

# FOCUS ON ADDING MANURE, RESIDUE MANAGEMENT AND MINIMISING TILLAGE OPERATIONS THROUGH SUBSOILING

**Name** László Lévai  
**Region** Kompolc, Hungary  
**Farm type** Arable farming (winter wheat, rape, sunflowers)  
**Farm size** 75ha



## Tell us about your farm

I farm alone although I farmed with my father for many years and before that I worked at an agricultural research institute. I farm 75 ha arable land, of which half is leased. Most of my parcels are on loam soil, although I have a 10 ha sandy area which is prone to drought and heat stress during summer.

## What changes have you made?

I apply manure and recycle crop residues in order to improve the soil structure. I also try to minimise tillage operations to protect the soil, so when conditions permit I use a subsoiler instead of a plough. These practices contribute to better soil functioning, which leads to better yields overall.

## Why did you decide to implement the practice?

The soil was in poor health and there were negative effects on plant development, nutrient and water uptake, and on farm economics due to high fuel consumption for tillage and low yields.

## How have you incorporated the practices into your rotations?

The use of the subsoiler is not introduced as a substitute but rather as a complement to ploughing. My usual rotation includes rape-winter wheat-sunflower-winter wheat (sometimes I have winter wheat for more than one year). Based on my experience, the most important issue for subsoiling is proper timing. I carefully assess each and every situation, mainly the soil conditions but also costs and machinery availability. I apply manure every 4–5 years, depending on availability and my financial situation. For residue management, the residue is spread evenly on the ground and partly ploughed in but this depends on the harvester.

## What has been the biggest challenge? And how have you overcome it?

The most difficult challenge was the timing of subsoiling operations, this needs constant learning and adaptation. Moreover, having access to a wider range of tools is not easy for my farm size due to financial barriers. I overcame this by buying used machinery (or sometimes built my own) or using contractors. For manure spreading I use contractors.

### How has the soil benefited from this change?

The application of manure and increased residue has resulted in better soil functioning. Optimising tillage operations by using the subsoiler when appropriate has led to better soil structure with greater infiltration and easier rooting. I know the soil is in a better state as I can see more organic matter and worms.

#### Estimated impact on soil carbon (tC/ha/yr)

Manure application	0,06
Residue management	0,62
<b>Total</b>	<b>0,68</b>

### How have the yields been affected by this change?

Yield change very much depends on the initial conditions and the soil. Having a poor soil to start with might allow 30–50% yield increase in 2–3 years. On average I managed to reach a 10% increase. I have not seen any change in the crop quality. However, the yield fluctuation between the years has decreased, which means planning ahead is easier, and shows there is more resilience in the system.

#### Farm-specific economic analysis for the combination of measures (based on winter wheat-rape-sunflower-winter wheat crop rotation).

##### Cost savings

Costs (€/ha)	With measure	Without measure	Results
<b>Crop protection</b>			
winter wheat	65,2	43,5	+33%
rape	117,1	78,7	
sunflower	124,3	82,8	
<b>Fuel costs</b>			
winter wheat	59,2	84,5	-30%
rape	59,2	84,5	
sunflower	59,2	84,5	



Photo | P.1, top: © Gunnar Assmy/Fotolia.com; P.1, below, P.2: © Andras Molnar

### How has the farm business benefited from this change? What are the financial implications of making the change?

Overall, this is a cost efficient combination. I experienced 10–20% lower fuel consumption, better nutrient uptake, and improved and more predictable yields. I do need to spend more on crop protection to tackle the weeds in the years when I don't plough. The labour needed changes each year but with improved machinery capacity, I only need a small window of time to complete each of the necessary tasks.

### Where did you get advice and support to make the change?

My main advisor is a rather old classic book written by Adolf G. Manninger about the "Shallow cultivation of soil". I also benefited from carefully observing the mistakes of the neighbouring farmers.

### What advice would you give to others thinking about the change

Do not think about one universal method or approach. The most important thing is to understand your own situation and environment in detail and to constantly adapt to these conditions. If you are ambitious and want to learn about appropriate farming practices then spending time and money on external advisory services is a good idea.

##### Additional revenue

	Yield (t/ha)		Revenue (€/ha)		Result
	With measure	Without measure	With measure	Without measure	
winter wheat	5,2	4,6	869,1	755,8	+15%
rape	3,3	2,9	1288,7	1120,6	
sunflower	2,4	2,1	881,7	766,7	

##### The change in Gross Margin

	With measure	Without measure	Results
winter wheat	202,1	153,0	+32%
rape	423,8	358,0	+18%
sunflower	408,7	359,9	+12%

For further information about these practices see the SmartSOIL toolbox:

<http://smartsoil.eu/smartsoil-toolbox/about/>