

# Winterwheat - autumn tillage- increased erosion during winter period in Norway.

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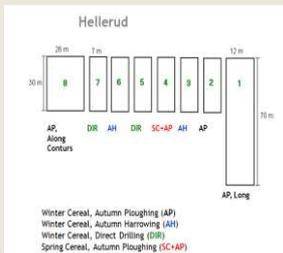
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## Introduction

In Norway the area used for winter wheat production is increasing, in some areas up to 50 % of the cereal area. Most erosion during Nordic climatic conditions occur during late autumn and especially during snowmelt period. Farmers get subsidies for leaving their soil in stubble during autumn and winter period. For winterwheat however, dominant tillage practice is autumn ploughing followed by harrowing before sowing. Winter wheat gives higher yield than spring cereals and is therefore economic beneficial for farmers. Winter wheat was supposed to give soil protection during winter period, but recent research has documented high erosion during autumn and winter period.

In a project (2002 - 2007) the purpose was to study effects of different soil tillage methods for winter wheat on soil erosion. Direct drilling, autumn harrowing, autumn ploughing and spring tillage was compared. Effects on runoff, soil losses and nutrient losses were studied in plot experiments.

## Soil Erosion - plot measurements



Examples of erosion in fields with winter wheat



Plots with different soil tillage. Runoff measurements and water sampling



## Results

Autumn harrowing reduced soil loss with 66 % (silt loam ) and 79 % (clay soil ) compared to traditionally ploughed plots with winter cereals. Direct drilling reduced soil loss with 88 %.

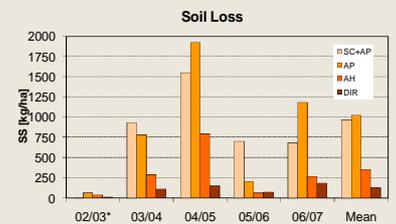
Soil losses from autumn ploughed winterwheat were even higher than from traditional autumn ploughed plots with spring cereals (factor 1.1 and 3.5).

Rainfall event shortly after sowing in autumn gave very high erosion:  
Rainfall and runoff event 16/9 - 5/10: 105 mm rain



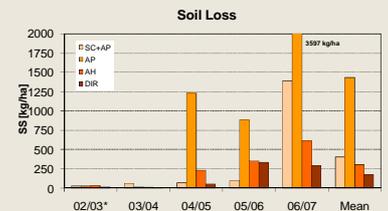
Sowing date: 10 September

### Hellerud (silt loam)



Ap: autumn ploughing  
AH: autumn harrowing  
Dir: direct drilling  
Sc: Spring cereals- autumn ploughing

### Øsaker (clay soil)



### Plot 2

Autumn harrowed

SS-conc 1110 mg/l

### Plot 3

Direct sowing

SS-conc: 5 mg/l

### Plot 4

Autumn ploughed

SS-conc: 5820 mg/l



## Acknowledgement

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Reference. Grønsten, H.A. Øygarden, L., Skjevdal, R. 2007. Effects of traditional soil tillage, autumn harrowing and direct drilling of winter wheat on runoff, erosion and nutrient losses. Bioforsk report Vol. 2 Nr. 60/2007. 71 pp.