

Soil Fact Sheet 1

Soil Structure

Soil structure has a major influence on soil behaviour. A 'well structured' soil has plenty of living spaces, storage spaces, doorways, and passages (for utilisation by water, gases, nutrients, roots and a vast array of organisms). A poorly structured soil is much less endowed, and much less productive.

What is soil structure?

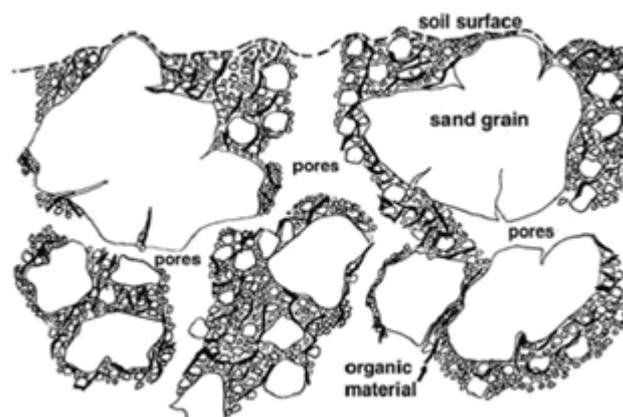
Soil structure is the arrangement of pores and fissures (porosity) within a matrix of solid materials (soil particles and organic matter). The solid materials bond and aggregate to give the pores and fissures. The quantity, distribution and arrangement of pores determines water holding capacity, infiltration, permeability, root penetration, and, respiration.

Soil structure close-up

Only about 50% of soil is solid material. The remainder is pore space. It is in these spaces that the action happens. Water is stored there. Organisms live there. Organic matter and nutrients accumulate there.

The diagram (magnified about 20 times) demonstrates how solids and pores might arrange in soil to give a porosity of 50 %.

Small pores within the peds (aggregates) provide storage and refuge. The larger pores (and fissures) between the peds are the pathways for liquids, gases, roots and organisms.



Why is soil structure so important?

Soil is like a city. The structure and layout of both determine how things happen, the rate at which they happen, and the capability to keep them happening. The following characteristics are used to help evaluate the ability of any soil to perform well (or otherwise):

- Porosity (to represent aeration, water storage capacity, plant wilting point and drainage)
- Permeability (to represent infiltration, drainage and respiration)
- Bonding and aggregation (to represent how the solids group together and the construction materials used)
- Soil strength (to represent toughness and resilience of structures)
- Friability, tillage and trafficability (to represent how soils behave with mechanical disturbance)

What types of soil structure are there?

Soil material fits and binds together in many different ways. With some, the bonding is very weak, in others very strong. With some, the size of peds is very fine, in others coarse and large. With some the peds are dense containing few pores, in others quite open with plenty of pores.

There are six broad categories of soil structure:



Figure 1: Granular (high permeability)

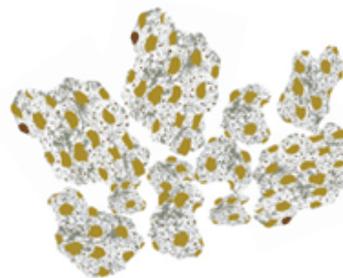


Figure 2: Aggregated (high permeability)

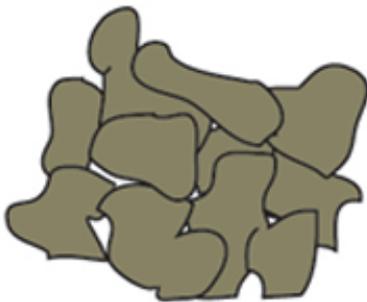


Figure 3: Blocky (moderate permeability)



Figure 4: Columnar/prismatic (moderate permeability)

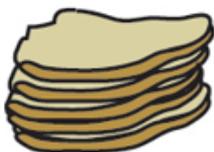


Figure 5: Platey (low permeability)

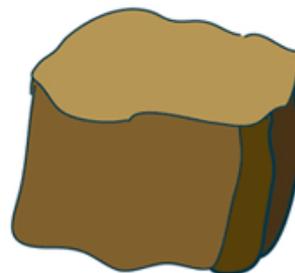


Figure 6: Massive (low permeability – lacks structure)

Further Information

Please contact Council's Development and Environmental Health Group on Ph 02 6686 1210.