



English language for agricultural majors

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Lecture 3 & 4

3 -The origin and composition of soil

I- Reading and comprehension



The origin and composition of soil

¹Soil is a residue composed of two main ingredients: mineral materials and organic materials.²Organic materials originates from dead plants and animals and materials other than this are derived from rocks of various kinds. ³These rocks are broken down into small particles by mechanical disintegration and chemical decomposition .



⁴This breaking down process, known as **weathering**, may thus be both physical and chemical .

⁵When weathering processes are largely physical – by **heat** or **wind**, for instance – the composition of the soil is very similar to that of the **parent rock**. ⁶In **arid regions** weathering is mostly physical. ⁷But in **humid regions** chemical processes of weathering are equally important.



⁸In such regions **rock particles** are affected by water which may contain **carbonic** or other **weak acids**.

⁹These acids **dissolve** some of the particles in rocks.¹⁰The mineral material that left behind is **insoluble**.¹¹Consequently, insoluble mineral residues in the soil have less **resemblance** to the **original rock**.¹²There are larger amounts of organic matter in the soil, too.



¹³The process of **soil formation** results in the development of the **soil profile**. ¹⁴This is made up of **succession of horizontal layers**, or "**horizons**", of varying **thickness**, above the surface to the parent rock. ¹⁵Generally speaking, there are three distinct horizons, known as **A**, **B** and **C**. ¹⁶A is the top soil, which is **coarse-grained**, and dark in colour because of the presence of **humus**.



¹⁷B is known as the **sub-soil** which contains some of the products **leached**, or **washed**, out of the **A horizon**. ¹⁸The **C horizon** consists of parent material which has been **weathered** in the upper part, and **unweathered** rock below .



¹⁹Any sample of the soil contains particles of different sizes. ²⁰These have been divided into the following size groups:

Table 1

<i>Material</i>	<i>Diameter (mm)</i>
Gravel	More than 2.0
Coarse sand	2.0 - 0.2
Fine sand	0.2 - 0.02
Silt	0.02 - 0.002
Clay	Less than 0.002



²¹Soils range from **pure clays** to **pure sands**.

²²Most of them contain various proportions of **sand** , **silt** and **clay** and these varying proportions make up a **soil's textural class**. ²³The principle classes in order of increasing **fineness** of material are **sand** , **loamy sand** , **loam**, **silt loam** , **silty clay loam**, **clay loam**, **silt and clay**.



²⁴Any Soil contains both mineral and organic matter. ²⁵Clay particles are the most important of the mineral particles because they are the smallest. ²⁶Smaller sized particles have a greater **exposed surface area** than larger sized particles. ²⁷The smaller the size of a particle, the greater is its **reactivity**.



²⁸That is to say, smaller sized particles can **react** or **combine** with water, **nutrients** and humus more easily than larger sized particles. ²⁹Thus, a clay soil more **reactive** than any other type of soil.

³⁰Humus from decomposed **organic matter** is vital to a soil as it makes a **heavy soil** lighter . ³¹In addition, it helps to **bind** the particles together in 'crumbs'.



Soil	carbonic acid
Residue	weak acids.
mineral materials	Dissolve
organic materials	<i>Insoluble</i>
Rocks	Resemblance
mechanical disintegration	original rock
chemical decomposition	soil formation
Weathering	soil profile
Heat	succession of horizontal
wind	layers
parent rock	Horizons
arid regions	Thickness
humid regions	fineness
rock particles	coarse-grained



Humus	silt loam
sub-soil	silty clay loam
leaching	clay loam
washing	silt
A horizon	clay
B horizon	exposed surface area
C horizon	Reactivity
weathered	react
unweathered	combine
pure clays	nutrients
pure sands	organic matter
soil's textural class	heavy soil
sand	light soil
loamy sand	Bind
loam	crumbs



EXERSICE B *rephrasing*

1. *Material other than mineral material* is derived from dead plants and animals.
2. *Breaking down rocks into small particles* is performed mostly by heat or wind in arid and semi-arid regions.
- 3, 4 and 5 *home work*



EXERCISE C *Relationship between statements*

Part 1 Exemplification and explanation

Exemplification

- (i) ⁵When weathering processes are largely physical , the composition of the soil is very similar to that of the parent rock.
- ⁶In arid regions weathering is mostly physical.
- When weathering processes are largely physical , the composition of the soil is very similar to that of the parent rock. *For example or For instance* In arid regions weathering is mostly physical.
 - When weathering processes are largely physical , the composition of the soil is very similar to that of the parent rock. In arid regions, *for example or for instance* weathering is mostly physical.



EXERSICE C *Relationship between statements*

Part 1 Exemplification and explanation

Explanation

(ii) ²⁷The smaller the size of a particle, the greater is its reactivity.

²⁸That is to say, smaller sized particles can react or combine with water, nutrients and humus more easily than larger sized particles.

- The smaller the size of a particle, the greater is its reactivity.

That is to say, or In other words, smaller sized particles can react or combine with water, nutrients and humus more easily than larger sized particles.



II - LANGUAGE IN USE

EXERCISE A *making a table from descriptions*

Profile of Soil A: Red Earth

Profile of Soil B: laterite (homework)

Profile of Soil C: Mountain and hill soil (homework)



1- Profile of soil A: Red earth

The A horizon extends to a depth of 36 cm. the soil consists of a brownish red sandy loam. It has a porous and friable granular structure which is mixed with pebbles . the B horizon extends from 36 to 130 cm and is red in color. It is a sandy loam , gravelly in structure with large quantities of pebbles. The C horizon, which extends down to 244 cm, has a yellowish white color. It is sandy, with a structure which is a cemented and compact mass, made up of decomposed feldspars.

<i>Horizon</i>	<i>Depth cm</i>	<i>Colour</i>	<i>Soil type Textural class</i>	<i>structure</i>	<i>Other features</i>
A	0-36	brownish red	Sandy loam	Porous and friable granular	Mixed with pebbles
B	36-130	red	Sandy loam	gravelly	Mixed with large quantities of pebbles
C	130-244	yellowish white	sandy	Cemented and compact mass	Decomposed feldspars



EXERSICE C *Writing descriptions from tables*

Part 1

- *Various forms for description*
- the soil is a loam *that is* slightly compact in structure
- the soil is a loam *with* slightly compact structure
- the soil is a loam *with a structure that is* slightly compact.
- the soil is a loam *that has* slightly compact structure.
- the soil is a loam *having a* slightly compact structure.



II - LANGUAGE IN USE

Part 2

(a) Descriptive labels for the textural class of different soils types.

ADJECTIVE	NOUN
Sandy	Clay
Silty	Clay loam
Gravelly	
Silt(y)	
Sandy	loam
Clay(ey)	
Loamy	sand
gravelly	



II - LANGUAGE IN USE

Part 2

(B) Expressions used to describe the color of the soil.

- i. Using *ish*: *brownish grey, yellowish*
- ii. *Comparing the color with other object* : *ash grey*
- iii. Using adjective such as *dark, light, deep* etc: *bright red , brownish deep red.*

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..... extends to the depth of in colour, the soil type is..... with astructure. A feature is the presence of extends from..... And is.....in colour. It consists of a having a The B horizon goes down to And isin colour. The textural class of the soil is a.....The soil has awhich contains Below 137 cm, the Cisa

<i>Horizon</i>	<i>Depth cm</i>	<i>Colour</i>	<i>Soil type Textural class</i>	<i>structure</i>	<i>Other features</i>
A1	0-15	Brownish grey	Coarse sandy clay loam	crumb	Contains pieces of quartz
A2	15-61	Dark grey	Heavy clay loam	Hard crumb	
B	61-137	Brownish or whitish grey	Heavy clay loam	Hard crumb	Contains white and dark carbonate nodules
C	Below 137	Ash grey	Heavy clay loam		Mixed with disintegrating rocks



Table 2 homework