

Agriculture in a global context

Lecture 5

October, 2026
MLA Vilnius Tech

Roxana Triboi &
Jeroen de Vries,
LE:NOTRE Institute,
with material of the TELOS and
AESOP4Food project

Content development led by
Akdeniz University Team: Dr. İbrahim YILMAZ &
Dr. R. Figen CEYLAN
and LE:NOTRE Team: Dr. Roxana Triboi &
Jeroen de Vries



R. Raveel

Roger Raveel, Voor een blauw gelijnde akker en een grijze lucht , 1975

**Agriculture**

- 1. Introduction and key concepts**
- 2. Past and present trends in agriculture systems**
- 3. Stakeholders of actions on agriculture – supply chain**
- 4. Developments, policies, strategies for agriculture and food in EU**
- 5. Challenges**
- 6. Two examples from the Netherlands**

**Agriculture**

1.1. Concept of Agriculture and Agricultural Activities

Agriculture is the most comprehensive word used to denote the many ways of cultivating plants and animals (Harris and Fuller 2014).

Spektrum of the agricultural activities;

cultivation**domestication****horticulture****arboriculture****Vegetable growing****ornamental plants****mushroom cultivation****seed and seedling cultivation**

**Agriculture**

1.1. Concept of Agriculture and Agricultural Activities

as well as animal husbandry including fisheries.

cattle breeding



sheep breeding



goat husbandry



pig farming



poultry farming



aquaculture



fishing



beekeeping



silk production





Agriculture

1.2. Agriculture and Economy

What exactly is the role of agriculture in the countries?

Agriculture is important because of (a) national food security and food quality, (b) dependency of many rural regional economies.

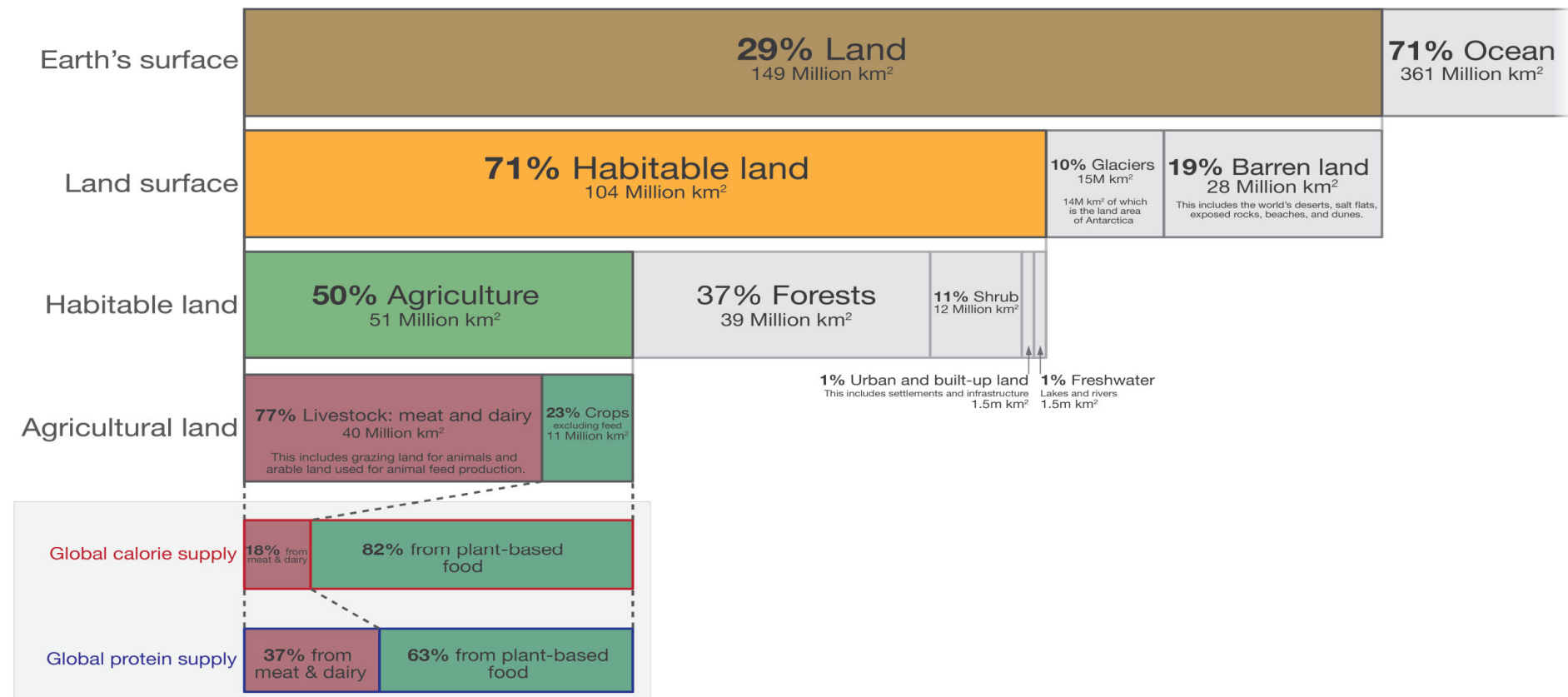
1. **Source of Food Supply:** Agriculture has been the basic source of food supply for mankind for centuries.
2. **Contribution to National Income:** Agricultural prosperity has significantly contributed to and fostered the economic advancement of several countries.
3. **Relief from Capital Shortage:** The development of agriculture in developing countries has helped save them from capital shortages. But there might be an imbalance between import and export.
4. **Providing Raw Materials:** Besides providing just food products, agricultural advancement has also made this industry a hub for raw materials.
5. **Creation of Infrastructure:** Agricultural development subsequently requires the development of other national infrastructures.
6. The agricultural sector also creates **markets for other economic sectors**.



1.3. Agricultural Landscapes (Agricultural Land Use)

Our World
in Data

Global land use for food production



Data source: UN Food and Agriculture Organization (FAO)
OurWorldinData.org – Research and data to make progress against the world's largest problems.

Licensed under CC-BY by the authors Hannah Ritchie and Max Roser in 2019.

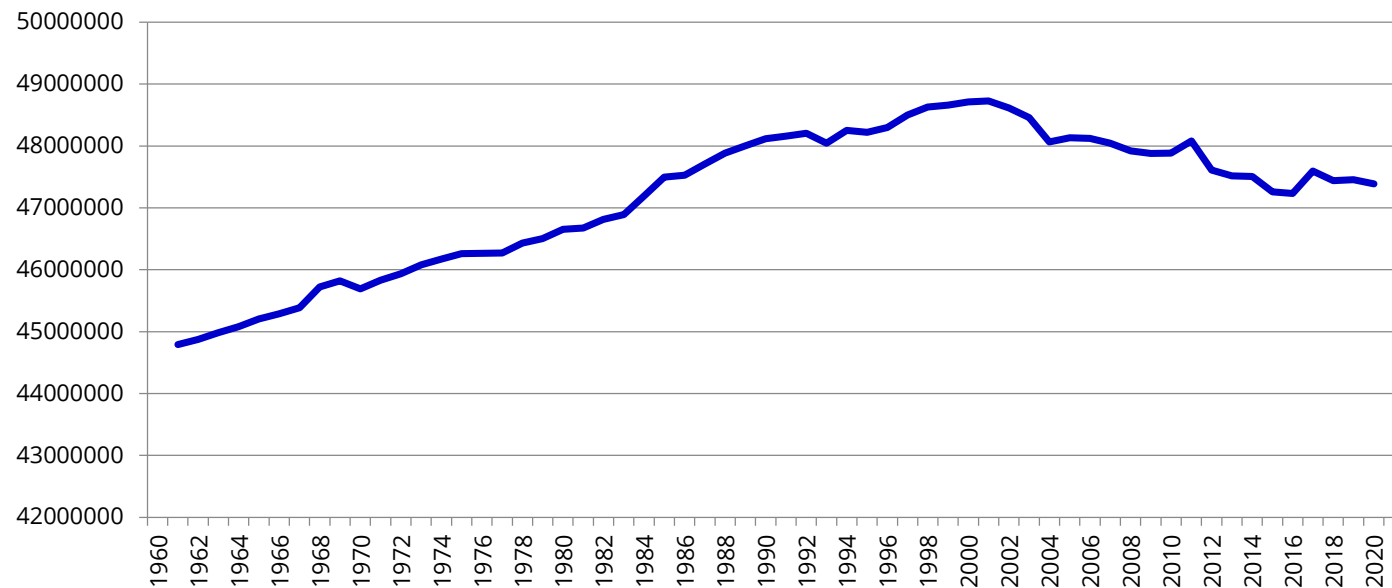
I. Introduction and Key Concepts

1.3. Agricultural Landscapes (Agricultural Land Use)



Agriculture

World Agricultural Land (sq. km)



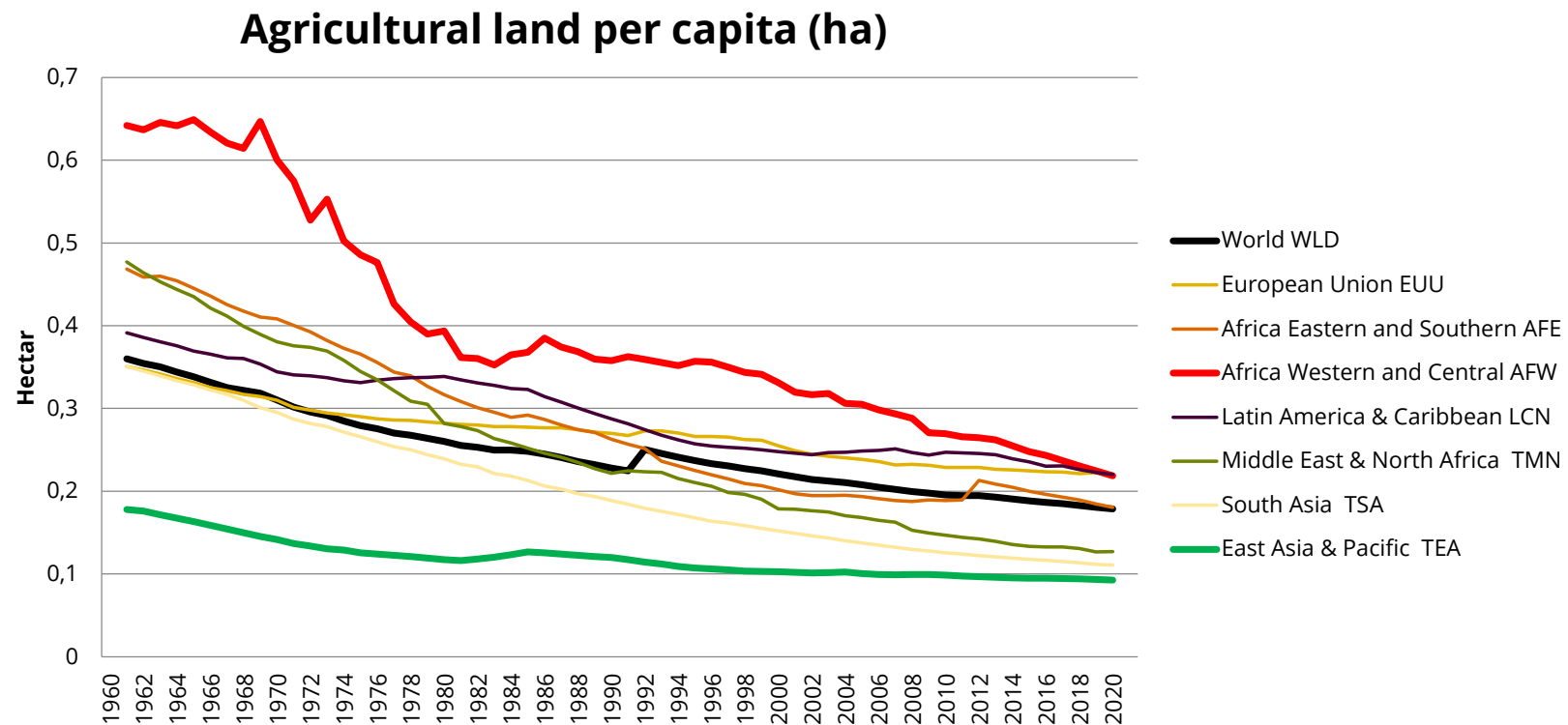
1961	44 790 648 sq. km
2001	48 731 764 sq. km
2020	47 388 929 sq. km

<https://data.worldbank.org/indicator>

1.3. Agricultural Landscapes (Agricultural Land Use)



Agriculture

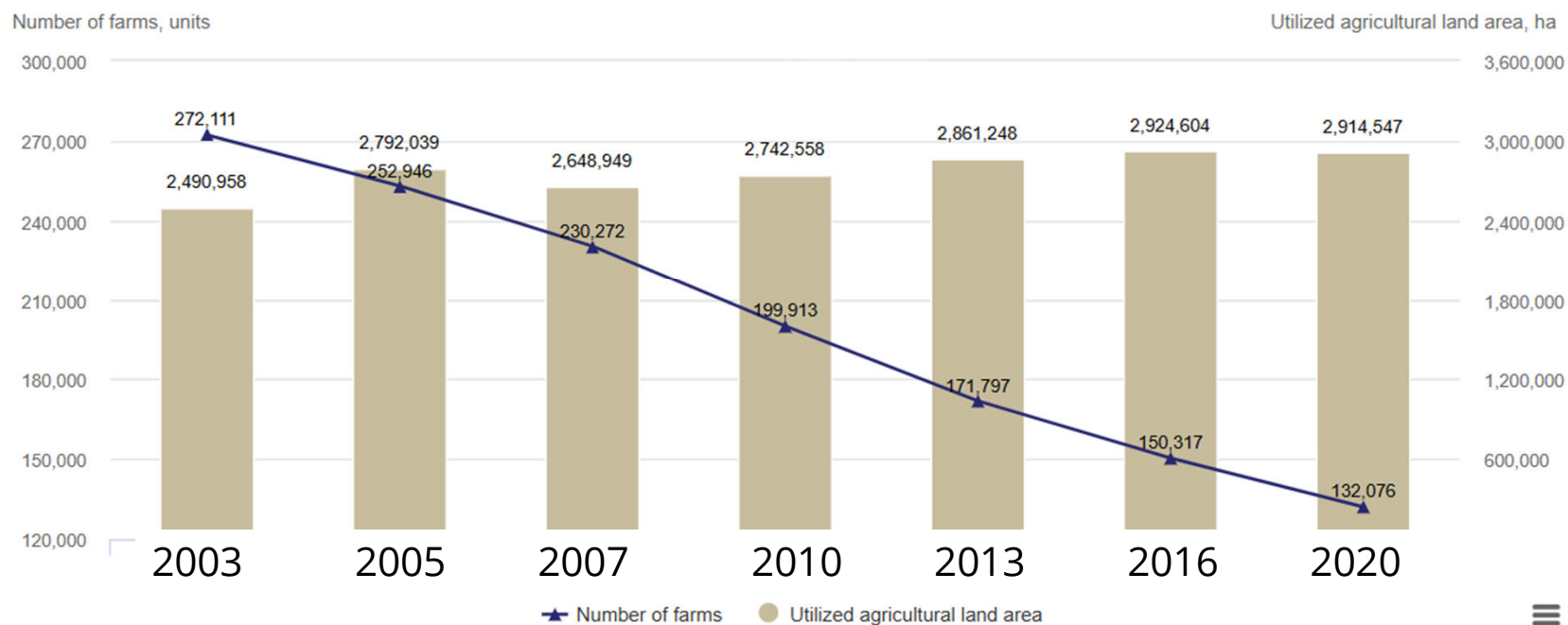


<https://data.worldbank.org/indicator>

Number of farms is declining – also in Lithuania

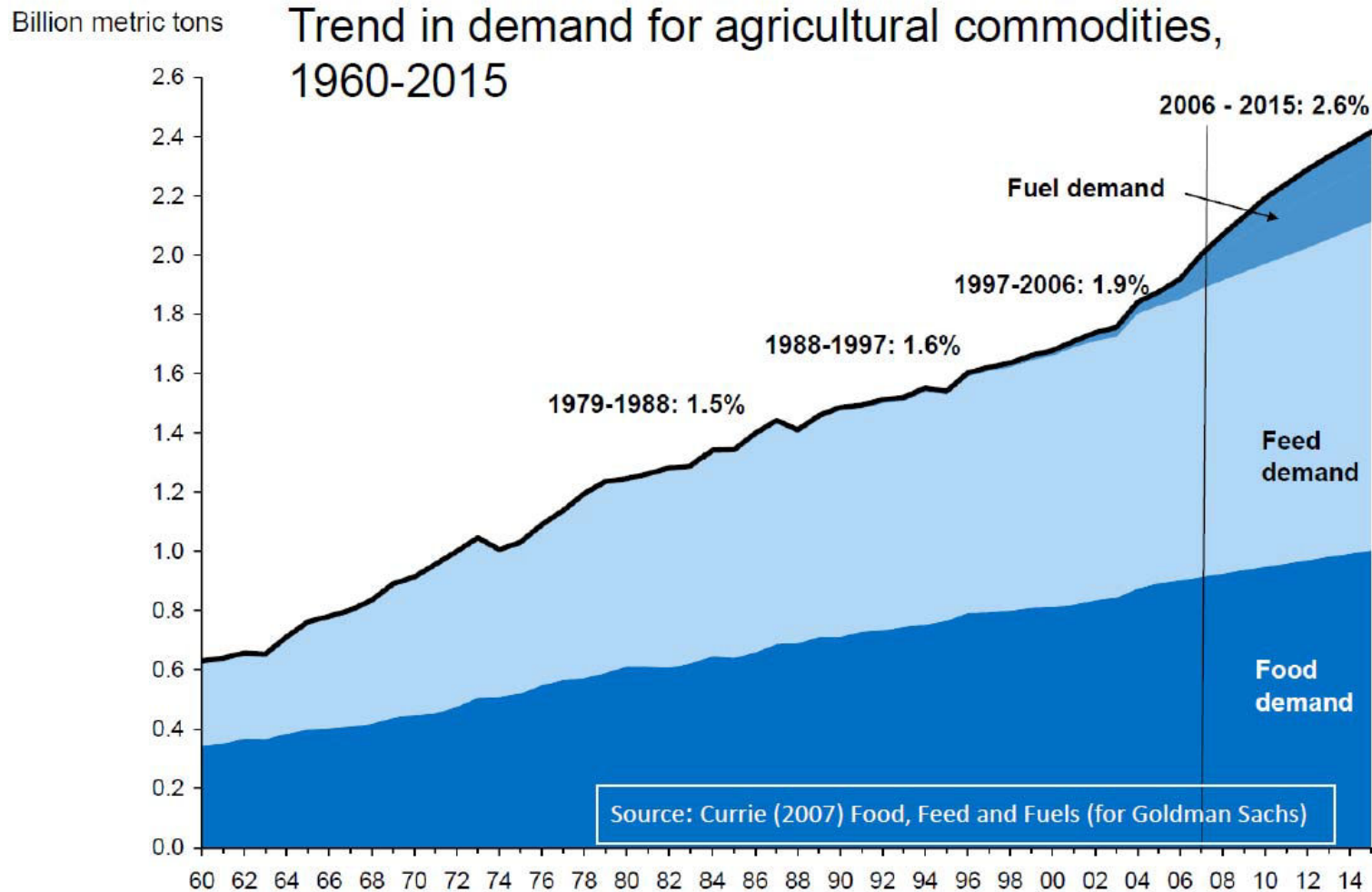
Number of farms larger than 1 hectare and utilized agricultural land in hectares in Lithuania

Change in the number of farms larger than 1 ha and utilised agricultural area





Agriculture





Agriculture

2.1. Commercial Agriculture - Industrial Agriculture

Industrial agriculture is the large-scale, intensive production of crops and animals, often involving chemical fertilizers on crops or the routine, harmful use of antibiotics in animals

Specifications:

- ❖ Capital and technology intensive farming
- ❖ Involves genetically modified crops
- ❖ Intensive use of chemicals (pesticides and fertilizer)
- ❖ Deplete the land
- ❖ Mistreat animals
- ❖ Increase various forms of pollution
- ❖ Vertical integration in the food chain
- ❖ Domination of international companies
- ❖ Prevention of competition



Agriculture

2.2. Sustainability in Agriculture

Sustainable development was defined in the 1987 Brundtland Report as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (Velten et al. 2015).

an "integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fiber needs;
- enhance environmental quality;
- make efficient use of non-renewable resources and on-farm resources and integrate appropriate natural biological cycles and controls;
- sustain the economic viability of farm operations; and
- enhance the quality of life for farmers and society as a whole"

(1990 U.S. Farm Bill).

<https://www.nal.usda.gov/farms-and-agricultural-production-systems/sustainable-agriculture>

**1. Impact:**

Land transformation (Due to use of land to yield goods and services)

Causes:

- Deforestation to create agricultural land
- Drainage of wetlands to field cropping
- Landscape degradation through infrastructure activities (road etc.)
- Urbanization (Transformation of agricultural lands into urban lands)

2. Impact:

Land degradation (The long-term decline in ecosystem function and productivity)

Causes:

- Soil erosion
- Soil salinisation
- Overgrazing
- Frequent burning
- Loss of soil biodiversity due to use of agrochemicals

3. Impact:

Water pollution

Causes:

- Soil erosion
- Excessive and incorrect use of chemicals (fertilisers and pesticides)
- Effluents from food processing factories
- Soil from infrastructure development

**4. Impact:**

Loss of biodiversity

Causes:

- Cutting and burning
- Agrochemicals usage
- Monoculture cropping
- Water eutrophication from agricultural fertilizers
- Genetic engineering

5. Impact:

Atmospheric pollution

Causes:

- Burning (bush and garden clearance)
- Use of fertilizers-produces GHG (Greenhouse gases)
- Rice growing
- Livestock activities

6. Impact:

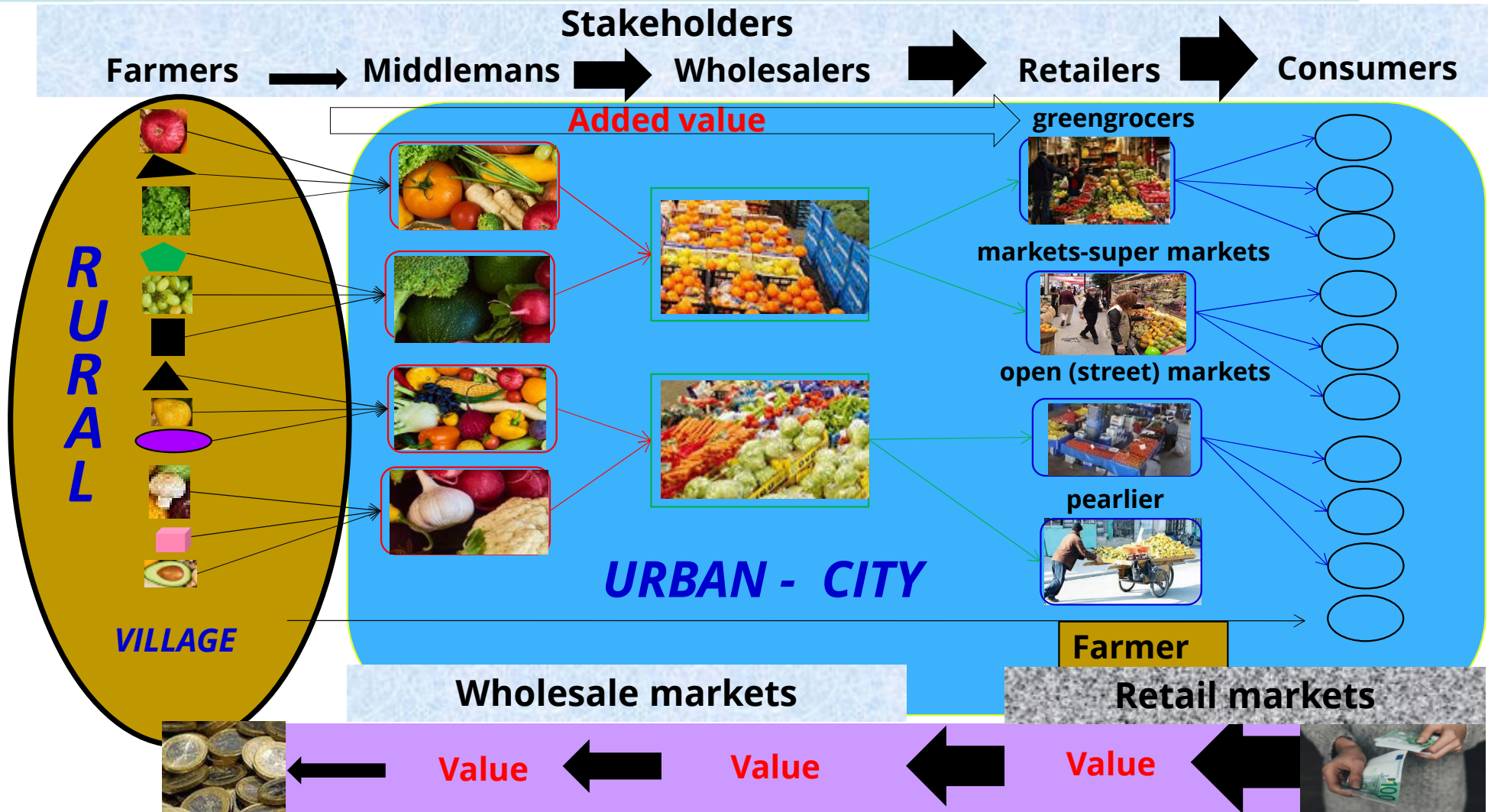
Marginalisation of small-scale farmers

Causes:

- Liberalisation of agricultural trade under WTO
- Legalising the use of export subsidies
- Use of agricultural subsidies for inputs by developed countries

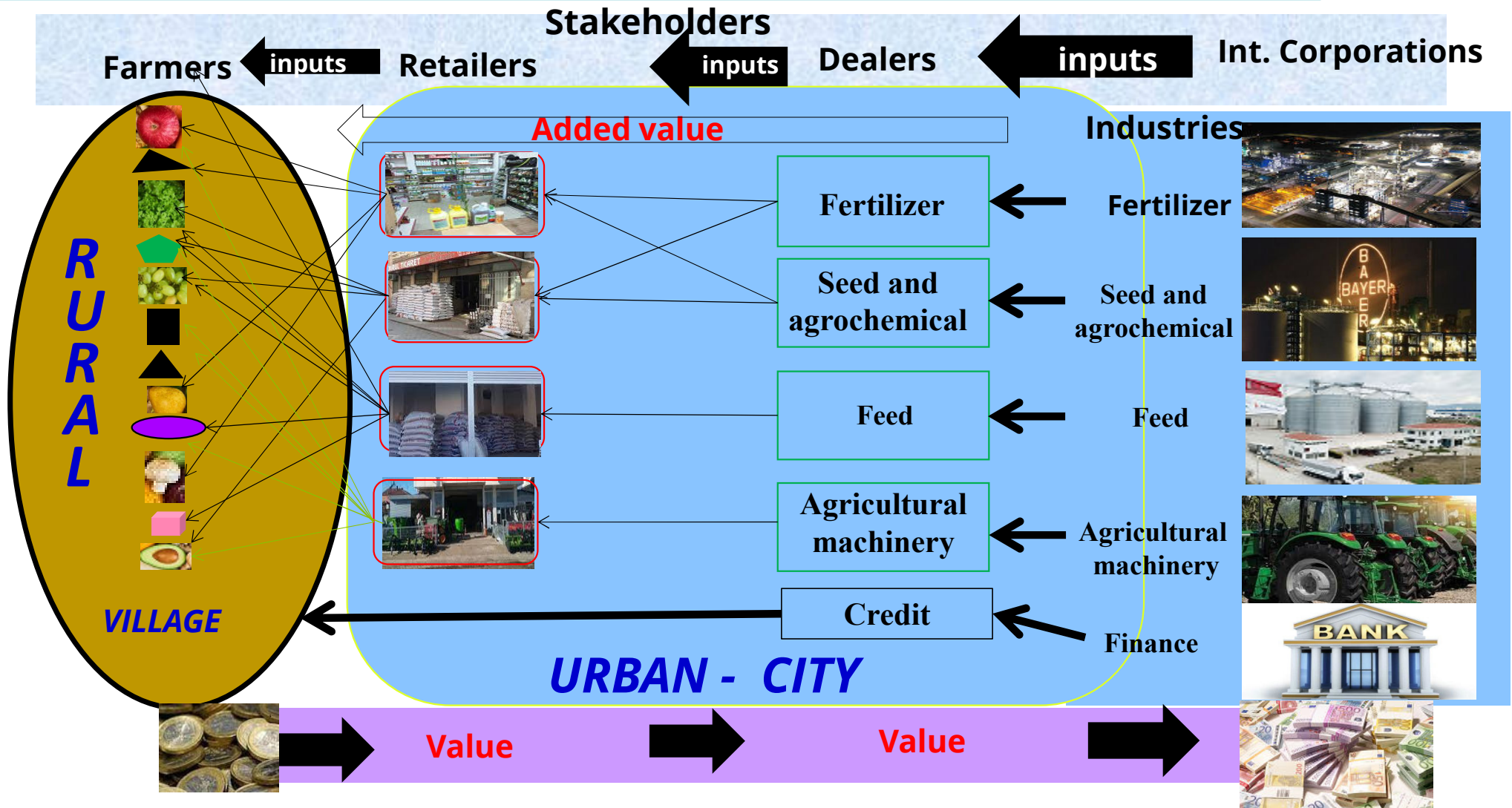
3. Stakeholders of Actions on Agriculture (Supply Chain)

Marketing Channels of agricultural products



Stakeholders of Actions on Agriculture (Supply Chain)

Marketing Channels of agricultural inputs

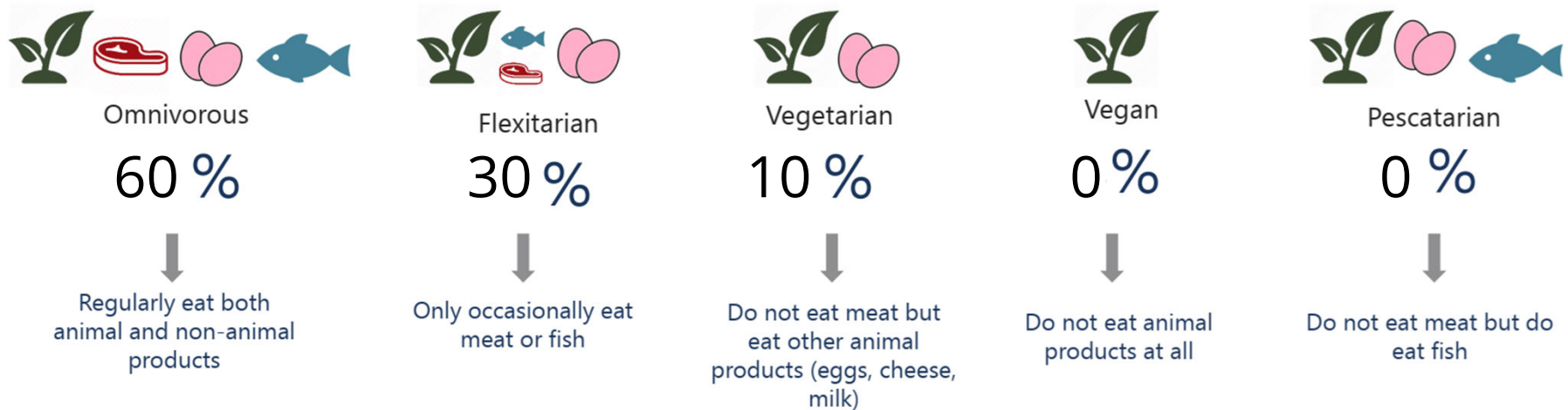


DPSIR Framework Agriculture Development

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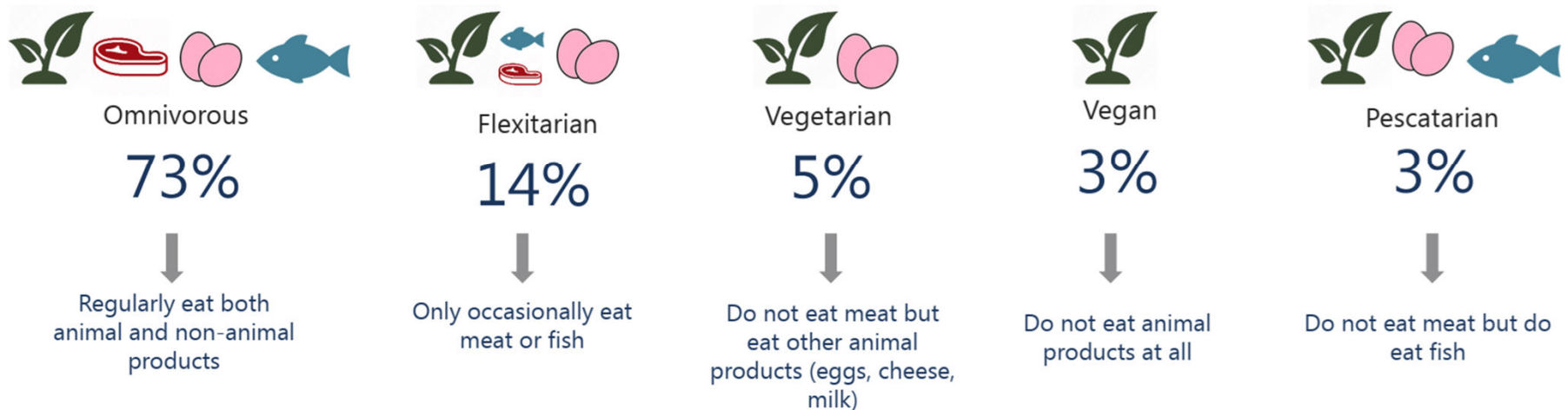
Driving Forces	Trends	Pressures	State	Impacts
Economic	Globalisation Market and price regulations Economies of scale	Revenues, costs, profits, assets values Land use change	Food identity oriented to export Fragile ecosystems	Rural economy, incomes and employment Loss of traditional culture Public health Creation of social disparities Degradation of ecosystem services Pressure over supply sustainability
Modernisation	Mass production Intensive input usage New technology Pollution	Concentration of power Water and soil pollution	Quantity and quality of food and agri-goods supply	
Urbanisation	Unstructured urban growth along an urban-rural continuum	Growing demand and degradation on natural resources	Land fragmentation Higher land costs Lack of common good	
Climate Change	Water scarcity Rising average temperatures	Climate Risks	Water shortage Changing crop pattern	
S P E C T R U M O F R E S P O N S E S				
Safeguard measures ➤ Resilience ➤ Democracy -Participation - Cooperation	➤ Multi-stakeholder processs ➤ Payment for ecosystem services ➤ Monitoring and evaluation	Dynamic conservation approaches	➤ Eco-agricultural products ➤ Sustainable tourism ➤ Industrial integration ➤ System Strategies ➤ Circular economy	

poll 1: How would you consider your own diet? Select the one that is most appropriate. Our groups data (anonymised)



Source: Ipsos MORI Global Advisor Survey, N=20313 28 countries

poll 1: compared to the world diets



4. Developments, policies, strategies for agriculture and food in EU

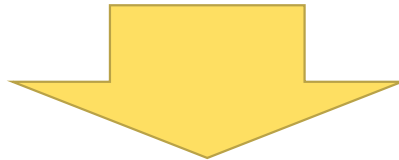
- CAP
- European union new CAP
- Green deal
- Farm2Fork
- Framework for Sustainable Food System



Agriculture

OBJECTIVES OLD CAP

- ✓ Increasing agricultural productivity
- ✓ Ensuring a fair standard of living for farmers
- ✓ Guaranteeing the availability of supplies
- ✓ Stabilising the markets
- ✓ Establishing a secure supply chain with reasonable prices
- ✓ Harmonising competition rules across all countries



- ❖ Price & market supports
- ❖ Tariffs on imports
- ❖ Price intervention to disable falling market prices
- ❖ Farmer support respecting amount of production

See for the historic development of the Common Agriculture policy of the EU with data the wiki:

https://telos.hfwu.de/index.php?title=Landscape_Economy_Readings_and_Resources#Session_4.1:_Agriculture



Agriculture

GREEN DEAL

- ❖ The Union should become **climate neutral** – **2050** – engage all citizens into Climate action
- ❖ **Biodiversity and its sustainability** – **2030** – bring nature back to centre and suburbs
- ❖ Secure environment and favourable livelihoods in rural and urban
- ❖ Zero pollution for water/air/soil and steady reduction in pollution
- ❖ **Landscape management and protection**



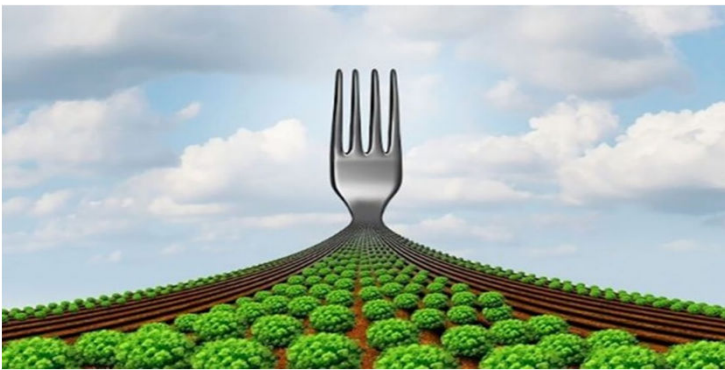


Agriculture

GREEN DEAL

A G R I C U L T U R E

- Sustainable production schemes with **minimum input use**
- **Natural production** as possible for regeneration
- **Monitoring food** industries
- **Horizontal and vertical integration** for efficiency
- Sustainable **consultancy** services
- Direct supports to **environment-friendly production**



- **CAP** almost disregarded food and nutrition for **60 years**.
- **Green Deal** suggests assuring **sustainability in food and nutrition** and developed plans and strategies.



Agriculture

NEW CAP (2023:2027)

December 2021

- ✓ Fairer, greener and more performance-based CAP.
- ✓ Application of clean/safe **circular economy** approach
- ✓ **European Green Deal**
- ✓ **Farm to Fork Strategy**
- ✓ **EU Soil Strategy for 2030**





Agriculture

FARM TO FORK STRATEGY – F2FS

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- ✓ Ensure sustainable food production
- ✓ Ensure food security
- ✓ Stimulate sustainable food processing, retail, hospitality and food services' practices
- ✓ Promote sustainable food consumption, and facilitate the shift towards healthy, sustainable diets
- ✓ Reduce food loss and waste
- ✓ Combat food fraud along the food chain

Enhanced
conditionality

Eco-schemes

Farm
Advisory
ServiceAgri-environment-
climate measures
and investments



FARM TO FORK STRATEGY – F2FS

2030 Targets for sustainable food production

PESTICIDES



Reduce the overall use and risk of chemical and hazardous pesticides

NUTRIENT LOSSES



Reduce nutrient losses by 50% whilst retaining soil fertility, resulting in 20% less fertilisers

ANTIMICROBIALS



Reduce sales of antimicrobials for farmed animals and aquaculture

ORGANIC FARMING



Increase the percentage of organically farmed land in the EU

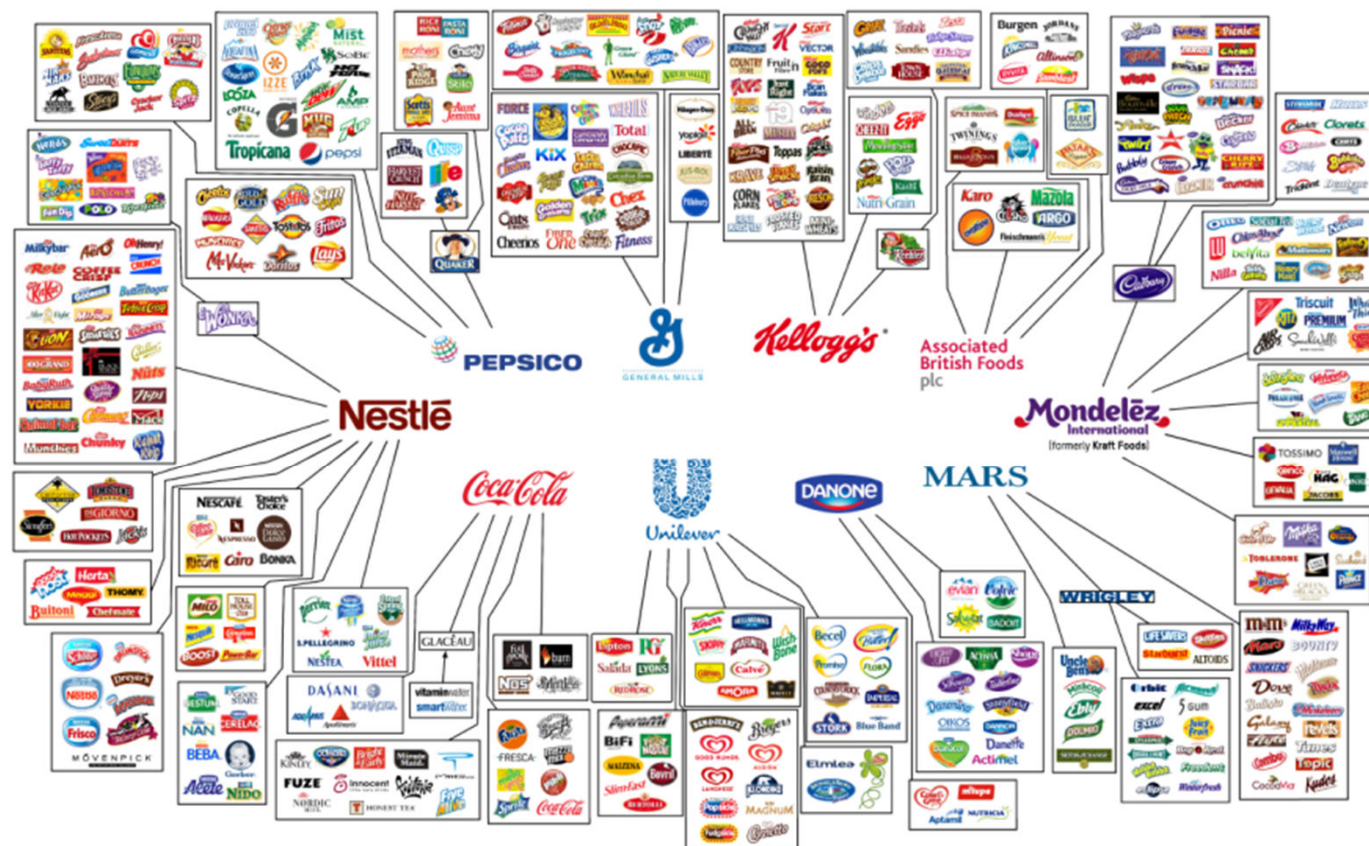
#EUFarm2Fork

#EUGreenDeal

4.7 EU Framework for Sustainable Food System

- Multi-departmental approach to address food system sustainability: DG SANTE, DG AGRI, DG ENV, and DG MARE
- Planned to be launched in the end of 2023.
- Aims to ensure coherent actions at both EU and member state levels.
- Focuses on key issues:
 - Incentives for sustainable food production.
 - Affordability of sustainable foods.
 - Food loss and waste reduction.
 - Cross-sector responsibilities for sustainability.
- The Commission presented a communication on A Vision for Agriculture and Food on 19 February 2025. EU will continue working with key international organisations to strengthen a stricter implementation of internationally agreed commitments and to increase their ambition to achieve global sustainable food systems in line with the Agenda 2030 and the Sustainable Development Goals.
- On 26 March 2026, the European Commission announced that the initiative to make EU food systems more sustainable was **abandoned**.

5. Where does the food come from? What is the social and environmental impact?



Source: Joki Gauthier for Oxfam 2012. For more information on this figure, and to see it online, visit <http://www.behindthebrands.org>

Source: OXFAM, 2013

5.1 Challenges: Environmental impacts:

see also slide 2.3 of the first part of this lecture

- Loss of soil and soil degradation, erosion
- Water shortages and flooding
- Pesticides and nitrogen fertilisers -> biodiversity loss, water pollution
- Loss of environmental services pollination
- Carbon and nitrogen emissions

Sources: IPES (2019,), OXFAM 2013,

5.2 Challenges: Health impacts

- Hidden cost of cheap food
- Food as a commodity and speculation: 850 million undernourished
- Shift to processed foods (richer in salt, sugar and saturated fats) often less nutritious
- Impact of air pollution by ammonia emissions, surface and drinking water pollution by pesticides and fertilizers
- Antimicrobial resistance and exposure to endocrine disrupting chemicals via foods and food packaging.
- Change in diets by industrial processing and marketing result in overweight and obesity (1.5 billion, 300 million diabetes type 2), especially for the poorer population groups.

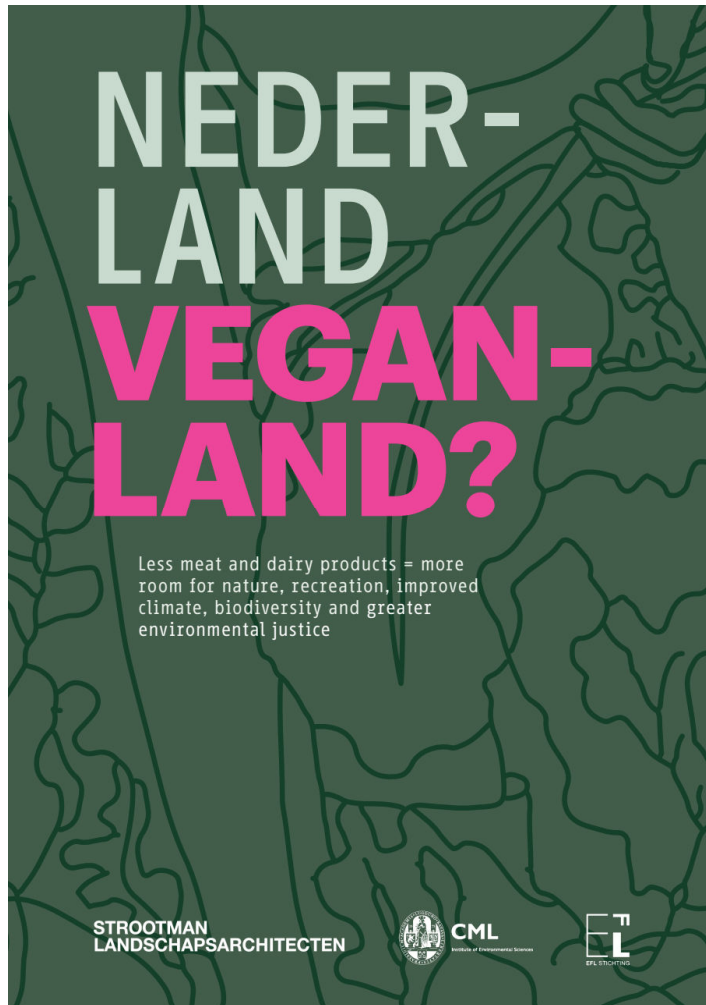
Sources: IPES (2019,), OXFAM 2013,

5.3 Challenges: Socio-economic impacts

- Regional hyper-specialization – for export not for providing food for residents
- Giant agri-food corporations result in precarious working conditions and poor working conditions and livelihood pressures for farmers by power imbalances.
- Techno investments make farmers depending on banks and large companies
- Erosion of traditional food cultures and the emergence of urban lifestyles -> disconnecting people from how food is produced and from concepts such as the seasonality of fruits and vegetables

Sources: IPES (2019,), OXFAM 2013,

6. Two Dutch reports as responses to the environmental impact of Agriculture



<https://nederlandveganland.nl/>

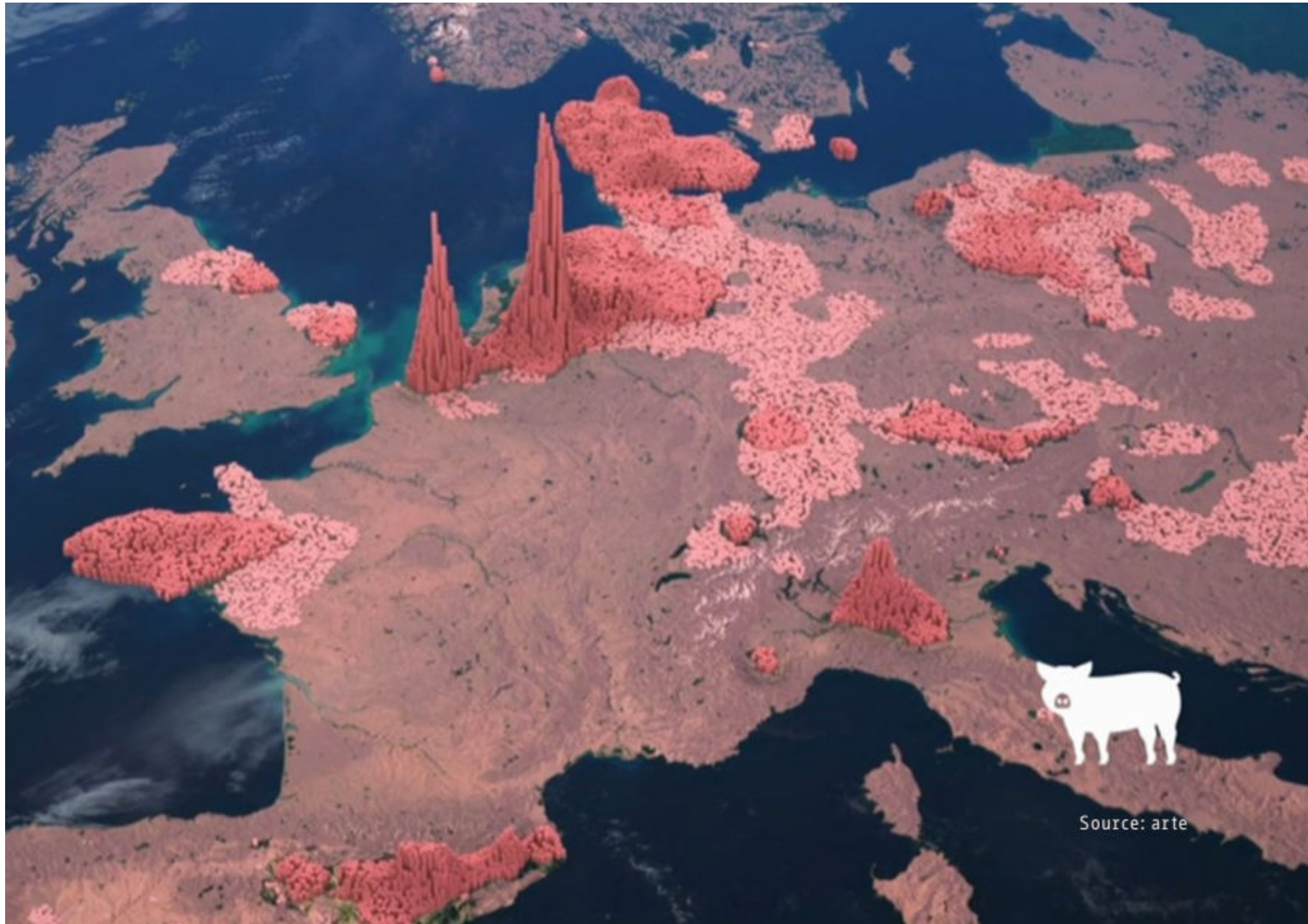


<https://grondbeginsel.nl/wp-content/uploads/2025/11/20251016-The-Hidden-Bill-final.pdf>

6.1 Principles of VEGANLAND

- Respect for the **values of people, plants and animals** that all have the right to exist on our planet in an ecological and evolutionary system.
- **Transparent and honest decision-making.** How are all voices heard and taken into account and included in the decision-making, and is every interest taken into account? That goes not only for people, but also for plants, animals and ecosystems.
- **Restorative justice:** How can (historical) injustice be put right, possibly with corrections and compensations?
- An equitable distribution of **human costs and benefits**, for example as expressed in financial costs and employment.

Pig density in Europe



<https://nederlandveganland.nl/>

Cow density in Europe



<https://nederlandveganland.nl/>

**IN THE NETHERLANDS
WE CAN PROVIDE
HEALTHY AND
SUSTAINABLE
NUTRITION FOR
A POPULATION OF
20 MILLION IN THE
NETHERLANDS.**

75



CML

STROOTMAN
LANDSCHAPSARCHITECTEN



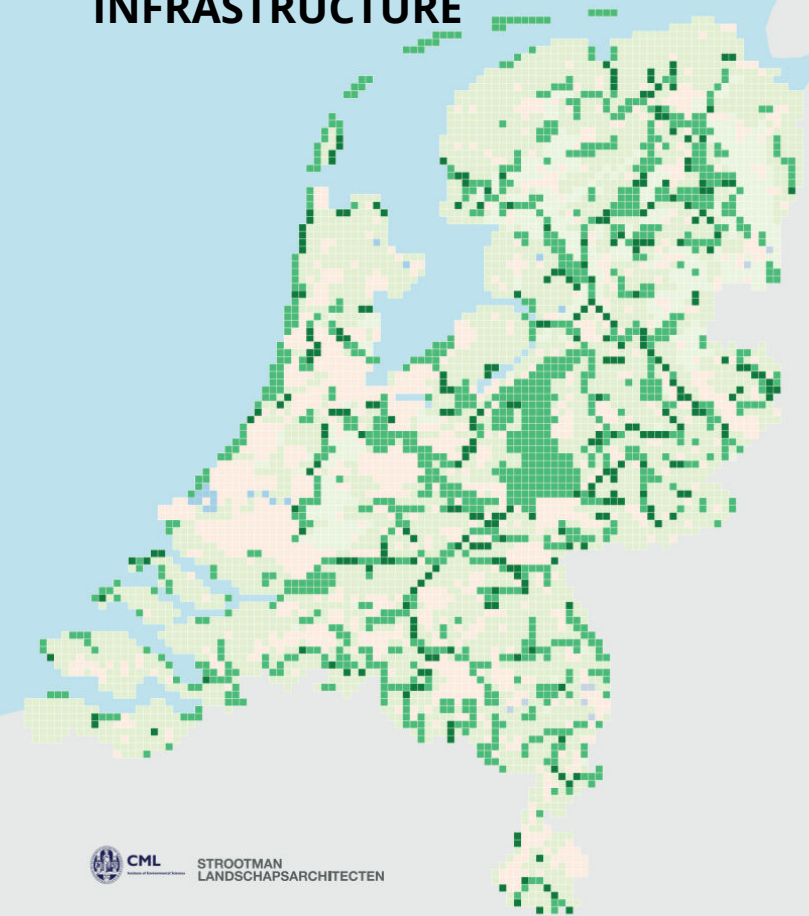
**ENOUGH SPACE TO
REACH NATURE GOALS:
NATURA 2000
GREEN ECOLOGICAL
INFRASTRUCTURE**

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CML

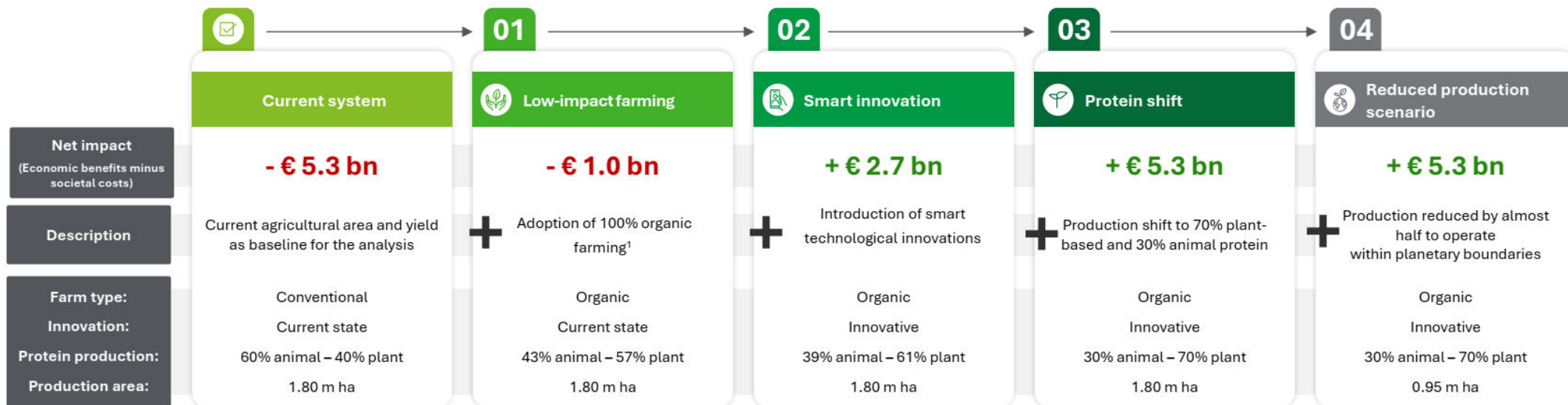
STROOTMAN
LANDSCHAPSARCHITECTEN



<https://nederlandveganland.nl/>



6.2 Scenarios of The Hidden Bill



<https://grondbeginsel.nl/wp-content/uploads/2025/11/20251016-The-Hidden-Bill-final.pdf>

Response of the Dutch Farmers Organisation (LTO)

This report presents a caricature of economy and reality

Not enough demand for organic products, if Dutch farmers produce less the bill goes to other countries, the report only calculates the primary production