



European Visual Soil Assessment Guidelines

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Definition of EVSA

Visual Soil Assessment (VSA) is the direct evaluation of soil properties that are visible to the naked eye and can be evaluated directly in the field without resorting to sophisticated equipment and laboratory analyses.

It uses: digging tool, spade, large bladed knife, plastic bag, dropper with water, dropper with 10% solution of HCl, stop-watch, pH field measurement kit, pocket ruler, magnifying lens (x 10)....

Purposes of VSA

- Soil survey
- Soil quality assessment
- Soil condition evaluation
- Soil use
- Soil protection
- Teaching purposes

To whom it is addressed

- VSA can be used by farmers for a rapid check of soil suitability for cultivation or evaluation of soil status during or after certain types of cultivation and crop rotation.
- Soil scientists can use VSA to describe soil profiles.
- VSA can be used by environmentalists to investigate some soil threats.
- VSA can be used by soil science students as a practical tool for investigating soil properties.

What can be evaluated

- Soil properties as parameters of soil quality
- Soil threats

Main Parameters of Soil Quality – Physical Parameters

- Soil texture and stoniness;
- Soil structure, agronomically valuable structure (shape and size of soil aggregates);
- Degree of clod development;
- Soil moisture and consistency;
- Soil porosity, bio-porosity;
- Soil depth, thickness of humus horizon and effective soil depth;
- Presence and percentage of soil wetting, water stagnation on soil surface;
- Soil hydrofobicity (i.e. water repellence);
- Depth of groundwater table.

Main Parameters of Soil Quality – Chemical and Physico-Chemical Parameters

- Crust and crack formation;
- Soil colour, estimation of humus content;
- Number and colour of soil mottles;
- Estimation of soil pH, plant nutrient requirements;
- Presence of carbonates, depletion of carbonates by plants;
- Estimation of soil properties from parent material.

Main Parameters of Soil Quality – Biological Parameters

- Root development; rooting depth, obstacle to root development;
- Biological activity in soil, number of earthworms and the depth of their occurrence.

Investigation of Soil threats

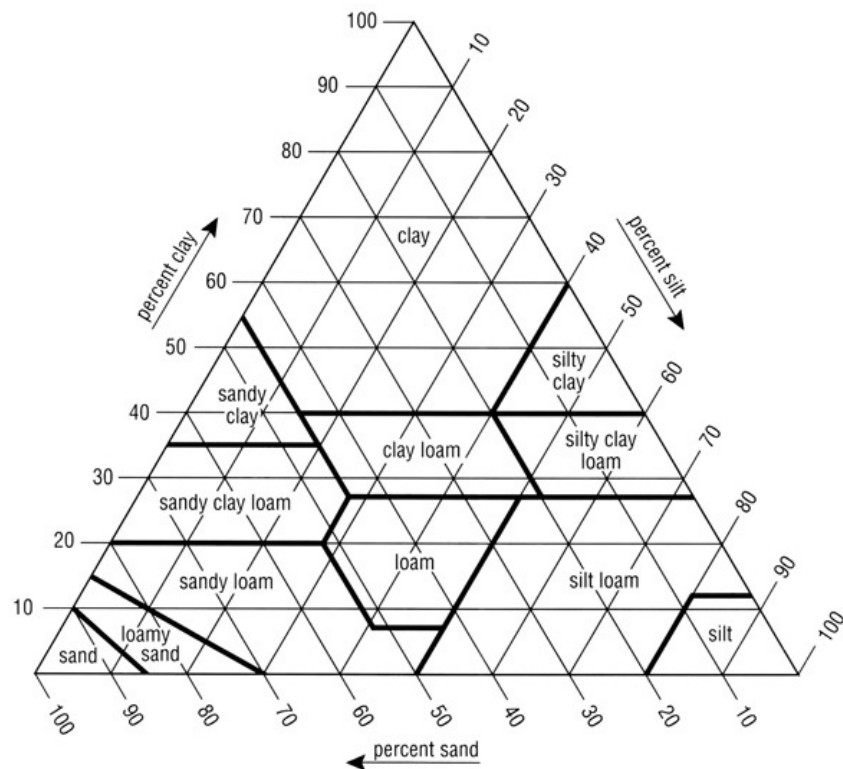
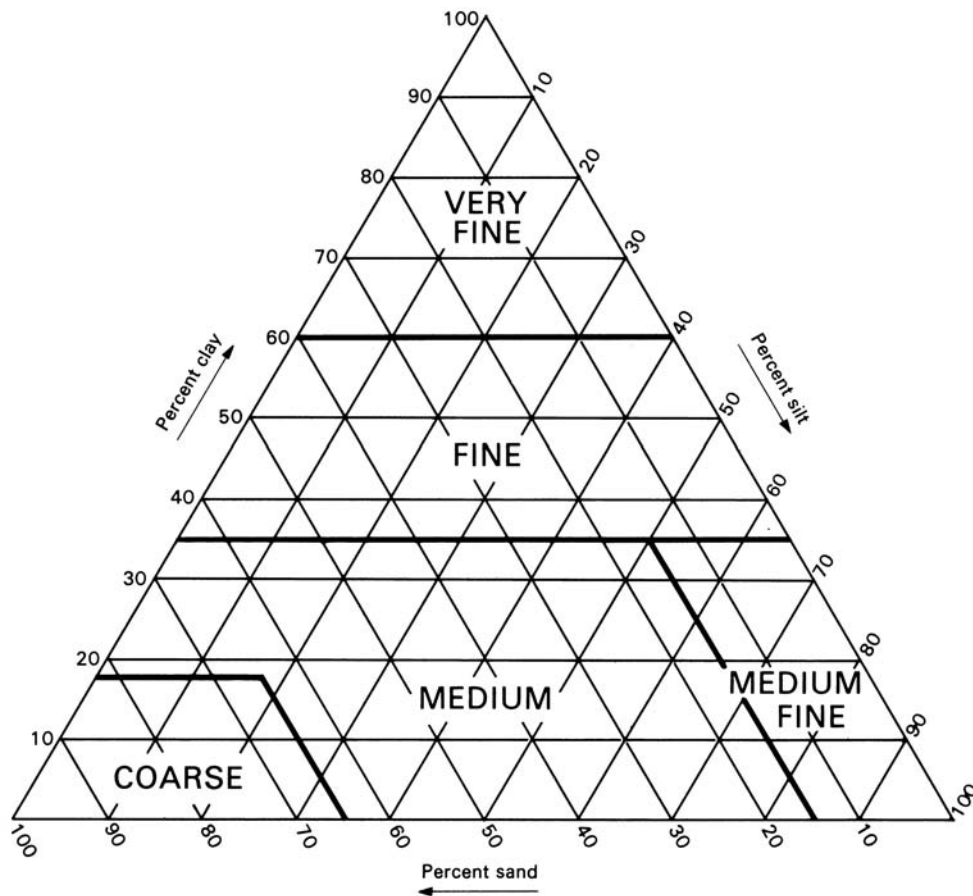
VSA can be used to investigate several soil threats.

However, in many cases, laboratory analyses are also required.

Possible soil threats to be investigated through VSA:

- Presence and degree of soil erosion;
- Soil compaction, tillage pan presence, thickness and depth;
- Soil organic matter decline;
- Salinisation / sodification;
- Landslides.

Example: Soil Texture



Size of Particles

The standard size of particles valid in EVSA (after CEC, 1985: EU Soil Map Texture Triangle):

- Sand: fraction between 50 μm and 2000 μm
- Silt: fraction between 2 μm and 50 μm
- Clay: fraction smaller than 2 μm



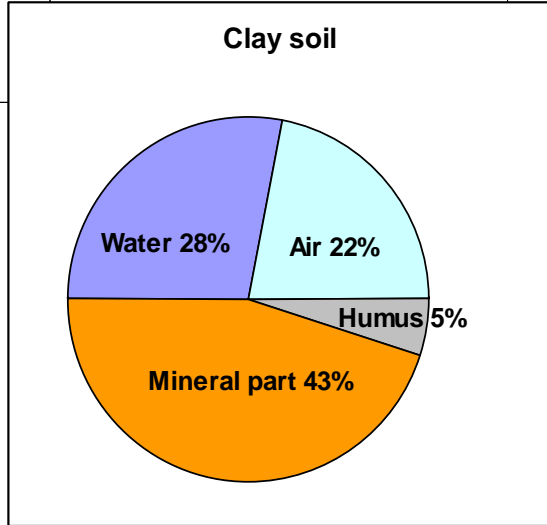
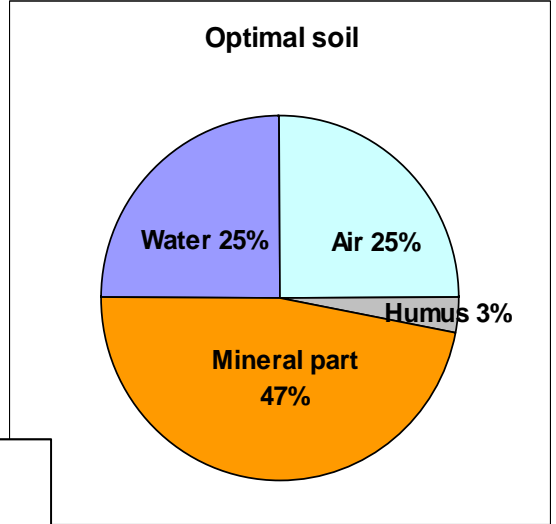
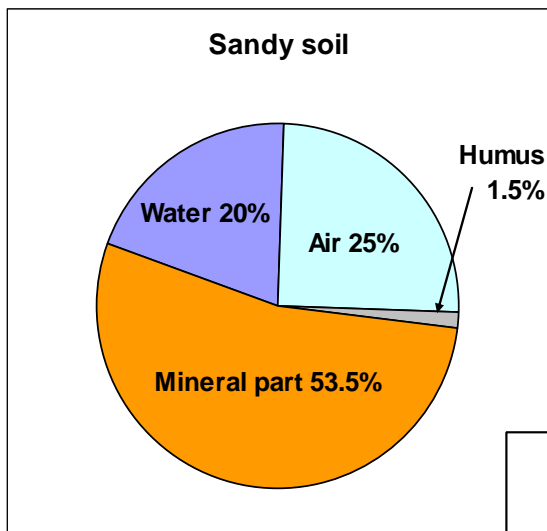
Evaluation rules of finger testing method (modified Soil texture leaflet 895)

Textural group	Textural Category	Finger testing evaluation
Coarse	Sand	Feeling of hard grains of sand, soil is rough, it is not remaining together but it is dividing into smaller parts even single particles. Soil does not strain the fingers.
Coarse	Loamy sand	Soil is not predominantly rough and gritty, slightly feeling of grains, soil strains the fingers. It is difficult to roll the soil into a ball.
Medium	Sandy loam	Soil is not predominantly rough, no feeling of grains, it is not difficult to roll a ball. Soil does not feel either smooth and silky or gritty.
Medium	Sandy silt loam	Soil is not predominantly rough, slight feeling of grains. Soil feels smooth and silky between fingers, as well as gritty.
Medium	Sandy clay loam	Soil mould forms strong ball that does not take polish but smears fingers. Soil feels between fingers also rough and gritty.
Medium	Loam	Soil is not rough. It has "powder" feeling between fingers.
Medium fine	Silt loam	Soil mould feels smooth and silky. It forms an easily deformed ball.
Medium fine	Clay loam	Soil mould forms strong ball, which smears but which does not take a polish.
Fine	Silty clay loam	Soil mould forms ball that does not take polish. Soil feels between fingers also smooth and silky.
Fine	Sandy clay	Soil mould is like plasticine, polishes and feels very sticky when wetter. Soil is also rough and gritty.
Fine	Silty clay	Soil mould is like plasticine, polishes and feels very sticky when wetter. Soil is also smooth and buttery.
Very fine	Clay	Soil mould is like plasticine, polishes and feels very sticky when wetter.

Why to investigate Soil Texture

- Estimation of Soil Porosity;
- Estimation of Air and Water Regime;
- Humus and organic matter content and quality;
- Soil consistency and stickiness;
- Bulk density and Susceptibility to Soil compaction;
- Susceptibility to Erosion;
- Proportion of Soil Phases.....

Proportion of Soil Phases



Structure of the book

- Part 1
Determination procedures for parameters of soil quality
- Part 2
Determination procedures for main soil threats investigation
- Part 3
Evaluation procedures for Visual Soil Assessment
- Glossary – soil related terms explanation
- Appendix – tables, clinometer

Evaluation Procedure

Evaluation procedure is based on main and auxiliary parameters. Evaluation can be applied on single soil property (green tables on the end of every chapter) or on several soil properties resulting in complex soil evaluation.

All parameters have the same value, which can be increased for chosen parameters in specific cases (individual soil threats investigation – erosion, compaction ...). It is the investigator choice which parameter s(he) wants to have as a main and which as an auxiliary one.

Evaluation Procedure

It is recommended to keep choosen parameters always as main and not auxiliary. These parameters are:

- Soil texture;
- Soil structure;
- Soil colour;
- Estimation of soil pH;
- Rootability/rooting depth.



Evaluated Parameters

- Soil texture
- Soil stoniness
- Soil structure stability
- Shape and size of soil aggregates
- Clods development
- Soil porosity
- Thickness of humus horizon
- Effective soil depth
- The depth to obstacle for plant's roots (rootability/rooting depth)
- The width, depth and distance between cracks
- Soil colour
- Soil mottles abundance
- Soil pH
- Amount of soil carbonates
- Soil moisture
- Soil consistency
- Depth to ground water table
- Water stagnation on soil surface
- Soil hydrophobicity
- Number of earthworms

Evaluation purposes

- Soil suitability for cultivation;
- Soil status before, during or after cultivation;
- Soil suitability for agricultural use in general;
- Estimation of soil balance with surrounding environment;
- Estimation of soil vulnerability according to different threats.



Evaluation scale for parameters

- Unfavourable
- 1 – Less favourable
- 2 – Favourable
- 3 – Very favourable

Complex soil evaluation (20 parameters)

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EVALUATION POINTS	DESCRIPTION
< 20	unfavorable soil conditions
20 – 30	less favorable
31 – 40	favorable
41 – 50	very favorable
51 – 60	optimal

Soil evaluation (10 parameters)

EVALUATION POINTS	DESCRIPTION
< 10	unfavorable soil conditions
10 – 15	less favorable
16 – 21	favorable
22 – 27	very favorable
28 – 30	optimal

Soil evaluation (5 parameters)

EVALUATION POINTS	DESCRIPTION
< 5	unfavorable soil conditions
6 - 7	less favorable
8 - 10	favorable
11 - 13	very favorable
14 - 15	optimal



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Title Picture

Thank you for your attention.



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