SOIL STRUCTURE INDEX

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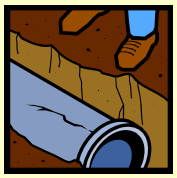
Soil structure index is a method to evaluate the physical status of the soil and the effect of the farming system on soil structure. The index consists of three parts:

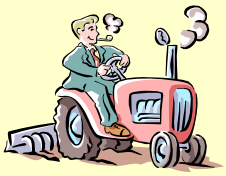
Land improvement



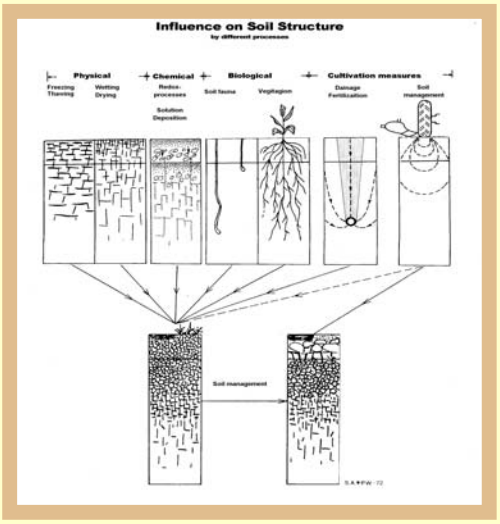
In the first part, basic agricultural land improvement measures such as drainage, subsoiling etc. are evaluated. The need for improvement is estimated either from typical values for different soil types and climatic areas, already measured values of e.g. hydraulic conductivity or from the results of the "Soil structure field test".

A good soil structure is of great importance for crop production. Good soil structure for plant growth requires the presence of pores for storage of plant available water, pores for the transmission of water and air, and pores in which roots can grow. Rooting, water supply and nutrient uptake are factors affected by the soil structure.

Farming system



In the second part, the effect of the farming system on soil structure is summarized in an index with three positive factors and three negative factors.



Soil structure field test

The soil structure field test consists of a couple of simple field tests that together give a good picture of the soil structure. They are easy to perform by your own and no special tools are required. By doing the tests on a regular basis, preferably together with other farmers and/or advisor, it is possible to assess and monitor the structure of the soil. From this knowledge it is possible to develop a long-term strategy to improve the soil structure of your fields.

The soil structure index evaluates the different factors affecting the soil structure, making it possible to predict the long term effect of different cropping systems

Farming System Index

The six factors in the Farming System Index are calculated for a whole crop rotation. All factors are multiplied by different coefficients before they are summed up to the Farming System Index.

Positive factors	Negative factors
• Plant root production	• Bare non- frozen soil
• Organic material	• Number of passages in the field
• Drying of the soil profile	• Subsoil compaction

The index has been evaluated with very promising results in a project called 4T located in southern Sweden. The aim of the project was to explain the difference in yield levels between neighboring farms. 14 farms where divided into 7 pairs. The farms in every pair are located closely together and have similar farming properties (soil, weather etc.). Historically one of the farms has high yields (good farm) and the other average yield for the area (average farm). The "good farms" had in most cases a higher Farming System Index and "better" physical properties than the corresponding "average farm". The table shows the result from pair 3.

Result of "Farming system index", pair 3 in the 4T project

Year	Crop	Organic material	Roots	Drying	Bare soil	Compaction	Passages	Sum Crop	Average Crop rotation
	Good farm								
1995	Ley	1,0	6,6	9,0	0,0	0,0	-2,3	14,3	
1996	Ley	0,8	5,6	9,0	0,0	0,0	-2,3	13,1	
1997	Sugar beats	6,1	0,4	6,5	-5,2	-2,7	-3,7	1,5	
1998	Winter barely	1,4	4,4	0,7	-1,6	-2,6	-3,3	-1,1	
1999	Winter wheat	5,0	6,0	5,8	-2,0	-2,7	-5,3	6,8	
2000	Sugar beats	7,1	0,4	6,5	-9,3	-2,7	-4,0	-1,8	
Sum crop rotation		**21,4**	**23,4**	**37,5**	**-18,1**	**-10,7**	**-20,9**		**5,4**
	Average farm								
1995	Winter rey	4,2	5,6	5,3	-2,0	-5,8	-2,3	5,0	
1996	Sugar beats	5,3	0,3	6,5	-5,2	-8,0	-4,0	-5,0	
1997	Peas	0,9	1,1	4,7	-5,8	-9,8	-2,3	-11,3	
1998	Winter rape	3,5	4,7	3,5	-1,3	-5,8	-3,3	1,3	
1999	Winter wheat	4,5	6,0	5,8	-2,4	-2,7	-3,3	7,8	
2000	Sugar beats	5,6	0,4	6,5	-9,2	-8,0	-4,0	-8,7	
Sum crop rotation		**24,0**	**18,2**	**32,3**	**-25,9**	**-40,1**	**-19,2**		**-1,8**

Ley had a very positive effect on soil structure

Peas for the industry. Harvested early by a very heavy harvester.

Average values for the whole crop rotation.

Heavy machinery on the "average farm"

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