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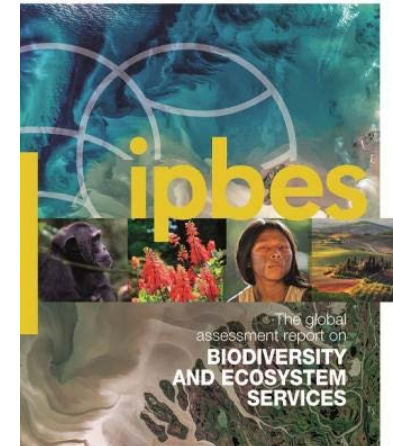


Biodiversity and Agriculture

Assem A. A. Mohamed

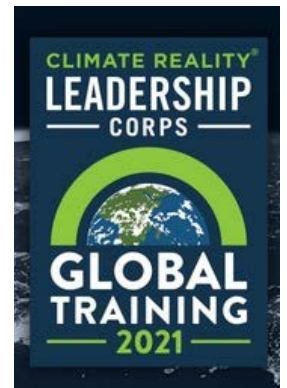
PhD, Associate Prof. CLAC

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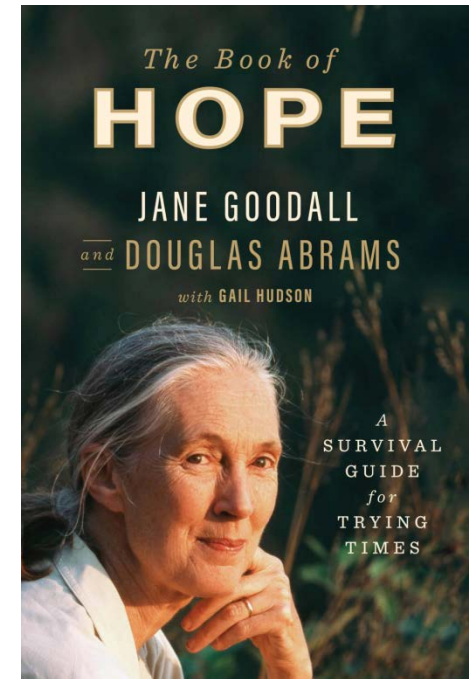
Preamble



Do you honestly believe there is hope for our world?
For the future of our children and grandchildren?

In *The Book of Hope*, Jane focuses on her
“Four Reasons for Hope”

The Amazing Human Intellect, The
Resilience of Nature, The Power of Young
People, and The Indomitable Human
Spirit.



Agriculture: Definition and Overview

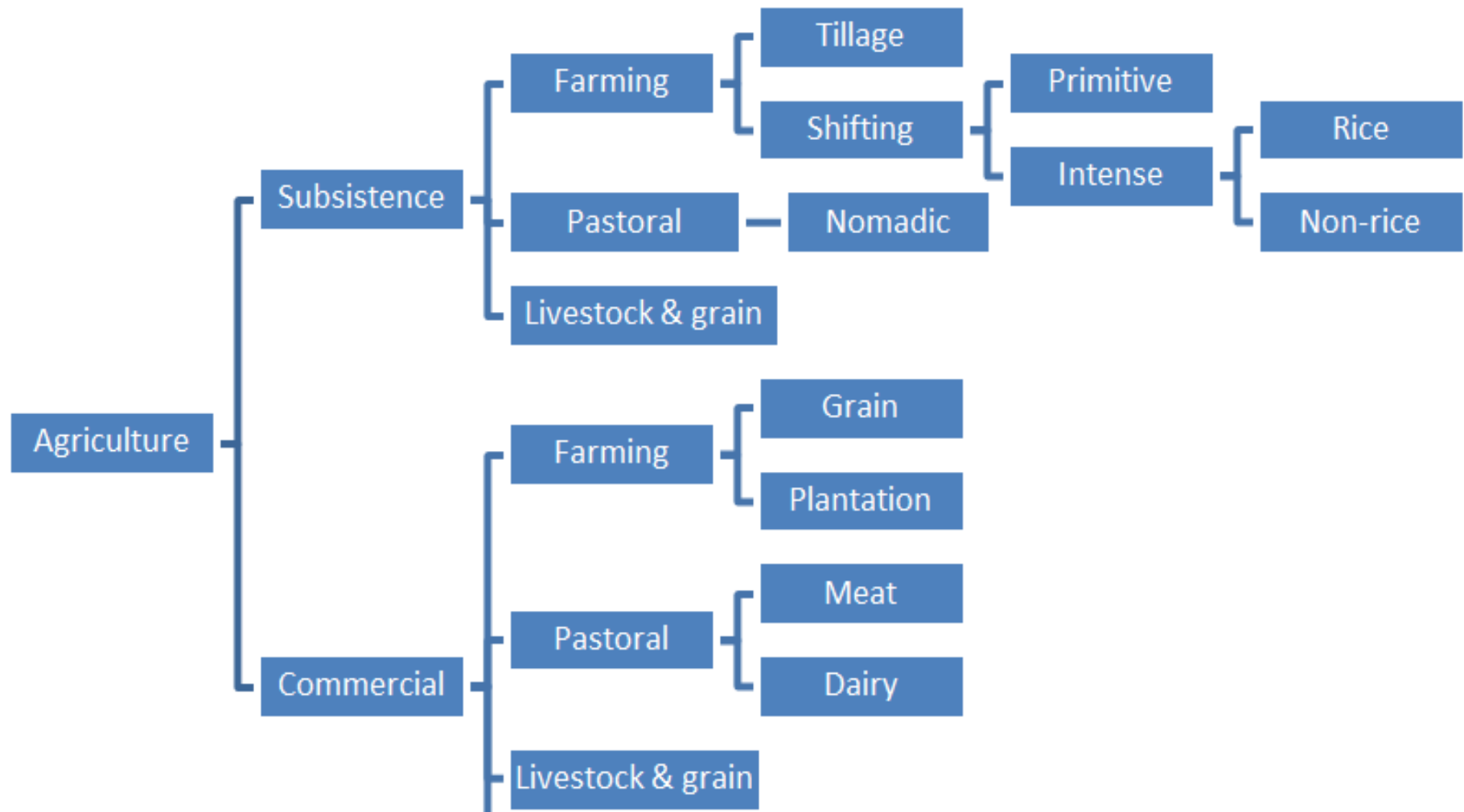
- Agriculture is the most comprehensive word used to denote the many ways in which crop plants and domestic animals sustain the global human population by providing food and other products.

The science or practice of farming, including growing crops and raising animals for the production of food, fiber, fuel and other products.

US, Environmental Protection Agency

- The English word agriculture derives from the Latin *ager* (field) and *colo* (cultivate) signifying, when combined, the Latin *agricultura*: field or land tillage.
- But the word has come to subsume a very wide spectrum of activities that are integral to agriculture and have their own descriptive terms, such as cultivation, domestication, horticulture, arboriculture, and vegiculture, as well as forms of livestock management such as mixed crop-livestock farming, pastoralism, and transhumance

TYPES OF AGRICULTURE



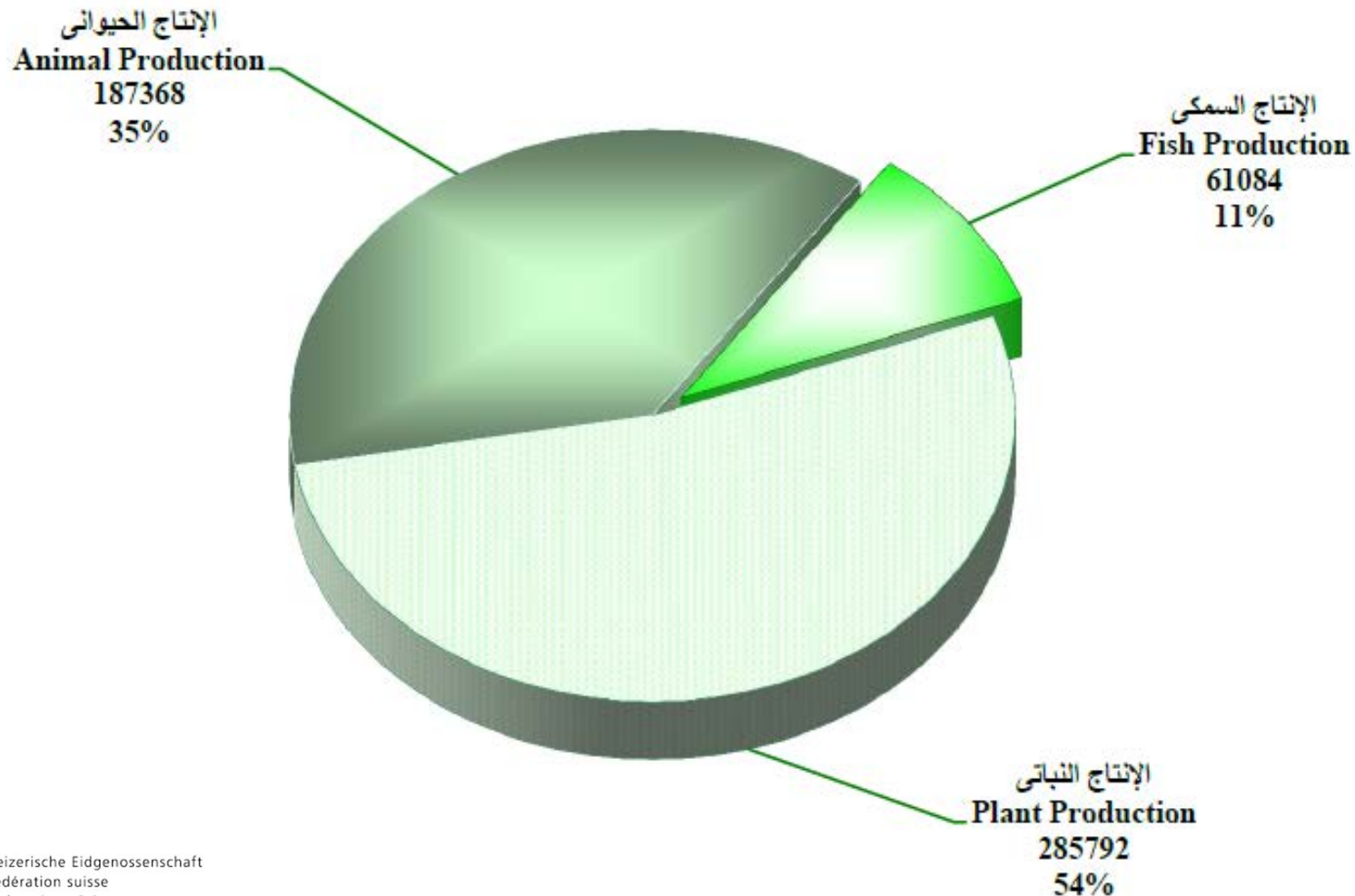
IDENTIFICATION OF THE TYPE OF AGRICULTURE SUITED FOR APPLICATION OF WIRELESS SENSOR NETWORKS.

December 2012 Russian Journal of Agricultural and Socio-Economic Sciences 12(12):19-36

Egyptian agriculture sector in figures in 2019

- Total cultivated area was 9.3 million fed.
- Total cropped area was 16.3 million fed.
- Total value of **agricultural production** was LE 534.2 billion.
- Total Value of Agricultural Inputs was LE 187.8 billion.
- Net Agricultural Income was LE 346.4 billion.

Figure 1. Total value of Egyptian agricultural at current farm prices in 2019 (LE Million)



What Is Biodiversity?

The term biodiversity (from “biological diversity”) refers to the variety of life on Earth at all its levels, from genes to ecosystems, and can encompass the evolutionary, ecological, and cultural processes that sustain life.

What is agricultural biodiversity?

- Agricultural biodiversity represents the variety and variability of animals, plants and micro-organisms that are used directly or indirectly for food and agriculture

Agriculture and the environment

- Food security and human well-being are threatened by the ongoing degradation of agricultural land. Modern agriculture, notably since the Green Revolution, has enabled us to produce food at productivity levels unthinkable in the past (Dasgupta 2021).

- Between 1960 and 2000, yields across all developing countries rose 208 percent for wheat, 109 percent for rice, 157 percent for maize, 78 percent for potatoes, and 36 percent for cassava (FAO 2004). By 2015, global agricultural production had tripled (FAO 2017a), with positive impacts on food security, economic growth, and poverty reduction.

- However, these high yields also require the application of large amounts of chemical fertilizers and pesticides, raising concerns about cost and potential environmental harms, including land degradation and loss of biodiversity and soil carbon (Pingali 2012)

Biodiversity in crisis

One Million Species at Risk of Extinction, Threatening Human Communities Around the World, U.N. Report Warns

A global assessment compiled by hundreds of scientists found that humans are inflicting staggering damage on the world's biodiversity

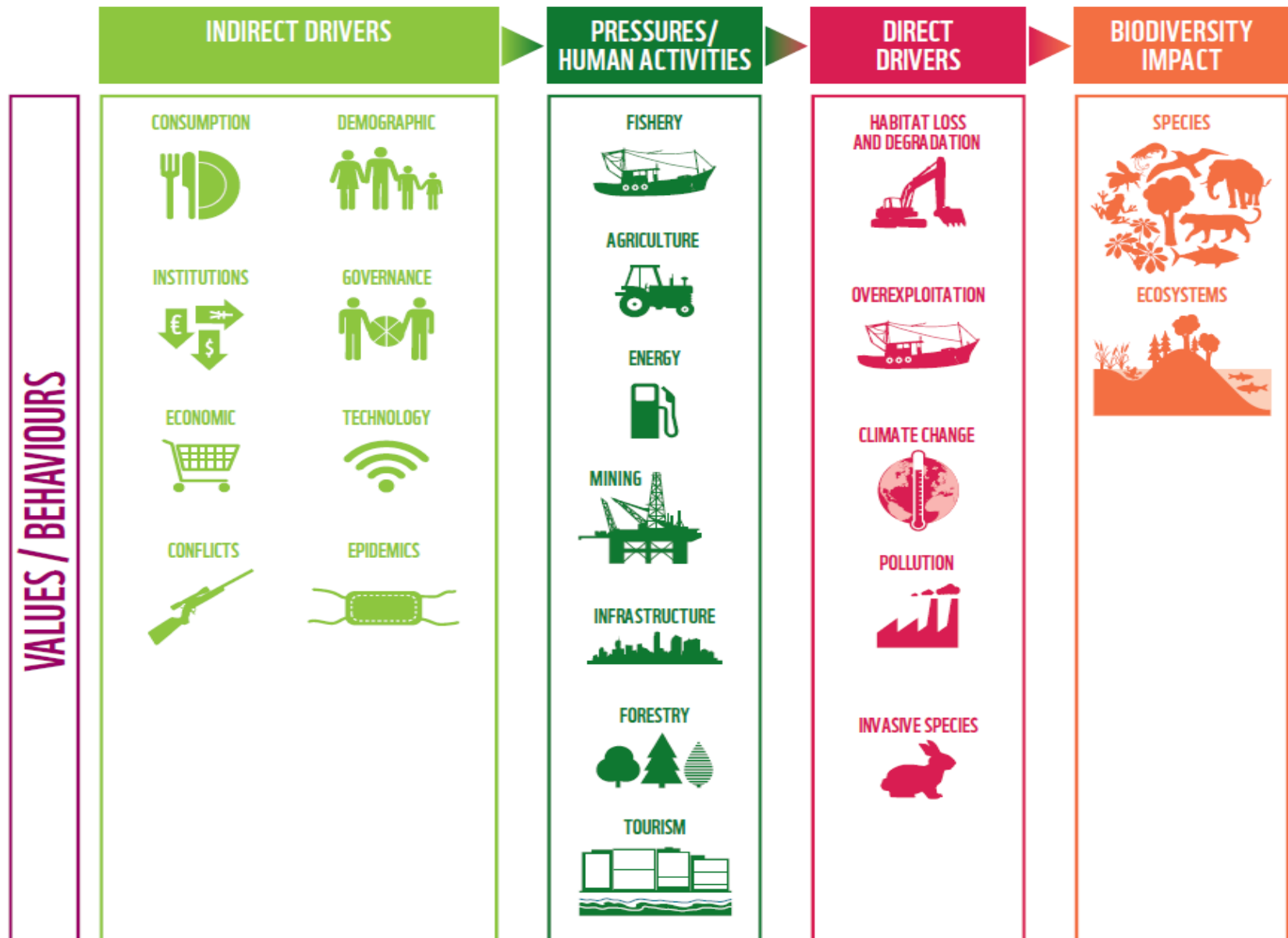


Threats to biodiversity

- Changes in land and sea use, including habitat loss and degradation.
- Species overexploitation
- Invasive species and disease
- Pollution
- Climate change



Threats to nature and the drivers and pressures behind them



**A QUICK
QUESTION
FOR YOU...**

- Before we look into the future, let's take a little test. See if you can complete the sentences



In 2018, global annual CO₂ emissions surpassed

405 ppm.



Greenhouse gases, such as CO₂, remain in the atmosphere for years and

trap some of the energy that comes from the sun.



In 2017, CO₂ concentration in the atmosphere surpassed

41.5 GtCO₂/year.

Can you distinguish weather from climate? *Drag and match.*



Thailand has high humidity
all year round

Weather



Freezing temperatures in
Toronto for 7 days in a row

Climate



The dry season in Kenya is
from June to October

Climate



It feels hotter than usual
right now in Bali

Weather

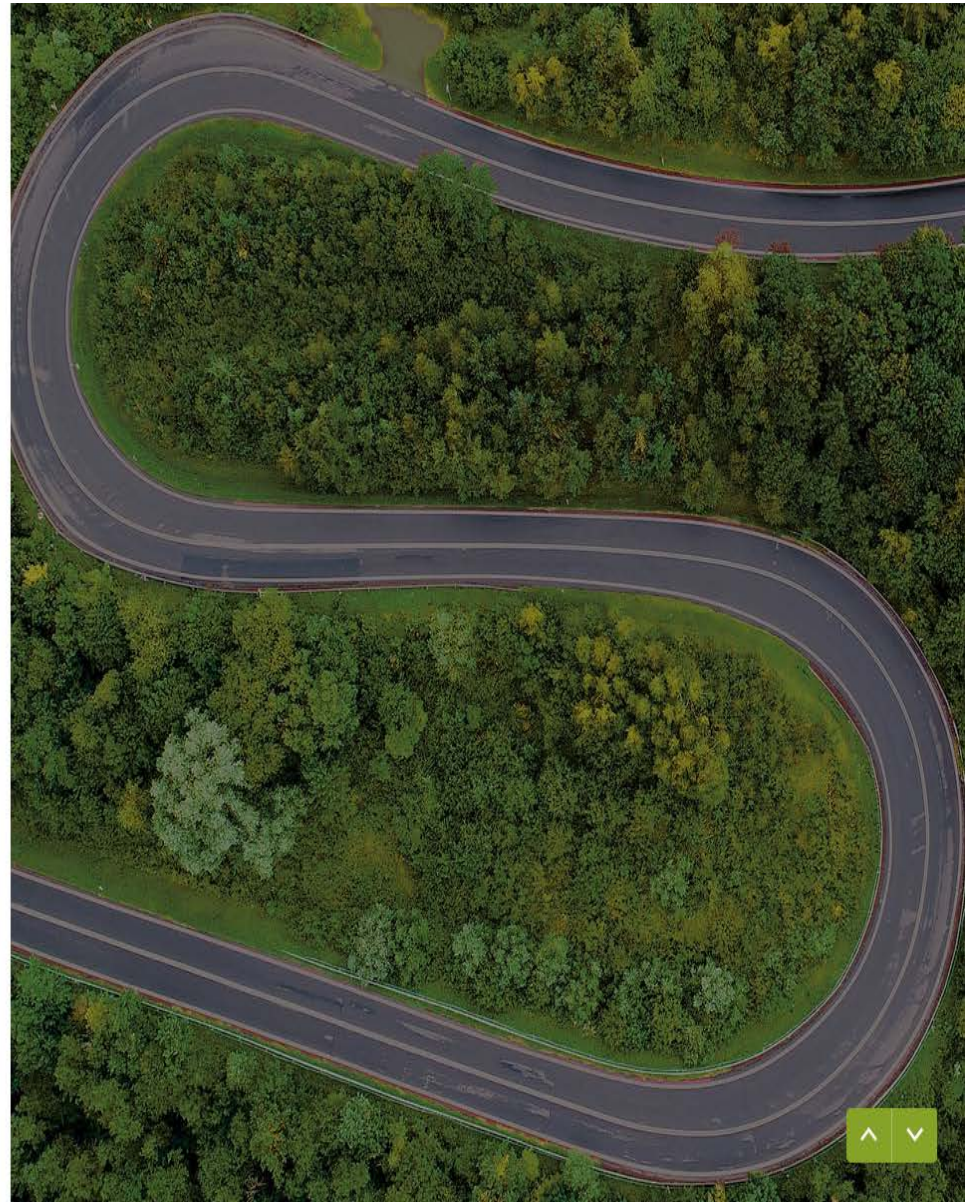
2 → There are currently 7.8 billion people on the planet. So, what do you think the world population is projected to be by 2030? *

A 7.9 billion

B 8.5 billion

C 10.1 billion

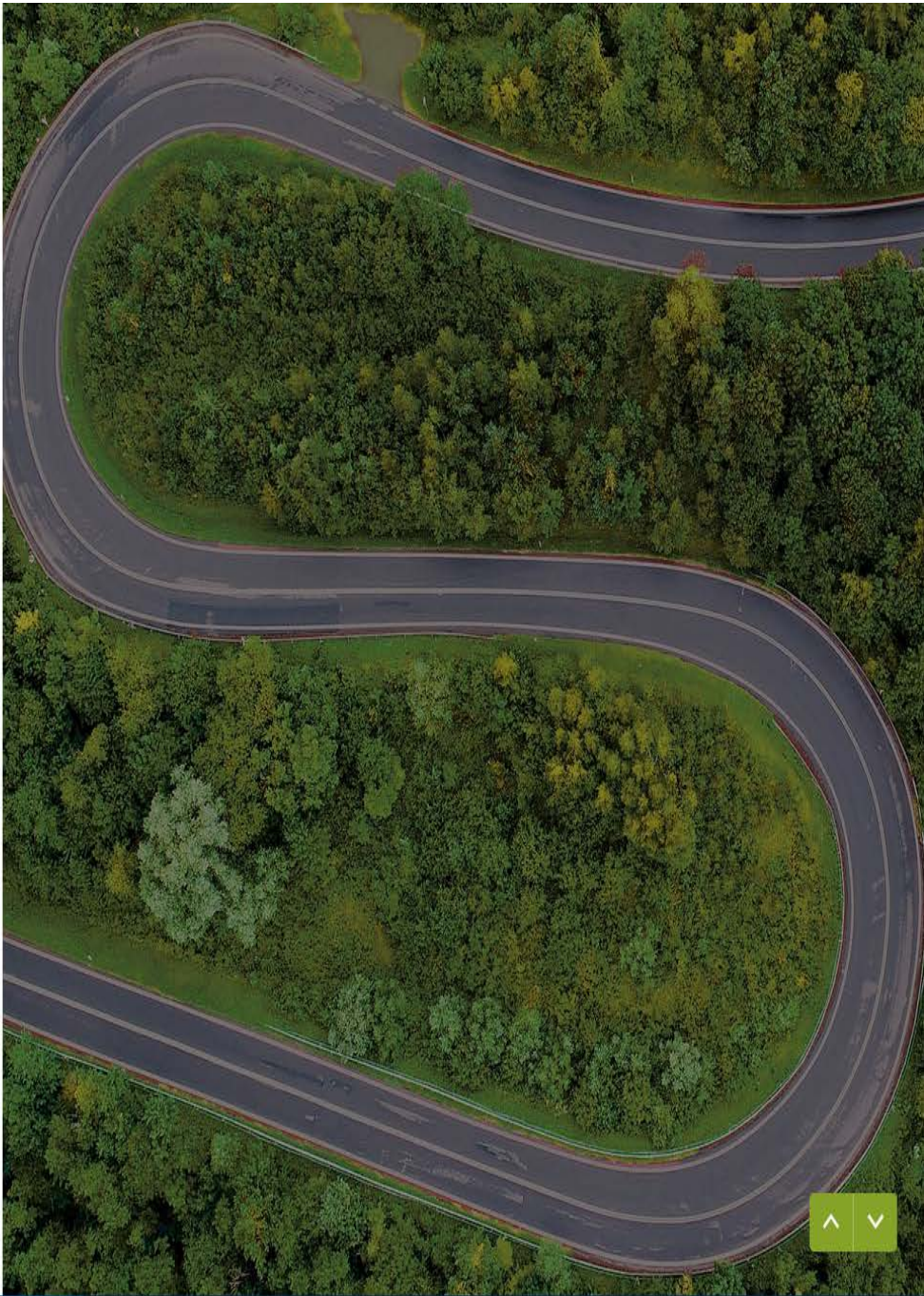
D 11.2 billion



3 → If nothing changes, the world's population will only have ____% of the water it needs by 2030. *

Can you fill in the blank?

- A 23%
- B 31%
- C 44%
- D 56%



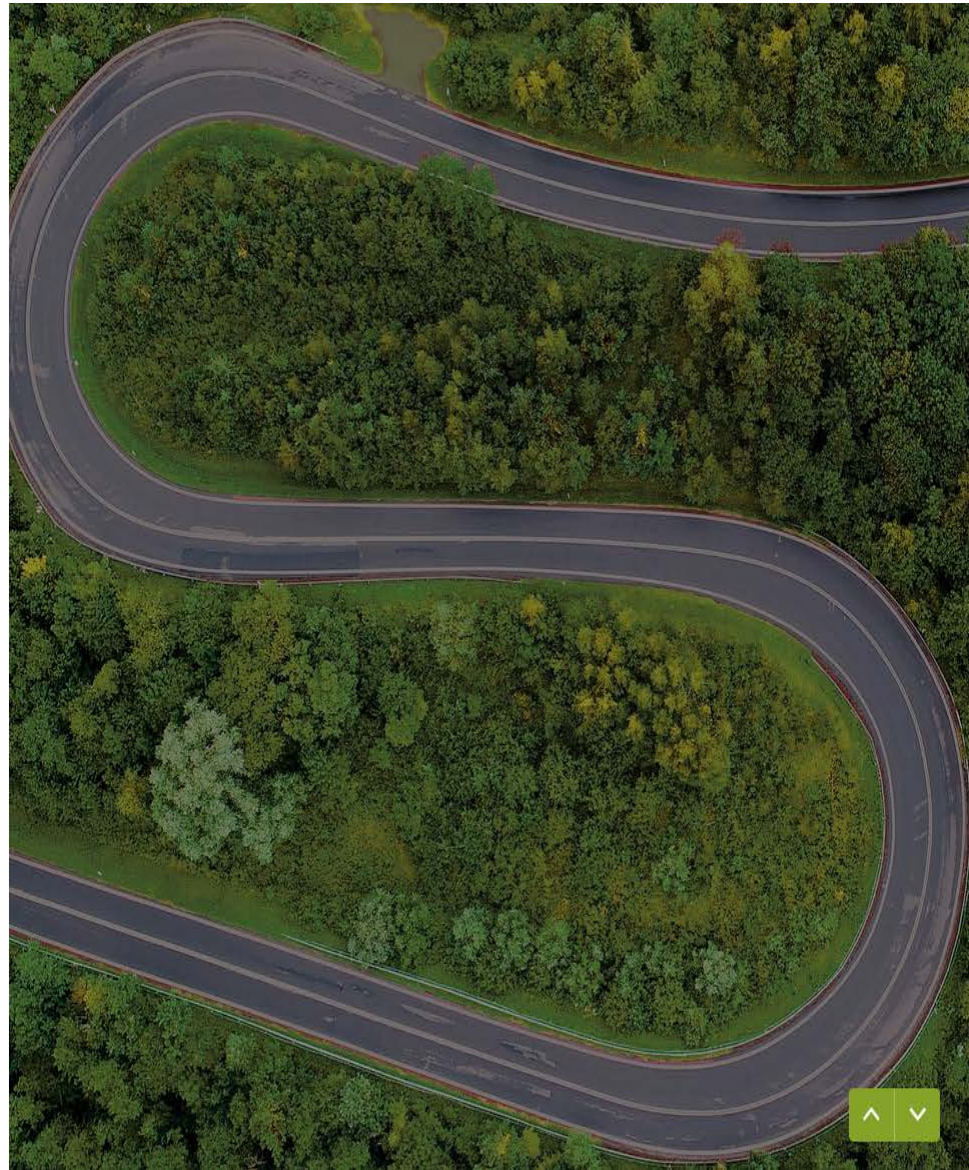
4 → Which of the following cities faced the threat of 'Day Zero' in 2018, when the government planned to turn off water taps across most homes and businesses to conserve supplies? *

☐ A Jakarta, Indonesia

☐ B Capetown, South Africa

☐ C Melbourne, Australia

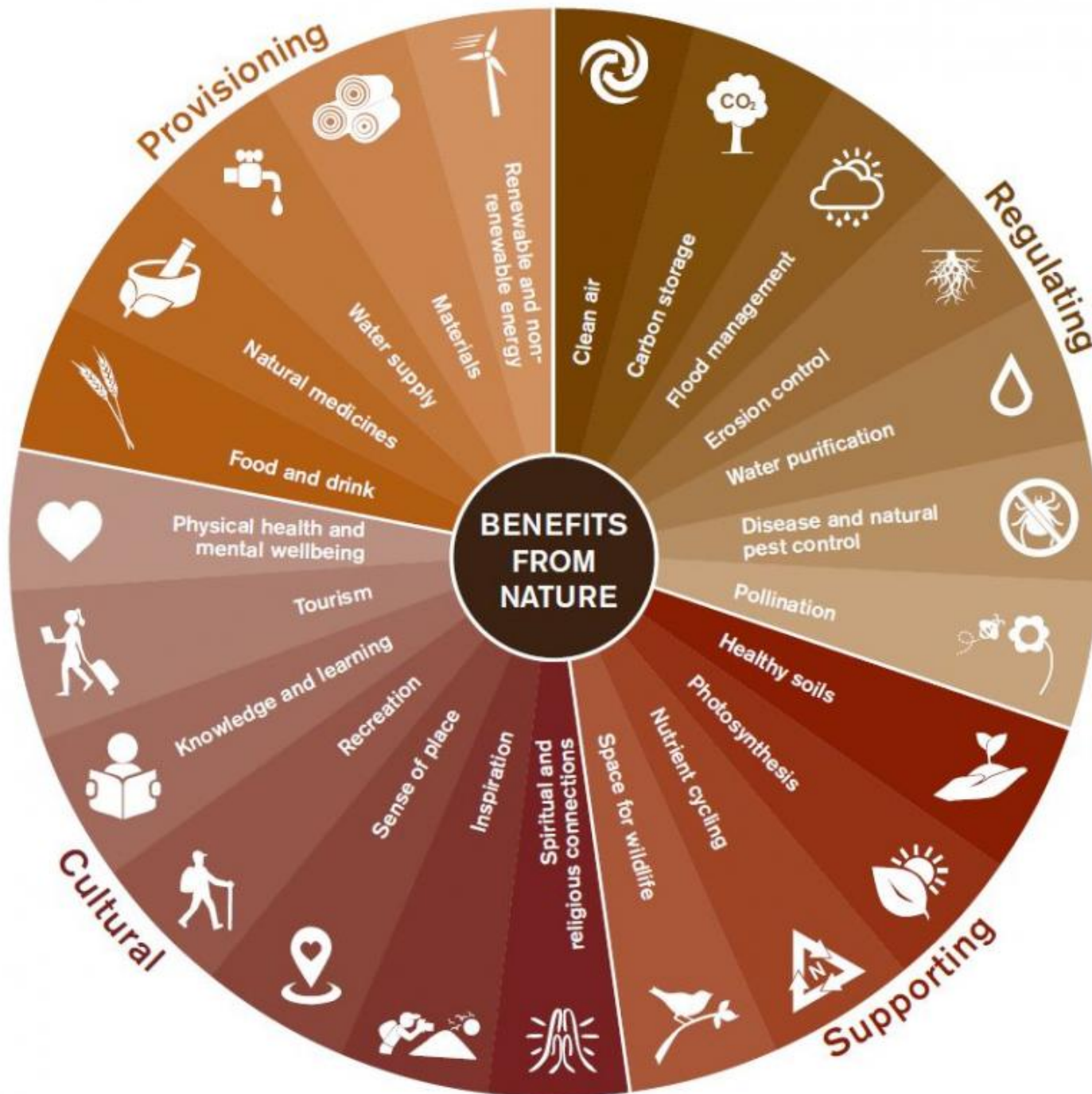
☐ D Mexico City, Mexico

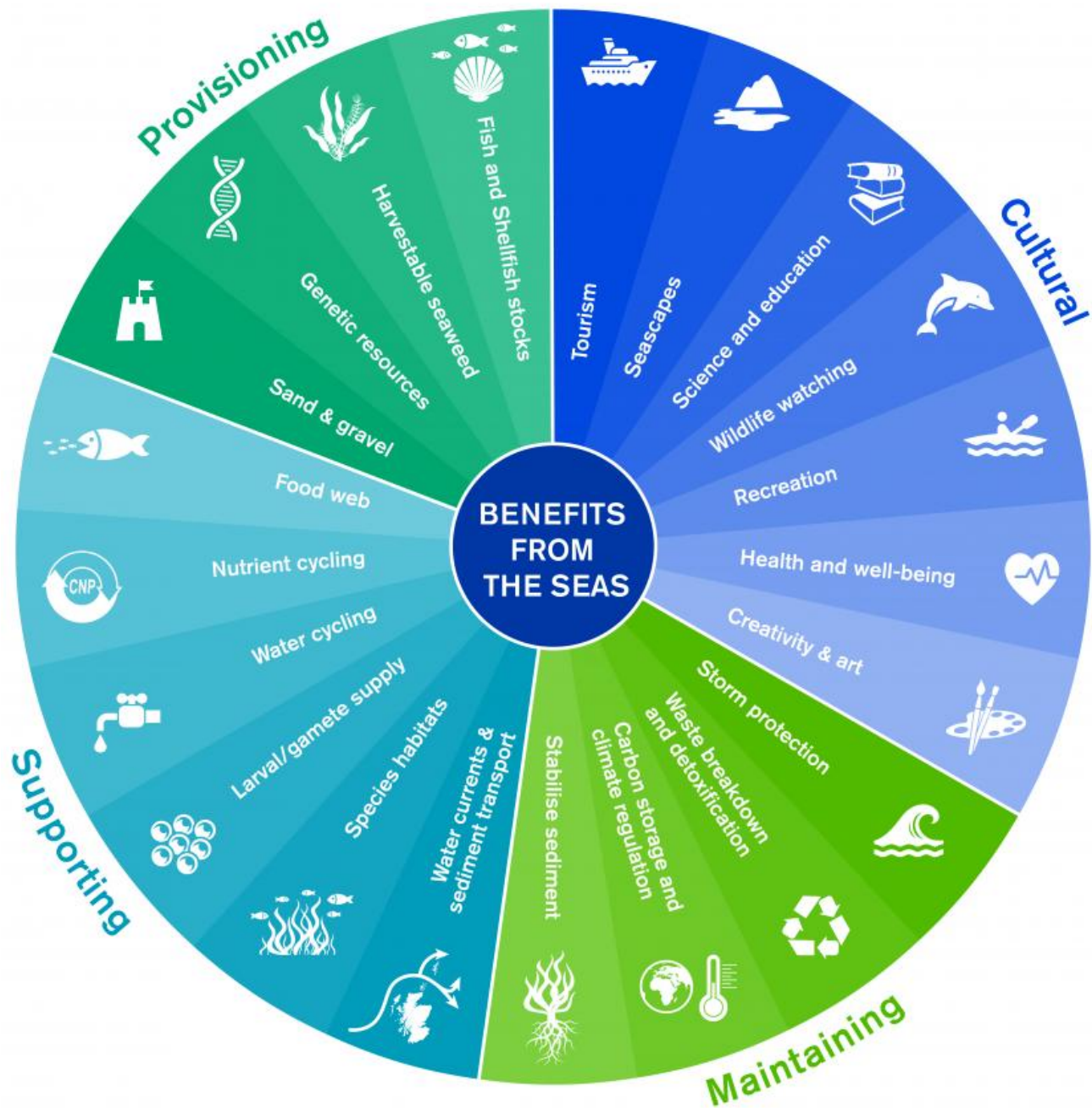


What are Ecosystem Services?

- Ecosystem Services are the direct and indirect contributions ecosystems (known as natural capital) provide for human wellbeing and quality of life.
- These services provided by ecosystems lead to benefits received by humans in the form of security, goods and materials, health and wellbeing.

- **Provisional:** these are tangible goods that people can harvest from the environment such as food, wood and fibre, water and fuel.
- **Regulating:** these are regulating services that occur in the ecosystem that lead to benefits such as climate regulation, flood management, and water filtration.
- **Cultural:** these include ways in which nature impacts people's health and wellbeing through recreational and education benefits as well as improving mental health and building spiritual connections.
- **Supporting:** ecosystems could not function without supporting services, such as the nutrient cycle, soil formation and habitat provision for biodiversity, forming the basis for the other three types of services.





What Can Farmers and Governments Do?

- There are steps that farmers and policymakers can start taking, beyond reducing the greenhouse gas emissions that are fueling climate change.
- We are going to have to be smart about how we manage insect pests. We'll need integrated pest and crop management and really think about what plants to plant when and where and in what sequence.
- And there needs to be more emphasis on protecting natural genetic diversity, because there are opportunities to work with plants that have natural resistance to pests

Discussion





Thank you !

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Selected references

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