

Motivation

The Label for Sustainable Soil Management was designed on request of ASR Real Estate Investment Management by CLM Research & Advice together with other soil quality experts (page 2). Sustainable soil management helps to preserve soil fertility and land value. ASR is investigating how soil quality can be incorporated in their financial products. Such a system would motivate farmers to choose soil management practices that promote soil fertility and soil health. ASR now seeks cooperation with other organizations in the agribusiness to apply the Label in practice on farmland soils. Vitens and Rabobank have joined this collective so far.

Reduction of greenhouse gas emission (CO₂, CH₄)

Disease suppression (reduced chemical crop protection)

Good soil structure and organic matter content

Water retention

Adequate delivery of nutrients to plants

Limitation of nutrient leaching



Fig.1: Most important soil functions in agricultural systems

What is soil quality?

Soil quality is a measure of the condition of the soil to function as a resilient ecosystem in support of plant and animal productivity and human health.

The most important functions of soils in agricultural systems are nutrient cycling, suppression of soil-borne diseases, a good soil structure and soil organic matter content, water retention and infiltration and limitation of greenhouse gas emissions (Fig. 1).

What is the Label for Sustainable Soil Management?

The Label for Sustainable Soil Management is a transparent system that motivates farmers to apply certain soil management practices in support of soil ecosystem functions. The effect of these soil management practices will be evaluated by measuring soil biological, chemical and physical indicators over time (Fig. 2).

Input: Soil management practice (effort farmer)

Output: Preserve and improve soil quality

Motivate via Label

Measure via soil indicators

Fig. 2: Relation between the Label, soil management practices, soil quality and soil indicators

Table 1¹: Selection of soil management practices in arable systems on sandy and clay soils and their valuation

Soil management practice	Valuation
1. 80% of the year crop growth (i.e. using cover crops)	3
2. Planting rest crops (40% in rotation)	
2a. General rest crops	1
2b. Deep-rooting rest crops	2
3. Crop rotation (potatoes) 1:4 minimum	2
4. Application of techniques reducing emission of crop protection products	1
5. Application of early varieties (potatoes, sugar beets)	1
6. Positive organic matter balance (farming company level)	1

How do we select suitable soil management practices and soil indicators?

A team of soil quality experts with experience in applied agricultural research selected soil management practices supporting soil ecosystem functions. Practices included in the final list had to meet certain criteria (see criteria soil management practices). The Label was differentiated according to type of farming (arable versus dairy farm) and soil type (sand, clay, peat). The same team of experts also selected soil indicators (such as C:N ratio of soil organic matter, number and diversity of nematodes, water infiltration capacity) to be able to evaluate the relation between the selected soil management practices and soil quality over time.

Table 2²: Selection of soil management practices in grassland systems on sandy and clay soils and their valuation

Soil management practice	Valuation
1. Age of grassland	
1a. Minimum of 20 years	6
1b. Minimum of 12 years	?
1c. Minimum of 4 years	1
2. Application of drag hose manure	1
3. Nine months slurry storage capacity	1
4. Grass-clover mixture	1
5. Average highest groundwater level <40 cm: permanent grassland ²	5

Criteria soil management practices

In order to be included in the Label, soil management practices:

- » Should have a positive influence on soil quality
- » Do not demand a disproportionately high investment
- » Should be applicable within regular farm management
- » Have to be easy to monitor and control

Table 3¹: Selection of soil management practices in maize fields on sandy and clay soils and their valuation

Soil management practice	Valuation
1. Grass (or other cover crop) sown in maize simultaneously or in June	1
2. Application of techniques reducing emission of crop protection products	1
3. Application of early varieties	1
4. Application of drag hose manure	1
5. Nine months slurry storage capacity	1
6. Positive organic matter balance (farming company level)	2
7. Grass-clover mixture	1
8. Average highest groundwater level <40 cm: permanent grassland	5

¹ 80% of the practices can be checked via registration data of RVO.

² The farmer can choose fewer measures under these conditions; only measures 2 and 3 are applicable.

³ The farmer can choose fewer measures under these conditions; only measures 5 and 6 are applicable.



Drawing the Label: how does it work?

The team of soil quality experts rated each soil management measure on the degree of positive influence on soil ecosystem functions, translated into a weighting factor per measure. The Label was then divided into four classes: A till D. The lay-out of the Label is as follows:

	For arable farms (table 1):	For dairy farms (table 2 &3):
Label A	9-10 points	7-9 points
Label B	6-8 points	4-6 points
Label C	4-5 points	3 points
Label D	0-3 points	0-2 points

When a farmer applies all above-mentioned measures, he/she will get Label A. Subsequently, (s)he would get the highest financial reward.

Soil management advice

Besides the selected soil management practices that are included in the Label, we formulated many more measures that can be undertaken to improve soil quality. For instance, the use of low ground-pressure tyres and following the same tracks in grassland to prevent soil compaction. These measures are, however, not easy to monitor and therefore are not part of the A-D labeling.

Who can benefit from the Label?

Sustainable soil management is important for landowners and land users to preserve soil fertility and thus the value of land, and the presented Label can help secure this. Land owners renting out land and banks can be driving forces of the system, linking the Label to financial incentives. The farmer can benefit from the Label as it helps maintain crop productivity and soil quality, meanwhile receiving a financial incentive for applying good soil management practices. Retail, food trade and processing companies can use the Label for stimulating sustainable sourcing. Finally, the Label may also help drinking water companies and governments to attain their objectives of good water and soil quality.

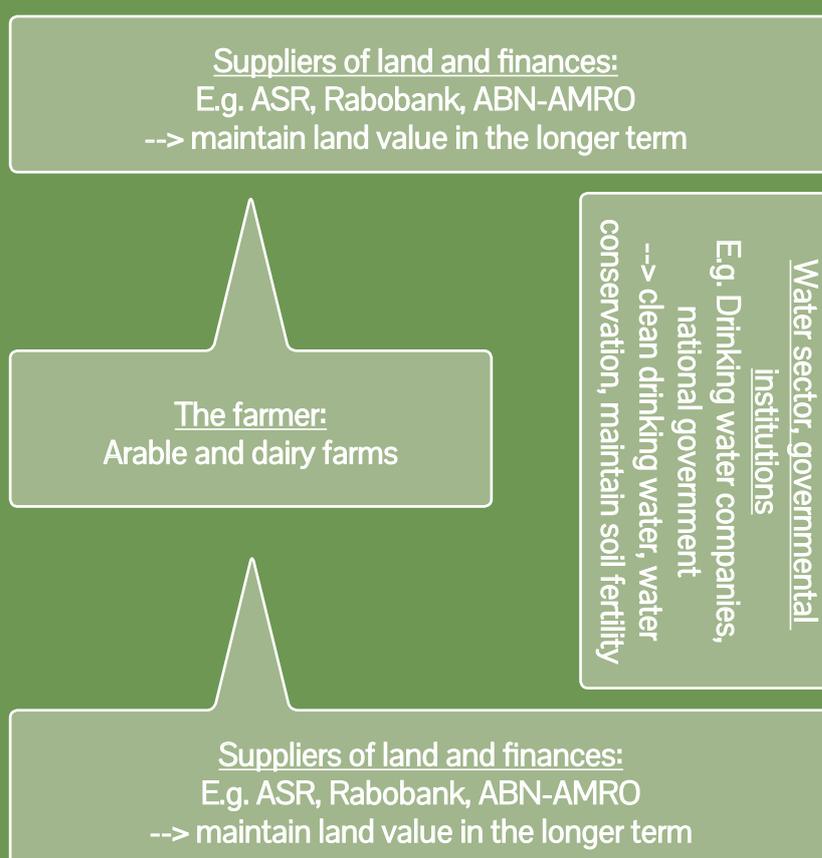


Fig. 3: Scheme of organizations in the food chain that can be assisted by the introduction of the Label.