DSMS 2025 – update of the Digital Soil Map of Sweden

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Map layers

The map layers in DSMS (Digitala åkermarkskartan) contain predictions of the contents of clay, sand and soil organic matter in the topsoil (0–20 cm) of arable land in southern Sweden – from Skåne County to Gävleborg County. The arable land corresponds to the extent of the Block map of agricultural land 2022 from the Swedish Board of Agriculture. The geographical resolution is 20 m × 20 m. The silt content has been calculated from the clay and sand content maps. The texture class (according to the USDA–FAO texture classification) has then been calculated from the clay, sand and silt contents. This version replaces the DSMS version 2019 (with 50 m spatial resolution) that was developed jointly by SLU and the Geological Survey of Sweden (SGU). The downscaling was done using some new covariates, and the method was random forest instead of multivariate adaptive regression splines. No new calibration data was available. Soil texture is only mapped in areas that were predicted to have <20% soil organic matter content.

Uncertainty and usage

When using the map layers, keep in mind that the calculations are uncertain. The deviation compared with measured soil samples can be significant. Before using the map layers, one should assess whether the values seem reasonable by comparing them with analysed soil samples or local knowledge. Use is at your own risk. Neither SLU nor SGU accepts any responsibility for direct or indirect consequences of the use of the maps.

Known limitations include, for example, difficulties in using the applied methodology to estimate topsoil properties in relatively narrow valleys (e.g. in Bohuslän), as well as in areas with very thin soil cover. It is also uncertain how well the predictions perform e.g. where a very thin soil layer with low clay content overlies soil with high clay content. In northeastern Götaland and eastern Svealand, clay contents are generally higher, and prediction errors are also larger there. The calibration samples are from arable land, but predictions have also been made within areas that the Swedish Board of Agriculture's field block map classifies as pasture. The maps have therefore not been possible to evaluate for pasture. As for soil organic matter content, the predictions are generally quite uncertain.

Validation statistics

The prediction modelling was carried out in 19 sub-regions. Validation statistics for each sub-region are shown in Figure 1.

Even if the MAE may seem low, remember that this is the mean of the prediction deviations – far bigger deviations exist.

The uncertainty is normally reduced when predictions are aggregated. For example, if averages of the different soil properties are calculated for a field, farm or region, the predicted values are likely to be more correct than predictions in individual pixels.

Copyright and citation

Piikki, K., Söderström, M. 2019. Digital soil mapping of arable land in Sweden – Validation of performance at multiple scales. Geoderma, 352, 342-350.
https://doi.org/10.1016/j.geoderma.2017.10.049

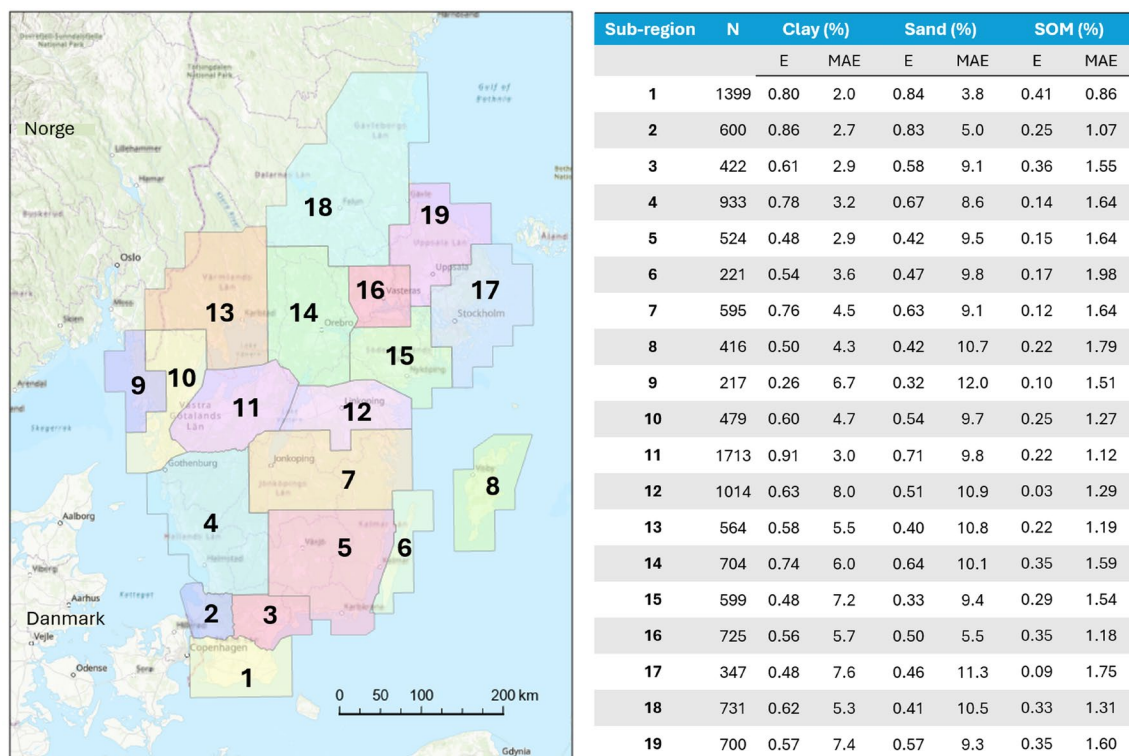| Sub-region	N	Clay (%)		Sand (%)		SOM (%)	
		E	MAE	E	MAE	E	MAE
1	1399	0.80	2.0	0.84	3.8	0.41	0.86
2	600	0.86	2.7	0.83	5.0	0.25	1.07
3	422	0.61	2.9	0.58	9.1	0.36	1.55
4	933	0.78	3.2	0.67	8.6	0.14	1.64
5	524	0.48	2.9	0.42	9.5	0.15	1.64
6	221	0.54	3.6	0.47	9.8	0.17	1.98
7	595	0.76	4.5	0.63	9.1	0.12	1.64
8	416	0.50	4.3	0.42	10.7	0.22	1.79
9	217	0.26	6.7	0.32	12.0	0.10	1.51
10	479	0.60	4.7	0.54	9.7	0.25	1.27
11	1713	0.91	3.0	0.71	9.8	0.22	1.12
12	1014	0.63	8.0	0.51	10.9	0.03	1.29
13	564	0.58	5.5	0.40	10.8	0.22	1.19
14	704	0.74	6.0	0.64	10.1	0.35	1.59
15	599	0.48	7.2	0.33	9.4	0.29	1.54
16	725	0.56	5.7	0.50	5.5	0.35	1.18
17	347	0.48	7.6	0.46	11.3	0.09	1.75
18	731	0.62	5.3	0.41	10.5	0.33	1.31
19	700	0.57	7.4	0.57	9.3	0.35	1.60

Figure 1. Sub-regions used in the prediction modelling, and validation statistics. N = number of soil samples; E (Nash–Sutcliffe model efficiency) = the closer to 1, the better (if it is close to 0, one might just as well use the mean value for the area); MAE = the mean of the absolute values of the deviation between the analysed value and the predicted value.

More information

https://www.slu.se/en/environment/statistics-and-environmental-data/environmental-data-catalogue/digital-soil-map-of-arable-land-in-sweden/