5 THE PRIMARY SECTOR. AGRARIAN SPACES

Reading and listening

Ester Boserup

My name is Ester Boserup. I was born in Copenhagen in 1910 and I am an economist and a writer. I have dedicated some of my work to the analysis of agricultural development and its relationship with the economy and productivity.

In 1947 I was living in Geneva, where I held a position in the research department of the United Nations Organisation. My work there focused on the study of international trade, particularly its relationship with agriculture. Later, in some of my publications like *Population and Technological Change* or *The Conditions of Agricultural Development*, I analysed, among other things, the use of different cultivation systems and reflected on the effect of population growth on agricultural transformations.

In the agrarian economy we can differentiate between a subsistence and market economy. In the first one, growing products is aimed at fulfilling the population's need for food, whereas in the second one, the aim is to sell products.

For a better understanding of the primary sector and agrarian spaces, you will learn about:

- Agrarian spaces and activities. Agrarian landscape and elements
- Agriculture, diversity and types
- Livestock farming: types and models
- Forestry
- Fishing and uses of the sea

1 Read the text and answer the following questions

a) Which relationship did Ester analyze in some of her works? b) What was Ester's job while she was living in Geneva? c) What did her work focus on?

2 What two models can be differentiated when talking about agrarian economy? Which model is more common in developed areas? Which model is common in less economically developed areas? Why do you think that is?

LANGUAGE BANK

SPEAKING

3 Talk to a partner about the difference between traditional and modern farming techniques, both in agriculture and in livestock farming.

4 In the case of livestock farming,in pairs and then in groups of 4, debate the effects of intensive farming on animal wellbeing, human health and the environmental footprint.

WRITING

5 You are a member of an environmental organisation and believe that some farming practices have very negative effects on our planet. Write a leaflet to raise awareness among the younger population.

6 Write an article for a magazine in which you go over the risks and consequences of the transformation of agricultural spaces in relation to the needs of the population.

CHALLENGES THAT LEAVE THEIR MARK

LEARNING SEQUENCE

4 HOW ARE RAW MATERIALS OBTAINED TO MAKE THE PRODUCTS WE CONSUME? ARE SOME METHODS MORE SUSTAINABLE THAN OTHERS?

4.1 Taking advantage of the fact that agricultural activities are explained in the book, reflect on the global population's dedication to this activity. How important is the impact it has on the environment?

4.2 Research the main features of organic farming.

4.3 When thinking about the components of our product, it would not be surprising if some of the raw materials used to make it were of animal origin. This will help us address the main features of livestock agriculture.

4.4 The production of a significant number of products requires forest exploitation. What types of forest masses exist and what impact does forest exploitation have on our planet?

+ for guidelines, go to **anayaeducacion.es**

1

AGRARIAN SPACE

The **primary sector** comprises of economic activities devoted to obtaining resources directly from nature. Examples include agriculture, livestock farming, silviculture (forestry) and fishing.

1.1 Agrarian and rural spaces

Agrarian and rural space are not the same thing.

- **The term agrarian space** is only used to refer to land where agrarian activities are undertaken. Therefore, it includes cultivated land, pastures, meadows and woodland.
- **The term rural space** refers to all 'non-urban' areas. Therefore, it includes agrarian spaces and land where other activities are also carried out, such as leisure areas, shopping centres, housing estates and factories, etc.

1.2 Agrarian activities

The majority of activities in the primary sector are agrarian and include agriculture, livestock farming and silviculture.

- **Agriculture** is concerned with cultivating the land in order to obtain plants for food. It provides food for people (wheat and vegetables), feed for livestock (maize and alfalfa) and raw materials for industry (flax).
- **Livestock farming** is concerned with rearing animals for human use. This activity provides food (meat, milk and eggs), fertiliser, raw materials for industry (leather and wool) and in some cases, a form of labour force.
- **Silviculture** is concerned with the use of woodland. It provides food (nuts and wild mushrooms) and raw materials for various industries (the furniture and paper industries).

1.3 The agrarian population

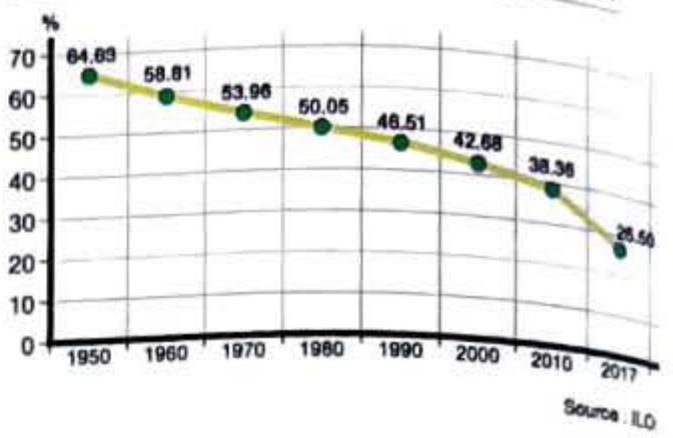
In 2013, agrarian activities provided work for 36.8% of the world's population. However, there are major contrasts between countries.

- In the most **underdeveloped countries,** more than 50% of the population is usually employed in this sector, which provides more than 10% of the nation's wealth.

  In some countries, above all those located in Sub-Saharan Africa, these activities are undertaken by more than 80% of the population and provide more than 50% of the nation's wealth.
- In contrast, in the **most developed countries,** agrarian activities play a minor role, as they only employ 10% of the population and represent very little of the nation's wealth. It generally accounts for less than 4% of the Gross Domestic Product (GDP).

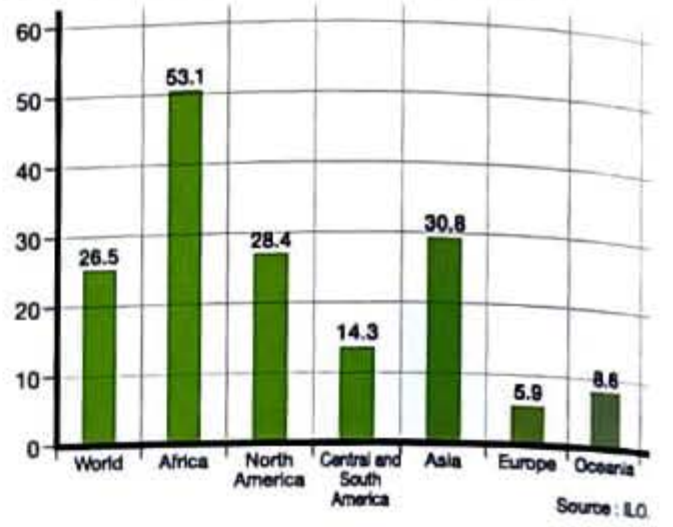
Farming population

Evolution of the farming population



Source : ILO

Global farming population, 2013



Source : ILO

Skills progress

Handling graphs

1 Find information on the relevant graph and complete the following tasks:

a) How has the global agrarian population evolved since 1950?

b) List the continents in ascending order of their agrarian populations. Which are above the global average? Which are below it?

Learning concepts

2 Clarify the differences between these concepts: *primary sector, agrarian space, agricultural space* and *rural space*. Which term is the broadest?

Go to statistical data ← SKILL

3

AGRARIAN ACTIVITY. PHYSICAL FACTORS

Agrarian activities are conditioned to a high degree by physical and natural factors, such as climate, terrain and the soil, amongst others.

2.1 Climate

All types of plants need a certain number of sunlight hours and can tolerate specific maximum and minimum temperatures, precipitation levels and winds. Therefore, agriculture is impossible in regions with temperatures below 0 °C or above 45 °C as well as in very arid regions or those with very cold or very hot winds.

Furthermore, different crops adapt better to different climatic conditions. Some require more humidity, for example, maize and rice; while others can support the cold better, for example, potatoes. Others require very high temperatures such as sugar cane and coffee.

2.2 Relief of the land

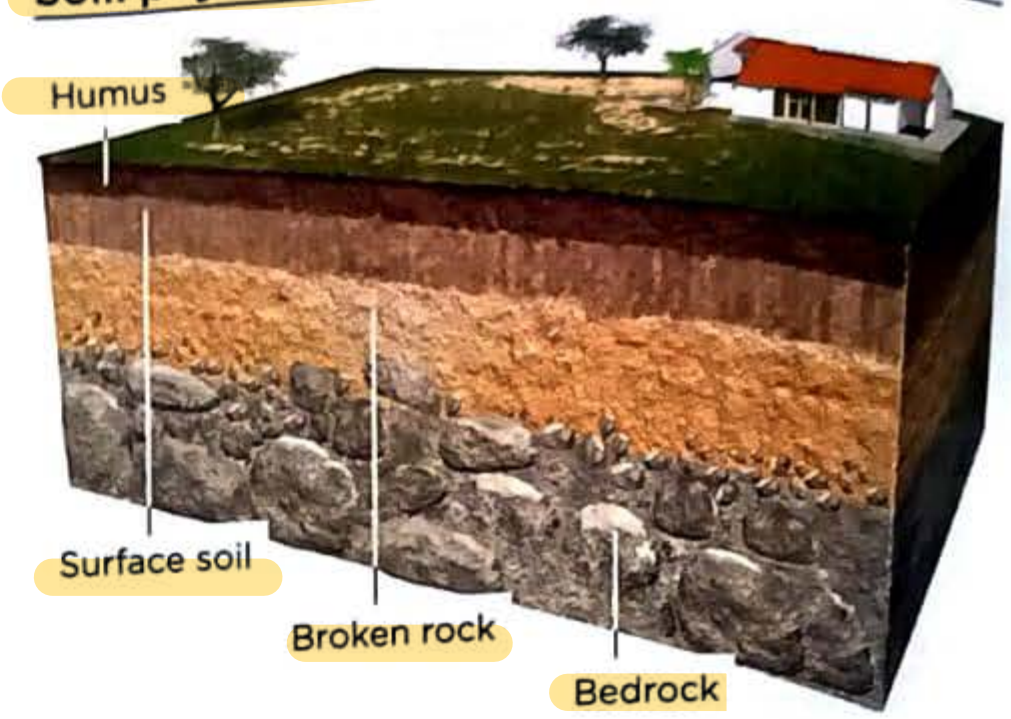
Farmers prefer to grow their crops on plains and in valleys. They avoid mountainous terrain, because the slopes lead to soil erosion, hinder work and the use of mechanical tools, and require the construction of hillside terraces, which are flat, horizontal sections built into the land. Furthermore, above a certain height, low temperatures prevent crops from growing.

In contrast, livestock farming and silviculture, along with certain crops, such as trees and shrubs, are better suited to mountainous terrain.

2.3 Soil and vegetation

- The **soil,** along with its physical and chemical characteristics, has important effects on crops, as the minerals it contains provide nutrients needed by plants.
- The most important characteristics are **depth,** as deep soils with well-developed layers are usually more fertile than shallow soils; **texture,** or particle size and composition, as these influence the soil's capacity to retain water; **porosity,** to be able to let air reach plants' roots; and **acidity** and **alkalinity,** since very acidic or alkaline soils are toxic for plants.
- **Vegetation** also partly conditions certain agrarian activities such as silviculture and livestock farming.

Soil: physical support for crops



Soil is the surface layer of the Earth's crust and its **structure** influences agrarian activity.

The **bedrock,** which constitutes the foundation of the soil, is broken down into smaller fragments of **broken rock** and **surface soil,** which provide plants with nutrients and minerals.

The top soil layer or **humus,** is formed by decomposed organic matter derived from dead plant and animal matter. This layer is essential for soil fertility, as it provides basic elements for plant nutrition such as nitrogen and phosphorus.

Skills progress

CLASSWORK 1,2

Organising information

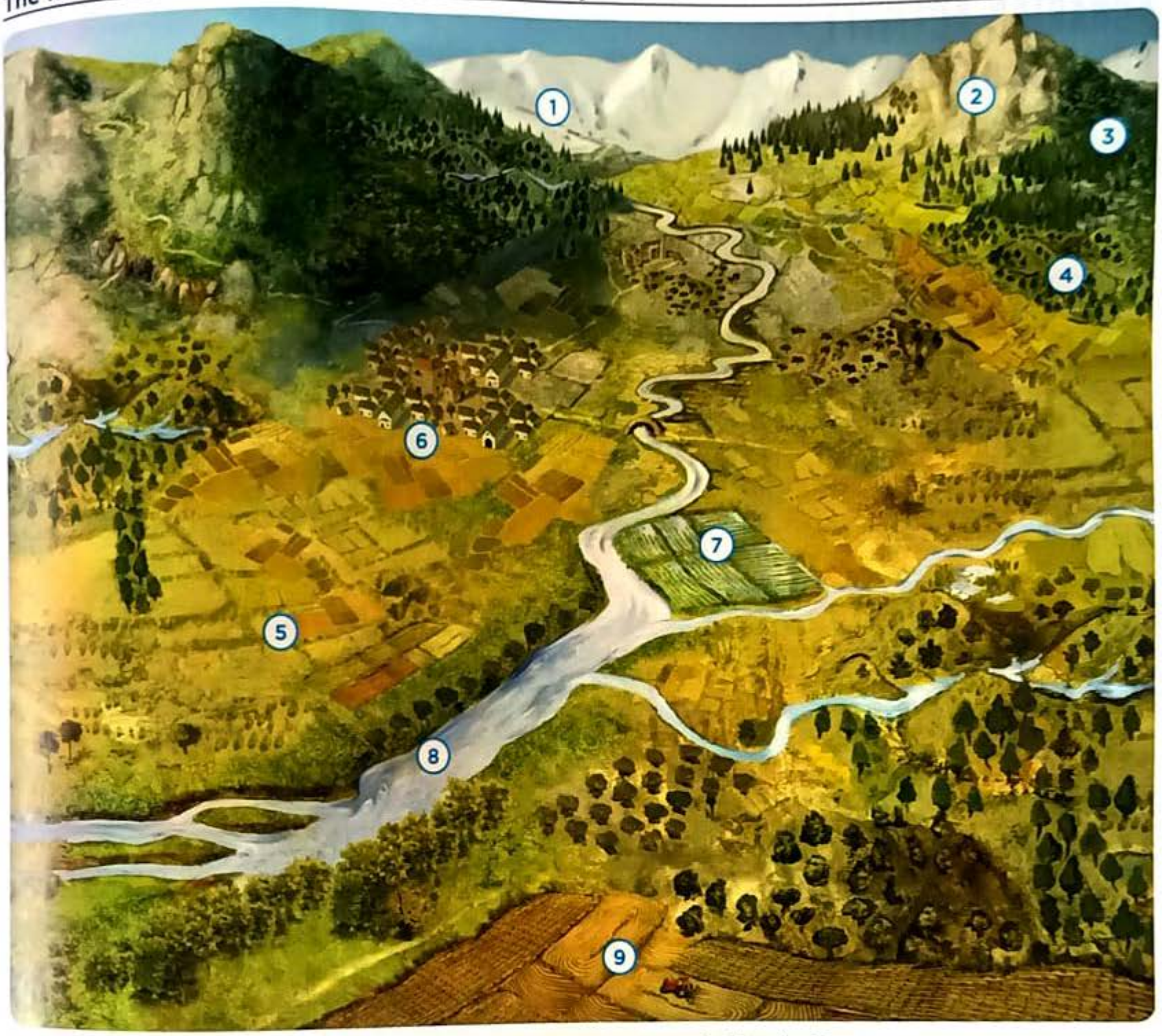
1 In a box, like the one below, compare the positive and negative influences of physical factors on agrarian activities.

Positive	Negative

Understanding the environmen

2 Indicate which of these statements are false and then correct them: a) Mountainous terrain favours growing crops. b) Each type of crop requires certain climatic conditions to be able to grow. c) Deep soils prevent crop growth. d) Soil is the surface layer of the Earth's crust. e) Mountainous terrain is not good for raising livestock.

The natural factors that condition agrarian activity

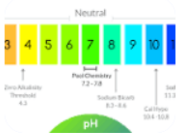


1. In the **mountains,** temperatures fall by 5 °C or 6 °C with every 1000 m of altitude, which has an impact on plants.
2. **Sunlit slopes** are the best for growing crops.
3. **Shady slopes** receive less sunlight and are more prone to frosts.
4. **Pastures** and **woodland** lend themselves to livestock farming and silviculture.
5. **Farmers prefer flat valley floors.**
6. Some crops, such as **wheat,** adapt well to a range of different climatic conditions, thus meaning they are grown across a wide geographical area.
7. **Rice** requires high temperatures and abundant water.
8. **Fresh water** improves agricultural output.
9. Flat land favours the **mechanisation of the countryside**.

Handling images

3 Study the illustration above, read the information it contains and answer the following questions: a) Pasture and woodland are well suited to which agrarian activities? b) What kind of agrarian activity is mainly carried out on flat valley floors? c) Link each item of information to one or more physical factors that affect agrarian activities.

Potencial de hidrogeno



pH, alkalinity, and acidity are interconnected properties of solutions, particularly in water chemistry. pH measures the concentration of hydrogen ions (H+) in a solution, indicating its acidity or alkalinity. A pH of 7 is neutral, while values below 7 are acidic and above 7 are alkaline or basic. Alkalinity, on the other hand, is the measure of a solution's ability to neutralize acids. It's essentially the buffer capacity of a solution against pH changes, primarily due to the presence of bicarbonate and carbonate.

3

AGRARIAN ACTIVITY. HUMAN FACTORS

Agrarian activity depends on human factors: population, technological development, economic and social organisation and agrarian policy.

3.1 Demographic density

Since ancient times, population increase has led to a rise in the amount of surface area of land dedicated to crops and pastures, which in turn results in **deforestation** or the reduction of natural vegetation.

High population densities lead to agrarian space being used to its maximum potential, which sometimes leads to **overexploitation** or excessive use. Low population densities can lead to the growing of some crops being abandoned, which leads to environmental decline in that area.

3.2 Technological development

The level of technological development available to a certain society influences the farming tools and techniques used.

- **Farming tools** vary greatly. In **traditional societies,** basic tools such as spades, hoes, sickles and ploughs are used. In contrast, in **advanced societies,** modern tools such as tractors, combine harvesters and milking machines are used.
- **Farming techniques** also vary. In **traditional societies,** either the soil is farmed until it is exhausted, a section of land is left fallow, or natural fertilisers are used so the soil recovers its nutrients. In **advanced societies,** chemical fertilisers are used, crops are irrigated with advanced systems, pesticides are used to protect crops against insects and infestations, crops are protected in greenhouses, and vegetable and livestock species are carefully selected, etc.

3.3 Economic and social organisation

- Different types of **agrarian economies** produce different ranges of products. **Subsistence economies** only produce enough to cover their food needs. They therefore cultivate various products and combine crop growing with livestock breeding. In contrast, **market economies** produce food in order to sell it, and tend to specialise in one crop or type of livestock.
- **Social organisation** has an impact on agrarian activity in terms of **property,** which can be private or collective and land **exploitation** or use. It can be **direct** if landowners or their employees work the land themselves, or **indirect** if the owner allows a tenant or partner to lease the land or by sharecropping.
- **Agrarian policies** implemented by governments also influence agrarian activities. The most common are agrarian reforms that aim to provide a more balanced distribution of property, and policies aimed at raising levels of modernisation and competitiveness.

Agrarian policies

Agrarian policies influence numerous aspects of agrarian activity. For example, in China, land is owned by state or agrarian collectives and the rural population is only granted the right to farm the land for renewable 30-year periods.

Another representative example, which you already know about, is the European Union's Common Agricultural Policy (CAP).

CLASSWORK
(1,2)

Skills progress

Developing knowledge

1 Link each of these terms to a human factor that influences agricultural activity: *stable, private property, market economy, tractor, agricultural subsidy.*

Learning concepts

2 Explain the difference between: *property* and *land use; private* and *collective property; direct and indirect land use; subsistence and market economy.*

Using sources of information

3 Find information about green revolutions and biotechnology. Write a summary and give a personal evaluation of these technical advances.

The human factors that condition agricultural activity

Population densities

Population densities

In areas with **high population densities,** agricultural space is used to the maximum; even the sides of mountains are farmed using terraces **(1)**.

In **depopulated areas,** the natural environment may begin to deteriorate, for example, if people begin to neglect terraces, this can lead to increased soil erosion **(2)**.

Technological level

Agricultural tools

Traditional societies use simple agricultural tools **(3)**, which means agrarian tasks require a large labour force and lots of hard work.

Advanced societies employ modern techniques **(4)** that require a smaller labour force and less work.

Species selection

The **green revolution,** developed in the 1960s, crossbred natural species of plants such as wheat **(5)**, in order to select the most productive species.

The **biotechnological revolution** of the 1990s led to the genetic manipulation of plants and animals, in order to produce genetically modified species **(6)**.

Economic and social organisation

Economy

Subsistence economies tend to produce more varied agricultural output **(7)**, in order to diversify the food supply. Farming is usually done on a small scale by landowners.

Market economies tend to specialise in certain crops or animals **(8)**. Farming is usually done on a large scale and managed by companies that employ workers.

Using images

4 Use the images to complete the following tasks:

a) Choose two images that show how the relief of terrain influences agricultural activity. For each picture, explain how this factor influences activity.

b) Select and give an explanation of two images that correspond to areas with a high population density.

c) Find three images that are representative of human factors in agricultural activity. Write an explanatory caption for each one.

4

THE AGRARIAN LANDSCAPE AND ITS ELEMENTS

4.1 The agrarian landscape

Agrarian activities transform the natural environment over time and give rise to agrarian landscapes.

These landscapes vary from one another. However, they are all composed of two elements: inhabited space and space farmed to obtain agrarian products.

4.2 Inhabited space

Space inhabited by the people who work or live in the countryside is different from both agrarian habitats and other types of landscapes populated by human settlement.

- **Settlement** is the way in which the agrarian population is distributed across the land. It can take three forms: dispersed, concentrated and interspersed. In a **dispersed** settlement, farmers' dwellings are separated from one another and surrounded by the land they farm. In a **concentrated** settlement, dwellings are grouped into a village or hamlet. Meanwhile, in **interspersed** settlements, some dwellings are grouped together, while others are isolated.
- **Habitat** includes dwellings and agricultural buildings, such as barns, stables and wine cellars, etc. These buildings are traditionally made from local materials. (graneros, establos o bodegas)

4.3 Farmland

The land dedicated to agrarian activities is organised into fields, which are the basic division of agrarian land. They are separated from one another by borders and distinguished from one another on the basis of size, shape, location and use.

- In terms of their **size,** fields can be small (less than 10 hectares), medium-sized (between 10 and 100 hectares) or large (more than 100 hectares).
- Their **shape** can be regular or irregular.
- With regard to their **location,** they can be open (if they are separated from one another by a furrow or boundary markers) or closed (if they are surrounded by fences, trees or walls). (surcos o vallas)
- Their **use** can be for agriculture, livestock farming or silviculture.

Agrarian settlements

Dispersed

In a dispersed settlement, such as this one on the Dingle Peninsula (Ireland), the houses are separated from one another and surrounded by pastures or farmland.

Concentrated

In a clustered settlement, such as Alquézar (Huelva), the houses have been built next to one another and form a rural village. The shape of these villages can be linear, when the houses are arranged alongside a river, path or road; or clustered, when the houses are located around a central point.

Interspersed

In an interspersed settlement, such the Baztán valley (Navarra), both concentrated and dispersed settlements are found in the same geographical space.

Skills progress

DO IT

Creating diagram

1 Create a mind map on the agrarian landscape and its different elements.

Building your own knowledge

2 Using images, explain the difference between the various types of agrarian population.

Agrarian dwellings

Traditional agrarian dwellings and buildings contribute to the rural habitat. Their materials are taken from the physical environment (branches, stone, wood and clay) and their distribution varies in accordance with the area's agrarian activity. In some cases, the different spaces needed are built under one roof, while in others, they are arranged independently around a patio.

Agrarian dwellings

Fields can be small, irregular and enclosed with hedges and trees (**1**); or large, regular and open (**2** and **3**).

Handling images

3 What kind of environmental features are indicated by the building materials and roofs of rural houses? Give arguments to support your answer.

4 Study the pictures in this unit and find examples of the following: a) dispersed and concentrated settlements; b) large-, medium- and small-sized fields; regular and irregular, open and closed fields; c) different examples of field use. Make a note of their page numbers.

1. **Climate Conditions**

- **Thatched Roofs or Sloped Roofs**
  Indicate high **rainfall** or **tropical climates**. Sloped or thatched roofs allow rainwater to run off easily, preventing water accumulation and leakage.
  Example: In tropical regions like Southeast Asia or parts of Africa, houses often have steeply sloped roofs made of palm leaves or grass.
- **Flat Roofs**
  Common in **arid** or **dry regions** with little rainfall. Flat roofs can be used as additional living space and don't need to shed much water.
  Example: Traditional homes in deserts (e.g., Middle East, Rajasthan in India) often have flat roofs.

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2. **Locally Available Materials**

- **Mud, Clay, or Adobe Bricks**
  Found in regions with **dry climates** and **abundant soil**. These materials keep houses cool in the day and warm at night, ideal for desert-like environments.
  Example: Southwestern United States and parts of North Africa.
- **Wood and Timber**
  Used in **forest-rich** or **temperate regions**. Wood provides good insulation and is readily available in such areas.
  Example: Rural houses in Scandinavia or Canada

3. **Natural Hazards**

- **Reinforced or Tiled Roofs**
  Found in areas prone to **strong winds** or **storms**, where heavy or secured roofs are needed to withstand natural forces.
  Example: Coastal regions vulnerable to cyclones.
- **Stilts or Raised Platforms**
  Suggest **flood-prone** or **wetland** areas. Houses are built on stilts to avoid water damage.
  Example: Rural homes in Bangladesh or the Amazon Basin.

Conclusion:

The materials and design of rural houses are practical responses to environmental conditions like **climate, natural resources, and hazards**. These features show how local communities adapt to their surroundings using available materials and traditional knowledge.

5

AGRICULTURE. DIVERSITY AND TYPES

Agriculture today is a very diverse activity, as it includes a great variety of crops (herbaceous plants, shrubs and trees), as well as methods for growing them.

5.1 Different cultivation methods

Cultivation methods are the procedures used by farmers to grow agrarian products. They are usually classified according to a number of criteria:

- **Crop varieties.** The term **monoculture** is used when fields are used to grow just one crop, while the term **polyculture is used** when they are used for various crops.
- **Water supply for plants. Dryland** crops only receive rainwater, while **irrigated** crops are provided with additional water from rivers, wells and springs. Irrigation requires farmers to invest major amounts of money on infrastructure, which explains why this is limited to crops with a high market value. This is especially true of arid regions.
- **Soil use.** Soil may be used for **continual cultivation** of the land, which does not involve leaving the land fallow for a certain period of time, or **crop rotation,** which consists of alternating the crops grown in fields.
- **Degree of land use.** Agriculture can be **intensive,** if the land is used to its full potential, or in the opposite case, **extensive.** In either case, the yield or output according to the surface area may be high or low, as it depends on the capital invested and the technology used.

5.2 Types of agriculture

Two types of agriculture can be identified on the basis of the cultivation systems used and the intended use of the agrarian products:

- **Traditional agriculture.** This type is used when most of the produce is intended to supply the farmer and their family. It is also known as subsistence farming.
- **Modern agriculture.** This type refers to the growing of crops for sale in national or international markets, and is also known as commercial agriculture. There are currently two different types of modern agriculture:
  - **Industrial agriculture.** This has become the most widespread since the 1940s and its aim is the mass-production of agricultural products. To achieve this, chemical products, inorganic fertilisers and machinery are used, as well as biotechnological advances, such as genetically modified seeds or transgenic seeds.
  - **Organic farming.** This has spread since the 1990s and aims to grow healthy products without harming the environment. Therefore, organic fertilisers and the rotation of local crops are used. It is also known as bio-extensive farming.

Crops

Herbaceous plants

Herbaceous crops, such as cereals and some leafy greens, have a stalk, which is similar in thickness to grass. The majority are annual and need to be replanted after each harvest.

Hojas verdes

Woody crops

Shrubs

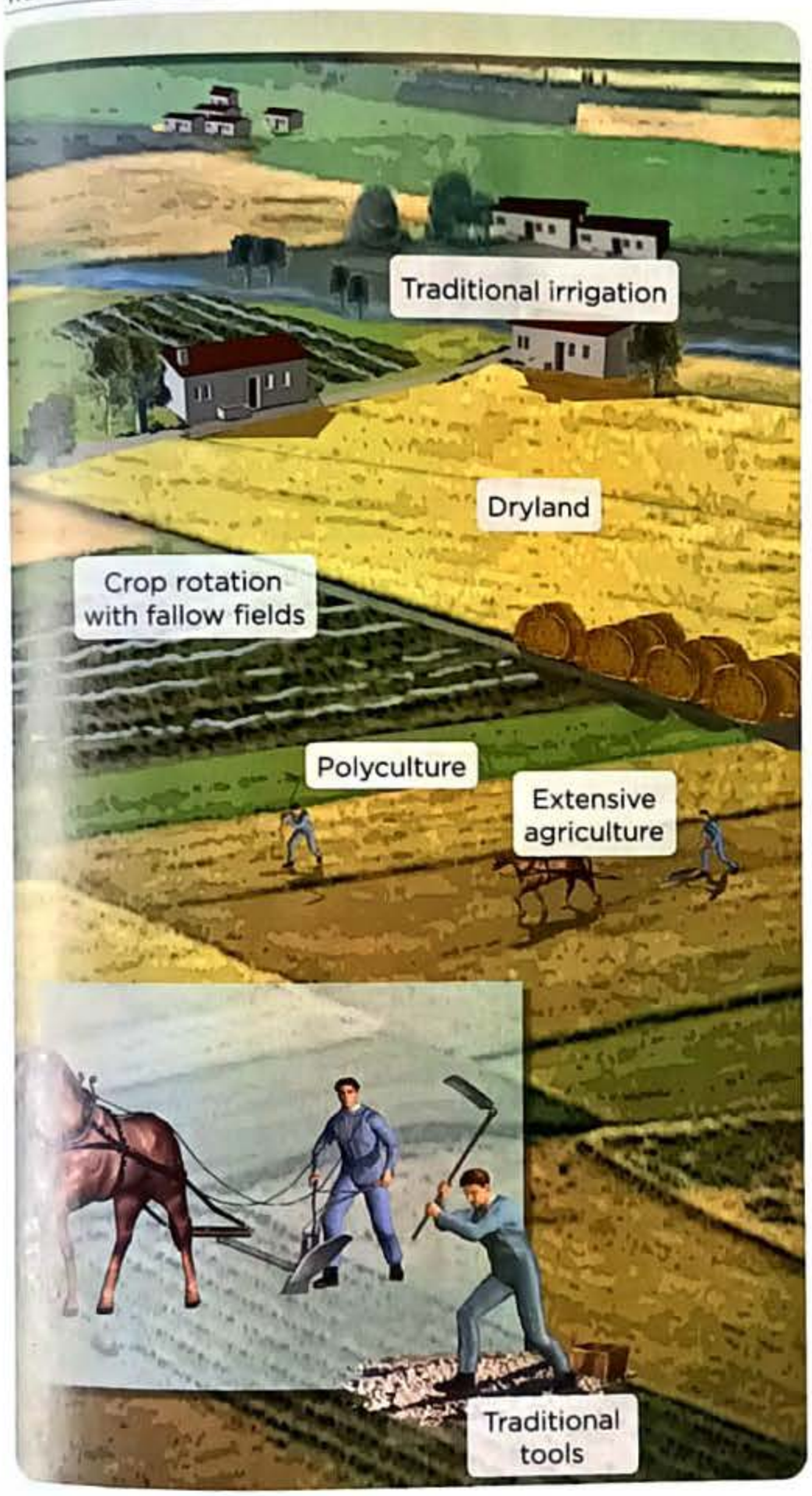
Trees

The stems of **treelike** crops are wood-like in consistency. They can be **shrubs** such as the grapevine, or **trees** such as olive and fruit trees.

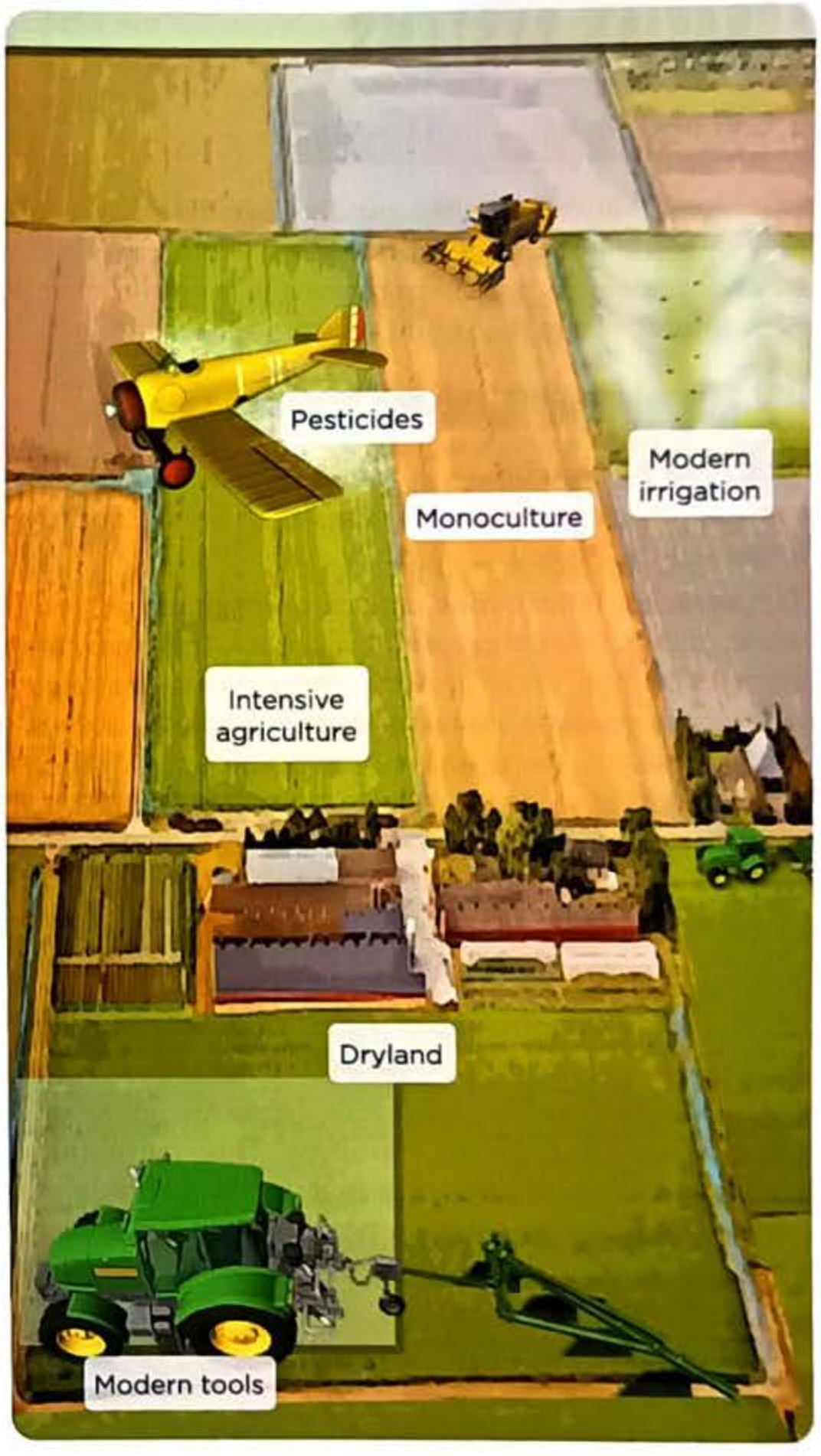
They are perennial crops, because they live a long time before they need to be replanted.

The transformation of the agrarian landscape

Traditional agriculture



Evolved agriculture



Skills progress

Finding relevant information

1 Find images that illustrate the following types of agriculture: monoculture and polyculture, dryland and irrigated land, extensive and intensive.

Learning about environmental problems

2 Identify whether the following statements are true or false and explain why: a) Intensive agriculture always produces a high yield. b) Extensive agriculture always produces a low yield. c) Dryland agriculture is typical of areas with low precipitation levels.

Participating in the learning process

3 Many businesses focused on sustainable development goals depend on organic farming. Different professionals from fields such as agriculture, chemistry, and technology contribute to its development. Investigate ways you could train academically to work on an organic farm.

Handling images

4 Comment on the agrarian transformation illustrated in the image above.

6

AGRICULTURE. TRADITIONAL AGRARIAN SYSTEMS

6.1 Characteristics and location

Traditional agriculture uses outdated technology and requires a great deal of work and a large labour force. Production is low and is for self-consumption. It is typical of regions with low levels of development in Africa, South East Asia and Latin America.

6.2 Migratory or slash-and-burn agriculture

ROZA Y QUEMA

This type of agriculture is found in countries with an equatorial and humid tropical climate in Africa, Central and South America and, to a lesser extent, Asia.

The **agrarian landscapes** consist of irregular shaped fields created in woodland by 'slashing' or cutting back the trees, then burning them along with the undergrowth. These fields are used for polyculture farming, to produce cereals and other products such as sorghum, millet, maize, cassava, yams and sweet potatoes, etc. The **soil** is cultivated continuously and is exhausted* in two or three years. The farmer then repeats the process on another site.

sorgo, mijo, maíz, yuca, ñame y batata, etc

6.3 Sedentary dryland agriculture

yams: batatas
cassava: mandioca

This type of agriculture is found in the tropical areas of the African savannah and areas in South America and Asia.

The **agrarian landscape** consists of vegetable plots and fields. The vegetable plots are located near the farmer's house and are fertilised with refuse and animal fertiliser. This facilitates the continuous cultivation of vegetables, maize and beans. The land surrounding the hamlets is divided into three types of field, which are used to rotate a main crop (maize or millet) and a complementary crop (groundnuts or tubers), or they are left fallow and fertilised with livestock manure. Using this system, the **soil** is not exhausted and enables the population to establish a permanent settlement.

(CACAHUETE O TUBÉRCULOS)

6.4 Irrigated monsoon agriculture

This type of agriculture can be found in the tropical monsoon climate of South and South East Asia, in countries such as China, Vietnam, Cambodia and the Philippines.

parcelas de hortalizas

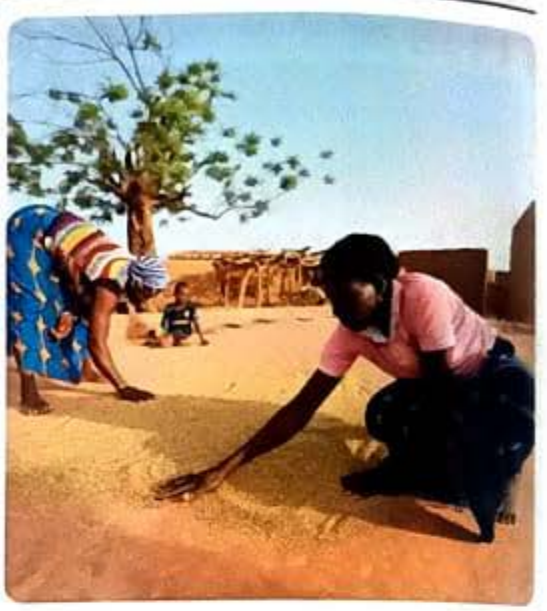
The typical **agrarian landscape** is paddy fields located in alluvial plains and river deltas. Rice is grown in small fields, separated by ditches so the fields can be flooded. The growing methods are highly labour intensive. First, the rice is planted in a fertilised nursery. The other fields are ploughed, fertilised and flooded. When the plants have grown, they are transferred to the paddy field. When the crop begins to ripen, the water is removed, and the rice is harvested, threshed* and collected. This system allows a continuous production with two or three yearly crops

Paddy fields (arrozales)

nursery: semillero

ripen: madurar

Traditional agriculture



Traditional agriculture is widespread and is practised by more than 1.5 billion farmers in Africa, South East Asia and Latin America.

The different models are adaptations to different environmental conditions.

Focus on English

exhausted: completely used up.

thresh: to remove the seeds of crop plants using either a machine or a hand tool.

TRILLA

HOMEWORK

Skills progress

Creating tables

1 Create a table comparing the migratory, sedentary dryland and irrigated forms of agriculture. Include: location, organisation of the agrarian landscape, cultivation methods and consequences.

Evaluating resource allocation

Logic wheel

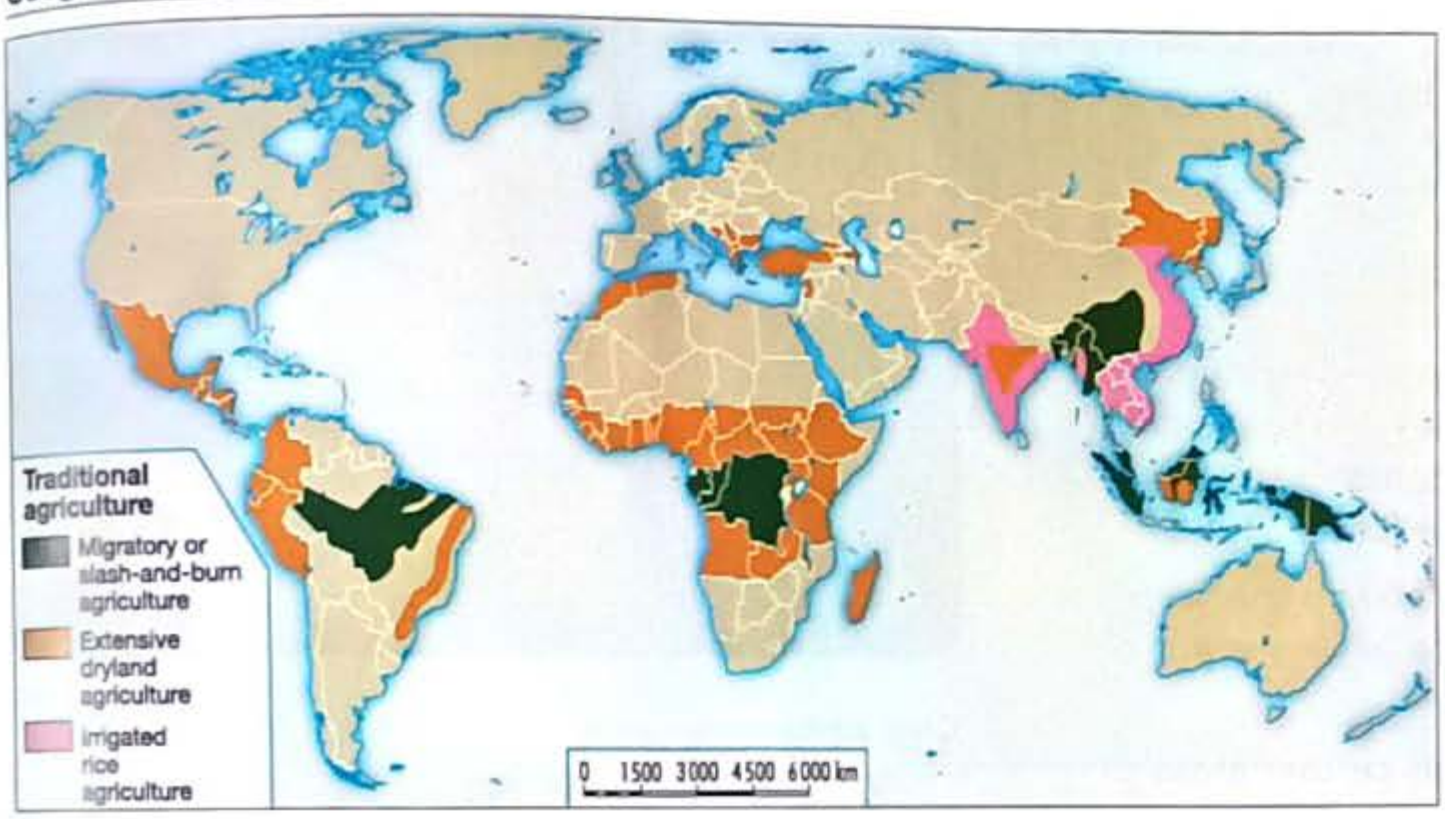
2 Which of these traditional forms of agriculture do you think could feed the largest population? Why?

Acquiring relevant knowledge

3 Create a diagram showing the rice farming process.

Traditional agrarian countries

Geographical location



Using maps

4 Using the map, answer these questions:

a) Traditional agriculture is located in which of the Earth's climate zones?

b) Across which continent is it most widespread?

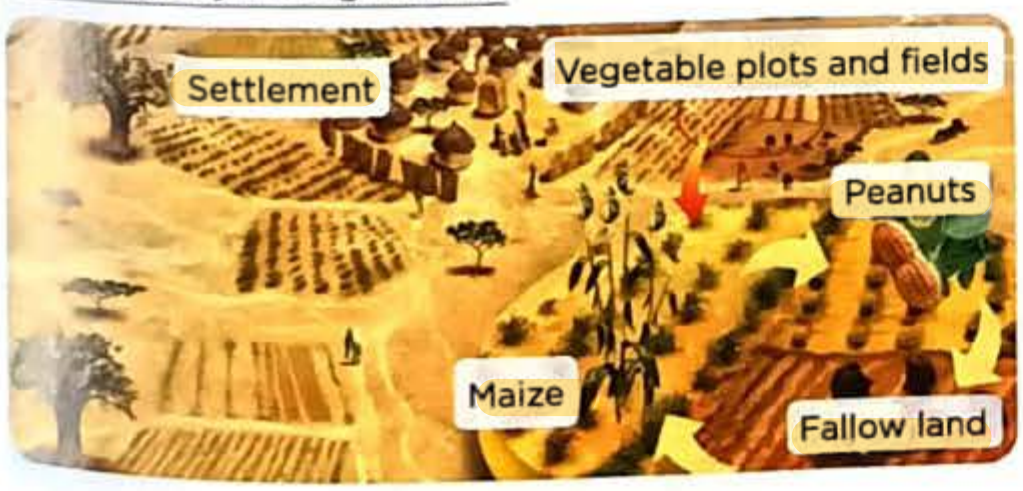
Handling images

5 Describe the task being carried out in each picture. Why are they illustrative of traditional agriculture?

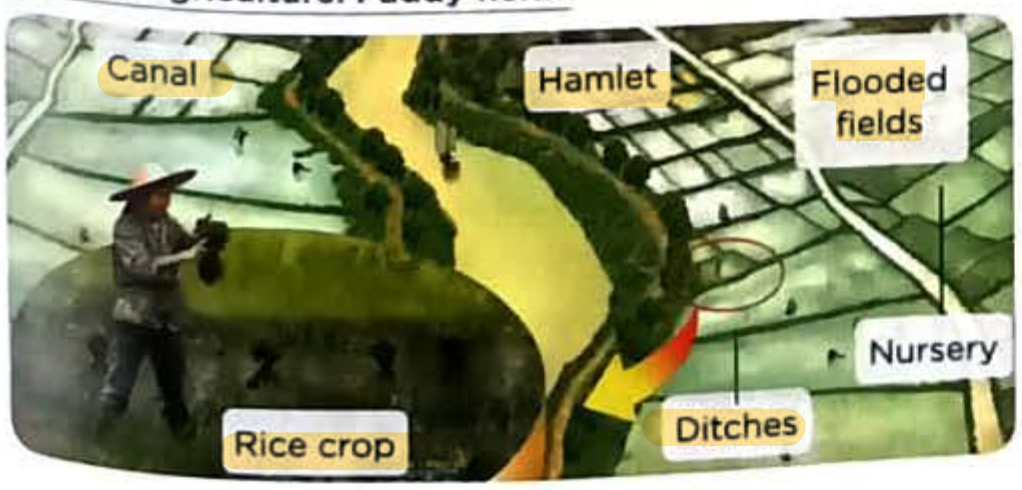
Types of traditional agriculture

Migratory or slash-and-burn

Sedentary dryland agriculture



Irrigated agriculture. Paddy fields



7

AGRICULTURE. ADVANCED AGRARIAN SYSTEMS

7.1 Industrial agriculture

Characteristics and location

Industrial agriculture uses technological advancements (such as manure, fertilisers, herbicides and pesticides), mechanisation and scientific advancements to achieve high yields with the minimum labour force.

It is used for mass-agrarian production and specialises in the crops best suited to the local environment or that can be sold most profitably.

This type of agriculture is typical in certain areas of new countries, along some tropical coasts, and in Europe. The latter was studied last year.

Agriculture in new countries

This agriculture is located in the Americas and Oceania that were colonised by Europeans during the modern and contemporary periods.

The **agrarian landscape** is organised into large, regular-sized fields that belong to a highly skilled farmer or large multinational companies. These are used to grow specialised crops suited to the local climate. There are various crop belts in the United States, specialised in wheat, maize, tobacco and cotton.

The use of advanced farming **methods** facilitates mass production, intended to supply an international market.

Plantation agriculture

This type of agriculture is located in coastal areas of countries with a humid tropical climate in Central and South America, in addition to South East Asia and the Gulf of Guinea in Africa.

The **agrarian landscape** is characterised by enormous fields in which one single crop is grown. These fields generally belong to multinational companies from developed countries. They are used to grow both food (bananas, pineapple, coffee, cocoa and sugar cane, etc.) and industrial products (rubber, cotton and palm oil), which are in high demand in wealthy countries.

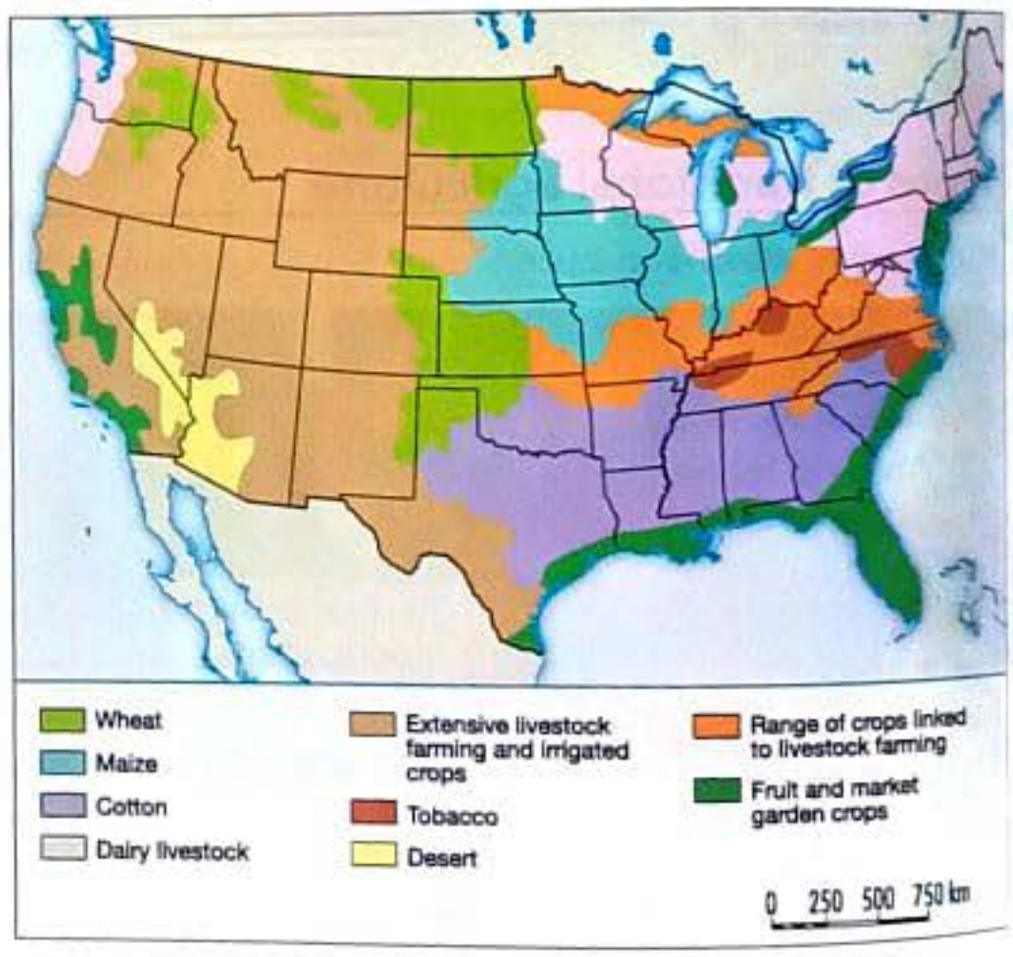
goma,

The combined use of advanced **techniques** (selected seeds, fertilisers, pesticides sprayed by aeroplanes, etc.) and an extensive paid labour force, required for some tasks, facilitates cheap mass production intended for the international market.

New countries: The United States

The agrarian landscape

Crop belts



Skills progress

Creating diagrams

1 Create a mind map to compare the characteristics of traditional, industrial and organic agriculture.

Generating your own ideas

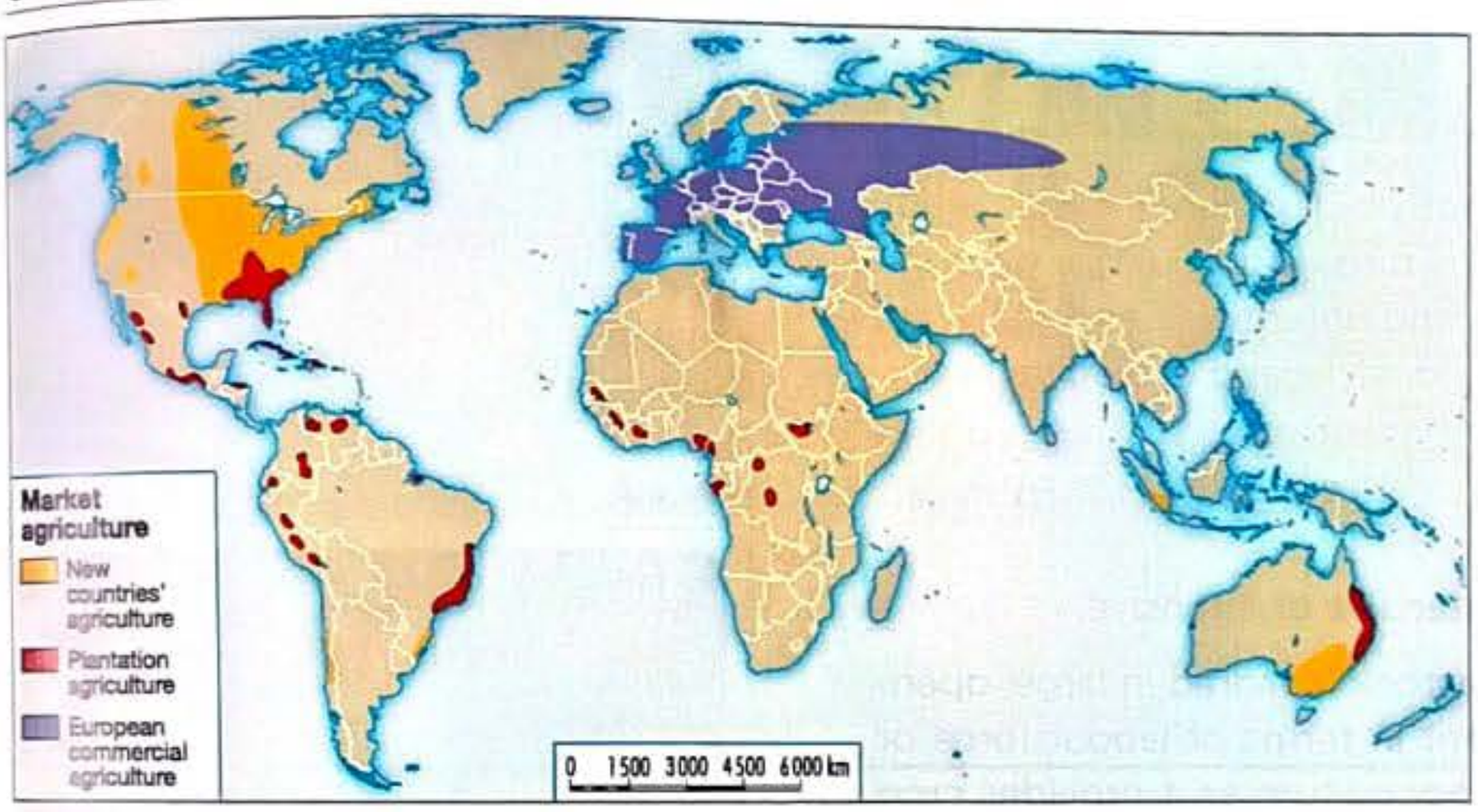
2 What is the difference between the agricultural methods used in the new countries and the methods used on plantations?

Handling maps

3 Trace the journey of a plantation agrarian crop from its harvest location to the distant consumer regions. Draw conclusions.

Modern agrarian landscapes

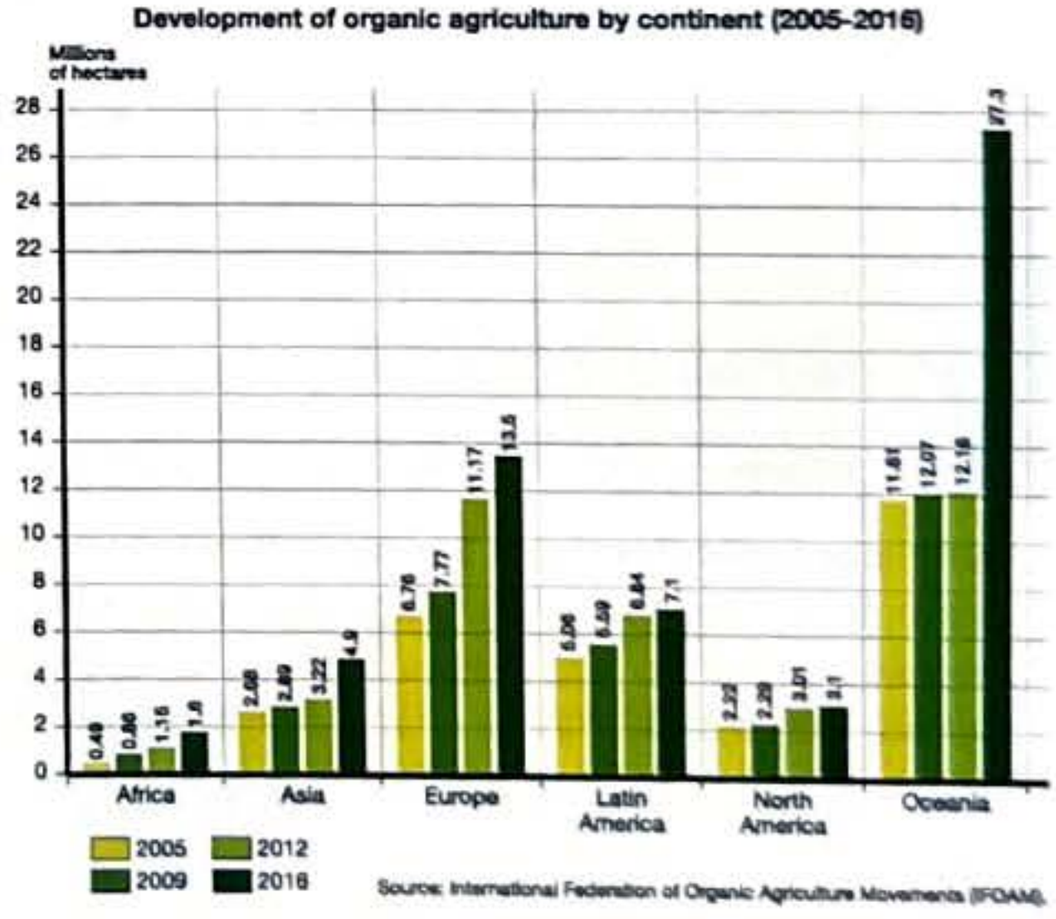
Geographical location



In the "Apply skills" section you have the quiz: Organic?

Plantation agriculture

Organic agriculture



7.2 Organic agriculture

Organic or bio-extensive agriculture uses **environmentally friendly techniques** and does not use artificial chemical products. Therefore, organic fertilisers are used along with crop rotation to avoid soil depletion and to control pests in a natural way.

These techniques require more work than those used in industrial agriculture and provide a lower, less economical yield. However, organic agriculture is more varied and of higher quality. It is designed to meet the needs and requirements of a growing number of *green* consumers, above all in North America and Europe, who are prepared to pay more for this type of product.

In 2012, organic agriculture was practised on 37.4 million hectares of land (0.9% of the world total). However, this figure is growing across all continents. The most typical **crops** grown in this type of agriculture are cereals, coffee, olive oil and cocoa.

Handling maps

4 List the continents and countries where advanced agriculture is used.

Handling images

5 What characteristics of industrial agriculture are shown in the pictures?

Evaluating sustainability

6 Plan an activity to promote the advantages of organic agriculture at your school.

8

LIVESTOCK FARMING. TYPES AND MODELS

Livestock farming is a highly diversified activity. It includes a wide range of livestock species (cows, sheep, goats, pigs and poultry), different livestock farming systems (extensive and intensive) and different livestock farming methods (traditional, industrial and ecological).

8.1 Livestock farming systems

The systems to rear livestock may be extensive or intensive.

- With **extensive livestock farming,** livestock is reared in large, open-air fields. This requires little investment in terms of labour force or capital. At times, it can complement agriculture as it provides crop growers with a form of labour force and fertiliser. Otherwise, it is above all the dominant activity in areas with natural features that do not favour agriculture.
- With **intensive livestock farming,** livestock is housed in barns and fed with artificial feeds. This demands high levels of investment in buildings, breed selection, feeding technology and veterinary care.

8.2 Traditional livestock farming

Traditional livestock farming is extensive and falls into two models:

- With **nomadic livestock farming,** livestock is continually moved in order to provide animals with fresh pastures. It is characteristic of peoples living on the edges of deserts such as the Tuareg of the Sahara and the Bedouins of the Arabian Peninsula.
- With **seasonal migration,** livestock is moved on a seasonal basis, between summer and winter pastures. It is typical of mountainous regions in America, Asia and North Africa.

8.3 Industrial and organic livestock farming

- **Industrial livestock farming** seeks to obtain the maximum yield to be sold on the market. In some cases, it is **extensive** and large quantities of livestock are reared in the open air. This is the case of North American and Australian ranches or farms in the Argentine Pampas and Patagonia. Otherwise, it is **intensive** and genetically selected livestock is reared in barns and fed on artificial feeds. The animals are monitored by vets and mechanised systems are used (computer-controlled feeding systems and mechanical milking, etc).
- **Organic livestock farming** respects the environment and animal welfare. To do so, semi-extensive systems are used. The livestock is not fed on artificial feeds, nor are the animals kept permanently in barns. Growth stimulants are not used, medication is limited to what is essential and local breeds are reared. Production output is lower but of a higher quality.

Livestock species

Cattle

Sheep

Pigs

Poultry

Skills progress

HOMEWORK

Learning concepts

1 Explain the differences between these concepts: intensive and extensive livestock farming; nomadic and seasonal migration livestock farming; traditional, industrial and organic livestock farming.

Learning about environmental problems

2 Write a short report on the problems associated with rearing livestock in barns.

Livestock production in 2016

					Meat tons	Milk tons
World	1474887717	1173353790	981797339	22705417	329890425	798476317
Africa	324844768	351579045	36625241	1903550	18956661	48909874
North America	103953713	6146337	84271733	2141686	49203413	103903084
South and Central America	359125605	66026146	69128495	2456819	42864389	60154663
Asia	470224322	511711463	573649431	12830776	140023880	317242027
Europe	121934483	131059072	186995248	2239722	62562539	221441428
Oceania	35879934	95154412	5435548	126644	6685903	29458417

Data for heads of cattle, poultry, data in thousands of euro.
Source: FAO.

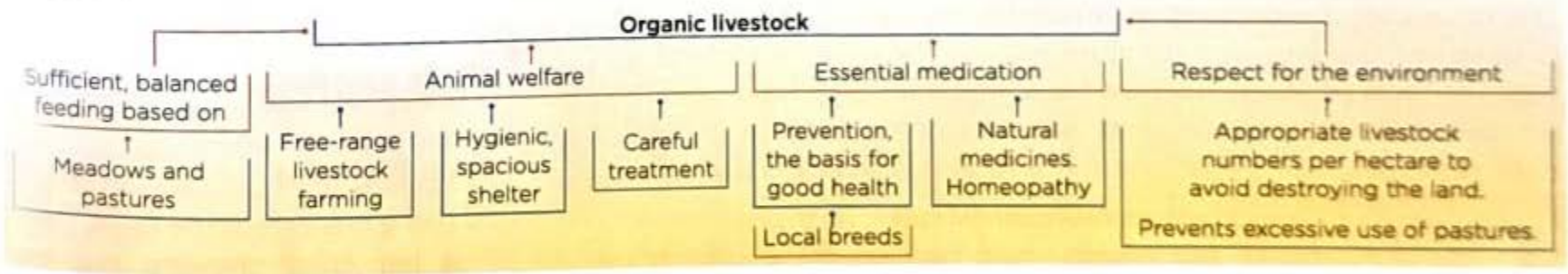
Livestock farming systems

Productive

Extensive

Intensive

Ecological



Geography and History

Create Different types of livestock farming exist in the world nowadays. Eggs that you buy have a number printed on the shell. Record a video for parents explaining why it is important for sustainability to buy eggs with numbers starting with 0 or 1.

Understanding the environment

3 Think and answer: What similarities are there between extensive agriculture and livestock farming? What about intensive agriculture and livestock farming?

Handling data

4 Look at the data in the table and complete the following tasks: a) Indicate the two regions in the world that have the highest number of each type of livestock. b) Create a bar chart on global meat and milk production. What are the two main production regions for each product?

Ensuring sustainable development

5 If you had to set up a livestock farm, which of the livestock farming systems would you choose? Give arguments to support your answer.

9

SILVICULTURE

9.1 Forest spaces

In 2012, the Earth's forests covered around 40.3 million km^2 of land. In other words, the world's forests accounted for approximately 30% of the Earth's surface. Within this extensive area, there are various types of woodland, each adapted to diverse climatic conditions.

- Humid **equatorial and tropical woodland** is located in the hot zone. It consists of tall, hardwood trees with many species combined together. Therefore, in order to harvest the most profitable timber, such as mahogany, ebony and teak, extensive areas have to be deforested.
- **Temperate woodland** covers the middle latitudes. It includes smaller trees that are grouped in a more homogeneous manner. The most profitable species such as oak, beech and chestnut were exploited in past eras. Today, they are sometimes replaced by more profitable, non-native species, such as pine and eucalyptus.
- The **boreal forests** or taiga are located in the northern regions of the temperate zone. They are dense forests containing few species, which are generally softwood. The predominant species are conifers, such as pine and fir, as well as birch.

9.2 Forestry production and environmental roles

The main **use** of woodland is to harvest the wood from trees, which is used for building and furniture making. However, woodland also supplies food products, such as fruits, game and mushrooms; energy sources, such as firewood; and industrial products, such as rubber, cork, resin, cellulose, paper, pharmaceutical products and perfumes.

Forests also fulfil important **environmental roles,** as they absorb CO_2 from the atmosphere and thereby help to reduce the greenhouse effect. They also add humidity to the atmosphere, protect the soil from erosion and contain rich plant and animal biodiversity. They also play an economic role, as their landscapes can be used for leisure and recreation activities.

9.3 Problems created by forestry activities

The uncontrolled exploitation of the world's massive areas of woodland has led to serious levels of **deforestation.** Since 1950, almost one third of the Earth's forest areas have been lost and the tropical forest has been reduced by half.

Therefore, the UN has established international agreements to protect forests. Of particular importance amongst the measures adopted are the following: controls on tree felling to ensure sustainability, replanting, recycling wood products, and promoting the value of resources, in order to encourage local populations to care for them.

Wood production

15 leading roundwood producing countries (2017)	Roundwood m^3	% of production
The United States	419 578 132	11.11
India	355 051 309	9.40
China	333 695 387	8.84
Brazil	256 809 000	6.80
Russia	212 399 199	5.62
Canada	155 120 600	4.11
Indonesia	120 250 104	3.18
Ethiopia	112 323 671	2.97
Democratic Republic of the Congo	88 148 851	2.33
Nigeria	75 605 432	2.00
Sweden	74 669 599	1.98
Finland	63 294 712	1.68
Chile	60 676 789	1.61
Germany	53 490 600	1.42
France	51 232 416	1.36
World	3 776 774 168	100.00

Source: FAOSTAT.

Skills progress

Handling data

1 Using the data in the table, create a bar chart showing the main roundwood producing countries. What percentage of global production is provided by these fifteen countries?

Handling maps

2 Produce a world map showing areas with different types of forest. Create a legend listing the tree species that can be found in each area.

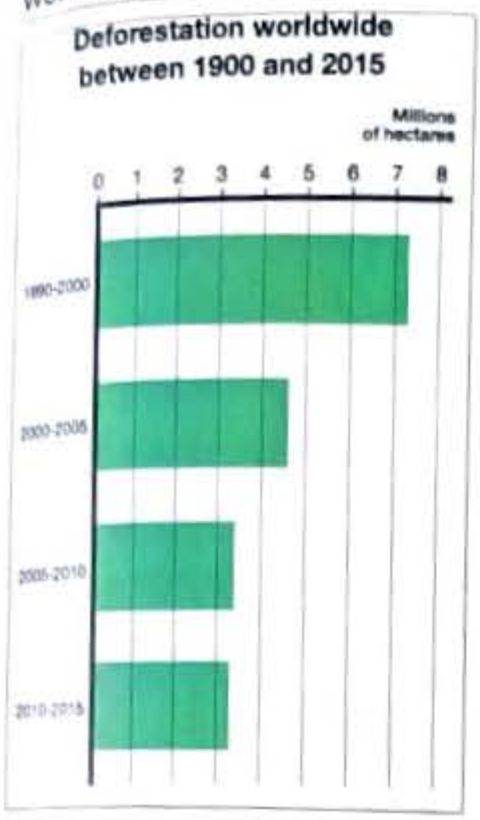
Ensuring sustainable development

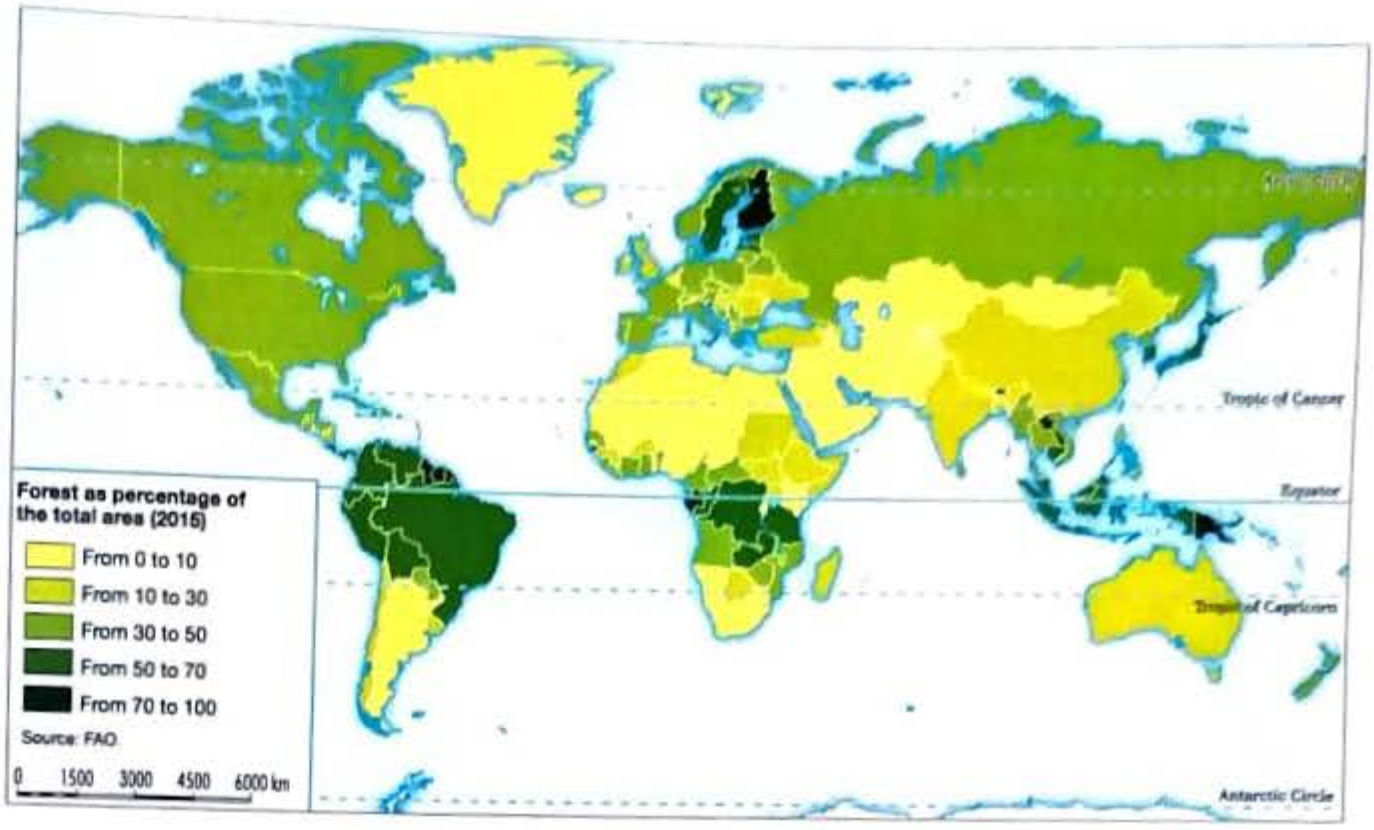
3 Write a list of five items we use on a daily basis that are derived from silviculture.

Go to the statistical data ← SKILL

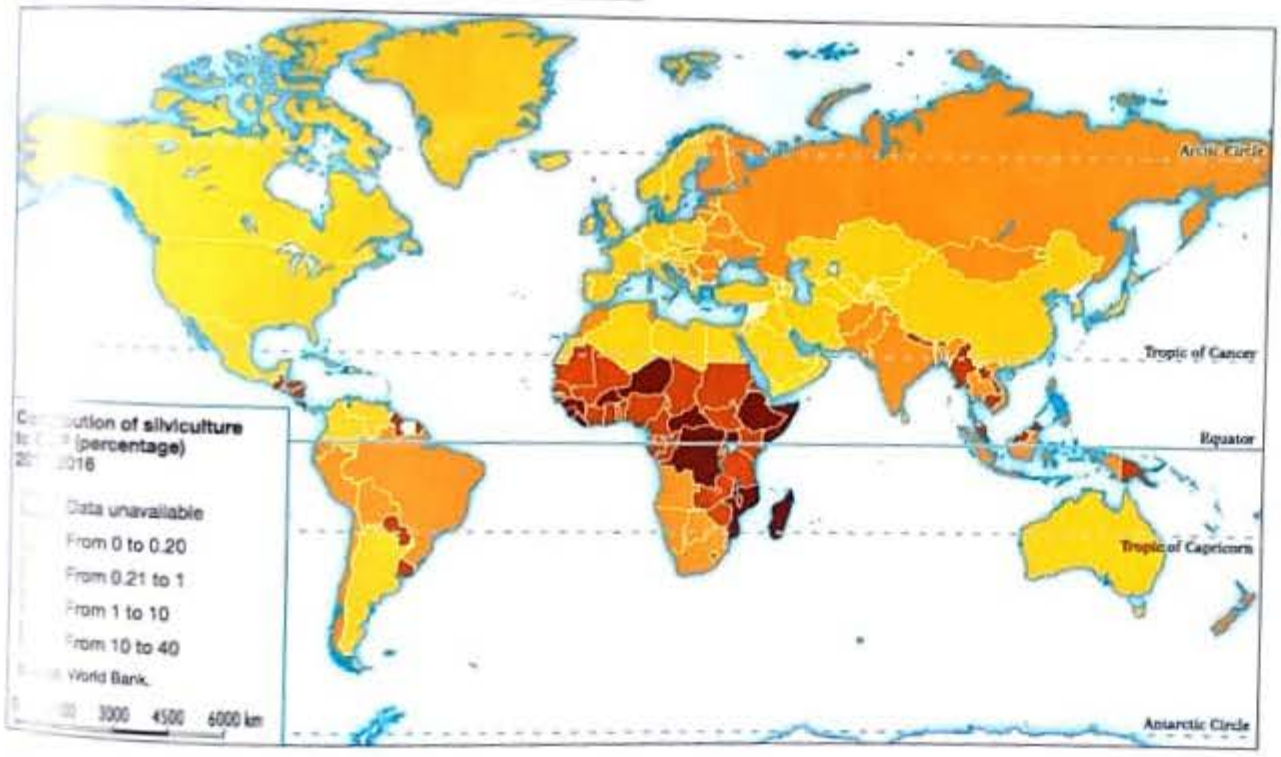
Current woodland zones and area

World's forests in 2015





Contribution of silviculture to GDP in 2016



Regions	Employment in forestry sector (in millions)				Proportion of total labour force employed in the sector (%)			
	Woodland*	SWWP**	PP***	Total	Woodland	SWWP	PP	Total
Africa	0.3	0.2	0.1	0.6	0.1	0.1	0.0	0.2
Asia and Oceania	1.8	2.6	2.5	6.9	0.1	0.1	0.1	0.3
Europe	0.8	1.5	0.9	3.2	0.2	0.4	0.2	0.9
North America	0.2	0.4	0.5	1.1	0.1	0.2	0.3	0.6
Latin America and the Caribbean	0.4	0.6	0.4	1.3	0.1	0.2	0.1	0.5
World	3.5	5.4	4.3	13.2	0.1	0.2	0.1	0.4

On a global level, silviculture generates around 1% of the world's GDP and employs 0.4% of the total labour force. However, there are major differences between regions and countries.

*Silviculture and logging **Sawn wood and wood panels. ***Pulp and paper

Handling graphs

4 Study the graph and answer the following questions:

a) How has deforestation evolved?

b) Think and discuss in class about this problem and the measures to solve it.

c) Look at Finland on the map. What percentage of forest does it have? Investigate its environment.

Taking a position

5 Explain the meaning of this phrase: 'To plant a tree is one of the few human deeds which can truly be considered as altruistic. One plants a tree for one's children, one's grandchildren or one's grandchildren's children but not for oneself' (Seymour, 1983).

10

FISHING. USE OF THE SEA

Fishing is the activity that provides products from the sea. **It provides** food for people and raw materials for industry, such as tinned and frozen products, oils, flours and fertilisers, etc.

The areas of the sea where fishing levels are particularly high are called **fishing grounds.**

10.1 Fishing systems

The fishing systems or procedures used today are highly varied and there are a number of different classifications:

- **According to the place where fishing is practised and the period of time required: shallow-water** fishing takes place near the coast on a daily basis; **deep-sea** fishing is undertaken far from the coast over several days or weeks and **ocean** fishing is undertaken at high sea for several months.
- **According to the technology used on fishing boats,** fishing may be traditional or industrial.
  - **Traditional fishing** uses small boats, traditional technology and a limited labour force. Production is limited and intended for the local market.
  - **Industrial fishing** uses large factory boats, modern technology (radars and sonars, etc.,) and a large labour force. Production levels are high and intended for sale on national or international markets.

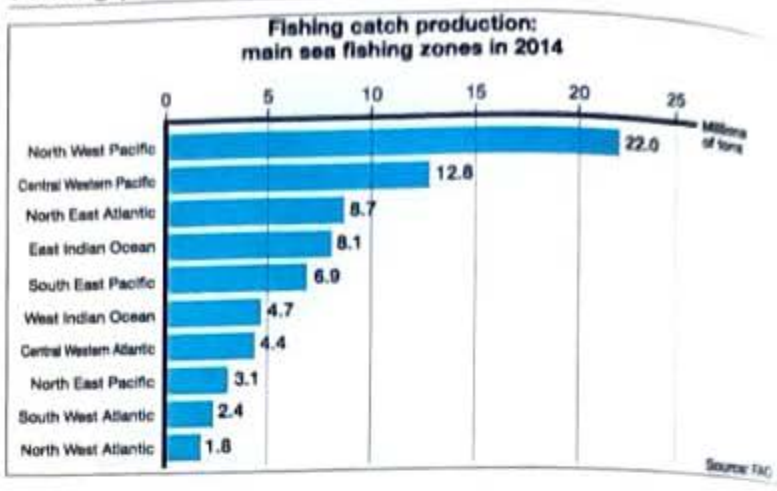
10.2 The future of fisheries

Fisheries now face three main **problems: overfishing,** which leads to the exhaustion of marine resources; damage caused by sea **pollution** and the increasing difficulty of **gaining access to fishing grounds** belonging to other countries (in 1982, exclusive national fishing grounds were established within 200 nautical miles (370 km) of each country's coastline).

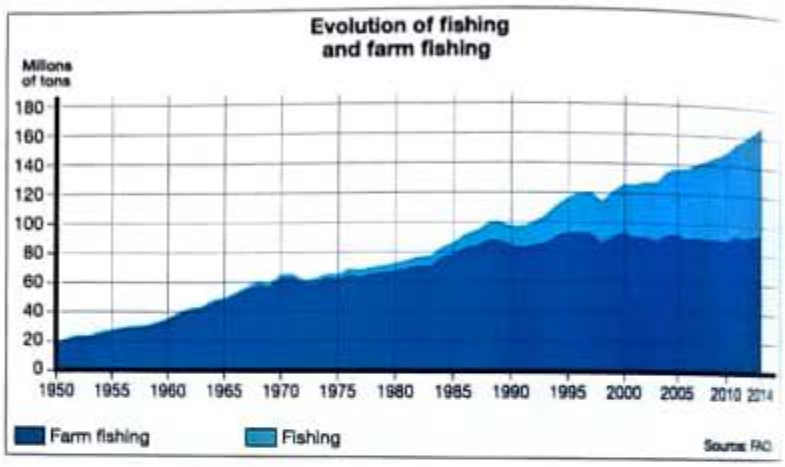
The **fishing policies** implemented by countries and international organisms aim to find solutions to these problems. Of particular importance amongst these are the prohibition of harmful fishing practices, the establishment of fishing quotas, the application of anti-pollution measures, the signing of international fishing agreements and the promotion of aquaculture or the breeding of fish, crustaceans and molluscs.

Fishing statistics

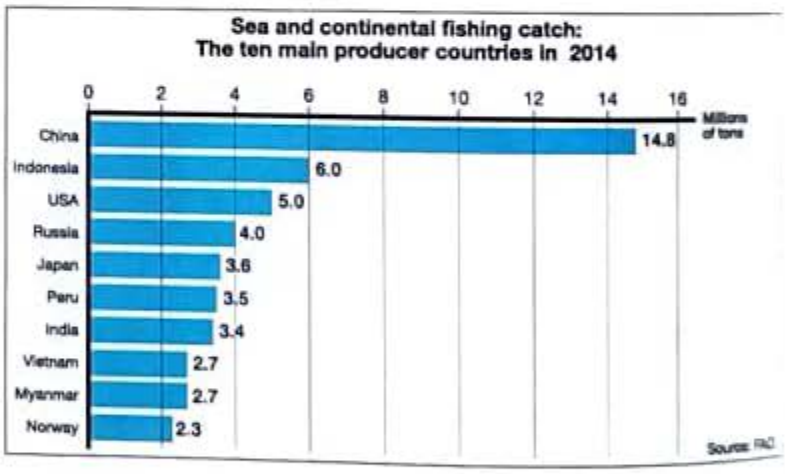
Fishing production by zones



Fishing production and aquaculture production



Main producer countries



Skills progress

Handling graphs

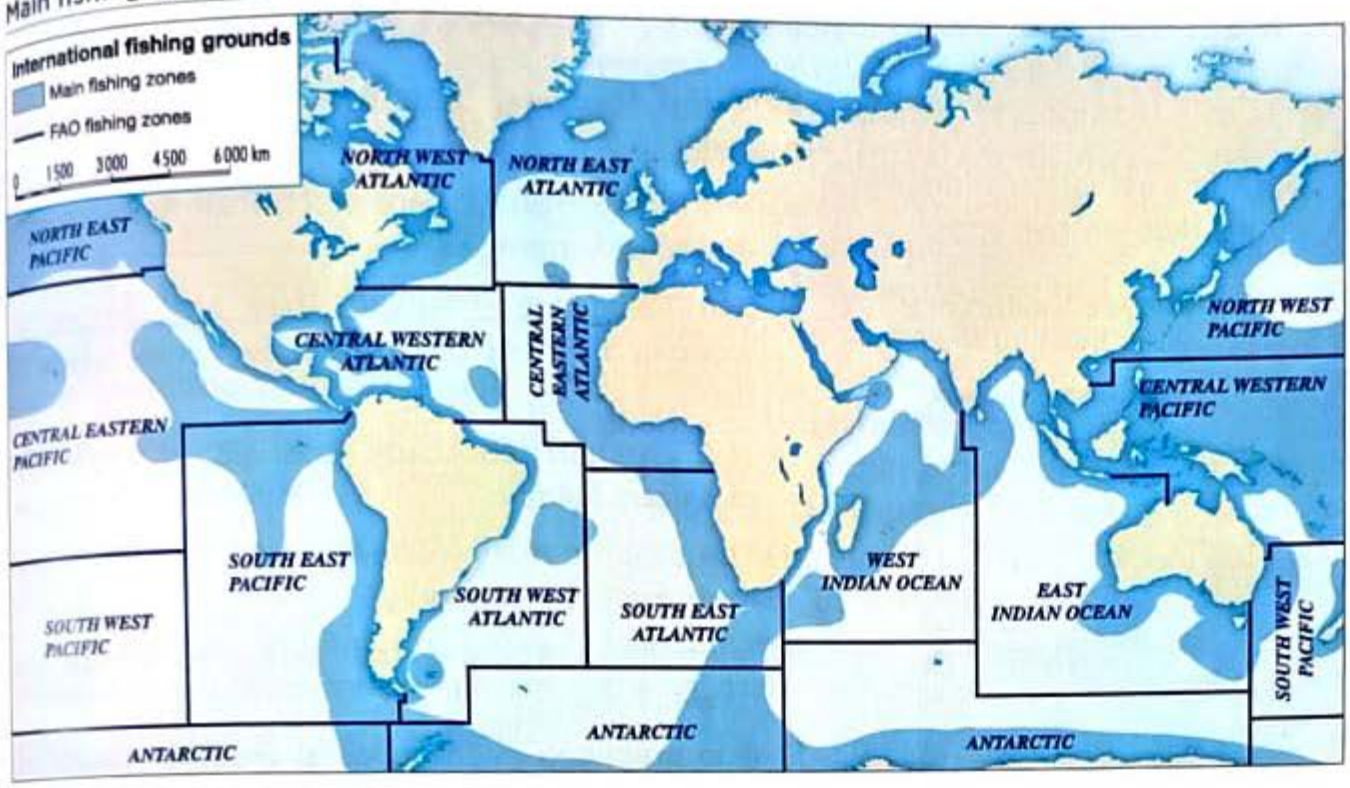
1 Look at the graphs above and answer the following questions:

a) How have fishing catches around the world evolved? Use mathematical data in your answer.

b) On a world map, mark the countries with the highest fishing output in the world. Also mark the main fishing grounds.

Fishing ground and fishing techniques

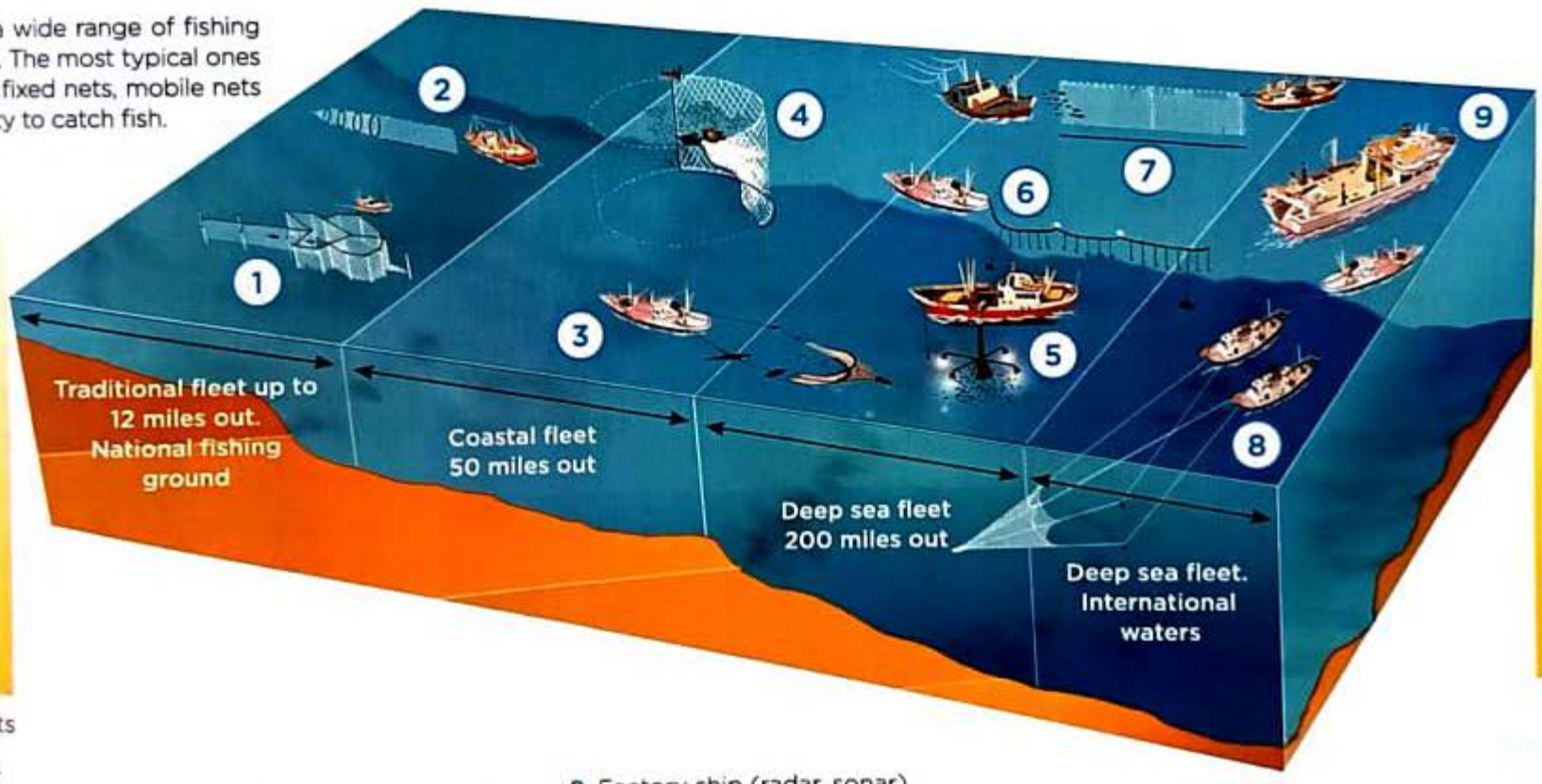
Main fishing grounds



The world's **most significant fishing grounds** are located in areas with abundant sources of plankton. This is the case in areas with large continental shelves, such as the Sea of Japan and the North Sea; in areas with cold marine currents, such as the coast of Newfoundland (Canada), and areas where warm and cold currents meet, such as the American Pacific Coast.

Fishing techniques

There are a wide range of fishing techniques. The most typical ones use hooks, fixed nets, mobile nets or electricity to catch fish.



1. Tunny nets
2. Fish trap.
3. Trawling.
6. Bottom set longline.
9. Factory ship (radar, sonar).

Creating diagrams

2 Draw a diagram to summarise the contents of this section. Choose the type of diagram you consider to be most suitable.

Using texts and images

3 Use the text and pictures to answer the following questions: a) How far from the coast do international fishing grounds begin? b) What impact has the creation of these zones had? c) Name the different types of fishing fleet according to the distance from the coast at which they operate. d) Give an example of fixed-net and trawler fishing techniques.

Evaluating sustainability

4 Find information on how aquaculture can help to resolve the problems the fishing industry currently faces, then write a text giving your views on this issue.

APPLY

1 Link each concept to an agrarian activity: fodder, fertiliser, wild mushrooms, paper, rice, leather, eggs.

2 Give a brief explanation of what influence the factors illustrated in this picture have on agriculture.

3 Write ten lines explaining the elements of agrarian landscapes. Use the pictures below as a guide.

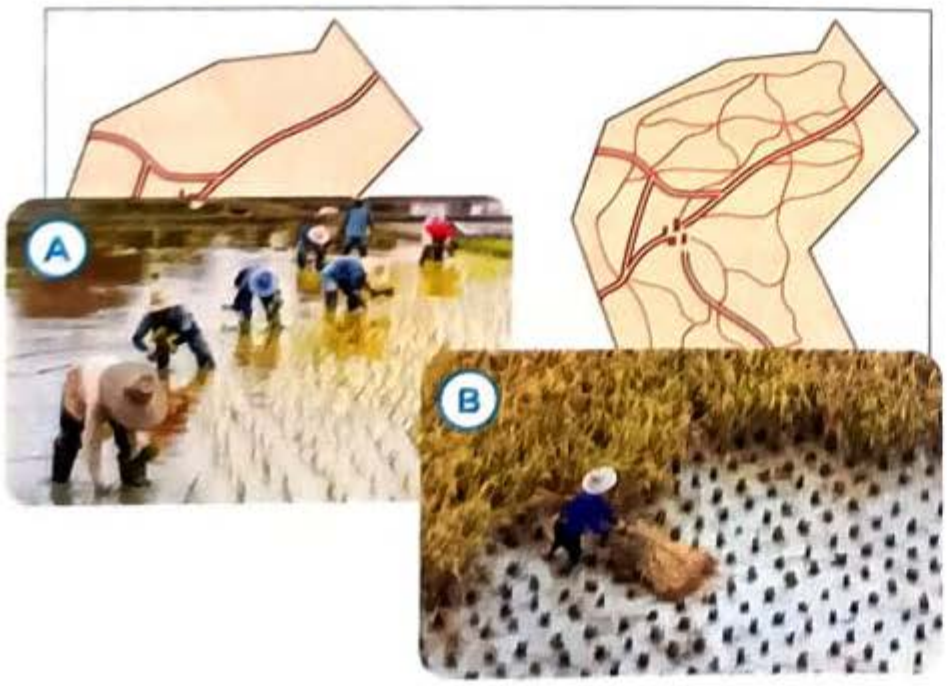
4 Study the images below with care and answer the following:

a) In which agrarian system would you include this form of agriculture and why?

b) Where would it be located?

c) What are the growing/cultivation techniques like?

d) What advantages would it have over other agrarian models?



Growing method. 1. Plant nursery. 2. Transferred to the paddy field (A). 3. Flooded fields. 4. Collection (B)

5 Link the following statements to an agricultural model:

a) Products are grown here which are in high demand in wealthy countries.

b) The fields are irregular. They are created in woodland where the trees have been 'slashed' back.

c) The agrarian landscape consists of vegetable plots and fields.

d) The techniques used are natural and environmentally friendly.

e) Specialised products that suit the climate are grown.

f) It is practiced in the coastal areas of countries that have a humid tropical climate in Central and South America, in addition to South East Asia and the Gulf of Guinea in Africa.

6 Think carefully about this question before answering. What is the main use of livestock farming around the world?

7 Give a written opinion in response to these questions:

a) What benefits are provided by woodland?

b) What are the negative consequences of deforestation?

c) What can we do to help protect woodland?

REFLECT AND EVALUATE

Primary sector activities will be the first ones that you will study and use in your report. Reflect individually and share in a group your evaluation of the activities involved.

To do this, download the corresponding rubric at anayeducacion.es

TEST YOUR SKILLS

To test your knowledge of the primary sector, fill out the self-assessment. You can find it at anayeducacion.es

PROTAGONISTS

IN THE PAST

Veridiana Victoria Rossetti

Basic information

Name: Veridiana Victoria Rossetti

Period: 1917-2010

Nationality: Brazilian

Occupation: agronomist / agricultural engineer

I was born in Santa Cruz das Palmeiras and vegetation always played an important part of my life. My father was a doctor of Agronomy and he initiated us into the world of plants. During my childhood I collected samples of plants from the garden and with the help of my father investigated the effect of insect pests on them. When I had to decide what to study, I remembered those children's games in which we analysed plant diseases and thought I could work in that area. I enrolled at the Luiz de Queiroz College of Agriculture at the University of Sao Paulo and in 1937. I became the first female agronomist in this state and the second in my country.

Later, I started working at the Biological Institute, where I developed all of my research until my retirement in 1987.

I always focused my efforts on studying the diseases of the citrus family, so finally my working life has been quite similar to my childhood experiments.

In 2004, I received the Grand Cross of the National Order of Scientific Merit from the President of Brazil. Now, I have started having difficulties memorising things and sometimes I can't find the words in my head, so I'll have to think about resting.

NOW

AFAMMER

Basic information

Name: **AFAMMER** (Associations of Farmeresses and Women of the Rural Environment)

Place and date of creation: Spain, 1982

AFAMMER started as a small association of rural women and has become a National Confederation of Federations and Associations of Farmeresses and Women of the Rural Environment. It has delegations in sixteen autonomous communities and has more than 180000 members.

The association has participated in the elaboration of numerous plans and documents that seek to achieve equal opportunities for women in the rural world. In 1995 AFAMMER participated in the IV World Conference of Women in Beijing. That same year the NGO collaborated in the preparation of the first Charter of Equality for Rural Women. In 2003, AFAMMER were in favour of women who were beginning to contribute to the Social Security System, since, although they had always worked in the fields, it was men who were listed as active agrarian workers. Currently, it develops different training plans that seek both equal opportunities and the creation of jobs that allow economic diversity in our villages.

It also advocates women having a more active role in decision making in rural areas, and fights for women's presence in the most representative organs and institutions.

In addition, it tries to improve the living conditions in the villages and promotes actions aimed at expanding the transport and communications network and providing people with health, culture and education services.

QUESTIONS

1 Victoria Rossetti investigated problems with the citrus family of plants. Is the cultivation of citrus plants important in our country? What kind of crops are they? Review and make a brief classification of this type of crop.

2 Enter into the website of AFAMMER and look for information about the activities that it has carried out over the last year. Choose one of them, make a brief summary of it and explain why you have chosen it.