Special Terms	
Organic matter	matter found in or produced by, living animals and plants, which contains carbon, hydrogen, oxygen and often nitrogen and sulfur.
Crops	any product of the soil. In a narrow sense, the product of a harvest obtained by labor, as distinguished from natural production or wild growth.
Crop plants	any plant cultivated by man for its fruit, fiber, root, flower, etc.
Livestock	any domestic animal produced or kept for farm or market purposes.
Mechanization	to change a process so that it is run by machines rather than people.
Pest	anything such as insect, animal, plant or other organism that causes injury or loss to a growing crop, or injury or irritation to domestic animals or man.
Weed	a plant out of place. For example, a rose growing in a field of wheat is a weed.
Fertilizer	any organic or inorganic material added to soil or water to provide plant nutrients and to increase the growth, yield, quantity or nutritive value of the plants grown therein.
Herbicide	any chemical used for killing plants.
Fungicide	any chemical used for killing fungi.

Practice Tasks

Task 1 *True or False?*

1. Loss of crops may be maximized with the use of pesticides. [__]
2. Agriculture aims only to meet food demand in the world. [__]
3. Mechanical weeding aims to protect loss of crops due to pests. [__]
4. Fiber production raw materials are produced by agricultural products. [__]
5. Land is not essential in agriculture. [__]
6. Adequate food production is one of the aims of agricultural policies. [__]

7. Irrigation is another term for mechanization. [__]

8. Agriculture has not changed at all over the centuries. [__]

Task 2 *Choose one of the options to complete the sentences*

1. Living animals are capable of producing _____ .
   a) crops b) weeds
   c) organic matter d) subsidies

2. Another word for domestic animals is _____ .
   a) fungi b) farm
   c) food d) livestock

3. Government financial support is often termed as _____ .
   a) subsidy b) sum
   c) security d) objective

4. _____ is when people resort to artificial application of water to soil.
   a) manipulation b) irrigation
   c) production d) globalization

5. Anything causing injury to a crop is considered to be a _____ .
   a) pest b) test
   c) herbicide d) fiber

6. A chemical used for killing plants is _____ .
   a) fertilizer b) pesticide
   c) fungicide d) herbicide

7. Through agriculture we can get _____ to produce fibers.
   a) raw materials b) food processing
   c) research d) techniques

8. _____ production can be affected by weeds.
   a) crop b) genetic
   c) biological d) international

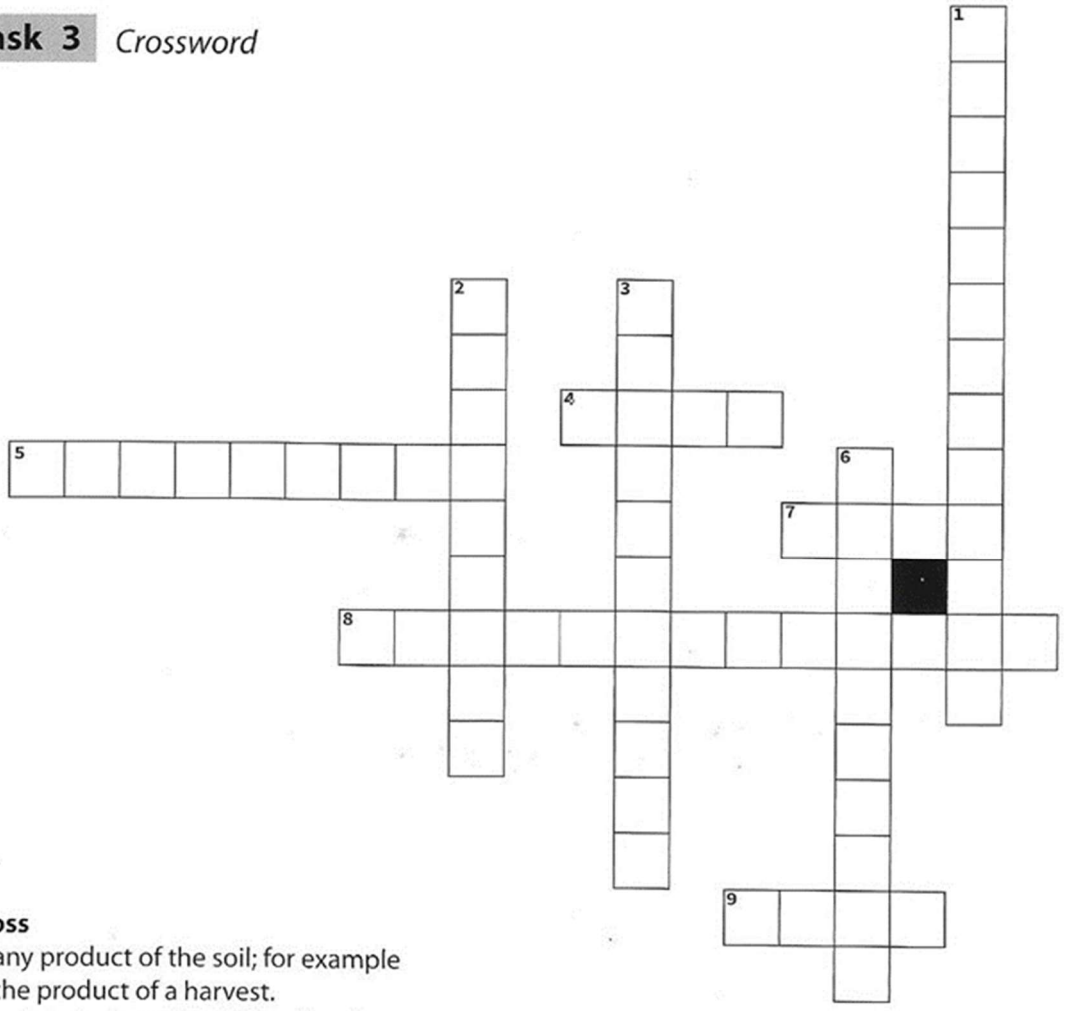
9. Any organic or inorganic material added to soil to provide plant nutrients in order to increase the yield is called _____.

a) crop
b) fertilizer
c) pest
d) weed

10. A rose growing in a field of wheat is a _____.

a) crop
b) weed
c) pest
d) support

Task 3 *Crossword*



Across

4 any product of the soil; for example the product of a harvest.
5 a chemical used for killing fungi.
7 anyhing such as insect, animal, plant or other organism that causes injury or loss to a growing crop.
8 the process by which businesses or other organizations develop international influence or start operating on an international scale.
9 a plant out of place.

Down

1 to change a process so that it is run by machines.
2 any domestic animal raised or kept for farm or market purposes.
3 the art and science of cultivating the soil, growing crops and raising livestock.
6 any organic material added to the soil to provide plant nutrients.

Task 4 *Watch the video titled 'EU Agriculture-CAP-Produce food' to learn about Common Agricultural Policy* https://www.youtube.com/watch?v=ranzxkS8fbU

Excerpt: *The European Union Common Agricultural Policy*

The European Union (EU) Common Agricultural Policy (CAP) was launched in 1962 and is a partnership between agriculture and society, and between Europe and its farmers. It aims to:

- support farmers and improve agricultural productivity, ensuring a stable supply of affordable food;
- safeguard European Union farmers to make a reasonable living;
- help tackle climate change and the sustainable management of natural resources;
- maintain rural areas and landscapes across the EU;
- keep the rural economy alive by promoting jobs in farming, agri-foods industries and associated sectors.

The CAP is a common policy for all EU countries. It is managed and funded at European level from the resources of the EU's budget. The CAP defines the conditions that will allow farmers to fulfil their functions in society in the following ways:

Produce food

- There are around 10 million farms in the EU and 22 million people work regularly in the sector. They provide an impressive variety of abundant, affordable, safe and good quality products.
- The EU is known throughout the world for its food and culinary traditions and is one of the world's leading producers and net exporter of agri-food products. Due to its exceptional agricultural resources the EU could and should play a key role in ensuring food security of the world at large.

Rural community development

- Within our countryside and its precious natural resources, there are many jobs linked to farming. Farmers need machinery, buildings, fuel, fertilisers and healthcare for their animals, also known as 'upstream' sectors.

- Other people are busy in 'downstream' operations – such as preparing, processing, and packaging food, as well as in food storage, transport and retailing. The farming and food sectors together provide nearly 40 million jobs in the EU.
- To operate efficiently and remain modern and productive, farmers, upstream and downstream sectors need ready access to the latest information on agricultural issues, farming methods and market developments. During the period 2014-20, the CAP is expected to provide high-speed technologies, improved internet services and infrastructure to 18 million rural citizens – the equivalent of 6.4% of the EU's rural population.

Environmentally sustainable farming

- Farmers have a double challenge – to produce food whilst simultaneously protecting nature and safeguarding biodiversity. Using natural resources prudently is essential for our food production and for our quality of life – today, tomorrow and for future generations.

Extracted from https://ec.europa.eu/info/food-farming-fisheries/key-policies/com mon-agricultural-policy/cap-glance_en 12 November 2020

Excerpt Task 1 *Answer the questions*

1. Is the agricultural policy of Greece compatible with the CAP. If yes/no why?

_____

_____

_____

2. Are farmers responsible for protecting the biodiversity? If no, why? If yes, how?

_____

_____

_____

3. How would you explain the downstream operations connected with farming? Do you think these exist in Greece?

_____

_____

_____

Delve Deeper Into...

12 BRIEF LESSONS ON

AGRICULTURAL POLICY IN EUROPE

1. The European Union's AGRICULTURAL POLICY is important for everyone in Europe. It shapes our farming, which in turn moulds the RURAL environment and its SOCIAL AND ECOLOGICAL conditions.

2. The Common Agricultural Policy takes THE BIGGEST SLICE of the EU's budget pie. The next seven-year support period begins in 2021. Negotiations on reforms are IN FULL SWING.

3. Structurally weak RURAL AREAS – and the people who live there – should benefit from the funding. But few do so because of MISGUIDED goals and rules. The proposed reforms will do LITTLE to change this.

4. Sustainable farming is key to the protection of INSECTS AND BIRDS, CLEAN WATER AND HEALTHY FOOD. Few EU funds flow into these areas.

5. Farmers who manage a lot of land get LARGE AMOUNTS OF MONEY; small farms get VERY LITTLE. As a result, investments are HARDLY STIMULATED in countries with many small farms.

6. Rural areas also get further support, other than for agriculture. But FAR LESS MONEY is available for these purposes than for the direct payments.

7. The EU has committed itself to international goals for CLIMATE PROTECTION AND BIODIVERSITY, as well as for GLOBAL JUSTICE. Without far-reaching reforms to its farm policies, it will MISS these targets.

8. Agricultural production in the EU has NEGATIVE ecological and social effects in many countries AROUND THE WORLD. Imported commodities produced in many countries overexploit the soil and water there; exports of milk powder and meat outcompete local producers.

9. ANIMAL WELFARE is a big concern for many European citizens. But FEW EU agricultural policy funds are allotted to solving welfare problems in animal husbandry.

10. In the EU, just 3.1 PERCENT of the farm enterprises manage MORE THAN HALF the agricultural land. Between 2003 and 2013, more than one-quarter of all farms CLOSED DOWN. Their land is now worked by others.

11. The EU's agricultural policy helps COMBAT THE POLITICAL EROSION of the European Union. It is especially important in rural areas, where dissatisfaction with the EU is high.

12. For the Common Agricultural Policy to be more widely accepted, it must PROTECT the environment and the climate, IMPROVE animal welfare and PROMOTE small and medium-sized sustainable farms.

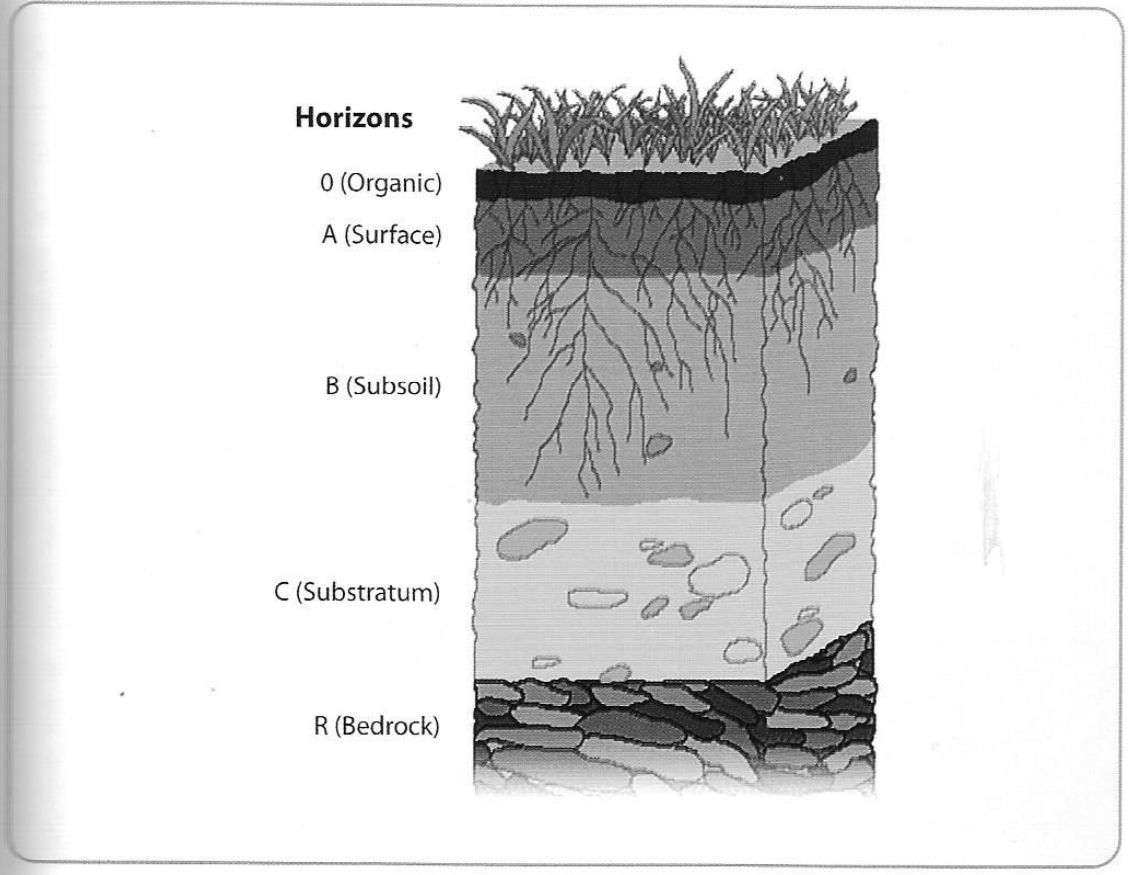
Unit 2

Soil Structure

Everything in agriculture depends on the soil and its productivity. If we wish to continue to live, we must look after our soil and understand it fully in order to produce the most and the best from it.

Soils are arranged in layers or strata just like a sandwich. These strata are called horizons and a mature soil normally has A, B and C horizons. To see the whole soil as it really is, we must look at a soil profile.

The A horizon is the covering layer. It is also called the surface soil, topsoil, or



Soil Horizons

plow layer. It varies from almost nothing to 12 inches deep, according to the nature of the subsoil underneath and the depth of cultivation. It is darker, because it contains organic matter and it is easy to work. It is the real living soil; plant growth and crop production depend on the condition of the shallow layer of the soil.

The B horizon is the next layer down and is called the subsoil. It consists of the rock partly broken down and altered in some way by action from the top of the soil. There is usually no organic matter in it and it is like dead soil. The roots of large plants usually grow in the subsoil. In mature soils the A and B horizons are called the solum.

Beneath the solum we have the C horizon which is the basic or parent material from which the solum has normally been formed. It may be of sandstone, limestone or other hard rock, chalk, sand, silt or clay.

There are though some exceptions in the structure of profiles. An example is the regosol, a group of soils without horizons, which have developed from deep loose rock or from soft rocky deposits.

When we speak of an ABC soil, we mean a mature soil, one having three well defined horizons. An AC soil is usually young or immature.

Exposed Soil Profile

Special Terms	
A horizon	the covering layer in a soil profile.
B horizon	the second layer in a mature soil profile, the subsoil.
Chalk	soft, white, fine grained limestone, which is highly fossiliferous.
Clay	soil particles less than 0.002 mm in diameter; the kind of soil used for earthenware.
Horizon	a layer in a soil profile.
Limestone	a rock which consists mainly of calcium carbonate.
Organic matter	matter found in, or produced by, living organisms.
Regosol	a group of soils in which clearly defined soil horizons have not developed.
Sand	soil particles from 2.00 to 0.5 mm in diameter.
Sandstone	a sedimentary rock composed of sand particles bound together by natural cementing materials.
Silt	small, mineral, soil particles ranging from 0.05 to 0.002 mm or 0.02 to 0.002 mm in diameter.
Soil profile	a vertical section of a soil.
Solum	the A and B horizons in mature soils.
Stratum: (pl. strata)	layer.
Subsoil	the B horizon in a mature soil profile.
Topsoil	the A horizon of a soil.

Practice Tasks

Task 1 *True or False?*

1. Agricultural production depends on the soil. [__]
2. If we look after soil profile we can increase production. [__]
3. The A horizon is 12 inches deep. [__]

4. The solum is formed by the A and B horizons. [__]
5. Plant production depends on the condition of the solum. [__]
6. Plow layer is a synonym for topsoil. [__]
7. All horizons are of the same depth. [__]
8. All layers are formed of the same parent material. [__]

Task 2 *Choose one of the options to complete the sentences*

1. Usually, the soil is arranged in layers or _____ .
   a) limestone b) clay
   c) horizons d) subsidies

2. The first (A) layer of the soil is called i- _____ or ii- _____ .
   i- a) subsoil b) cultivation
   c) crop d) plow layer
   ii- a) shallow layer b) topsoil
   c) limestone d) solum

3. The real living soil is _____ ; plant growth depends on this.
   a) subsoil b) topsoil
   c) substratum d) dead soil

4. The roots of large plants usually grow in _____ .
   a) subsoil b) plow layer
   c) topsoil d) surface soil

5. In mature soils, the A and B horizons are called the _____ .
   a) stratum b) humus
   c) solum d) substratum

6. _____ is a group of soils without horizons.
   a) loose rock b) solum
   c) regosol d) layer

7. When we talk about an ABC soil we mean a _____ soil.
   a) mature b) immature
   c) young d) regosol.

8. Sandstone or _____ can be some of the materials forming the parent material of C horizon.
   a) covering layer b) humus
   c) limestone d) stratum

9. A vertical section in the soil can show us _____ .
   a) the soil productivity b) the soil chemicals
   c) the deposit d) the soil profile

Task 3 *Fill in the blanks by selecting one of the words; additional words are provided*

Production, roots, surface soil, substratum, clay, horizons, strata, horizons, subsoil, limestone, crop, organic matter, topsoil, solum.

Mature soils are arranged in _____ which are also called _____ . In an ABC soil, we encounter three well defined _____ the first is called _____ , or _____ . The second is named _____ ; it does not usually include any _____ . Nevertheless, the _____ of large plants usually grow there. The third layer, is called _____ and it can be formed of _____ or _____ or other materials.

Task 4 *Match the words with the definitions*

1. Regosol [___] a) layer.
2. Horizon [___] b) the A & B horizons in mature soils.
3. Solum [___] c) a layer in a soil profile.
4. A horizon [___] d) a vertical section of a soil.
5. C horizon [___] e) substratum or the parent material in mature soils.

6. Stratum [___] f) a group of soils in which clearly defined soil horizons have not developed.

7. Soil profile [___] g) the topsoil.

Task 5 *List at least three materials forming the subsoil*

1. _____

2. _____

3. _____

4. _____

5. _____

Task 6 *Design a mature soil profile and write the terms of the three layers*

Task 7 *Watch the video titled 'Soil Basics: Color Clues' https://www.youtube.com/watch?v=m4YkJ1sNnZo&feature=youtu.be and answer the questions*

1. Should the soil be moist in order to determine its colour?

2. What are the principal components that attribute to the soil its colour?

3. Does iron oxidation colour differently the soil?

4. Do soils have mixtures of colours? If yes what are they called?

5. Is organic matter important in the colouring of soil?

Excerpt: What can Soil Colour Tell you?

Soils come in many different colours. Words alone cannot describe these differences very well because it is difficult to explain the slight variations that our eyes can see. Artists, painters, and soil scientists use the Munsell colour system to help describe colours more precisely using three components of colour: hue, value, and chroma. Soils are mostly brown or tan unless they were formed from a rock with an unusual colour. However, organic matter (OM), iron oxides, and long-term contact with water changes soil colour. Iron minerals are responsible for brown, red, and yellow colours in the soil. OM usually makes soils dark brown or black. Increasing organic matter typically improves soil health, because OM improves soil productivity through physical, chemical, and biological actions. OM is a small part of soil, just 2%–5% and is mainly on the soil surface. Contact with water over long periods of time creates waterlogged soil that becomes clay (rhymes with grey) coloured. When soils are waterlogged, they become oxygen-depleted and turn dull blue, grey, or green. These colours usually indicate a soil that is wet most of the time. Understanding the colour of the soil is important, particularly for clay soils. Homes should not be built on clay soils because drainage is likely to be a problem. A brown soil will have much better drainage than a clay soil. Hue is the general shade; value tells you where the colour is on a scale from black to white; and chroma describes the brightness of a colour.

Delve Deeper Into...

Main Threats of the Soils of Greece

Agricultural land worldwide is seriously threatened by degradation due to climatic change and mismanagement. In extreme cases, land degradation leads to desertification, i.e., a non-reversible step. Desertification is considered as the greatest threat of land resources which led to the United Nations to sign the United Nations Convention to Combat Desertification (U.N.C.C.D.) in 1974. Since the Mediterranean environment is favorable to land degradation, in the convention a special appendix was devoted to the Mediterranean countries (Annex IV). In Greece, the convention legislated and entered into force in 1997 with the law 2468/97 which imposed the implementation of a National Program of Action through which an appointed committee prepared a plan of measures to combat desertification. At the same time, the European Union funded a series of research projects to obtain a better knowledge on the desertification progress and processes through which a substantial advancement was made on these issues. A number of indicators were developed through the recent research in Europe to present the environmental sensitivity to desertification, grouped in four categories including soil, climate, vegetation, and management (Kosmas et al. 1999). Among them, soil and management factors have the greatest effect on desertification.

Unit 3

Soil Chemicals and Plant Nutrition

According to their chemical reactions, soils are characterized as acid, neutral or alkaline. The acidity of the soil can be measured with the use of the pH meter although this is not the only method of testing the soil reaction. High pH readings, above 7.0, indicate plenty of lime and the soil is classed as alkaline. Readings from 6.6 to 7.3 indicate that the soil is neutral, and low pH, 6.5 or less, show an acid soil.

Some plants grow well in soils that are highly acid while others can grow in soils with pH readings above 7.3. Such plants, called plant indicators, show with their presence the relative acid content of the soil.

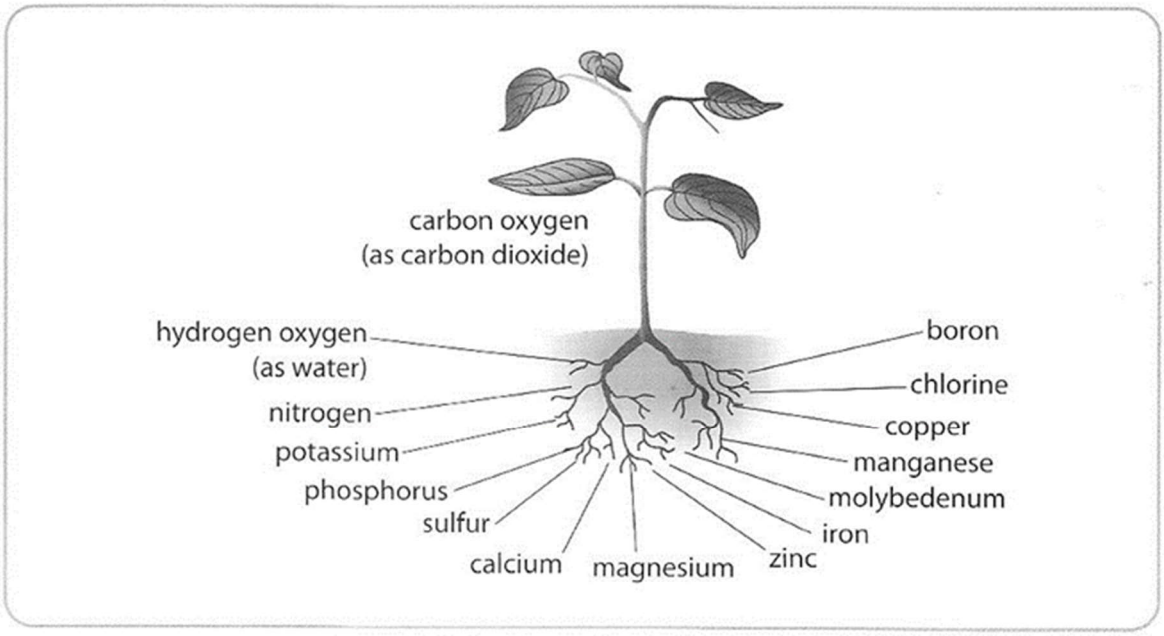
Plants, like all living creatures, need nutrients to live and grow. Plants use nutrients from the air, water, and soil to make their own food through the process of photosynthesis. More than 60 elements are found in plants, but only 18 are considered essential elements. Scientists categorize the essential elements as macronutrients, which plants need in relatively large amounts, and micronutrients, which plants need in small amounts. Calcium, carbon, hydrogen, magnesium, nitrogen, oxygen, phosphorus, potassium, and sulfur are plant macronutrients. Plants take up carbon, hydrogen, and oxygen from air and water. All the other macro- and micronutrients come from weathered minerals or decomposing organic matter dissolved in the water in soil.

Photosynthesis, the process by which plants make sugar from air and water in the presence of light and chlorophyll, takes place only when nitrogen is present. Too little nitrogen causes stunted and weak plants with yellow looking leaves. Too much nitrogen causes tall and weak plants.

Phosphorus is important for the root system of a plant. It is found in the growing parts of the plant, the flower and the seed.

Potassium is found in the soil and enables the plant to produce good fruit because it helps the plant to form sugar and starches. It also makes it possible for these nutrients to move from one part of the plant to another.

Apart from the three main plant foods mentioned above, calcium is very important too because it holds plant cells together and enables the plant to take the other foods from the soil.



Soil Chemicals

Watch the video titled 'Soil Nutrients From the Ground Up' https://www.youtube. com/watch?v=gBrhZKuG-HY to revise how nitrogen, phosphorus and potassium affect the development of plants.

Periodic Table of Elements

1 H Hydrogen																	2 He
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne
11 Na Sodium	12 Mg Magnesium											13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr
37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe
55 Cs Cesium	56 Ba Barium	*	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn
87 Fr Francium	88 Ra Radium	**	104 Rf Rutherfordium	105 Db Dubnium	106 Sg Seaborgium	107 Bh Bohrium	108 Hs Hassium	109 Mt Meitnerium	110 Ds Darmstadtium	111 Rg Roentgenium	112 Cn Copernicium	113 Nh Nihonium	114 Fl Flerovium	115 Mc Moscovium	116 Lv Livermorium	117 Ts Tennessine	118 Og
		*	57 La Lanthanum	58 Ce Cerium	59 Pr Praseodymium	60 Nd Neodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium	71 Lu
		**	89 Ac Actinium	90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium	103 Lr

Special Terms

Acid soil	a soil giving an acid reaction (precisely, below pH 7.0; practically below pH 6.6).
Alkaline	containing alkali; having a pH greater than 7.
Macronutrients	chemical elements of which large quantities are essential to the growth of plant.
Magnesium	the chemical element Mg.
Neutral soil	a soil with a pH between 6.6 and 7.3.
Nutrient	an element in a soil which is essential for the growth of a plant.
Plant indicators	an individual species of a plant, or a community, which by its presence indicates a condition of soil, depth of moisture, climate or other characteristics of the site.
Potassium	the chemical element K.
Sulphur-Sulfur	a yellow mineral substance, insoluble in water, easily fusible and inflammable; the chemical element S.
Trace elements	any of certain chemical elements necessary in very small quantities for growth and development of plants.

Practice Tasks

Task 1 *True or False?*

1. If the soil contains plenty of lime then it is neutral. [__]
2. Most of the chemical elements required for a plant's healthy growth can be obtained from the soil. [__]
3. Trace elements are found in large quantities in the plants. [__]
4. Photosynthesis takes place only if nitrogen is absent. [__]
5. Phosphorus is only useful for the root system of the plant. [__]
6. Potassium is not helpful for the fruit production of a plant. [__]

7. Calcium and magnesium are macronutrients. [__]
8. Sulfur and potassium are micronutrients. [__]
9. Nitrogen is not needed for plant's cell division. [__]
10. Neutral soils are characterized by readings of acidity which are higher than 7.3pH. [__]
11. Plants grow well in acid soils. [__]
12. All elements needed for a healthy growth of plants can be acquired from the soil. [__]
13. Magnesium is a trace element. [__]
14. Abundance of nitrogen causes stunted plants. [__]
15. Phosphorus is essential for the flowers and seeds of a plant. [__]
16. Sugar and starches move to the various parts of plants with the help of potassium. [__]
17. Calcium takes other plant foods from the soil. [__]

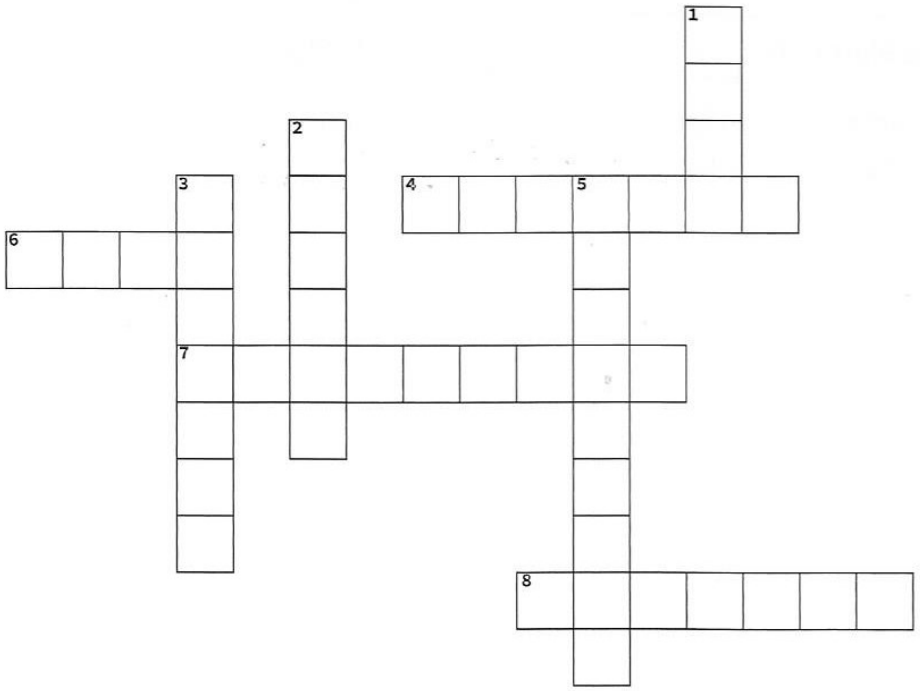
Stunted Tomato Plants

Task 2 *Write the terms for the following symbols*

Mg _____ Ca _____ K _____

N _____ P _____ S _____

Task 3 *Use the clues to fill in the crossword puzzle*



Across

4 It can be measured with pH meter.
6 A mineral that consists mainly of calcium carbonate.
7 To break something, into smaller parts or to decay.
8 A chemical substance is neither an acid nor an alkali, it is…

Down

1 The part of a plant that grows down into the earth to get water and food.
2 A white substance that exists in large amounts in potatoes and particular grains such as rice.
3 The number that a piece of measuring equipment shows.
5 A synonym for diluted.

Task 4 *Complete the sentences by choosing the appropriate part from the right column*

1. Too much nitrogen causes [__] a) the transfer of nutrients from one part of a plant to another.
2. Too little nitrogen causes [__] b) acid.

3.	Phosphorus	[__]	c) are also called micronutrients.
4.	Photosynthesis requires	[__]	d) helps the root system of the plants.
5.	Chemical elements required for plant growth	[__]	e) classified as alkaline.
6.	Potassium enables	[__]	f) are called macronutrients.
7.	Calcium	[__]	g) tall and weak plants.
8.	Trace elements	[__]	h) the presence of light.
9.	Elements found in large quantities in the plants	[__]	i) holds plant cells together.
10.	Soils with pH above 7.3 are	[__]	j) are found in the soil.
11.	Soils with pH 6.5 or lower are	[__]	k) plants with yellow looking leaves.

Excerpt 1: Micronutrient Soil Deficiencies

Micronutrients occur in in relatively small quantities. Soil conditions such as pH level and weather conditions such as drought affect their availability. Selected micronutrients and visual cues to diagnose a deficiency of them are below. Visual diagnosis — difficult for both macro- and micronutrients — is more art than science. The following guidelines may help.

- Boron deficiency appears first on younger or upper leaves that appear pale green and twisted at the base. The buds die.
- Calcium deficiency appears first on younger or upper leaves. Buds and young leaves die back.
- Copper appears first on younger or upper leaves that are pale and wilted with brown tips.
- Iron deficiency appears first on younger or upper leaves as interveinal chlorosis. Growth is stunted.
- Manganese deficiency appears first on younger or upper leaves as interveinal chlorosis with brown spots scattered through the leaf.
- Molybdenum deficiency appears first on younger or upper leaves as interveinal chlorosis. Growth is stunted.
- Sulfur deficiency appears first on younger or upper leaves that appear light green overall. Growth is stunted.
- Zinc deficiency appears first on older or lower leaves as interveinal chlorosis. Leaves thicken, and growth is stunted.

Excerpt 1 Task 1 *Read the excerpt and record the impact nutrient deficiencies have on plants*

Nutrient	*Nutrient deficiency impact*

Excerpt 2 *Nutrition Facts for Plants and People*

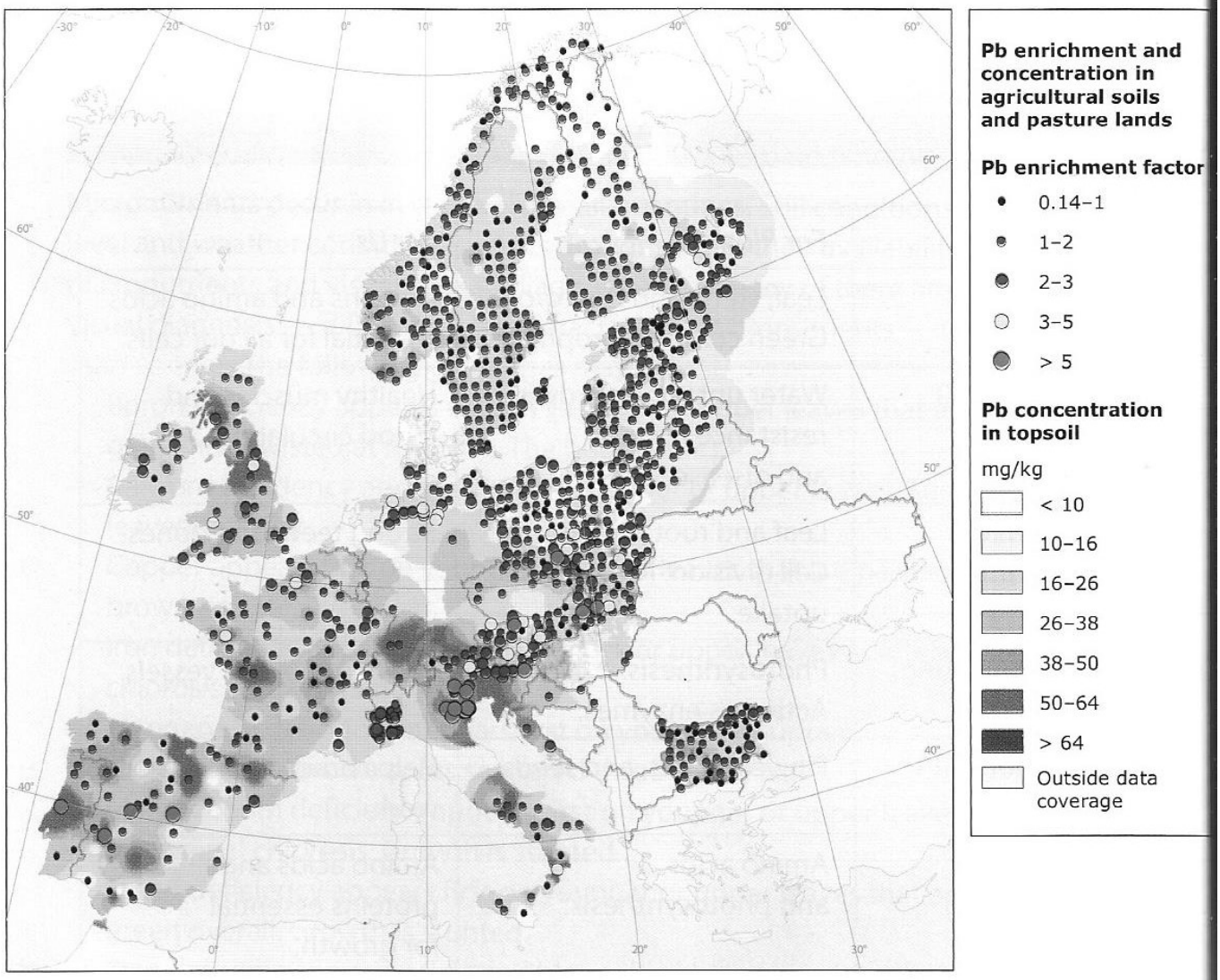
Nutrient	*For Plants*	*For Us*
Nitrogen (N)	Leaf, stem, and root growth. Green color (chlorophyll).	Proteins and amino acids essential for all our cells.
Potassium (K)	Water uptake. Improves resistance to pests and disease.	Healthy muscles and blood circulation.
Calcium (Ca)	Leaf and root growth. Cell division. Nutrient uptake.	Strong teeth and bones.
Magnesium (Mg)	Photosynthesis. Activates enzymes.	Heart and blood vessels.
Phosphorus (P)	Flowers, fruits, and seeds.	Helps brain and nerves work.
Sulfur (S)	Amino acids and photosynthesis.	Amino acids and proteins essential for growth.

[Source: Agronomy: Grow with it! Ateh et al., 2016, p.73].

Delve Deeper Into...

Soil Contamination

Soil contamination is the occurrence of pollutants in soil above a certain level causing a deterioration or loss of one or more soil functions. Also, soil contamination can be considered as the presence of man-made chemicals or other alteration in the natural soil environment. This type of contamination typically arises from the rupture of underground storage tanks, application of pesticides, percolation of contaminated surface water to subsurface strata, leaching of wastes from landfills or direct discharge of industrial wastes to the soil. The most common chemicals involved are petroleum hydrocarbons, solvents, pesticides, lead and other heavy metals. The occurrence of this phenomenon is correlated with the degree of industrialization and intensity of chemical usage.



Soil Contamination by Heavy Metals