Physical soil properties – Exercise P03

OBSERVATION OF SOIL STRUCTURE[1]

Reference posters n.4- 7a-8a

RELEVANCE	Soil structure is defined by the way organic and mineral particles are grouped together. When individual particles are clustered, they look like larger particles and are called aggregates. Soil structure defines important aspects such as soil structural stability, which refers to the capacity of a soil to maintain its level and state of aggregation when external forces are applied, whether of natural origin or due to anthropic activities on the soil.
MATERIALS	 Shovel  Plastic sheet
PROCEDURE	1) Remove a 200-mm cube of topsoil with the shovel
	2) Place the plastic sheet over a hard surface (e.g., wood plank). Drop the soil sample a maximum of three times from a height of 1 m onto the plastic sheet until all clods are shattered into small units
	3) Applying very gentle pressure, part each clod by hand and move the coarsest fractions to one end and the finest to the other end of the sheet. Arrange the distribution of aggregates so that the thickness of the soil is uniform over the whole surface
ADVANTAGES OF THE METHOD	Easy to assess visually with few tools needed. It is possible to compare soils with different management.
LIMITATION OF THE METHOD	Proper amount of soil is required for the observation. The method is valid for a wide range of moisture conditions but is best carried out when the soil is moist to slightly moist; avoid dry and wet conditions.

QUESTIONS TO BE ADDRESSED	What are the characteristics (size, shape, firmness) of observed aggregates and clods? How is the porosity? What are the cause of observed soil structure? Do you think that tillage operations affect the structure of your soil? Have you observed differences between soil types and/or management?

EVALUATION EXAMPLES		
POOR	MODERATE	GOOD
Soil is dominated by coarse clods or appears with powder consistency. Very few or no pores are present which reduce the aeration and gaseous exchange rates, negatively affecting plants development.	Presence of aggregates although with angular shapes and irregular size. Root penetration and development might be limited by inadequate soil structure.	Soil dominated by friable and fine aggregates with rounded edges. Good soil structure reduces the susceptibility to compaction under wheel traffic. Soil aeration and gaseous exchange as well as water movement and storage are optimal in these soils.
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1 https://www.fao.org/3/i0007e/i0007e00.pdf