the key greenhouse gases and their sources and lifespans



Competencies to be acquired

6. Saving Biodiversity

- **Knowledge:**
 - to define “biodiversity” and “ecosystem services
- **Skills:**
 - to illustrate and relate how the terrestrial ecosystems works
- **Responsibility and Autonomy:**
 - to identify the human factors driving the sixth extinction

Chapter 1. Introduction to Sustainable Development

1.1 What Sustainable development is



Sustainable development is really two ideas:

- One, is a way to understand this complicated world.

How do the economic, the social, the environmental, the political, the cultural factors fit together?

- And the second aspect of sustainable development is the idea of sensible goals for this crowded, interconnected planet.

1.2 Economic Growth and Progress



One very crucial aspect of sustainable development is economic well-being and prosperity.

There have been great gains in material well-being. In average income per person, in other indicators of material life, such as health and life expectancy, over the course of recent decades.

1.3 Continuing Poverty

Poverty is usually viewed as lack of adequate income, but let's think about it as a lack of income, a lack of access to basic health services.

A lack of access to basic amenities that most of the world takes for granted.

Safe water, sanitation, electricity, access for children to, a decent education.

People living in extreme poverty are people who cannot meet these basic needs.





CHART OF THE WEEK

Where Do the Richest People Live?

Ranking the world's most affluent countries by average and median wealth

Countries often compete over who's the richest, and rely on economic indicators such as average wealth to make their case.

But some argue that this simple metric doesn't factor in the gap between the richest and poorest in a nation—also known as income inequality.



Average wealth:

Calculated by dividing a country's overall wealth (gross assets) by its total adult population.



Median wealth:

Calculated by dividing wealth distribution into two equal groups—those with more above, and those with less below, the middle wealth value.

Using data from the Credit Suisse Global Wealth Report 2018, we break down the top 10 countries by average wealth per adult, and who's really the richest when median wealth is accounted for.

Top 10 (Average)				Top 10 (Median)			
1		SWITZERLAND	\$550,244		AUSTRALIA	\$181,455	
2		AUSTRALIA	\$411,060		SWITZERLAND	\$181,159	
3		UNITED STATES	\$403,974		BELGIUM	\$163,429	
		BELGIUM	\$210,045		NETHERLANDS	\$174,935	
		NORWAY	\$219,105		FRANCE	\$106,827	
		NEW ZEALAND	\$200,796		CANADA	\$100,342	
		CANADA	\$208,205		JAPAN	\$103,081	
		DENMARK	\$200,712		NEW ZEALAND	\$98,613	
		SINGAPORE	\$285,716		UNITED KINGDOM	\$97,169	
		FRANCE	\$200,580		SINGAPORE	\$91,656	

Data estimates are for mid-2018 values
Source: Credit Suisse Global Wealth Report 2018, Global Wealth Databook 2018



1.4 Environmental Threats

We need to understand what those planetary boundaries are:

- climate change,
- ocean acidification,
- ozone depletion,
- the nitrogen cycle,
- the phosphorous cycle,
- global fresh water use,
- changes in land use,
- loss of biodiversity,
- driving other species to extinction,

that is, aerosol loading, the particles we're putting into the atmosphere through industrial processes, and chemical pollution, poisoning air and waterways.

These are planetary boundaries that we trespass at profound risk for ourselves and for our children.



1.5 Business as Usual vs. Sustainable Development



One part of sustainable development is to understand the inter-linkages of the economy, of society, of the environment, and of our politics and government processes, and the other part of sustainable development to do something about it.

We need to move from the business as usual trajectory to the sustainable development trajectory.

1.6 Agenda 2030



SUSTAINABLE DEVELOPMENT GOALS



Chapter 2: Economic Development – How We Measure It, How It Varies Around the World

2.1 Incomes Around the World



Sustainable development we've seen has three major aspects:

- economic development,
 - broad-based inclusion and
 - environmental sustainability,
- all supported by good governance.

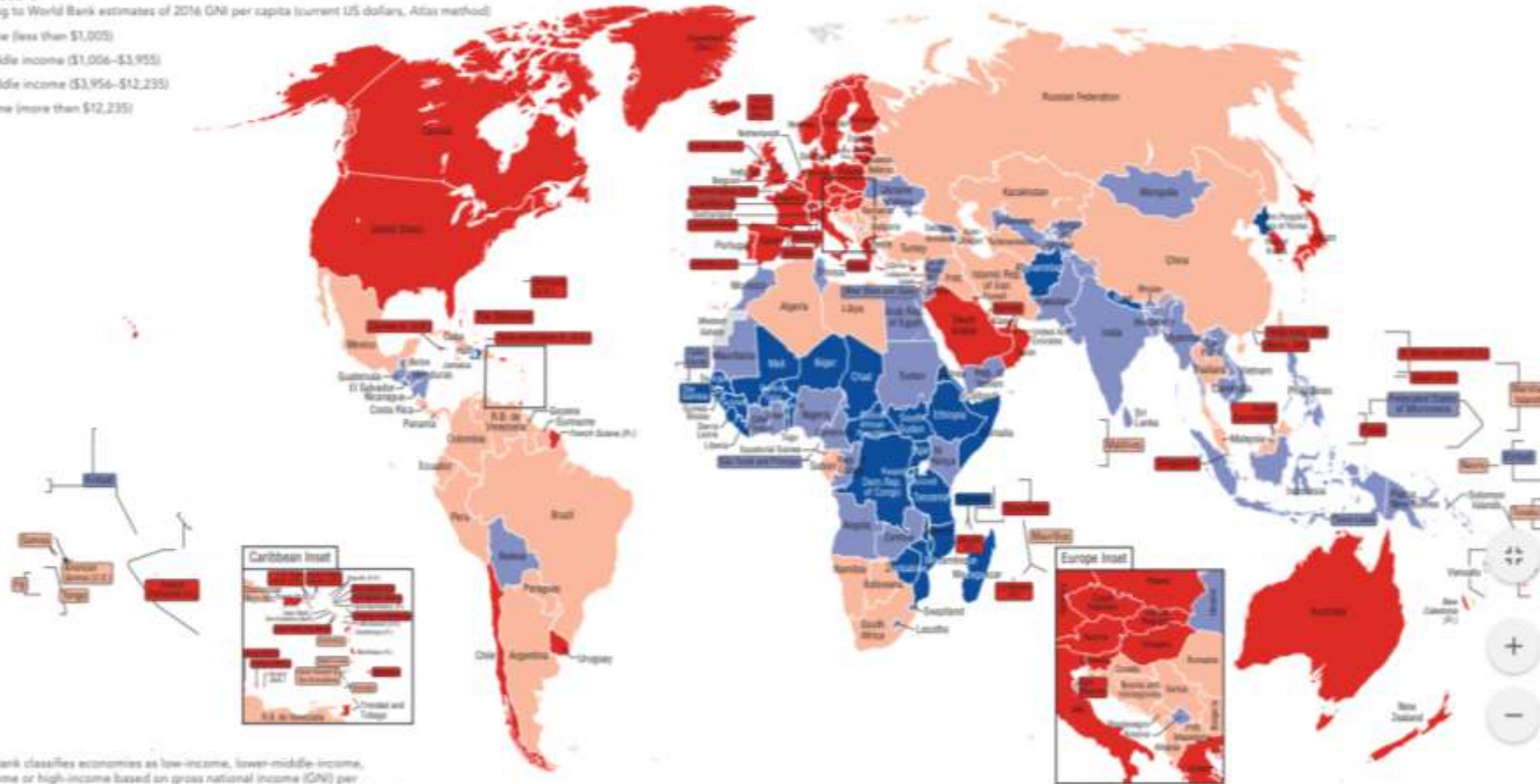
The World Bank gives three categories of countries:

- ✓ high income countries,
- ✓ middle income countries and
- ✓ low income countries,

The world by income

Classified according to World Bank estimates of 2016 GNI per capita (current US dollars, Atlas method)

- Low income (less than \$1,005)
- Lower middle income (\$1,006–\$3,955)
- Upper middle income (\$3,956–\$12,235)
- High income (more than \$12,235)
- No data



Note: The World Bank classifies economies as low-income, lower-middle-income, upper-middle-income or high-income based on gross national income (GNI) per

2.2 Measuring Well-being

The Organisation for Economic Co-operation and Development (<https://www.oecd.org/>) differentiates between measures of material conditions of life, which are essentially measures of income and wealth, jobs and earnings, and housing, and other quality of life indicators which include leisure time, health, education, social connectedness, whether society has the social capital to come to the aid of each other, civic engagement, voter turnout, environmental quality, personal safety, and subjective well-being.



CURRENT WELL-BEING

Key dimensions



How we measure them



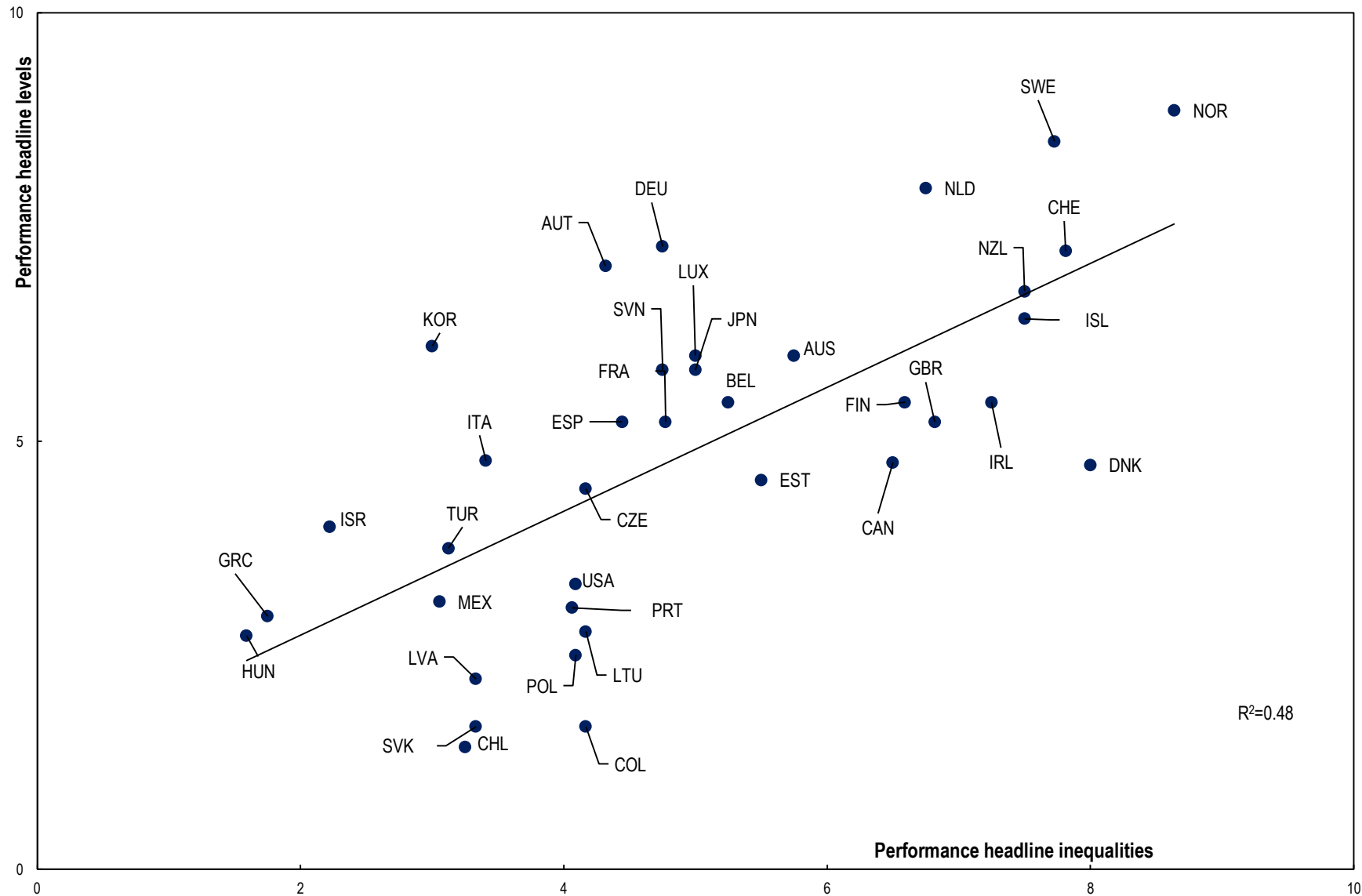
RESOURCES FOR FUTURE WELL-BEING

Key dimensions



How we measure them





In 2018, the countries expressing the highest subjective well-being were Finland, Norway, Denmark, and Iceland--four Nordic countries--and Sweden, the fifth of the Nordic countries

Chapter 3: Sustainable Food Supply and the End of Hunger

3.1. End of Hunger



Around 2.8 billion people on a planet of 7.2 billion people are malnourished, about 40% of the population.

We have a food crisis. It varies in different parts of the world, sometimes it's hidden, sometimes it's the wrong kinds of foods, sometimes it's simply not enough food.

3.2 How Environmental Change Threatens the Food System



Under the pressures of intensive agriculture, often when farms have encroached on forest lands or in topography not really suitable for farms, the result is also rapid land degradation. Soil loss. Depletion of soil nutrients.

Chapter 4: Sustainable Cities



4.1 The Patterns of Urbanization Around the World




















In 1950, 38% of the world's urban population was in Europe. Now, the era in which European and U.S. cities were the dominant cities of the world is coming to an end.

World Population by Region

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#	Region	Population (2020)	Yearly Change	Net Change	Density (P/Km ²)	Land Area (Km ²)	Migrants (net)	Fert. Rate	Med. Age	Urban Pop %	World Share
1	Asia	4,641,054,775	0.86 %	39,683,577	150	31,033,131	-1,729,112	2.2	32	0 %	59.5 %
2	Africa	1,340,598,147	2.49 %	32,533,952	45	29,648,481	-463,024	4.4	20	0 %	17.2 %
3	Europe	747,636,026	0.06 %	453,275	34	22,134,900	1,361,011	1.6	43	0 %	9.6 %
4	Latin America and the Caribbean	653,962,331	0.9 %	5,841,374	32	20,139,378	-521,499	2	31	0 %	8.4 %
5	Northern America	368,869,647	0.62 %	2,268,683	20	18,651,660	1,196,400	1.8	39	0 %	4.7 %
6	Oceania	42,677,813	1.31 %	549,778	5	8,486,460	156,226	2.4	33	0 %	0.5 %

TOP 20 LARGEST COUNTRIES BY POPULATION (LIVE)

1		<u>China</u>	1,441,273,319	11		<u>Japan</u>	126,342,016
2		<u>India</u>	1,384,805,010	12		<u>Ethiopia</u>	115,993,628
3		<u>U.S.A.</u>	331,685,463	13		<u>Philippines</u>	110,099,767
4		<u>Indonesia</u>	274,548,117	14		<u>Egypt</u>	103,026,440
5		<u>Pakistan</u>	222,431,455	15		<u>Vietnam</u>	97,648,089
6		<u>Brazil</u>	213,091,919	16		<u>D.R. Congo</u>	90,554,745
7		<u>Nigeria</u>	207,987,699	17		<u>Turkey</u>	84,660,613
8		<u>Bangladesh</u>	165,270,042	18		<u>Germany</u>	83,877,820
9		<u>Russia</u>	145,956,301	19		<u>Iran</u>	84,374,993
10		<u>Mexico</u>	129,412,529	20		<u>Thailand</u>	69,861,291

Rank	City	Population in Year 2018
#1	 Tokyo	38,194,000
#2	 Delhi	27,890,000
#3	 Shanghai	25,779,000
#4	 Beijing	22,674,000
#5	 Mumbai	22,120,000
#6	 Sao Paulo	21,698,000
#7	 Mexico City	21,520,000
#8	 Cairo	19,850,000
#9	 Dhaka	19,633,000
#10	 New York City	18,713,000

4.2 What Makes a City Sustainable?



- Is a green city
Green in the literal sense that there are parks and places of people and open areas combined. But also green in the sense that its economic impact on the environment, the ecological footprint of the city, is also limited.
- Is a resilient city
In the era of planetary boundaries, in a period where, whether we like it or not, we are going to be experiencing more jolts of human-induced climate change know that the cities are going to be buffeted.



- The energy system
- Transport
- The infrastructure, its water, its sanitation, its waste management

4.3 Planning for Sustainable Development

- A good example in sustainable development city planning is the plan of the city of New York, PlaNYC

10 goals:

1. Housing and neighborhoods
2. Parks and Public Spaces
3. Brownfields
3. Waterways- Waste fills dumping sites
4. Water Supply
5. Transportation
6. Energy
7. Air Quality
8. Solid Waste
9. Climate Change



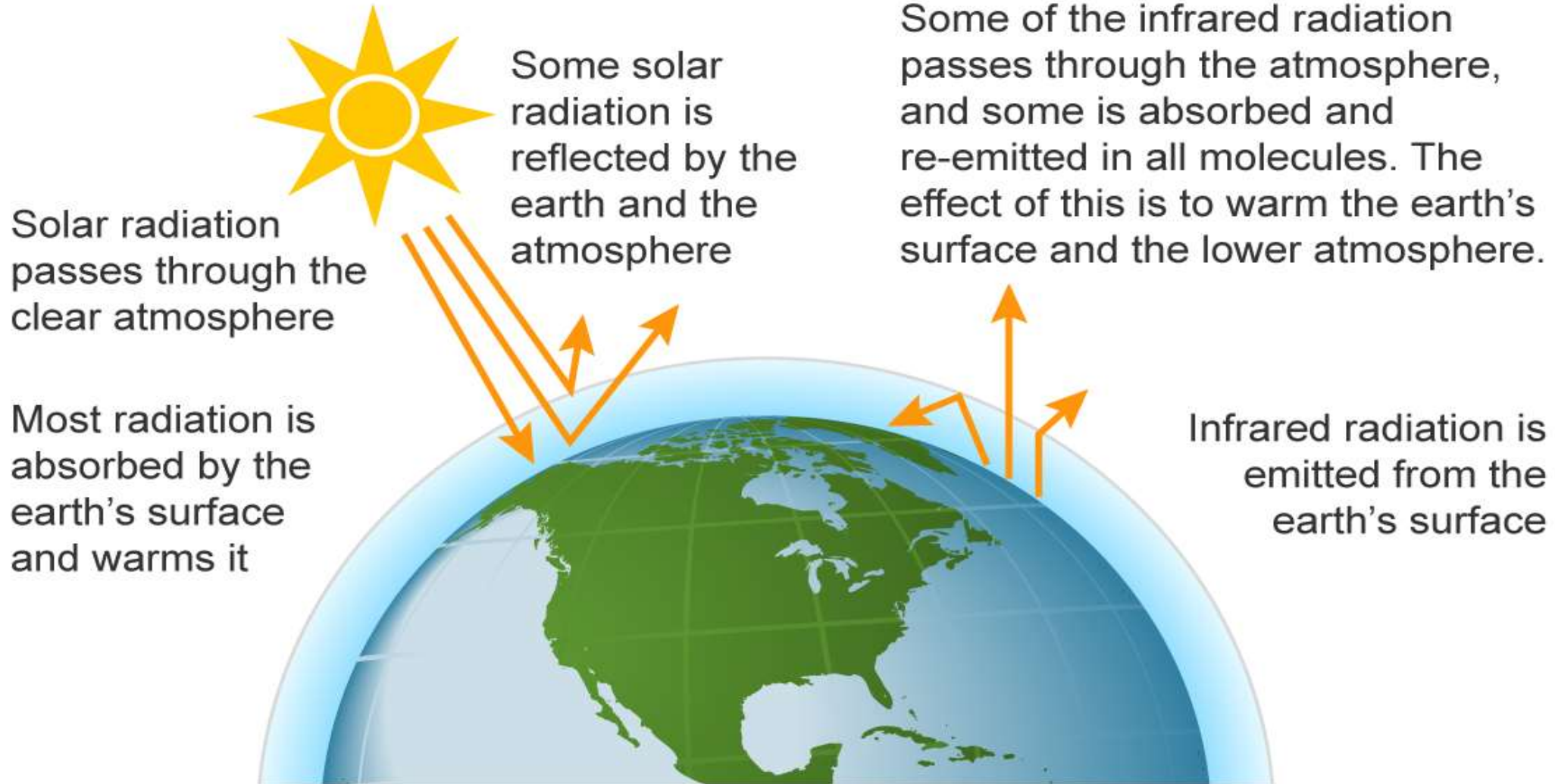
Chapter 5: Curbing Climate Change



5.1 The Basic Science of Climate Change

Climate change is the biggest of all the environmental threats that we face, and the magnitude of this threat is only gradually dawning on humanity.

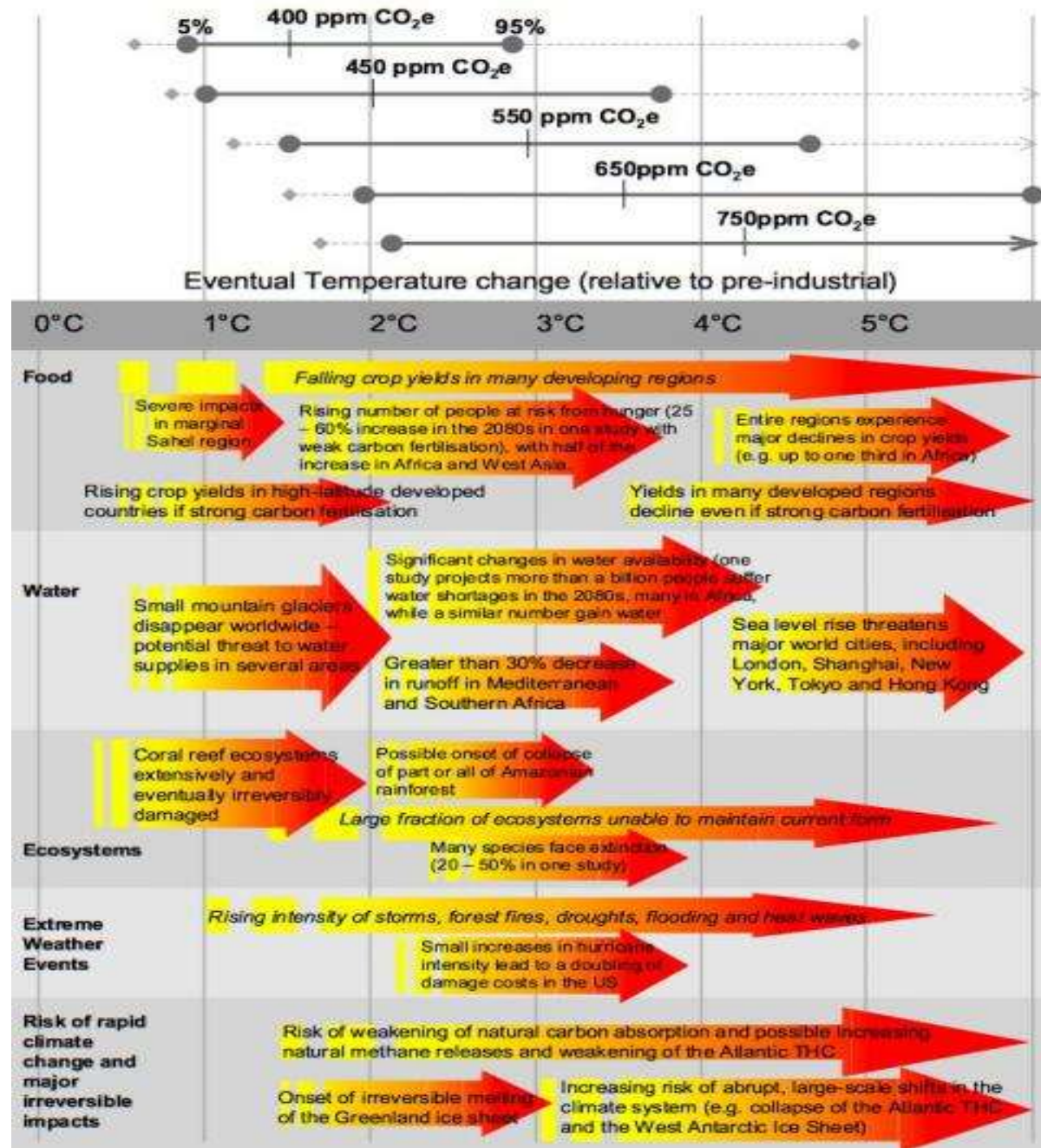
The greenhouse effect



5.2 Consequences



We are on a path of putting so much carbon dioxide, methane, nitrous oxide into the atmosphere that the temperature increase on average on the planet could be several degrees centigrade by the end of this century.

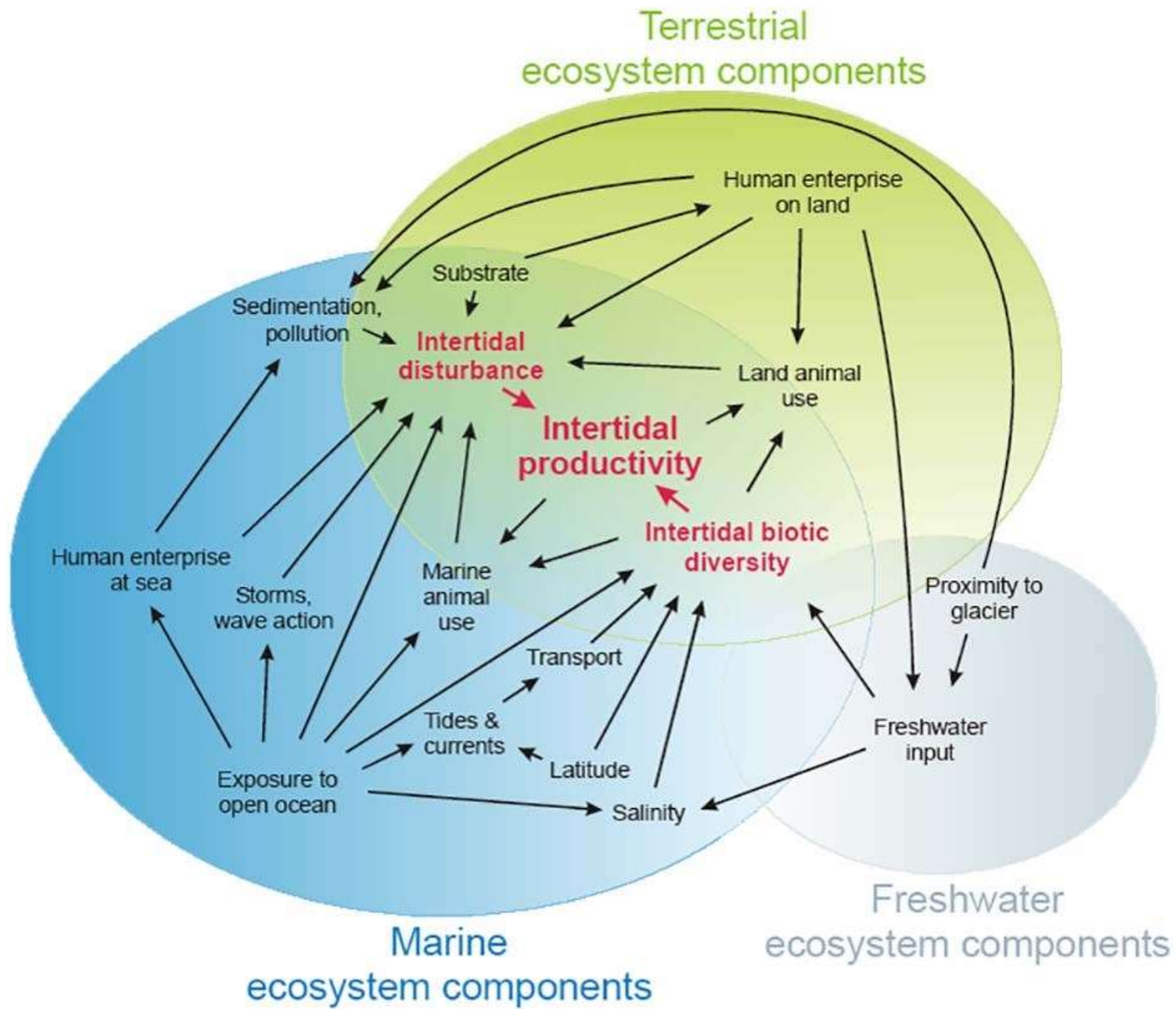


Chapter 6: Saving Biodiversity

6.1 What is Biodiversity?



Biodiversity is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.



6.2 Biodiversity Under Threat



Some of the main threats to biodiversity are:

1. Human Activities and Loss of Habitat,
2. Deforestation,
3. Desertification,
4. Marine Environment,
5. Increasing Wildlife Trade and
6. Climate Change.

