TELOS TOPIC 05

Agriculture

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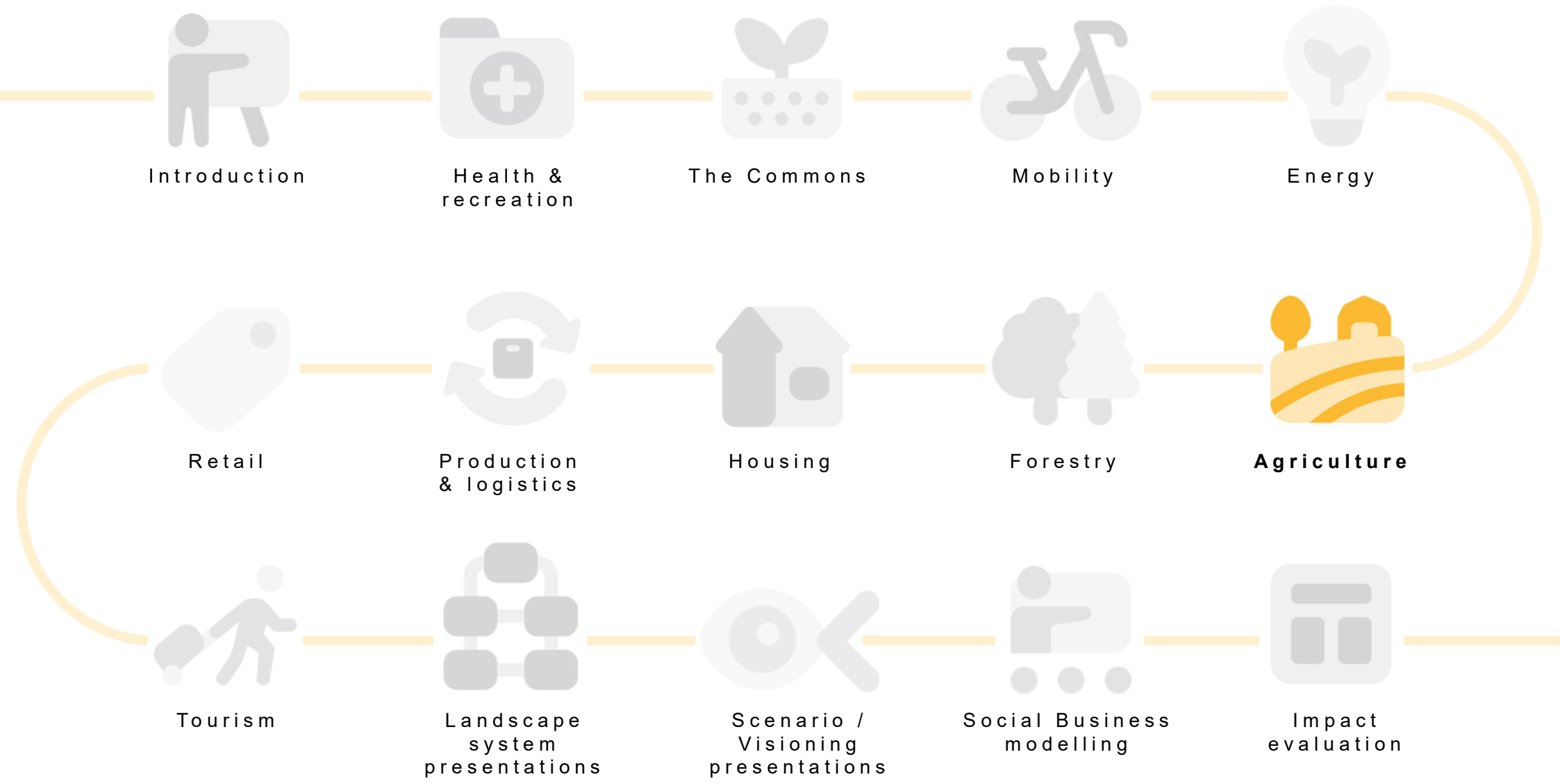
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Agriculture

AGRICULTURE

I. Introduction and Key Concepts

Agriculture

1.1. Concept of Agriculture and Agricultural Activities

AGRICULTURE

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,

vegeculture

Ornamental plants

mushroom cultivation

seed and seedling cultivation

I. Introduction and Key Concepts

Agriculture

1.1. Concept of Agriculture and Agricultural Activities

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as well as animal husbandry including fisheries.

cattle breeding

sheep breeding

goat husbandry

pig farming

poultry farming

aquaculture

fishing

beekeeping

apiculture

bumblebee production, insect production

I. Introduction and Key Concepts

Agriculture

1.2. Agriculture and Economy (Importance of Agriculture)

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Economic development and agriculture;

First, as economic growth proceeds, agriculture declines in economic importance relatively.

Second, at any stage of this growth process, resources frequently appear to be less productive in agriculture than in industry.

Johnston and Mellor (**1961**) listed five roles for agriculture in the development process:

1. increase the supply of food for domestic consumption;
2. release labor required for the industrial sector;
3. increase the size of the market for domestic manufactured goods;
4. release domestic savings for investment in industry;
5. earn foreign exchange.

I. Introduction and Key Concepts

Agriculture

1.2. Agriculture and Economy

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1. increase the supply of food for domestic consumption
   - What if supply exceeds demand everywhere?
2. release labor required for the industrial sector
   - Do we still intend to move young farmers out of agriculture?
3. release domestic savings for investment in industry
   – How to fund evolving agriculture and its sustainability now and in the future?

I. Introduction and Key Concepts

Agriculture

1.2. Agriculture and Economy

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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.

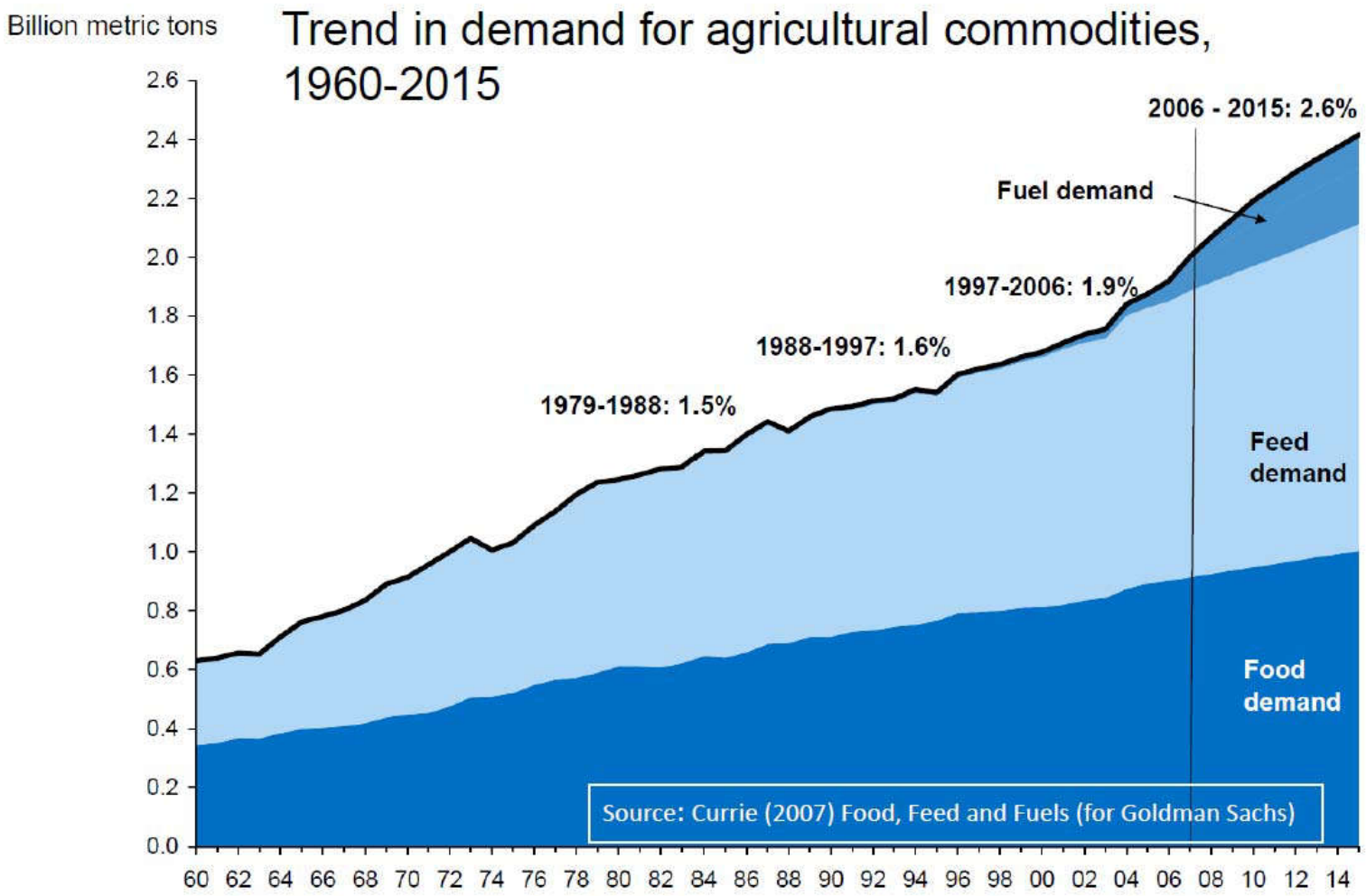
1. Source of Food Supply: As aforementioned, agriculture has been the basic source of food supply for mankind for centuries.
2. Contribution to National Income: Agricultural prosperity has significantly contributed to and fostered the economic advancement of several countries.
3. Relief from Capital Shortage: The development of agriculture in developing countries has helped save them from capital shortages.
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.

I. Introduction and Key Concepts

Agriculture

1.2. Agriculture and Economy

AGRICULTURE



I. Introduction and Key Concepts

1.3. Farm and Farmer (Farm Holdings)

AGRICULTURE

A farm is an area of land that is devoted primarily to agricultural processes with the primary objective of producing food and other crops; it is the basic facility in food production.

It includes;

ranches,

feedlots,

Barn-stables

orchards,

plantations

Tea plantations

Hencoop

and estates,

I. Introduction and Key Concepts

Agriculture

1.3. Farm and Farmer (Farm Holdings)

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Farm holdings include the farmhouse and agricultural buildings as well as the land. Nowadays the term has been extended so as to include such industrial operations as **wind farms** and fish farms, both of which can operate on land or sea.

An agricultural holding is an economic unit of agricultural production under single management consist of all resources for agricultural production purposes, without regard to title, legal form or size (FAO 2020).

The European Union regulations refer agricultural holding as: (a) agricultural holdings where the agricultural area utilized for farming is one hectare or more; (b) agricultural holdings less than one hectare, if those holdings produce a certain proportion for sale or if their production unit exceeds certain physical thresholds (Regulation (EC) No 1166/2008).

I. Introduction and Key Concepts

Agriculture

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1.3. Farm and Farmer (Farm Holdings)

1. How many farmers are there in the EU?
2. What is the average farm size (hectare) in the EU?

1. Number of farmers: 11 million
2. Average farm size: 17.4 ha

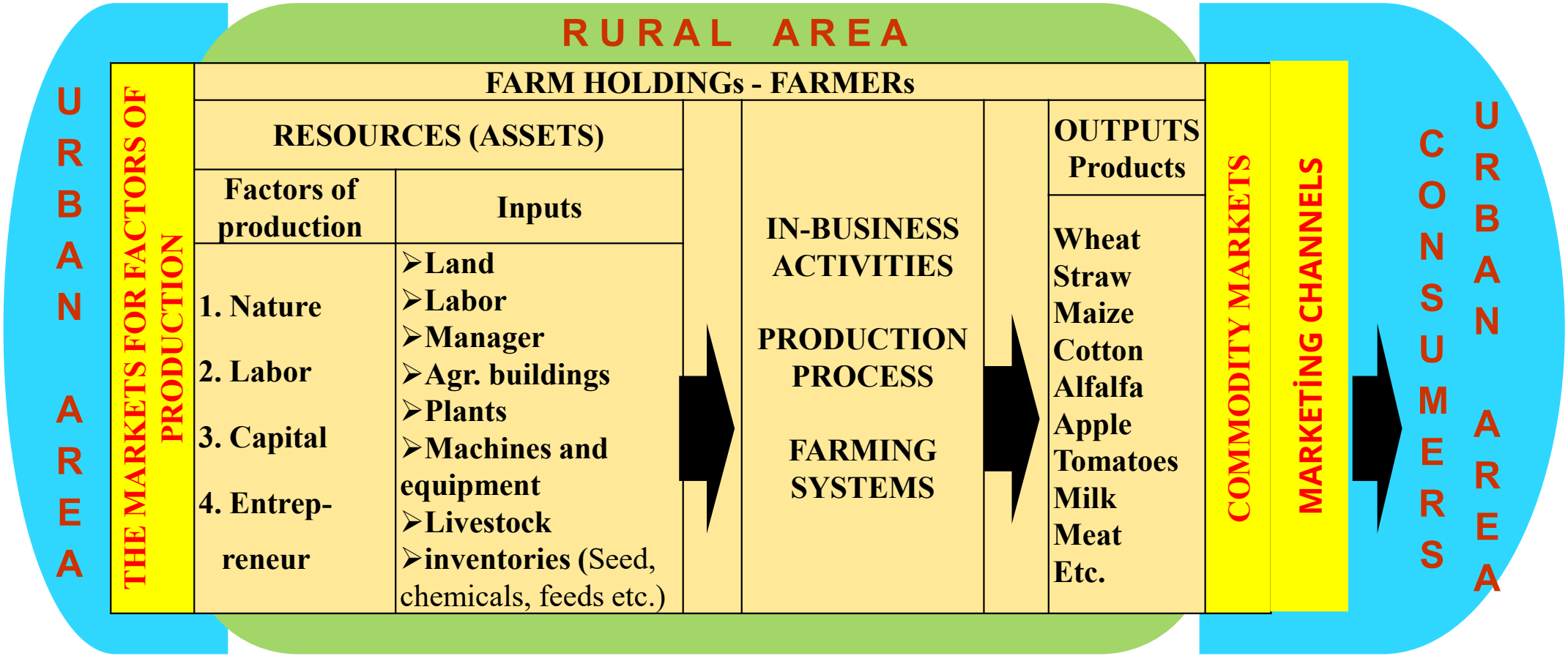
3. How many farmers are there in Turkey?
4. What is the average farm size (ha) in Turkey?

3. Number of farmers:
   2.000.172 (Registered in the farmer registration system, Ministry of agriculture and forestry, 2022)
   4.893.585 (Registered in Chambers of farmers, 2021)
4. Average farm size: 6.1 ha

1.3. Farm and Farmer (Farm Holdings)

Agriculture

Farming Framework - Agriculture and City Relationship



I. Introduction and Key Concepts

1.4. Land Ownership and Land Tenure

Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. Rules of tenure define how property rights to land are to be allocated within societies.

Land tenure is often categorized as:

1. Private: the assignment of rights to a private party who may be an individual, a group of people, or a corporate body such as a commercial entity or non-profit organization.
2. Communal: a right of commons may exist within a community where each member has a right to use independently the holdings of the community.
3. Open access: specific rights are not assigned to anyone and no-one can be excluded. This typically includes marine tenure, rangelands, forests, etc, where there may be free access to the resources for all.
4. State: property rights are assigned to some authority in the public sector.

FAO 2002. Land Tenure and Rural Development.

I. Introduction and Key Concepts

1.4. Land Ownership and Land Tenure

Forms of ownership

In some societies, collective farming is the norm, with either government ownership of the land or common ownership by a local group. Especially in societies without widespread industrialized farming, **tenant farming** and **sharecropping** are common; farmers either pay landowners for the right to use farmland or give up a portion of the crops.

1.5. Farm Classification and Farm Typology

The Family Farm

FAO defines a "family farm" as one that relies primarily on family members for labor and management.

Family farming is the predominant form of agriculture both in developed and developing countries. There are over 500 million family farms in the world (FAO, 2022).

The United Nations nominated 2014 as the International Year of Family Farming

I. Introduction and Key Concepts

1.5. Farm Classification and Farm Typology

The Mechanized Farm

- Many things have changed with the introduction of the tractor in agriculture.
- Demand for farm labour reduced and economics of farming changed with the new mechanized equipment as economies of scale involve in.
- Larger production levels result in lower costs. Farming also became a pretty expensive business.

Factory farming

- Intensive animal farming or industrial livestock production, also known as factory farming and macro-farms.
- Designed to maximize profit, while minimizing costs.
- Main products of this industry are meat, milk and eggs for human consumption.

I. Introduction and Key Concepts

Agriculture

1.5. Farm Classification and Farm Typology

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Agribusiness

The primary goal of agribusiness is to maximize profit while sustainably satisfying the needs of consumers for products related to natural resources such as biotechnology, farms, food, forestry, fisheries, fuel, and fiber.

Farm Typology

Farms are classified into different types according to their dominant activity:

- **a crop-specialist holding** is an agricultural holding where crop production is the dominant activity, providing **at least two-thirds of the production** or the business size of an agricultural holding
- **a livestock-specialist holding** is an agricultural holding where livestock production is the dominant activity, providing **at least two-thirds of the production** or the business size of an agricultural holding
- **a mixed-farming holding** is an agricultural holding where neither livestock nor crop production is the dominant activity - an activity is called dominant if it provides **at least two-thirds of the production** or the business size of an agricultural holding

1.5. Farm Classification and Farm Typology

The EUROSTAT has developed a farm typology, or farm classification, that divides the European Union farms into relatively 9 main groups:

1. Specialist field crops
2. Specialist horticulture
3. Specialist permanent crops
4. Specialist grazing livestock
5. Specialist pig poultry
6. Mixed cropping
7. Mixed livestock holdings
8. Mixed crop-livestock
9. Non-classifiable holdings

EU farm holdings are classified based on Standard Gross Margin (SGM). SGMs represent the level of profit to be expected on the average farm under 'normal' conditions. The sum of standard gross margins in a farm is a measure of its overall economic size, expressed in European Size Units (ESU).

1 ESU is a 1200 euro SGM.

1.5. Farm Classification and Farm Typology

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The U.S. Department of Agriculture (USDA) defines a farm as any place from which $1,000 or more of agricultural products were produced and sold.

Family farms are classified based on gross cash farm income (GCFI).

The USDA's Economic Research Service (ERS) has developed a farm typology, or farm classification, that divides the 2.1 million U.S. farms into relatively homogeneous groups:

1. **Small family farms** – GCFI less than $350,000 Low-sales farms – GCFI less than $150,000.
2. **Moderate family farms** – GCFI between $150,000 and $349,999.
3. **Midsize family farms** – GCFI between $350,000 and $999,999.
4. **Large-scale family farms** – GCFI of $1,000,000 or more.
5. **Large family farms** – Farms with GCFI between $1,000,000 and $4,999,999.
6. **Very large family farms** – Farms with GCFI of $5,000,000 or more.
7. **Non-family farms** – Any farm where the producer and persons related to the producer do not own a majority of the business.

I. Introduction and Key Concepts

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1.6. Urban Agriculture

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Urban agriculture, urban farming, or urban gardening is the practice of cultivating, processing, and distributing food in or around urban areas.

Can we say «urban agriculture» bear same functions or has similar structures in the developed and developing world?

Urban agriculture in the world shows a dual structure.

1. Urban agriculture in developing countries:

According to the United Nations (UN-HABITAT 2010), about 12.6 % of the global population (32.7 % of urban population) lives in areas classified as slums. Furthermore, more than half of the urban population lives below the poverty line in many countries.

Key motivations for urban agriculture in the developing world: food security, nutrition, and income generation

I. Introduction and Key Concepts

Agriculture

1.6. Urban Agriculture in Developing World

AGRICULTURE

Table 1. Main Typology of Socio-Economic Profiles of Urban Farmers (Orsini at all. 2013)

Item	Small-scale agriculture	Small-scale commercial agriculture	Farming enterprises	Nonspecialized farming
Main location where it is found	Urban (peri-urban)	Urban and peri-urban	Peri-urban (urban)	Peri-urban
Product destination	Household	Urban markets	Urban market + export	Household + urban markets
Main aim	Self-consu mption	Small income generation	Main or part-time activity for income generation	Self consumption + small income generation
Size	<100 m^2	<1,000 m^2	>2,000 m^2	>5,000 m^2
Products	Leafy veggie, cassava, plantain, corn, fruits, chickens, sheep	Leafy veggie, other vegetables, chickens, sheep, milk	Leafy veggie, other vegetables, chickens, animal rearing, aquaculture	Cereals, legumes, roots and tubers, traditional vegetables
Technological level[a]	Low	Low to medium	Medium to high	Very low
Main gender	Women	Both	Men	Both
Limiting factors	Land size	Land size, access to land and to agricultural input, market fluctuations	Technical knowledge, market fluctuations	Access to agricultural inputs, soil fertility

1.6. Urban Agriculture

AGRICULTURE

2. Urban agriculture in developed countries:

The emphasis is on ecological and social values.

Benefits of Urban Farming

a) Ecosystem services: Urban and peri-urban agricultural systems can improve urban environments through provisioning, regulating, supporting and cultural ecosystem services.

- Through the use of vacant lots and open spaces in urban and man-made environments, contribute to the increase of ecosystem services.
- Also, the increase of food production capacity in urban and peri-urban areas allows the decrease of the conversions of non-agricultural land to farmland.

I. Introduction and Key Concepts

Agriculture

1.6. Urban Agriculture

AGRICULTURE

Benefits of Urban Farming

- Increases surrounding property values, beautifies vacant properties,
- increases a sense of community, and provides recreational and cultural uses.
- Increases infiltration of rainwater, reducing storm water overflows and flooding, decreases erosion and topsoil removal,
- improves air quality (carbon sequestration), and reduces waste by the reuse of food and garden wastes as organic material and compost (nutrient cycling), and contributes temperature regulation.
- Promotes healthy communities: Increases physical activity and educates new gardeners on the many facets of food production from food security to nutrition and preparation of fresh foods.
- Helps boost the local economy.

I. Introduction and Key Concepts

1.6. Urban Agriculture

Benefits of Urban Farming

Supporting

- For agricultural sustainability is not only about agricultural production but also about managing the landscapes surrounding the agricultural activities and urban agriculture also contributes in this respect.
- Urban agriculture zones are key drivers for sustainability and urban biodiversity. Biodiversity favors resilience by supporting and mitigating the negative impacts of the built environment by hosting a diversity of fauna and flora.
- Urban agriculture have higher quality soil formation than agricultural soils, because of the regular inputs of organic matter, such as composts and manures.

b) Peri-urban agriculture is multifunctional. "Multifunctional agriculture" refers to agriculture beyond its primary role of producing food and fibre, but as also having other functions.

1.6. Urban Agriculture

AGRICULTURE

Challenges

Challenges for urban agriculture, like its benefits, arise from its proximity to densely built urban areas. Urban agriculture uses land, water, labor, and energy that might be used by other urban economic sectors. Competition for resources with other urban sectors, aspects of agriculture that may be unpleasant for city dwellers and quality of inputs must all be monitored.

Urban agriculture produces some aspects that may be unpleasant for urban residents, including smells, noises, pollution, and disease. Animal waste can be challenging. Runoff from facilities leads to over nutrienteted soils and water, which can in turn cause eutrophication and algal blooms in nearby water supplies.

Pathogens are often spread from wastewater reused for irrigation, from live animals in close proximity to dense human populations, and the disposal or sale of manure. Crops are an opportunity to reuse urban waste productively, and waste water as an irrigation source in particular has been explored by some cities to conserve water. If not treated properly before application, this wastewater can contaminate crops or surrounding vegetation with pathogens that make them unsafe for human consumption.

I. Introduction and Key Concepts

1.7. Agricultural Landscapes (Agricultural Land Use)

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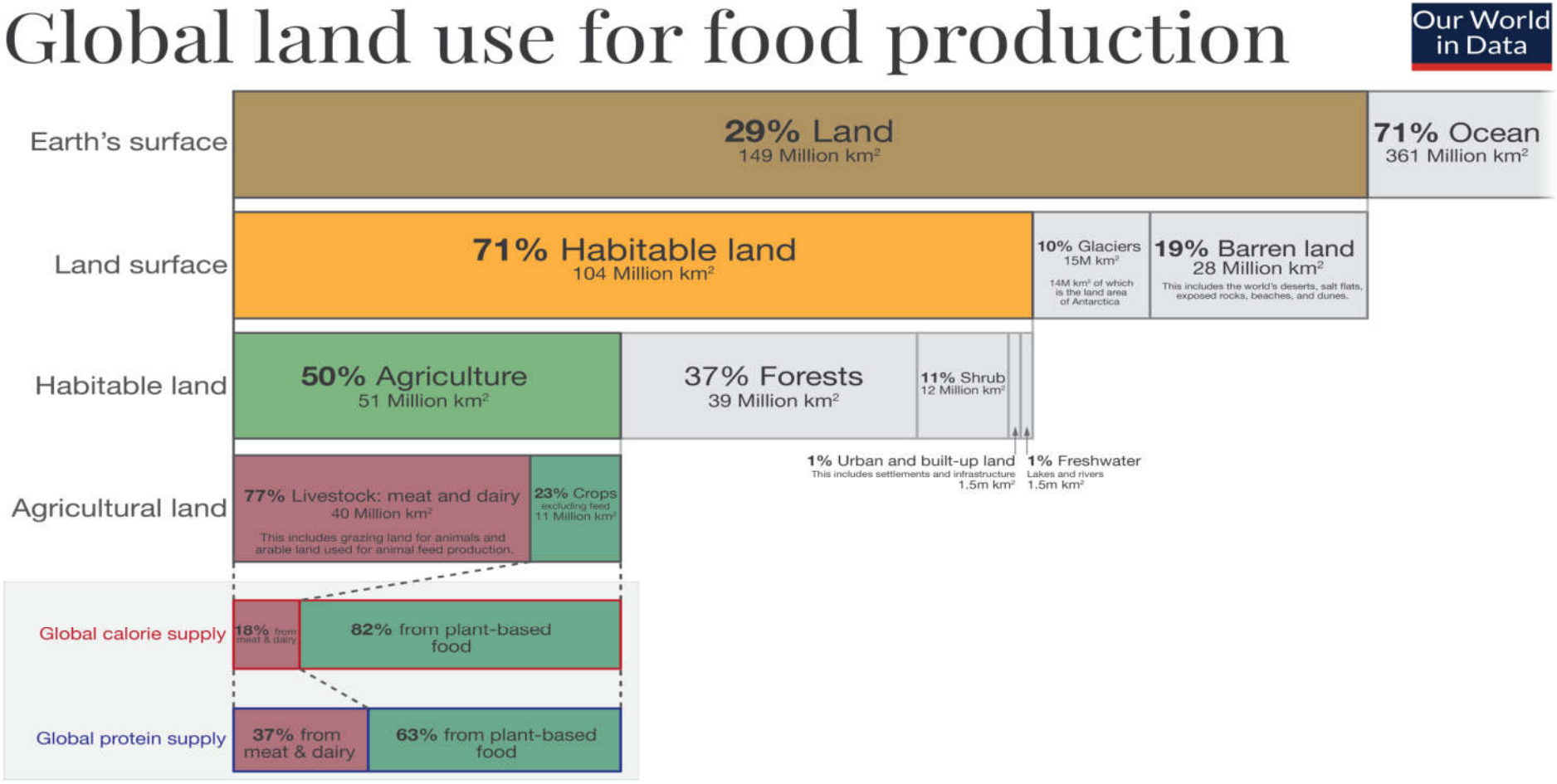

Data source: UN Food and Agriculture Organization (FAO)
OurWorldinData.org – Research and data to make progress against the world's largest problems.

I. Introduction and Key Concepts

Agriculture

1.7. Agricultural Landscapes (Agricultural Land Use)

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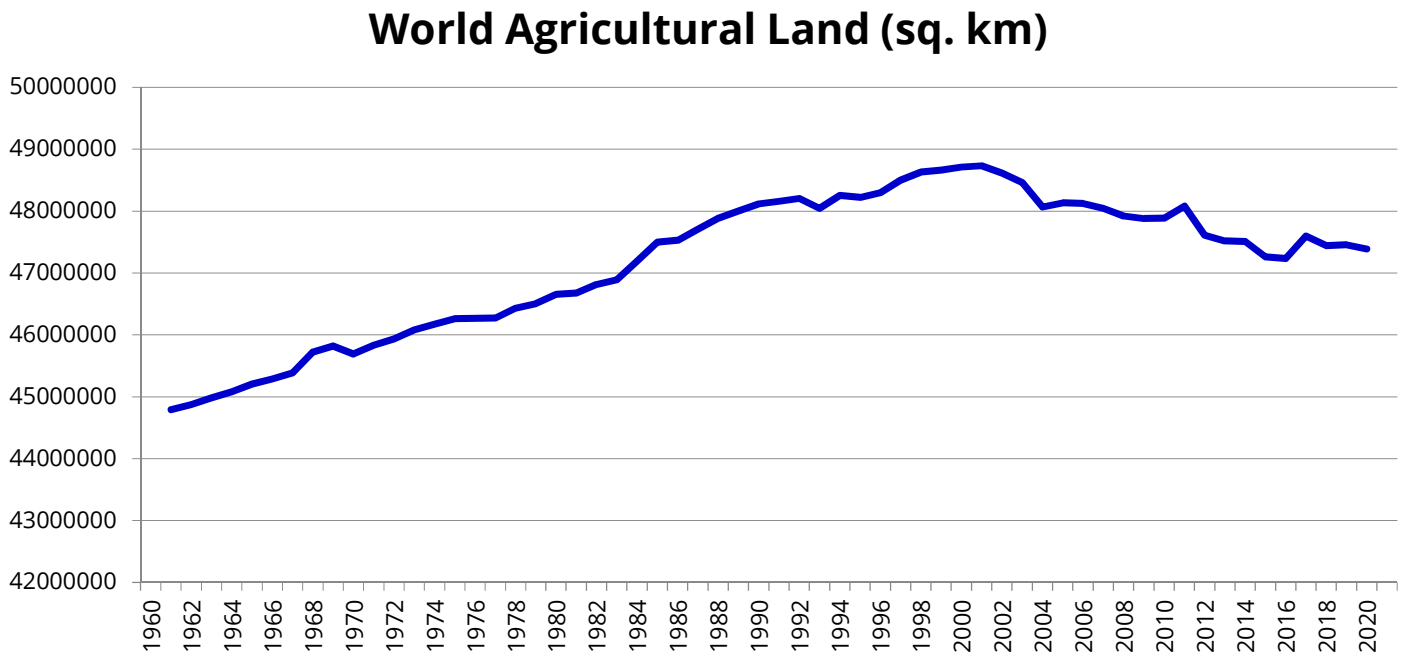

1961	44 790 648 sq. km
2001	48 731 764 sq. km
2020	47 388 929 sq. km

https://data.worldbank.org/indicator

I. Introduction and Key Concepts

Agriculture

1.7. Agricultural Landscapes (Agricultural Land Use)

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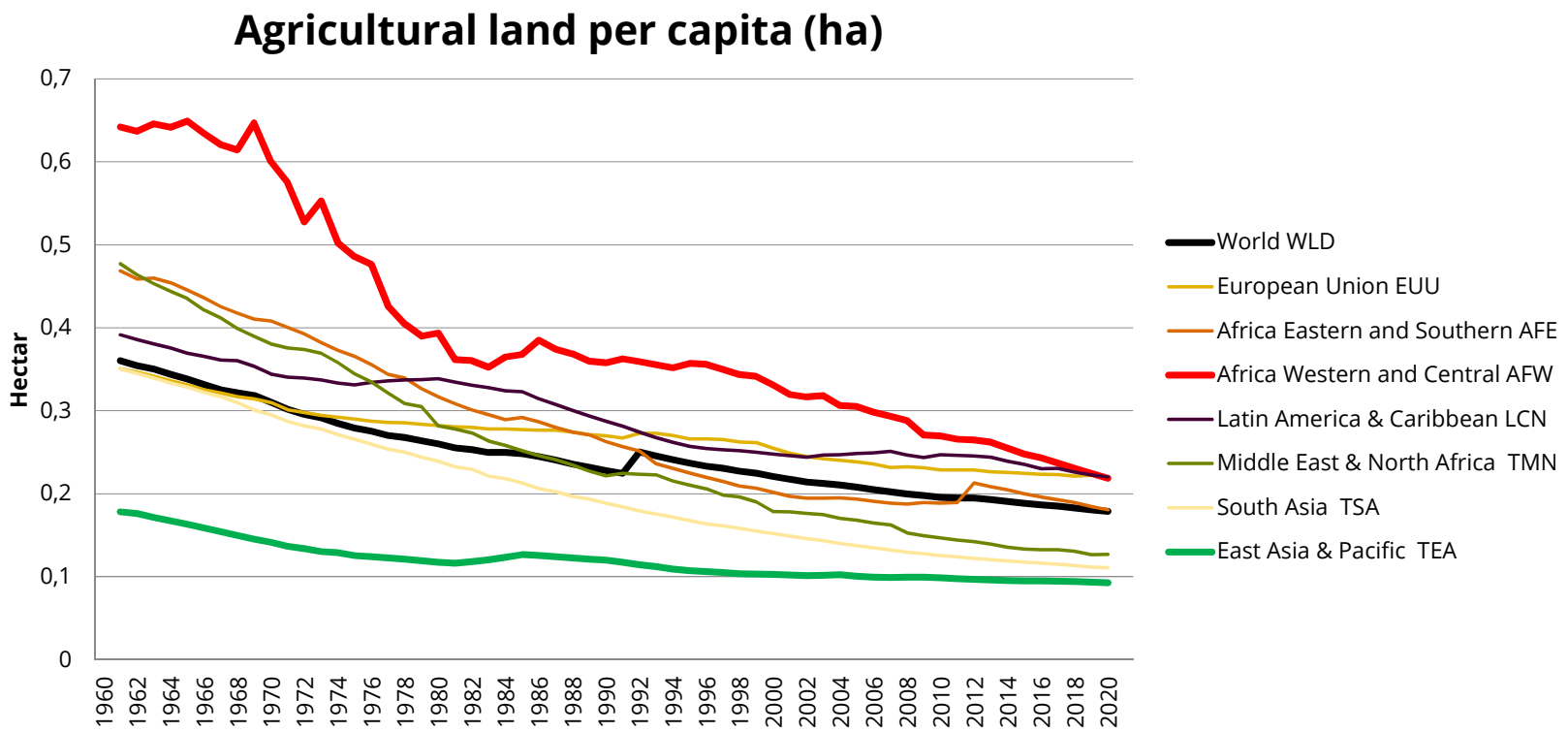


https://data.worldbank.org/indicator

I. Introduction and Key Concepts

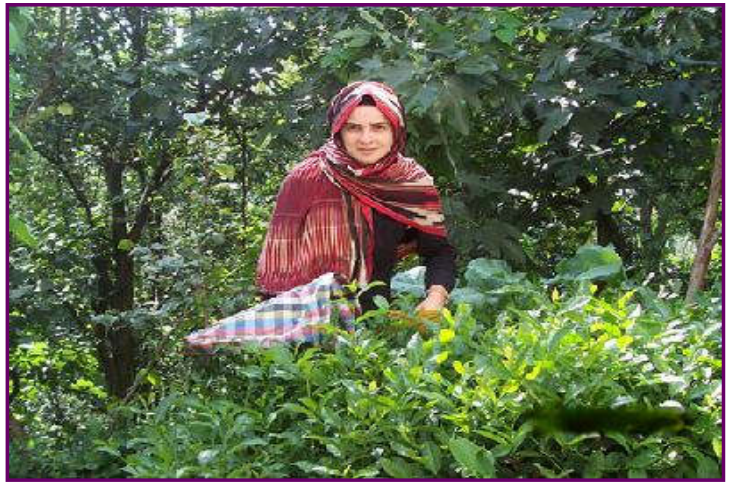
1.7. Agricultural Landscapes (Agricultural Land Use)

AGRICULTURE

Agricultural landscapes are extremely variable across the globe, varying with cropping system, topography and intensity of management.

The interactions between land use and land form are profound, leading to landscape mosaics.

Tea (*Camelia chinensis*)



Rize, Black Sea Region, Tea Gardens

I. Introduction and Key Concepts

1.7. Agricultural Landscapes (Agricultural Land Use)

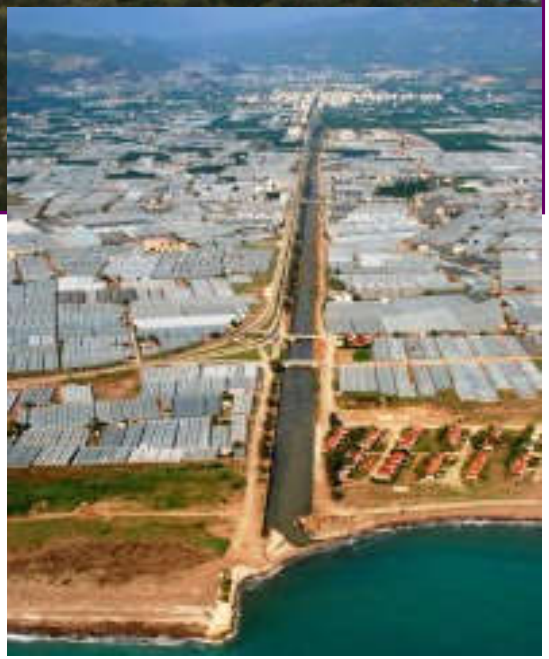
AGRICULTURE

Tea (*Camelia chinensis*)

1.7. Agricultural Landscapes

AGRICULTURE

Greenhouse and Citrus Production



Kumluca – Antalya

In intensive systems, land is typically enclosed and delineated with field boundaries. Most production areas are enclosed; that is, they are delimited or fenced into discrete areas.

1.7. Agricultural Landscapes

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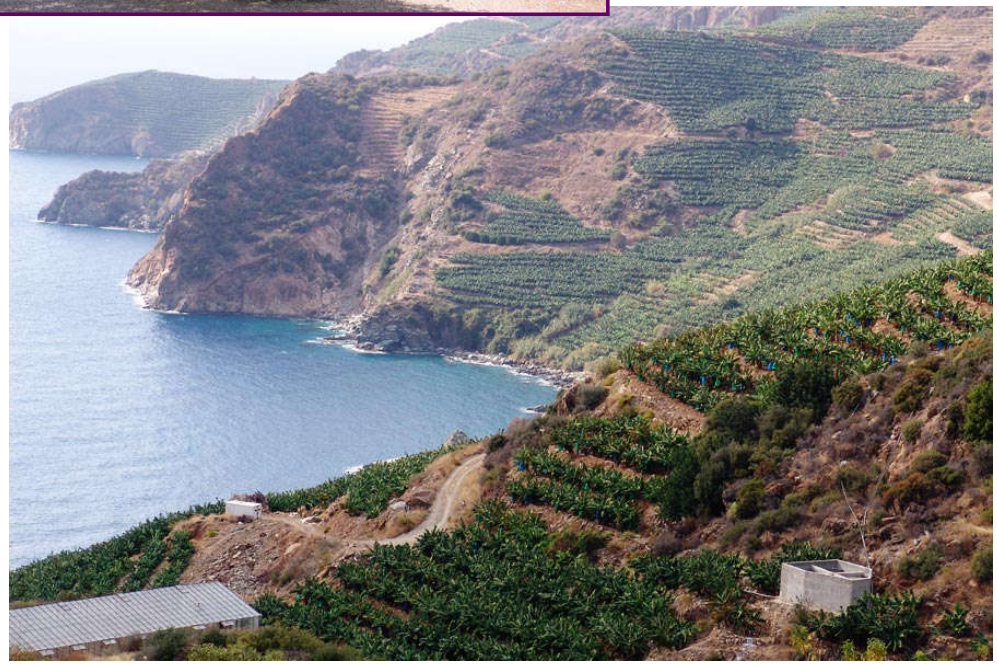
Olive
(*Olea europea*)

Banana
(*Musa cavendish*)



Gazipaşa – Antalya

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1.7. Agricultural Landscapes

Cotton

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1.7. Agricultural Landscapes

AGRICULTURE

Grape (*Vitis vinifera*)

Vineyard

1.7. Agricultural Landscapes

AGRICULTURE

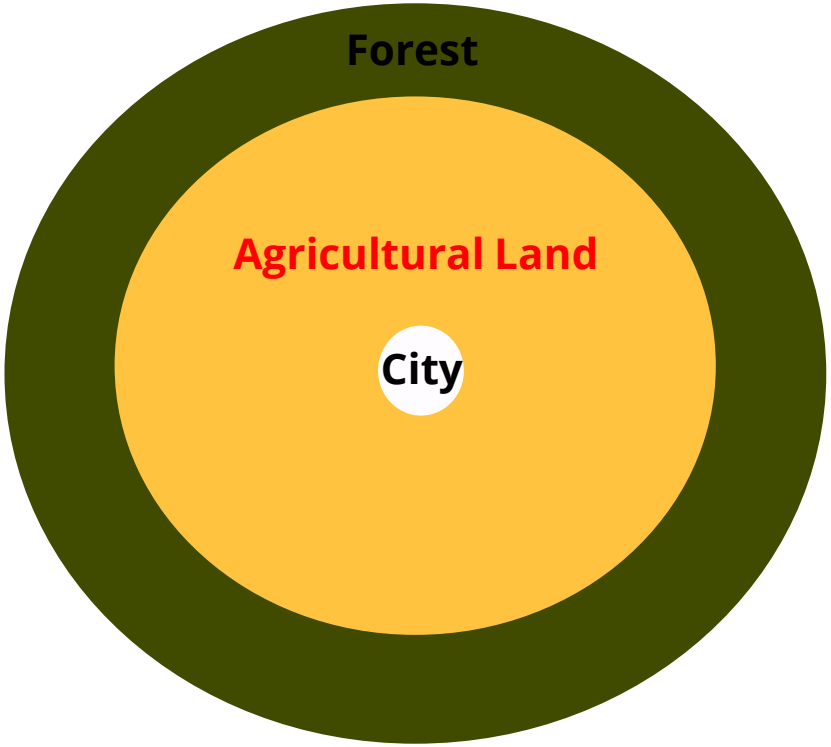
Paddy Fields, Kıbrısçık- Bolu, Black Sea Region

1.7. Agricultural Land Use

AGRICULTURE

Now let's imagine a city built in the middle of a flat plain surrounded by forest. Suppose the plain is circular and there is a vehicle that uses only animal traction.

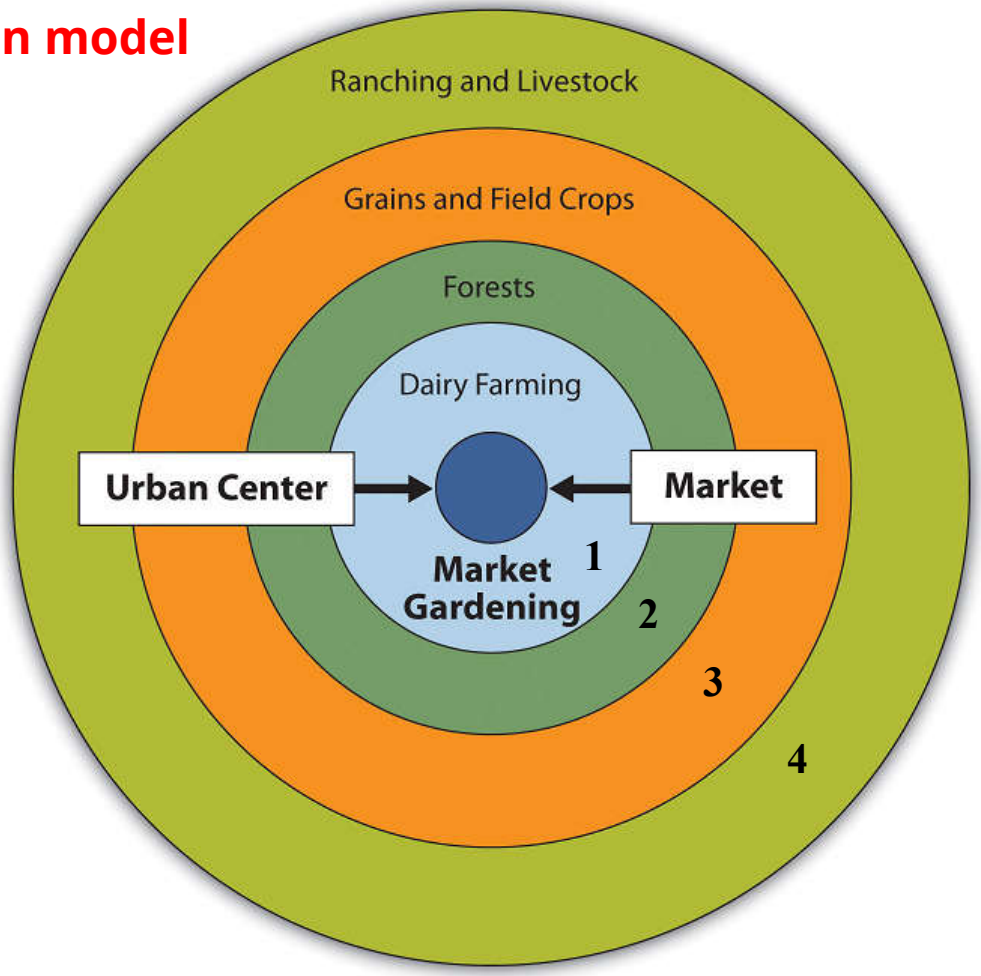
In such a case, which agricultural products would be grown near the city, and which products would be grown in distant places?



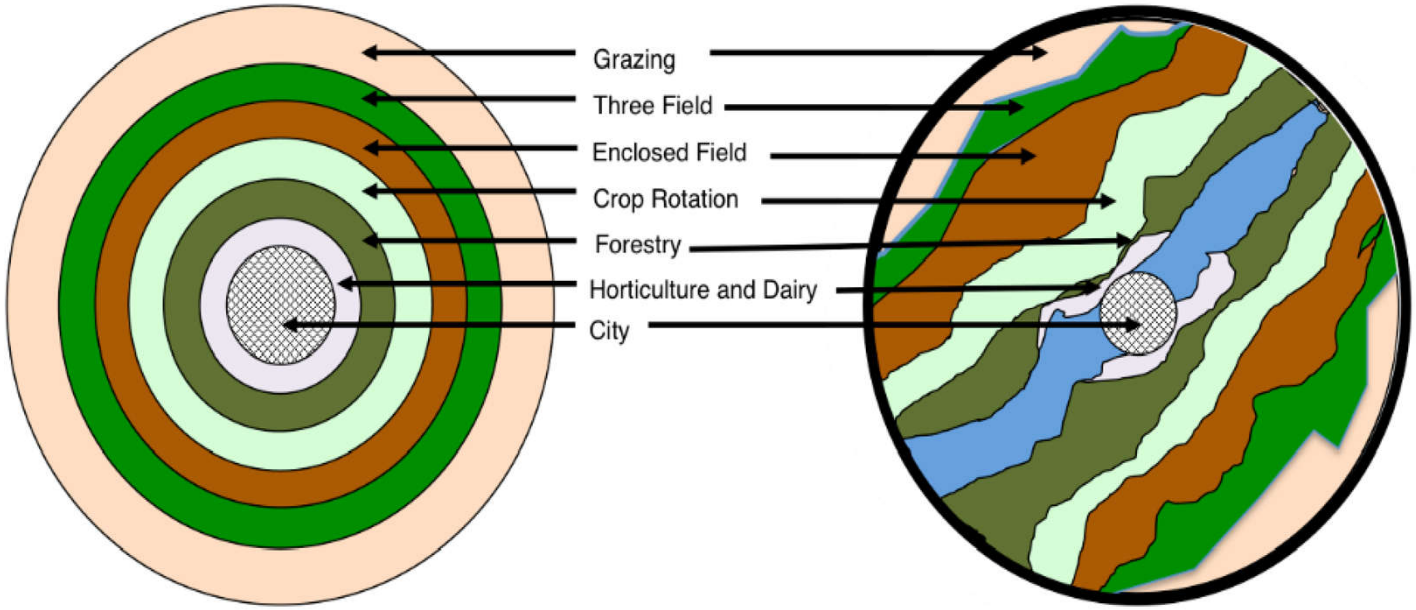
1.7. Agricultural Land Use

Johann Heinrich von Thunen (The Isolated State,1826)

Von Thünen model



1.7. Agricultural Land Use

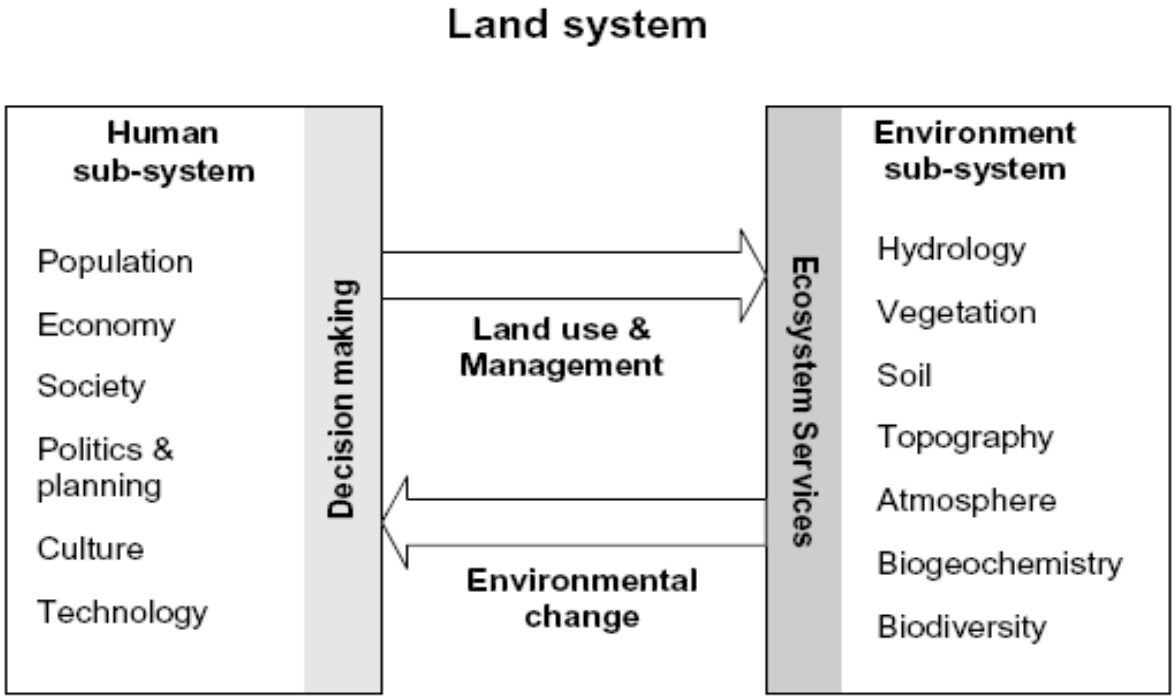


Von Thünen model, left – modified by a river, right by George Van Otten and Dennis Bellafiore (https://www.e- education.psu.edu/geog597i_02/node/744)

1.7. Agricultural Landscapes (Agricultural Land Use)

Agriculture

AGRICULTURE

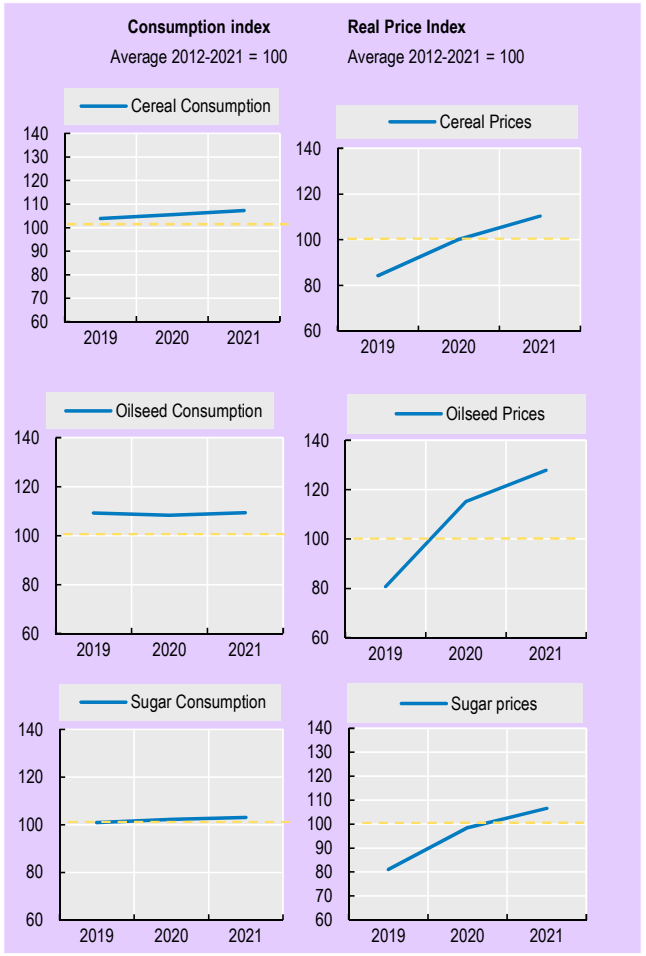


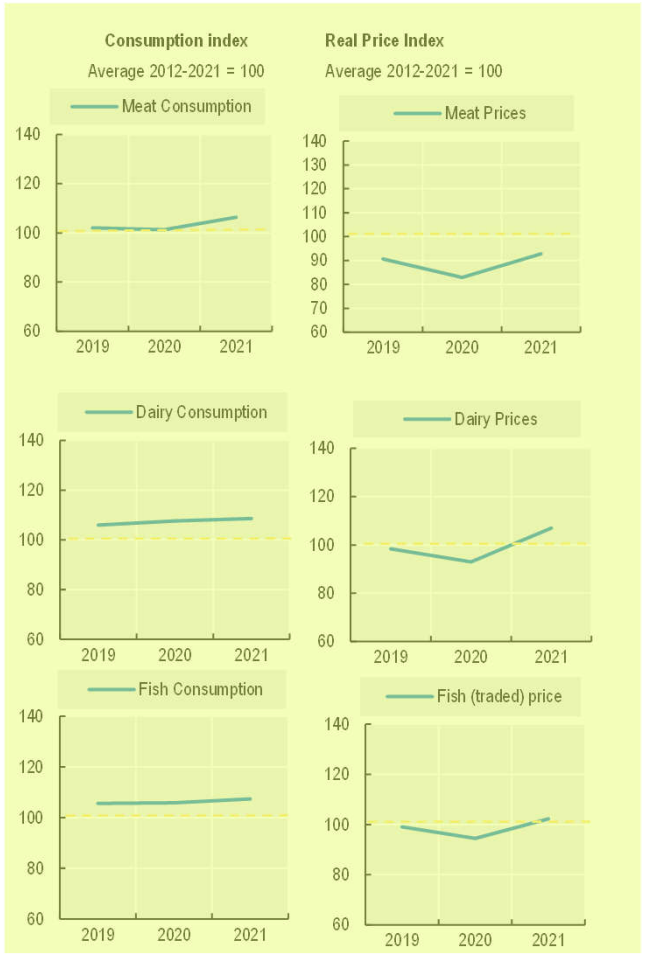
Conceptual Model of a Land System, Based on (GLP, 2005)

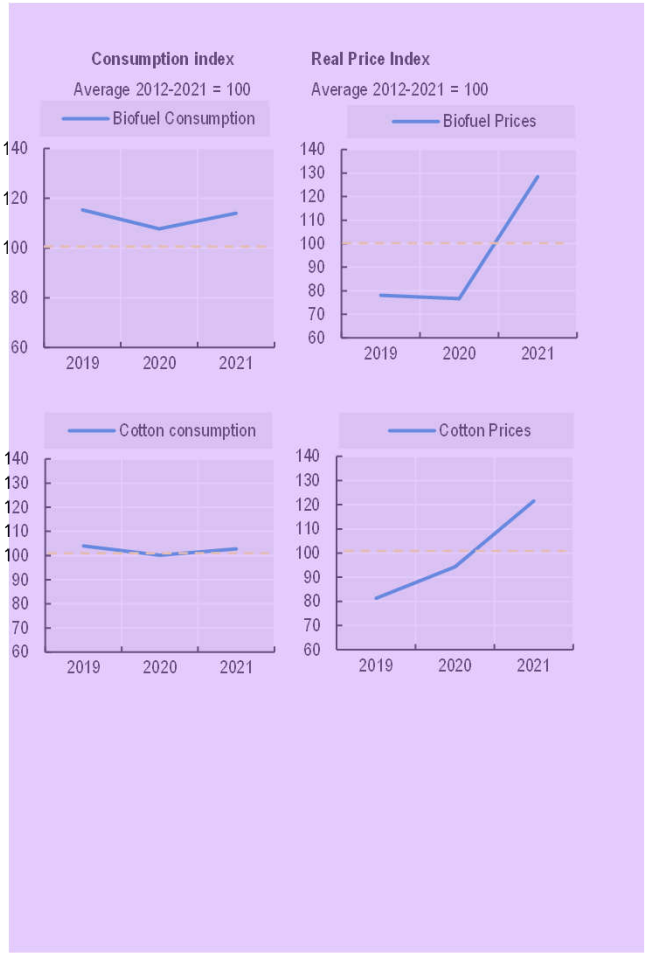
2. Past and Present Trends and Impacts of Agriculture

AGRICULTURE

World Market conditions for key commodities





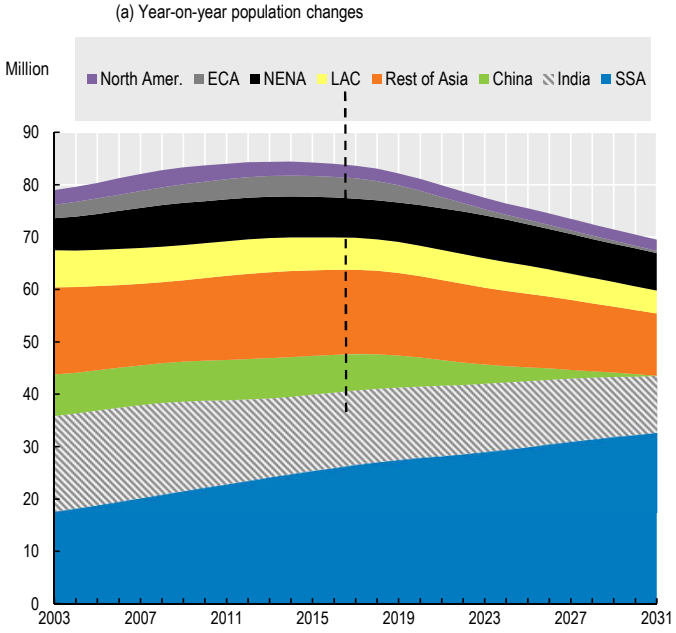


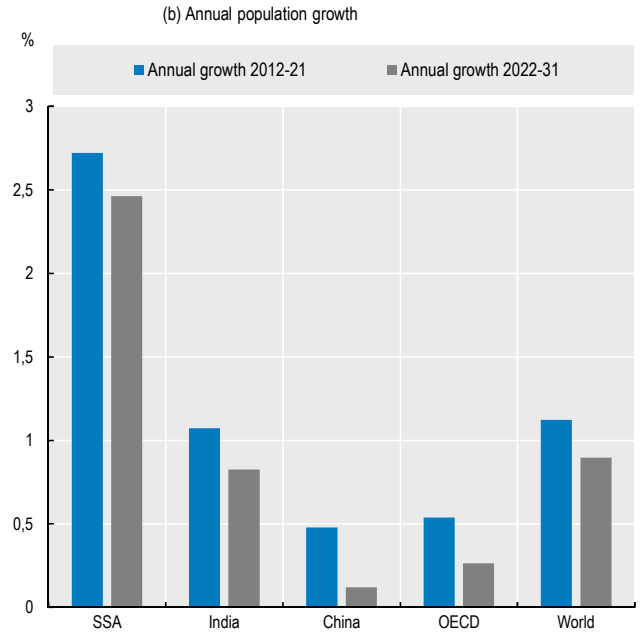
Source: "OECD-FAO Agricultural Outlook", OECD Agriculture statistics

2. Past and Present Trends and Impacts of Agriculture

AGRICULTURE

World Population Growth





	Annual growth 2012-21	Annual growth 2022-31
SSA	2,7	2,5
India	1,1	0,8
China	0,5	0,1
OECD	0,5	0,3
World	1,1	0,9

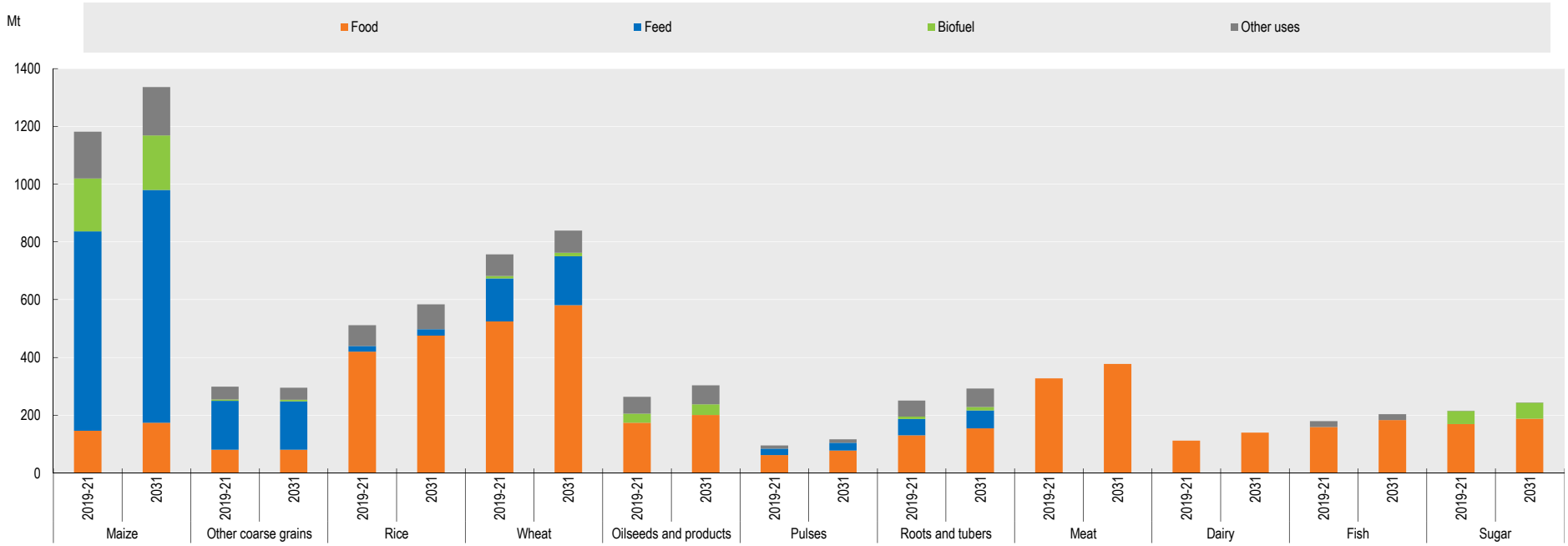
Note: SSA is Sub-Saharan Africa; LAC is Latin America and Caribbean; ECA is Europe and Central Asia; NENA stands for Near East and North Africa, and is defined as in Chapter 2; Rest of Asia is Asia Pacific excluding China and India.

Source: "OECD-FAO Agricultural Outlook", OECD Agriculture statistics

2. Past and Present Trends and Impacts of Agriculture

AGRICULTURE

Global Consumption



Source: "OECD-FAO Agricultural Outlook", OECD Agriculture statistics

2. Past and Present Trends and Impacts of Agriculture

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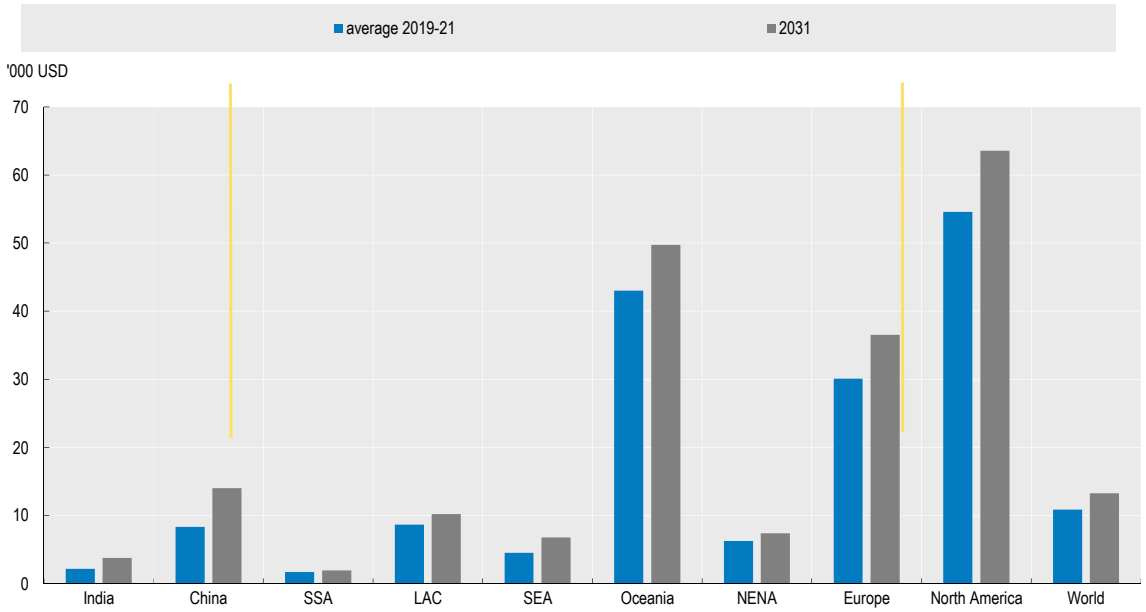
Per capita income (1000 USD)



	average 2019-21	2031
India	2,16	3,76
China	8,34	14,03
SSA	1,72	1,92
LAC	8,66	10,19
SEA	4,52	6,77
Oceania	43,02	49,74
NENA	6,27	7,36
Europe	30,09	36,55
North America	54,59	63,54
World	10,88	13,26

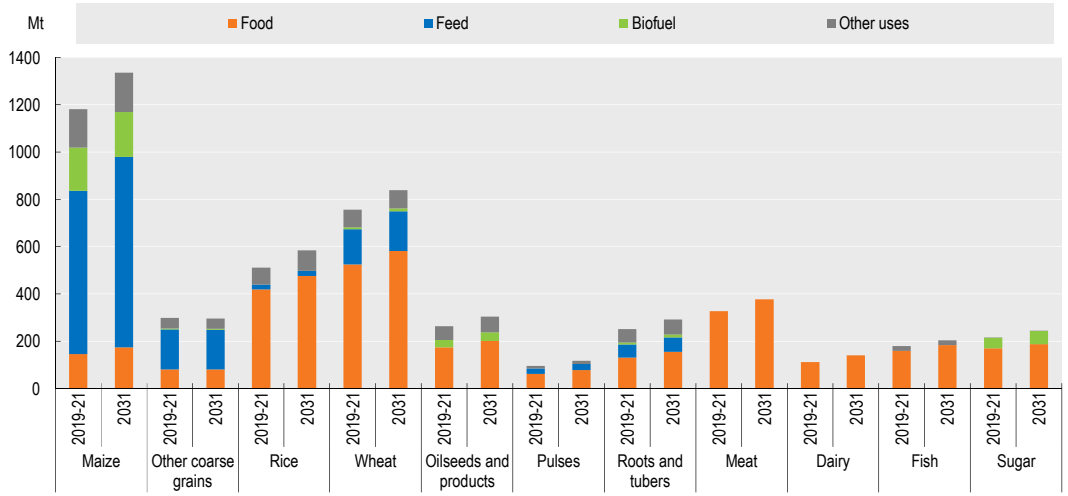
Note: SSA is Sub-Saharan Africa; LAC is Latin America and Caribbean; SEA is Southeast Asia; NENA stands for Near East and North Africa, and is defined as in Chapter 2. The graph shows per capita GDP in constant 2010 US dollars.

Source: "OECD-FAO Agricultural Outlook", OECD Agriculture statistics

2. Past and Present Trends and Impacts of Agriculture

AGRICULTURE

Global use of major commodities (Mt)



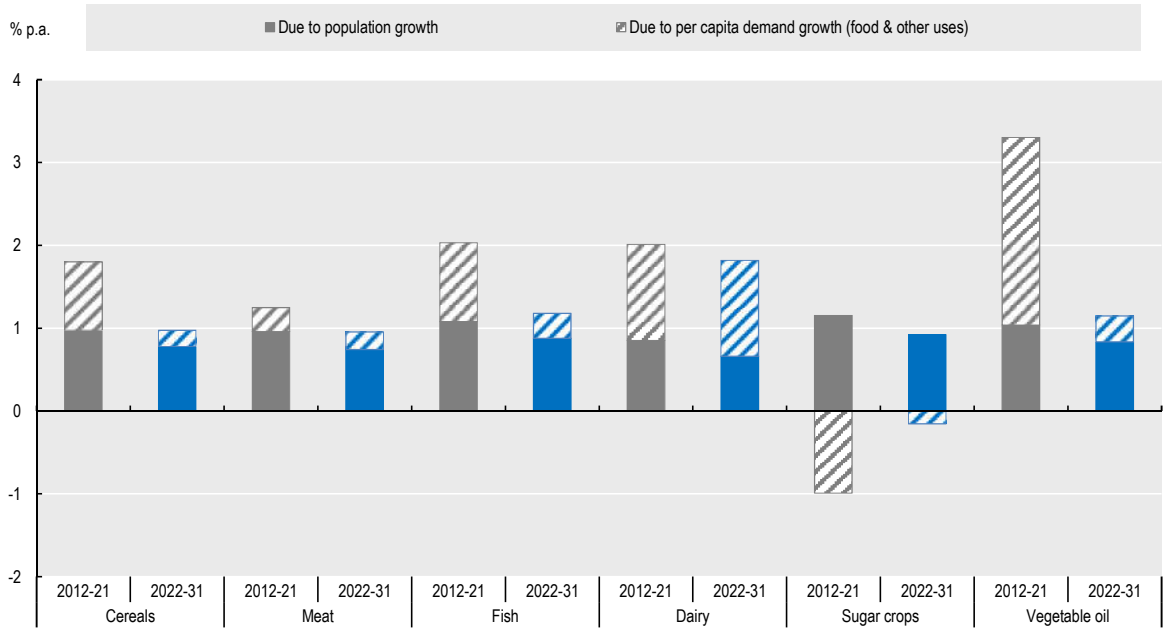
Product	Period	Food	Feed	Biofuel	Other uses
Maize	2019-21	146 299	690 227	182 827	162 379
	2031	173 745	806 294	188 847	167 226
Other coarse grains	2019-21	80 287	169 553	4 816	44 493
	2031	80 596	167 704	4 989	42 218
Rice	2019-21	419 679	19 782		71 828
	2031	475 715	22 179		85 822
Wheat	2019-21	524 843	148 665	8 706	74 434
	2031	581 412	168 525	12 008	76 721
Oilseeds and products	2019-21	173 576		32 071	57 854
	2031	201 066		36 424	66 092
Pulses	2019-21	61 523	22 587		10 977
	2031	77 463	26 681		12 691
Roots and tubers	2019-21	130 708	55 989	8 397	55 998
	2031	154 668	61 693	12 535	63 274
Meat	2019-21	327 683			
	2031	377 206			
Dairy	2019-21	112 277			
	2031	139 603			
Fish	2019-21	158 897			20 829
	2031	183 136			20 271
Sugar	2019-21	169 506		44 707	332
	2031	187 470		55 922	288

Source: "OECD-FAO Agricultural Outlook", OECD Agriculture statistics

2. Past and Present Trends and Impacts of Agriculture

AGRICULTURE

Annual growth in demand for key commodity groups(%)



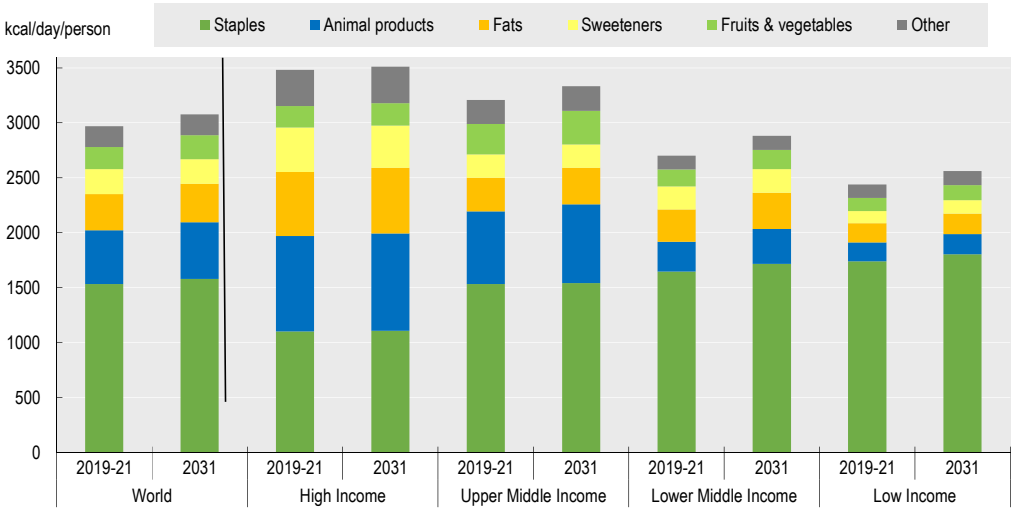
	Period	Due to population growth	Due to per capita demand growth (food & other uses)
Cereals	2012-21	0,98	0,83
	2022-31	0,78	0,19
Meat	2012-21	0,96	0,29
	2022-31	0,74	0,21
Fish	2012-21	1,08	0,95
	2022-31	0,88	0,30
Dairy	2012-21	0,85	1,16
	2022-31	0,66	1,16
Sugar crops	2012-21	1,15	(0,99)
	2022-31	0,92	(0,16)
Vegetable oil	2012-21	1,04	2,27
	2022-31	0,83	0,31

Source: "OECD-FAO Agricultural Outlook", OECD Agriculture statistics

2. Past and Present Trends and Impacts of Agriculture

AGRICULTURE

Per capita calorie availability of the main food groups, by country income group (kcal/day/person)



		Staples	Animal products	Fats	Sweeteners	Fruits & vegetables	Other
World	2019-21	1.530,70	490,51	329,12	228,70	200,09	189,26
	2031	1.579,03	516,48	347,11	226,33	218,43	190
High Income	2019-21	1.098,8	870,6	583,2	403,4	195,25	331,17
	2031	1.104,4	887,2	596,8	386,8	202,66	333
Upper Middle Income	2019-21	1.532,21	660,74	305,64	212,32	278,04	217,70
	2031	1.539,04	718,76	330,99	212,59	308,34	223
Lower Middle Income	2019-21	1.645	270,71	295,14	210,51	154,62	123,01
	2031	1714	320	327	216	176	127
Low Income	2019-21	1.737	171,84	176,01	109,62	120,18	121,92
	2031	1803	183	187	123	136	128

Source: "OECD-FAO Agricultural Outlook", OECD Agriculture statistics

2. Past and Present Trends and Impacts of Agriculture

Agriculture

AGRICULTURE

Today, there are two divisions of agriculture, **subsistence** and **commercial**, which roughly correspond to the less developed and more developed regions.

2.1. Subsistence Agriculture

Growing crops and rearing animals for the sole purpose of feeding the farmer and his family is known as subsistence farming.

Basic characteristics:

- ❖ Basic farm equipment use (Insufficient mechanization and capital)
- ❖ Family labor intensive production
- ❖ Insufficient education
- ❖ Small plots of land and small family farming
- ❖ Lack of irrigation infrastructure
- ❖ Insufficient and low quality input use
- ❖ Low soil fertility
- ❖ Dependency to climate
- ❖ Low level of farmer organization

- ➢ Low productivity
- ➢ Low income
- ➢ Limited marketable products
- ➢ Poverty

2. Past and Present Trends and Impacts of Agriculture

AGRICULTURE

2.2. Commercial Agriculture

More developed nations tend to have commercial agriculture with a goal to produce food for sale in the global marketplace called agribusiness.

Basic characteristics:

- ❖ Mechanized and capital intensive
- ❖ Hired labor use
- ❖ Good knowledge base
- ❖ Big farm land, benefit from economies of scale
- ❖ Sufficient and high quality input use
- ❖ Good soil fertility
- ❖ Nature friendly farming possible
- ❖ High level of farmer organizations
- ❖ Access to finance
- ❖ Appropriate supporting system

- ➢ High yield
- ➢ Quality products
- ➢ A fair price
- ➢ Sufficient productivity
- ➢ Market integration
- ➢ High income
- ➢ Wealth

2. Past and Present Trends and Impacts of Agriculture

Agriculture

AGRICULTURE

2.2. 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
- Domination of international companies
- Prevention of competition

2. Past and Present Trends and Impacts of Agriculture

2.2. Commercial Agriculture - Industrial Agriculture

AGRICULTURE

Soilless agriculture:

It can be defined as an advanced production technique in which plants are grown by using different solid or liquid media other than soil, in the root zone of plant nutrients and water required for the development of plants. With the soilless production model, it is aimed to provide the most appropriate air, water and nutrient balance in the root zone, in addition to physical support to the plants in an artificial environment.

Hydroponics has been recognized as a viable method of producing vegetables (tomatoes, lettuce, cucumbers and peppers) as well as ornamental crops such as herbs, roses, freesia and foliage plants. Due to the ban on methyl bromide in soil culture, the demand for hydroponically grown produce has rapidly increased in the last few years (Shrestha and Dunn, 2022. Hydroponics, at: http://osufacts.okstate.edu.

2. Past and Present Trends and Impacts of Agriculture

Agriculture

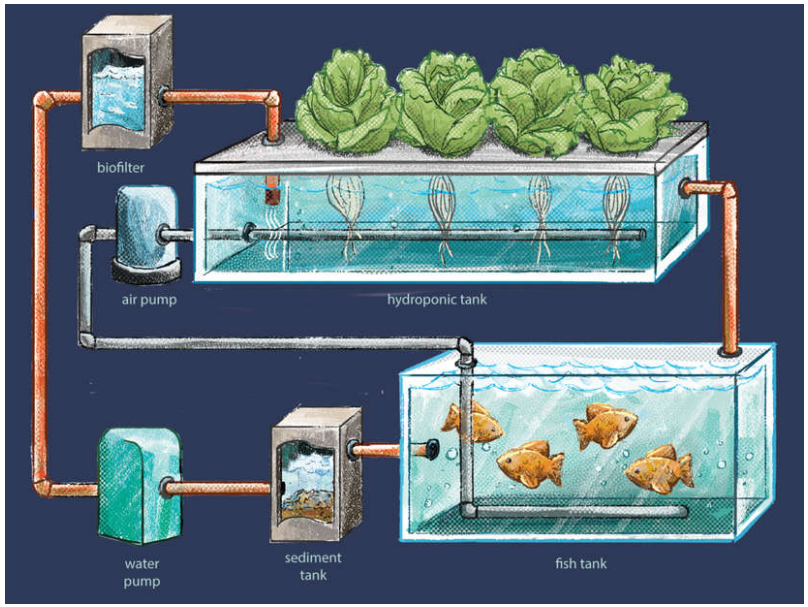
AGRICULTURE

Aquaculture and Aquaponics

"Aquaponics is an integrated production operation that encompasses recirculating aquaculture systems and hydroponics to produce fish and plants in a closed-loop system. Simply said, the fish produce nutrient-rich effluent that fertilizes the plants, and the plants filter the water for the fish. The synergistic relationship of the fish and plants has created a popular perception of sustainability around aquaponics by the general public (Pattillo, 2022.)

Advantages of this closed-loop system over conventional crop production methods include:

- reduced land area requirements,
- reduced water consumption,
- accelerated plant growth rates,
- year-round production in controlled environments,
- operational efficiency with shared equipment,
- reduced or eliminated effluents, and
- multiple crops produced simultaneously



2. Past and Present Trends and Impacts of Agriculture

Agriculture

2.3. Sustainability in Agriculture

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 at all. 2015).

In this context, sustainable agriculture is an “integrated system of plant and animal production practices having a site specific application that will, over the long term:

(a) satisfy human food and fiber needs;

(b) enhance environmental quality;

(c) make efficient use of non-renewable resources and on-farm resources and integrate appropriate natural biological cycles and controls;

(d) sustain the economic viability of farm operations; and

(e) 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

3. Stakeholders of Actions on Agriculture (Suply Chain)

Agriculture

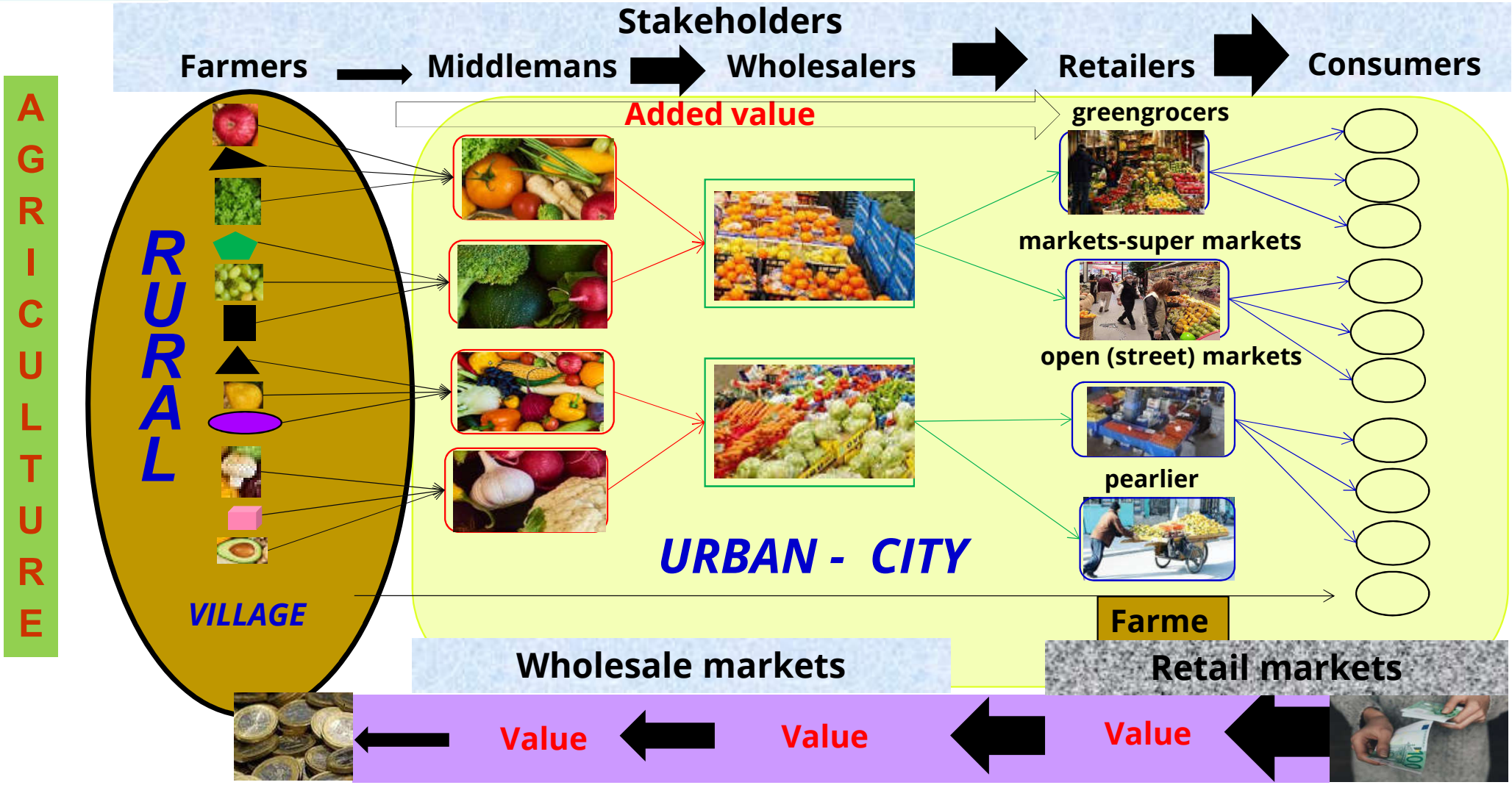
AGRICULTURE

Agricultural marketing is a process which starts with a decision to produce a saleable farm commodity. It involves all the aspects of market structure or system, both financial and institutional, based on technical and economic considerations, and includes pre- and post-harvest operations, assembling, grading, storage, processing, transportation and distribution.

Agricultural marketing brings producers and consumers together through a series of activities and thus becomes an essential element of the economy. The scope of agricultural marketing is not only limited with the final agricultural produce. It also focuses supply of agricultural inputs (factors) to the farmers.

3. Stakeholders of Actions on Agriculture (Suply Chain)

Marketing Channels of agricultural products



3. Stakeholders of Actions on Agriculture (Suply Chain)

Antalya wholesale market

AGRICULTURE

In Antalya Metropolitan Municipality Wholesale Market, which is the biggest producer in Turkey, 5-6 million kilograms of fresh fruit and vegetables are sent to domestic and foreign markets daily. Hal, which has been serving for 22 years, is also the livelihood of approximately 5,500 people. Life begins at night in the Wholesale Market. The product that the producer collects from the fields and greenhouses during the day reaches the state in the evening.

3. Stakeholders of Actions on Agriculture (Supply Chain)

AGRICULTURE

3. Stakeholders of Actions on Agriculture (Suply Chain)

AGRICULTURE

Antalya fisherman's shelter

Fish wholesale market

Auction

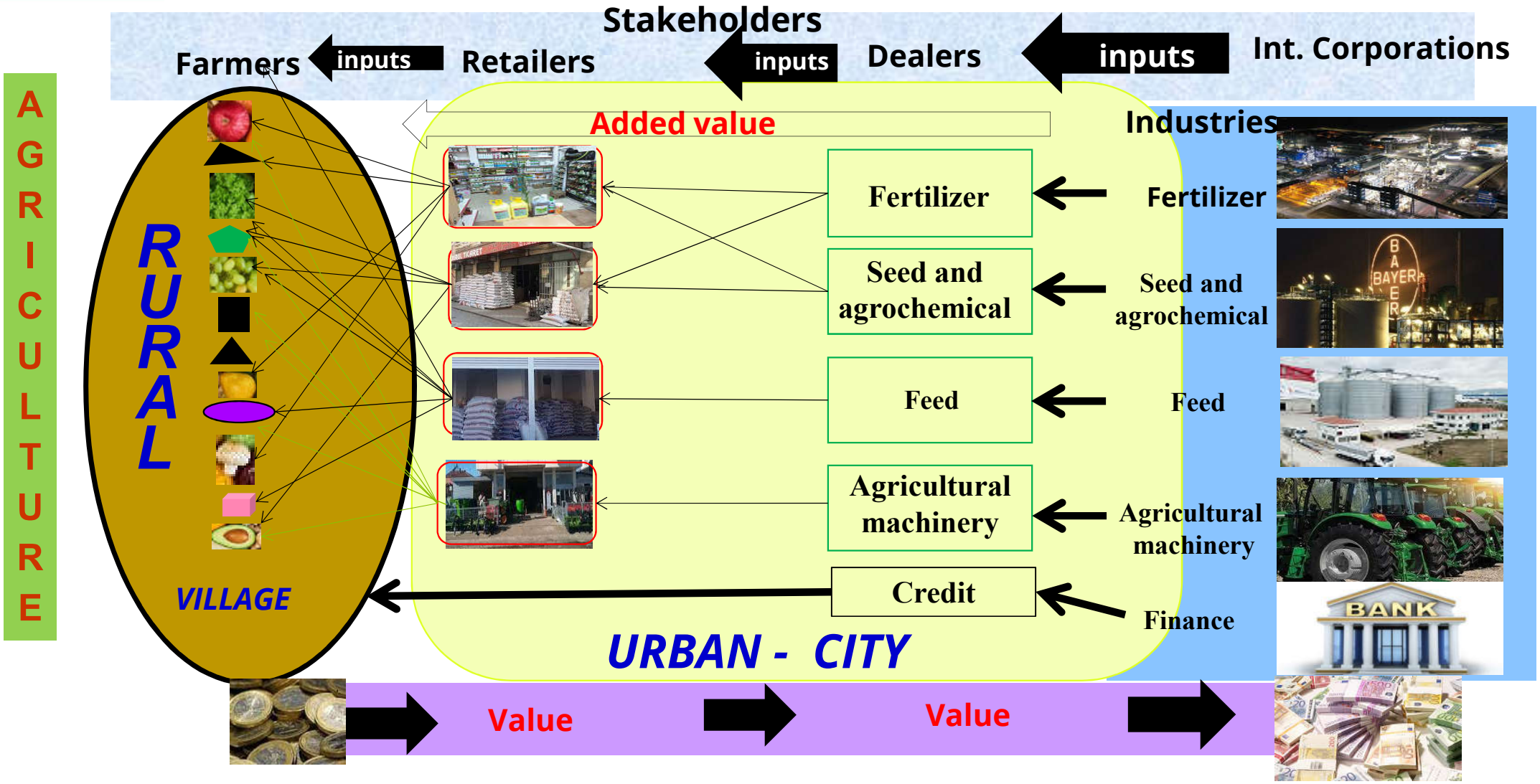
Processing

www.antalyabalik.com.tr

Retailing

3. Stakeholders of Actions on Agriculture (Suply Chain)

Marketing Channels of agricultural inputs



3. Stakeholders of Actions on Agriculture (Suply Chain)

Marketing Channels of agricultural inputs

AGRICULTURE

2017 Sales of Leading Seed Companies

Rank	Company	Sales (million $)	Market share (%)
1.	Monsanto+Bayer	10,913 + 1,769 = 12,682	33.0
2.	DowDuPont	8,200	21.3
3.	Syngenta	2,826	7.3
4.	Limagrain (Vilmorin)	1,842	4.8
4 big sum		25,550	66.4
Global seed sales		38,429	100.0

2017 Sales of Leading Agrochemical Companies

Rank	Company	Sales (million $)	Market share (%)
1.	Syngenta + ChemChina	9,244 + 3,523 = 12,767	23.5
2.	Bayer Crop Science + Monsanto	8,713 + 3,727= 12,440	23.0
3.	BASF	6,704	12.3
4.	Dow + DuPont*	6,100	11.2
4 big sum		38,011	70.0
Global agrochemical sales		54,219	100.0

Source: Yücel D., 2021

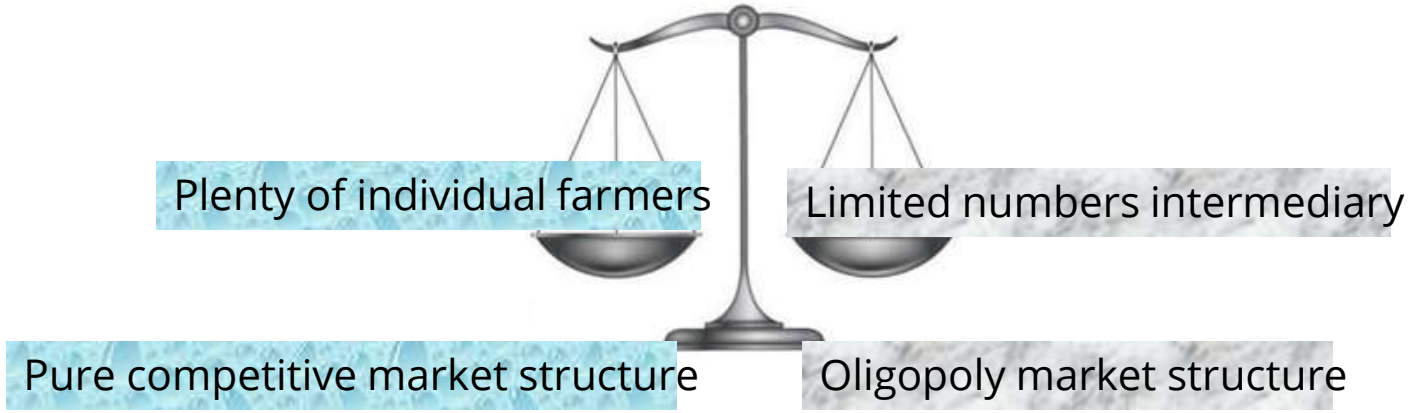
3. Stakeholders of Actions on Agriculture (Suply Chain)

Marketing Channels of agricultural products

Agriculture

AGRICULTURE

1. In wholesale markets;
which part has more bargaining power?



2. How can we increase the bargaining power of farmers in wholesale markets?

3. Stakeholders of Actions on Agriculture (Suply Chain)

Marketing Channels of agricultural products

Agriculture

AGRICULTURE

Farmer-Producer Organizations

Farmers' and producers' organizations are important institutions that deliver services to their members, facilitate their access to markets, and empower small farmers to engage in policy dialogue. They have a key role to play in ensuring inclusive and sustainable rural transformation at local, national and international levels (https://www.ifad.org/en/producer-organizations).

Many farmer work on relatively small family farms (95.2 % in the EU) which operate independently of each other. By contrast there is a far higher concentration amongst both processors and retailers. This asymmetry of bargaining power makes it difficult for farmers to defend their interests when negotiating with other actors in the supply chain.

To strengthen farmers' collective bargaining power, the EU supports farmers who wish to work together in producer organizations.

3. Stakeholders of Actions on Agriculture (Suply Chain)

Marketing Channels of agricultural products

Agriculture

AGRICULTURE

Farmer-Producer Organizations Types

1. **Economic organizations (Producer organizations, Cooperatives)**
2. **Vocational organizations**
3. **Social organizations**

1. Economic organizations (Producer organizations, Cooperatives)

Producer organizations strengthen the collective bargaining power of farmers by:

- concentrating supply
- improving marketing
- providing technical and logistical assistance to their members
- helping with quality management
- transferring knowledge.

POs can take different legal forms in the EU, including agricultural cooperatives.

3. Stakeholders of Actions on Agriculture (Suply Chain)

Marketing Channels of agricultural products

Agriculture

AGRICULTURE

Farmer-Producer Organizations Types

1. Economic organizations (Producer organizations, Cooperatives)

There are around 3,638 recognised POs in the EU (as of 2017). They mainly operate in three sectors:

Distribution of recognized POs between sub sectors

Category	Share (%)
Fruit and vegetables	52.00
Others	39.00
Milk and dairy products	9.00

Number of recognized POs by EU country

No	Category	N. of POs	No	Category	N. of POs	No	Category	N. of POs
1	FR	724	11	BE	21	21	LV	4
2	DE	692	12	RO	19	22	DK	2
3	IT	583	13	BG	17	23	IE	2
4	ES	579	14	NL	14	24	MT	1
5	EL	466	15	HR	10	25	EE	0
6	PL	239	16	CY	9	26	LT	0
7	PT	119	17	SE	5	27	LU	0
8	HU	60	18	SI	5			
9	CZ	32	19	SK	5			
10	AT	26	20	FI	4			

Formation is possible;

- Multi-national producer organizations
- Interbranch organizations

Farmer-Producer Organizations Types

2. Vocational organizations

The chambers of agriculture, professional association of the farmers are in public qualification like other nongovernmental organizations.

Chambers of Agriculture mostly act to increase the technological knowledge of the farmers and to form public opinion in order to protect the interests of the farmers.

Functions of Farmers' Associations

The basic mission of farmers' associations is to represent farmers, in order to ensure their participation in the formulation and implementation of policies and agricultural development actions. The accomplishment of this mission is based on three principal functions:

- consultation
- information and training of farmers
- support for professional organization of farmers

Although recognized by law as the official interlocutors of the government, farmers associations do not have a monopoly of this function; other actors can carry out these functions. The role of farmers' associations in this case is to facilitate dialogue between all those who exercise these functions on behalf of farmers.

DPSİR Framework Agriculture & Forestry Development

Driving Forces	Trends	Pressures	State	Impacts
•**Urbanization**	•Unstructured urban growth along an urban-rural continuum (e.g., Highway: fragmentation of agricultural land)	•Growing demand and degradation on natural resources (land, water, ecosystem services)	•Land fragmentation Higher land costs (plain) and abandonment (Mountains / Hills) •Limited participation on decision making •Lack of common good	•Loss of local food identity and know-how •Public health •Creation of social disparities and vulnerabilities •Degradation of ecosystem services •Pressure over supply sustainability •Reducing agricultural employement
•**Tourism**	•Growing dependency on tourism	•Commoditization •(Economic, cultural, social) Transition from agriculture to tourism	•Seasonality (employment, use of resources) •High concentration of people flows and consumption •Generational and migration transition •Lack of food system strategy (biodiversity, agricultural, nutrition, etc.)	
•**Climate Change**	•Water scarcity •Rising average temperatures	•Climate Risks	•Water shortage •Changing crop pattern	
•**Global/Regional Economic Development**	•Economies of scale •Pollution from inland to coast and sea	•Concentration of power •Water and soil pollution	•Food identity oriented to export/globalization •Fragile ecosystems	
•**Regional Crisis**	•Social, economic, energetic, food security uncertainty •Legal and illegal migration	•High input costs •High prices	•Lower income of farmers •Lower registered farm employment	
S P E C T R U M O F R E S P O N S E S				
→**Resilience** →**Reterritorializa-tion** →**Democracy-Participation - Inclusion**	→Multilevel cooperation -Horizontal-Vertical -Intersectoral -transdisciplinary *Green Deal *CAP, COP *PNRR *MUFPP *One-Health	→Building awareness and evidence-based decision making *Landscape Observatories *Living Labs *Participatory Action Research *Grounded Research *Seeking national and international funding	→Integrated and Inclusive Food System Strategies -Integrating Food in the (urban) political agenda *Circular economy policy of Emiglia-Romagna *Integrated Landscape structure of the region Diversification of integrated actions for multilaral development	→CILS Social Food →Popular kitchens →Food hubs

4. THE CAP – Common Agricultural Policy

AGRICULTURE

- ✓ CAP and the EU
- ✓ Reforming CAP
- ✓ Funding CAP
- ✓ CAP in the future
- ✓ CAP and the Green Deal

4.1 CAP and the EU

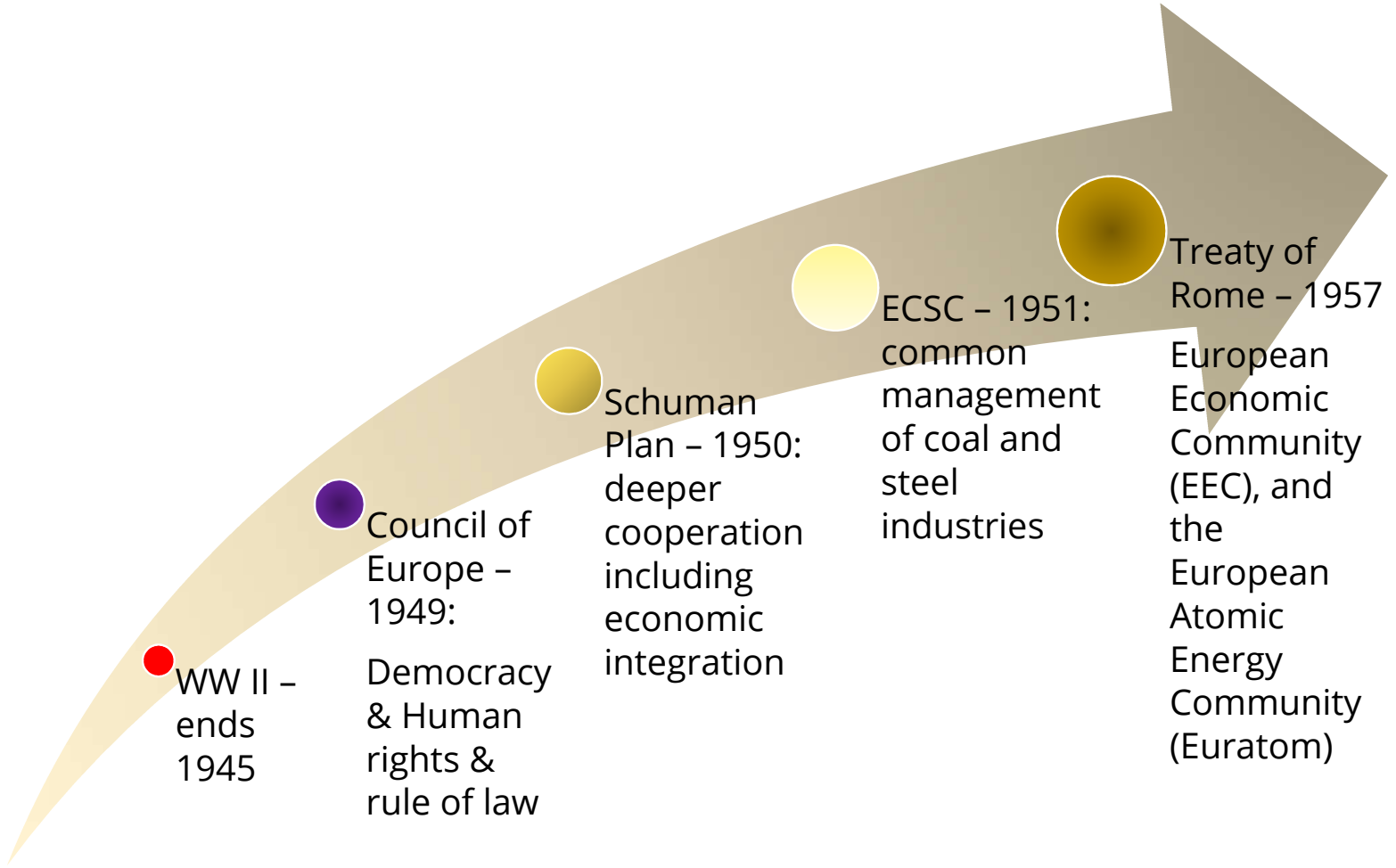
Where to begin? From EC to EU 27

AGRICULTURE

4.1. CAP and the EU

Agriculture

AGRICULTURE



4.1. CAP and the EU

Agriculture

AGRICULTURE

- Treaty of Rome – 1957
- EC – 6: Belgium, France, Germany (West), Italy, Luxembourg, the Netherlands

4.1. CAP and the EU

With the consolidation – economic integration has been attributed more importance than ever.

NO WAR – NO HUNGER

- Low food production (war)
- Much lower income for farmers
- Need to provide easy access to food and raise productivity
- Non-harmonised national farming policies
- Need to assure competitive markets within the EU

4.1. CAP and the EU

Agriculture

AGRICULTURE

1962

- Community preference
- Single Market
- Financial Solidarity

→ AGRICULTURE

4.1. CAP and the EU

Agriculture

AGRICULTURE

OBJECTIVES THEN

- ✓ 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

4.2. Reforming CAP

AGRICULTURE

TIMELINE	CHALLENGE
1970	**The Mansholt plan** – (first reform) **Modernisation** • optimise the area of land under cultivation • merge farms to create larger units
1984	**Supply management, aligned production with market needs** • Supply exceeded demand • Quota imposition (milk quotas) – reduce production for sustainability • Tight pricing policy • Leaving lands unattended

4.2. Reforming CAP

Agriculture

AGRICULTURE

MARKET SUPPORT

PRODUCER SUPPORT

TIMELINE	CHALLENGE
1992	**The MacSharry reforms** • **Direct income supports** to farmers • Environmental protection • Food quality improvement • **WTO compatibility** • Rising competitiveness due to declining prices • Cost of supports CONSUMERS → PRODUCERS

4.2. Reforming CAP

Agriculture

AGRICULTURE

TIMELINE	CHALLENGE
1999	• CAP – still constituted **50 % of the EC budget**. • Yet fewer job creation potential comparing specifically with services and others. **AGENDA 2000** Improvement of competitiveness to assure Rural development – (income and suprastructure) **SOCIAL COHESION**

4.2. Reforming CAP

Agriculture

AGRICULTURE

TIMELINE	CHALLENGE
2003	➢ Supports – **DECOUPLED** to prevent excess supplies ➢ Rising **single payments (~ 10%)** to promote organic farming) ➢ Modulations for compatibility with the WTO (safeguard for large farmers) ➢ **€ 1,2 million for rural development** ➢ Renovated farmer consultancy systems – more technical – direct reach ➢ **Cross cutting issues** (environment/food/animal welfare/health/social security) ➢ **Max € 10.000 per farmer** / food quality and animal welfare – guarantee payments.

4.2. Reforming CAP

Agriculture

AGRICULTURE

TIMELINE	CHALLENGE
2013	**TREATY OF LISBON (Council co-legislation with the Parliament)** ❖ **Green payments** ❖ Agricultural sustainability ❖ **Equal distribution** of supports – from large to small farms via income supports) ❖ Incentives for **young people** to join and remain in agriculture

MORE FUNDING TO RURAL DEVELOPMENT

4.2. Reforming CAP

Agriculture

AGRICULTURE

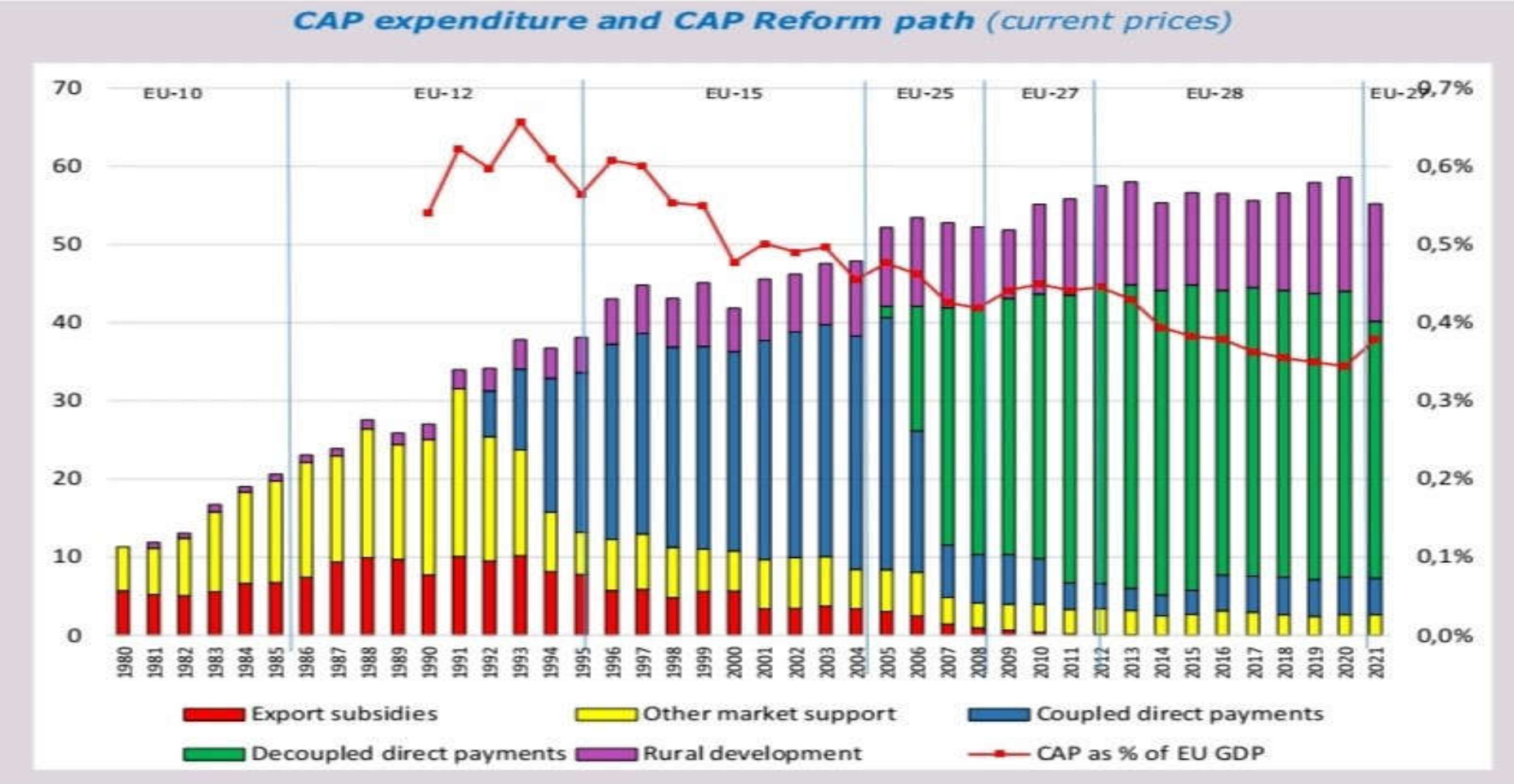
TIMELINE	CHALLENGE
2021	○ **Green Europe – Green World** ○ **Autonomous needs** (production & consumption) ○ **Joint strategies** – in line with the EU objectives ○ Applicable policies
(post-2020)	○ Funding became conditional on compliance with **EU environmental and climate laws** ○ Rewards for greener practices via direct payments – eco-schemes. ○ From large to small farms ○ Introducing and advocating **'Workers' Rights**)

4.3. FUNDING CAP

Agriculture

AGRICULTURE

FUNDING CAP (1980:2021)

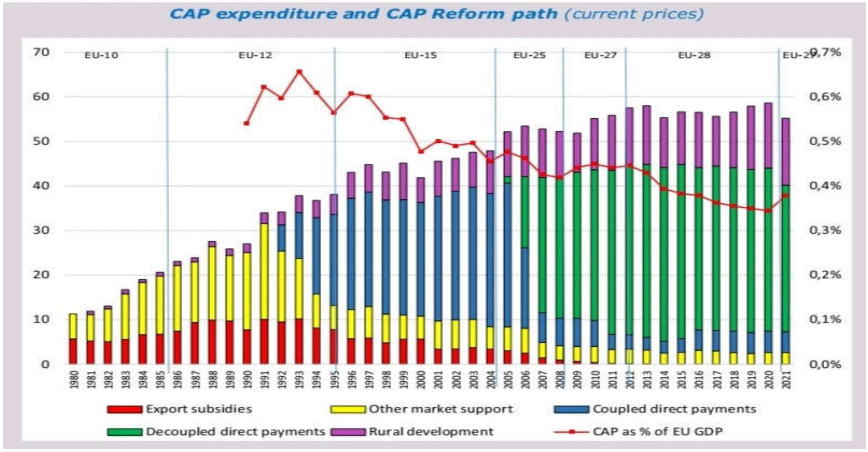


4.3. FUNDING CAP

Agriculture

AGRICULTURE

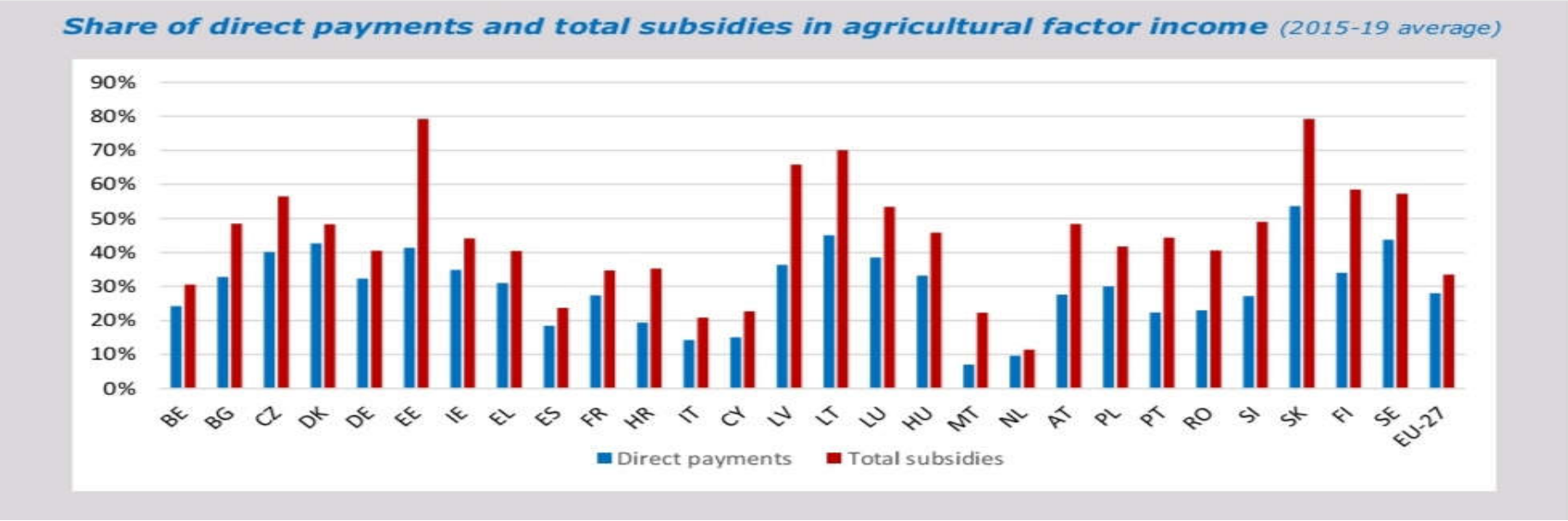
FUNDING CAP (1980:2021)



- Share in the budget declines since mid of **1990s**.
- It remained above **35 % even after 2010s.**
- **Rural development funding** rises steadily.
- Greening measures gained importance since **2013 reform**.
- **Export subsidies** removed.
- Coupled payments replaced with **decoupled payments**.
- Market interventions minimised.

FUNDING CAP (2015-2019)

AGRICULTURE



- Public dependence of agricultural systems is visible.
- Average share of **direct payments** = **28 %**; more than **40 %** in geographically land-lock countries
- **Total public support** average is **33 %** of total agricultural income

Agriculture

AGRICULTURE

FUNDING CAP (2021:2027)

European Agricultural Guarantee Fund (EAGF)

- € 291 billion
- € 270 billion – **Direct Income Support**
- Remaining (~21) – **Market Supports**

European Agricultural Fund for Rural Development (EAFRD)

- € 95 billion
- € 8,1 billion – post Covid-19 (**Next Generation Recovery**)

AGRICULTURE

FUNDING CAP (2021:2027)

✓**EU Budget** (as of December 2020):
€ 1,21 trillion
+
€ 808 billion for recovery funds

✓**CAP** without recovery allocation – **€ 378,40 billion ~ € 38 billion per annum**

31 %

4.4. CAP IN THE FUTURE

Agriculture

AGRICULTURE

- ✓ CAP supports **7 million beneficiaries** across the EU
- ✓ Distributes **1/3** of the total EC Budget
- ✓ Provides food to **447 million Europeans** under quality monitoring
- ✓ Contributes to **Climate action** under renovated measures

FUNDING CAP (2021:2027)

- ✓When number of beneficiaries kept fixed as 7 million (assuming all farmers)
- ✓**€ 5.420 per year**

- ✓When average farm size was kept fixed as 17,4 ha
- ✓**€ 312 per ha**

4.4. CAP IN THE FUTURE

NEW CAP (2023:2027)

AGRICULTURE

4.4. CAP IN THE FUTURE

Agriculture

AGRICULTURE

NEW CAP (2023:2027)

December 2021

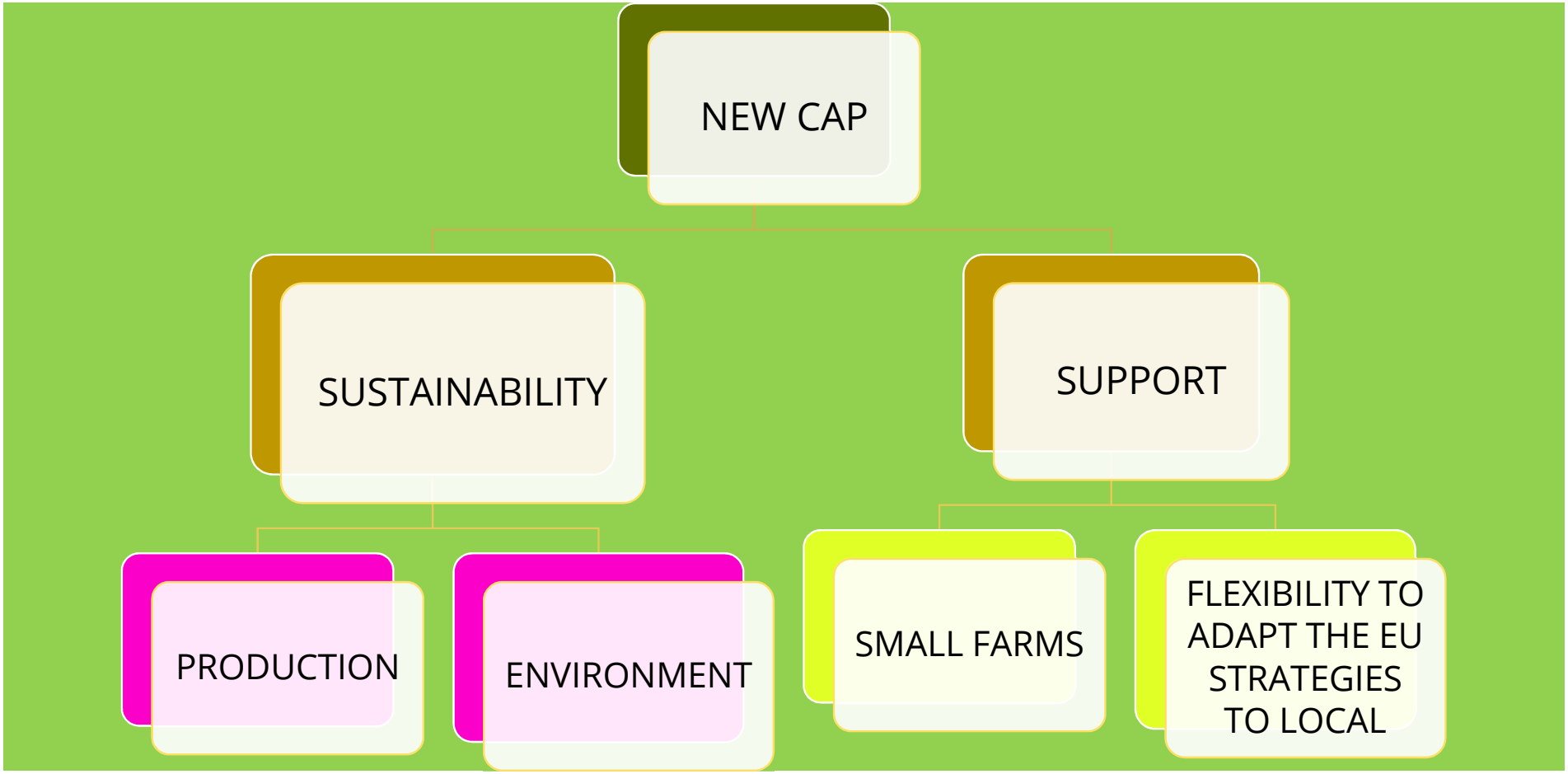
- ✓ Fairer, greener and more performance-based CAP.
- ✓ Application of clean/safe **circular economy** approach
- ✓ **European Green Deal**
- ✓ **Farm to Fork Strategy**

4.4. CAP IN THE FUTURE

Agriculture

NEW CAP (2023:2027)

AGRICULTURE

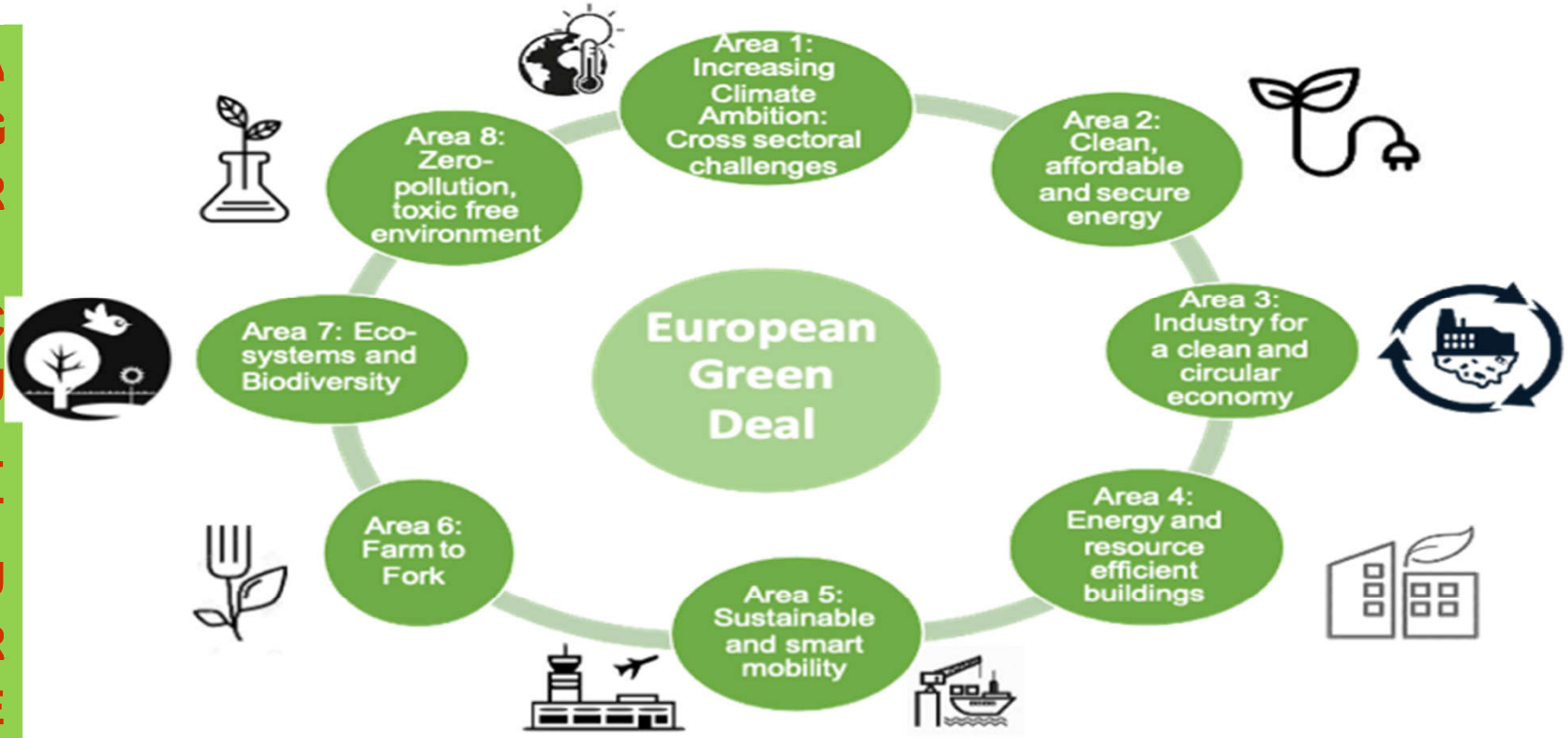


4.5. CAP AND THE GREEN DEAL

Agriculture

AGRICULTURE

GREEN DEAL



Area 9: Strengthening our knowledge in support of the European Green Deal

Area 10: Empowering citizens for the transition towards a climate neutral, sustainable Europe

5.5. CAP AND THE GREEN DEAL

Agriculture

GREEN DEAL

AGRICULTURE

- 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**

5.5. CAP AND THE GREEN DEAL

Agriculture

AGRICULTURE

GREEN DEAL

- **Directs Income** Supports – conditional to biodiversity applications in **3 %** of arable lands
- **25 %** of total funding and **35 %** of rural development funds to environment friendly eco-schemes measures

Via:

- Sustainable production schemes with **minimum input use**
- **Natural production** as possible for regeneration
- **Monitoring food** industries
- **Horizontal and vertical integration** for efficiency – Convergence across and within countries.
- Sustainable **consultancy** services
- Gender and age balances
- Social conditionality – labour acts and and standards

5.5. CAP AND THE GREEN DEAL

Agriculture

AGRICULTURE

EFUA European Forum on Urban Agriculture

- URBAN FARMING
- URBAN GARDENING

Urban farms/farmers:

- Mostly ineligible for funds including **Direct Income Supports** – 1st pillar

Why?

- Farmer should have at least **1 hectare** of farm land (0.3 ha in Hungary, Portugal, Romania, Slovenia, Cyprus and 0.1 ha in Malta)
- Supports to varied urban farms would not contribute general objectives of the CAP – relevant to the market supply and regulations

4.5. CAP AND THE GREEN DEAL

URBAN FARMs/PARKs

AGRICULTURE

OWNED BY NGOs – INFORMAL GROUPs

- **COMMUNITY PARK** – urban/peri-urban & limited production for own consumption
- **DIY GARDEN/FARM** – focus on more production than leisure & efficiency based on individual efforts
- **COMMUNITY GARDEN** – small gardens & teaching to practice diverse farming
- **SOCIAL FARM** – urban agriculture + social/health care for disadvantaged groups

COMMERCIAL

- **ZERO ACREAGE FARMS** – small farmland in the urban – vegetative production for direct or consumption or sales
- **URBAN FARM** – Farmer/farmer family owns and allows consumers to get involved, leisure included

4.5. CAP AND THE GREEN DEAL

URBAN FARMS

- Excluded from **Rural Development Funds** – 2nd pillar (unless in the peri-urban / towns)

Eligibility for **rural development** if aims to:

- Improve competitiveness of the farming and forestry sectors
- Enhance the **environment and the countryside**
- Improve **the quality of life** in rural areas.

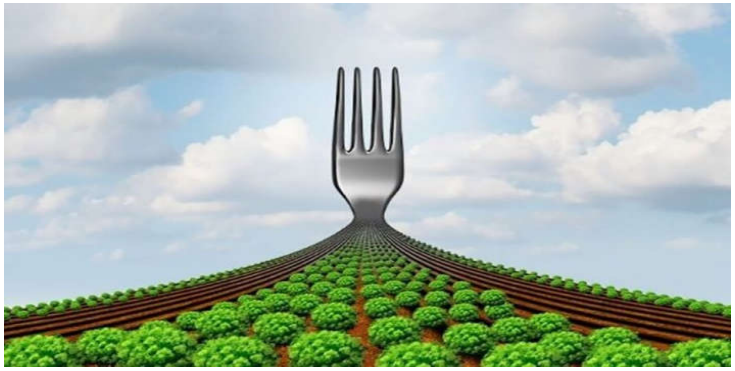
Enrichment of environmental protection and landscape development acts can become in line with rural development funding under proper planning

4.5. CAP AND THE GREEN DEAL

GREEN DEAL

AGRICULTURE

- 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.

4.5. CAP AND THE GREEN DEAL

Agriculture

FARM TO FORK STRATEGY – F2FS

AGRICULTURE

- ✓ 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 Service

Agri-environment-climate measures and investments

4.5. CAP AND THE GREEN DEAL

Agriculture

AGRICULTURE

FARM TO FORK STRATEGY – F2FS

2030 Targets for sustainable food production

PESTICIDES	NUTRIENT LOSSES	ANTIMICROBIALS	ORGANIC FARMING
50%	50%	50%	25%
Reduce the overall use and risk of chemical and hazardous pesticides	Reduce nutrient losses by 50% whilst retaining soil fertility, resulting in 20% less fertilisers	Reduce sales of antimicrobials for farmed animals and aquaculture	Increase the percentage of organically farmed land in the EU

#EUFarm2Fork #EUGreenDeal

European Commission

4.5. CAP AND THE GREEN DEAL

Agriculture

FUNDING GREEN DEAL – € 1 trillion for 10 years

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EC Budget

€ 503 billion

InvestEU – EIB & Nat. Banks

€ 279 billion

Carbon Trade

€ 25 billion

for workers and citizens

€ 100 billion

Private and Public Investments

€600 billion in sum

THANK YOU

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