



**Land
Degradation
Neutrality**



United Nations Convention
to Combat Desertification

Water erosion in Hungary

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Soil



2015
International
Year of Soils

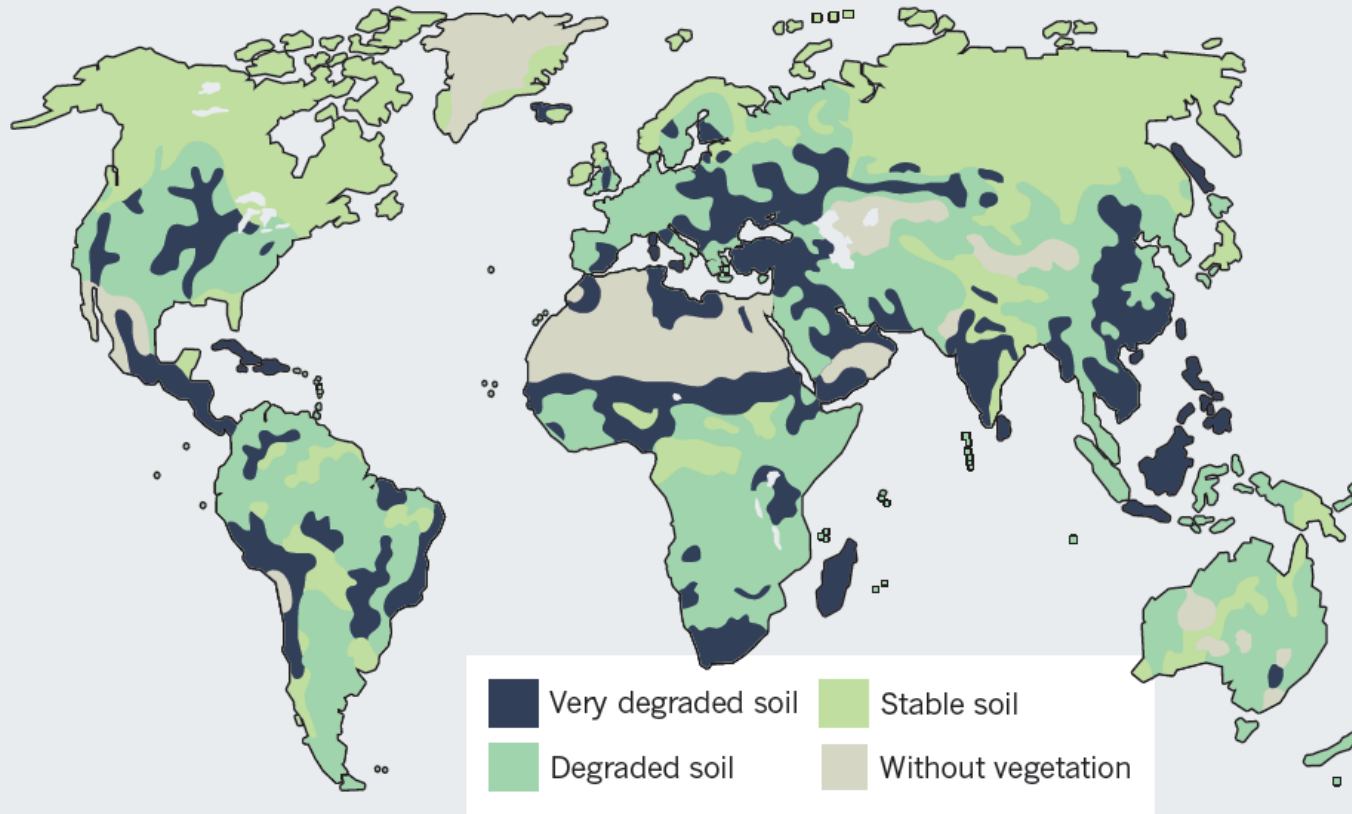


Soil is a non-renewable resource



A THREATENED RESOURCE

In some places soil is being lost 100 times faster than it forms.



Water erosion

Geomorphic process that detaches and removes **soil** material from its primary location by

- water (ice), wind, and gravity;
- soil tillage, land leveling, crop harvesting, road and building construction, quarrying;
- trampling and soil removal by burrowing animals.

Geologic erosion



Accelerated erosion

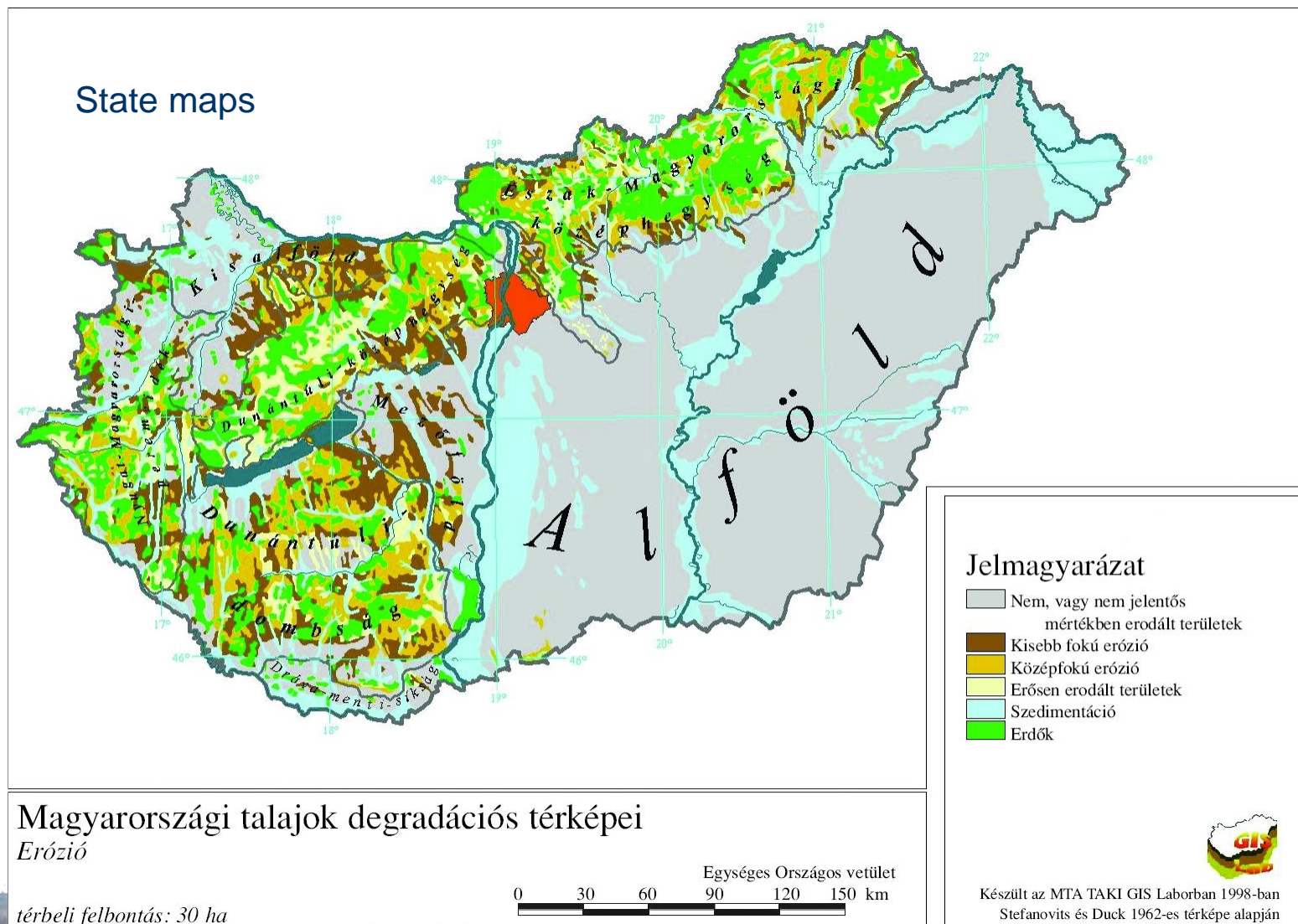


Off site effects



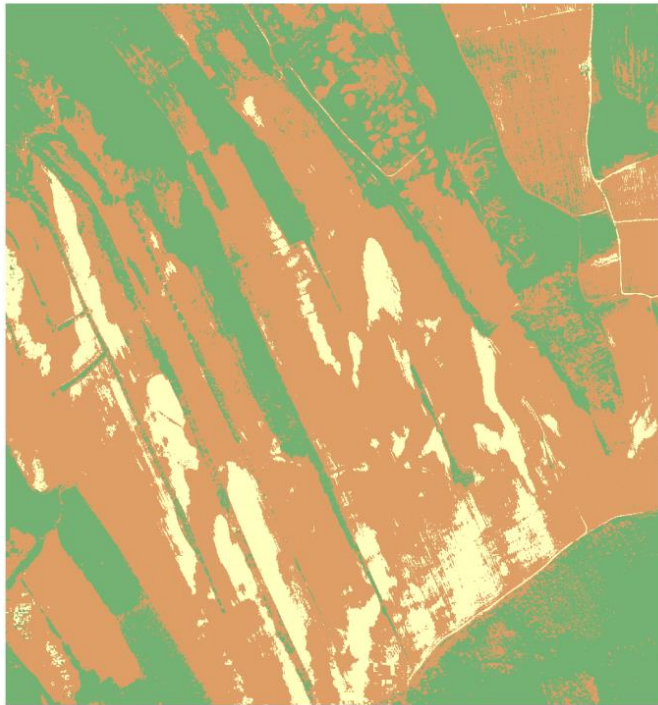
- Silting of pools
- Crop burial



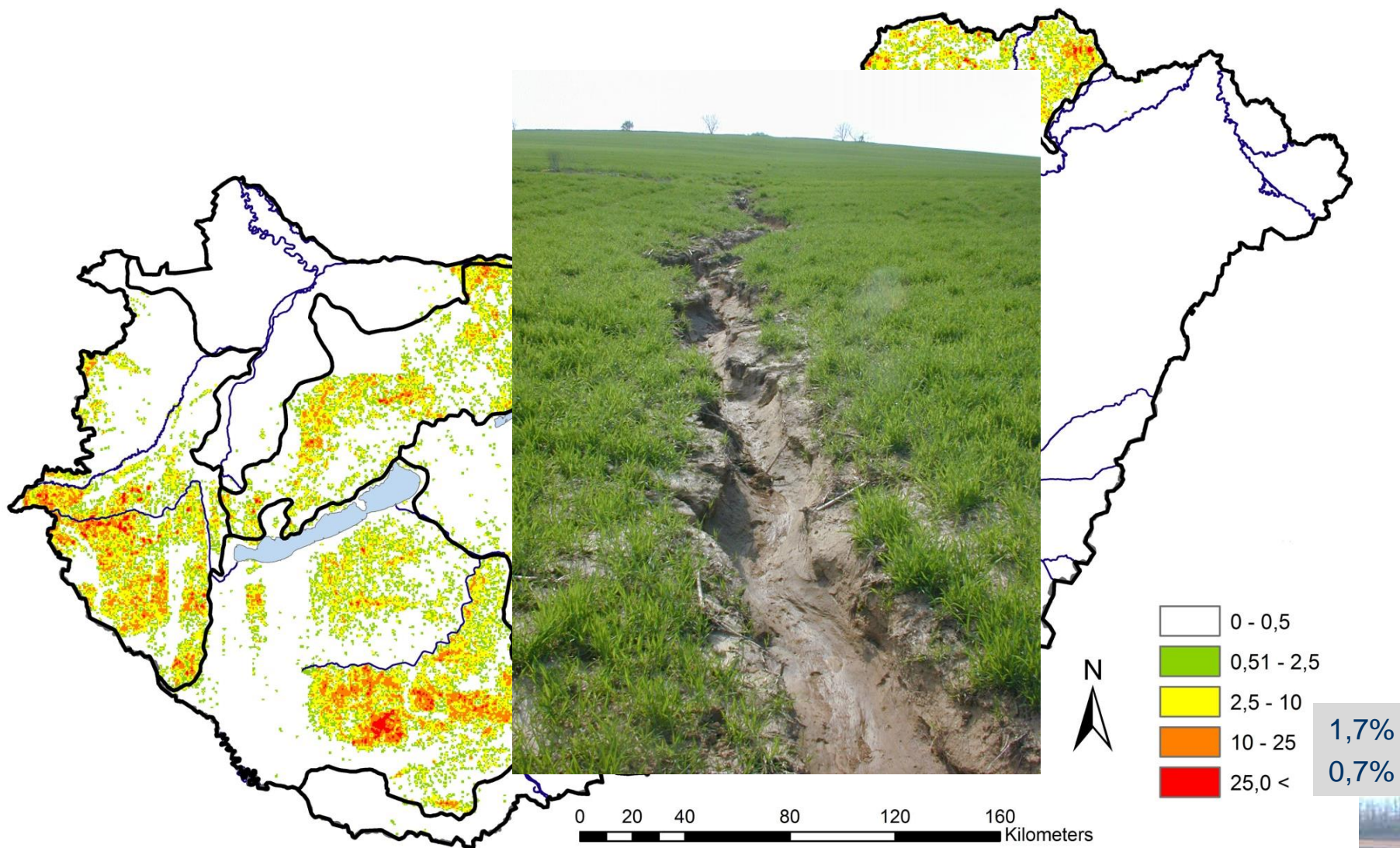


Erosion on the plains and under forest

0 0,125 0,25 0,5 0,75 1 Kilometers



Gully density km km⁻²



Caching the process

What to be measured – Question of scales

- For initial erosion processes
- Measurement of the detached soil
- Suitable for USLE comparisons
- ~ 100 plot years data on soil loss and runoff
- Direct measurements on standard plots
- Extrapolation based on USLE parameters



Results among scales

Field scale

~ 60 plot years

Soil loss is inversely proportional to the studied area but the actual connection depends on several environmental circumstances

Role of extreme precipitation events

Catchment scale



Modeling

- On the basis of these databases soil erosion prediction models can be tested and calibrated for Hungarian conditions

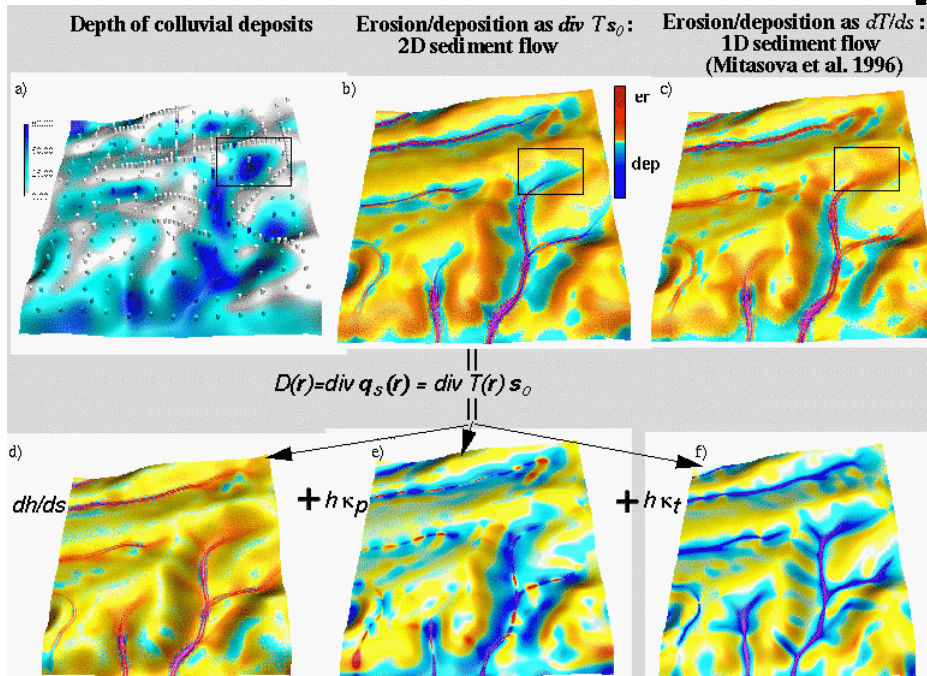
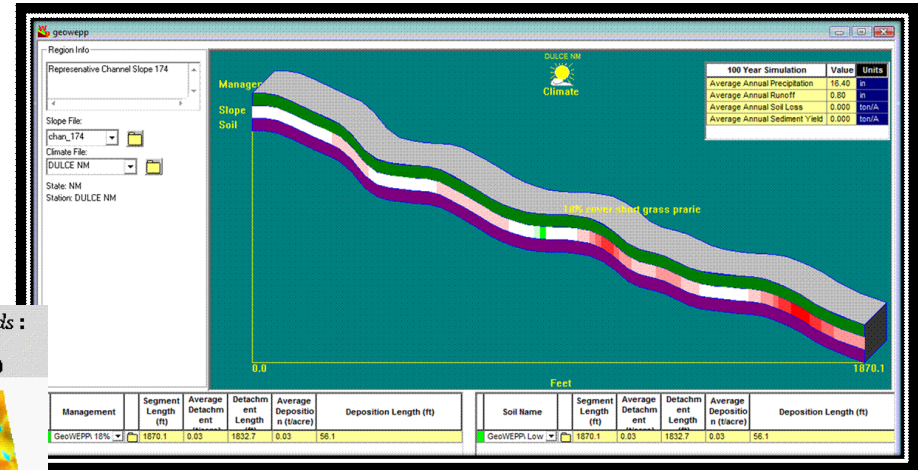
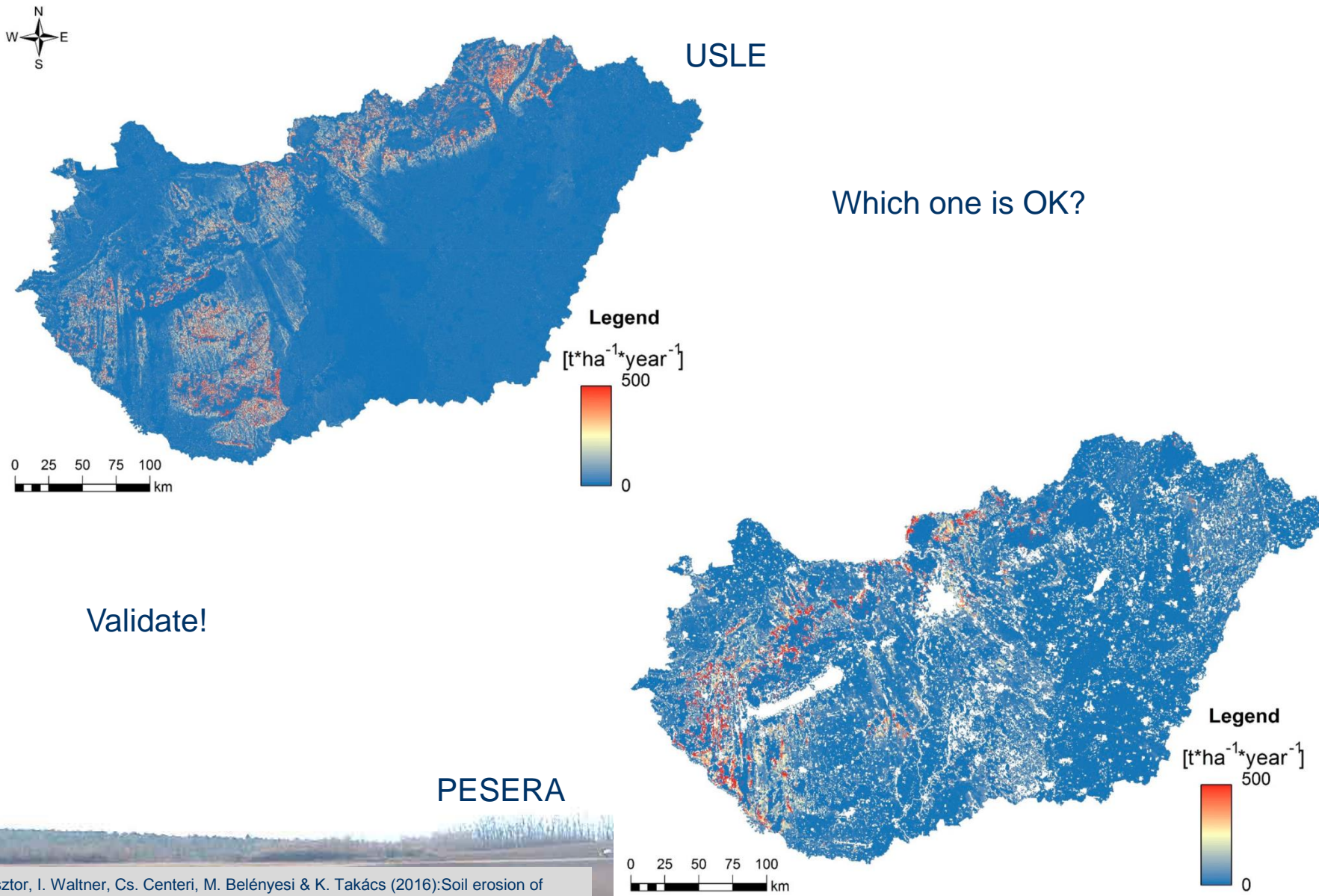


Figure 3. Comparison of observed and predicted deposition pattern a) observed colluvial deposits, b) prediction based on eq. (17), c) prediction based on 1D sediment flow, d) water depth term, e) profile curvature term, f) tang. curvature term. Mitas & Mitasova

- Validation results suggest that single precipitation events have a good correlation with measured results BUT
- Reliability decreases with time (model predicts on the basis on past soil loss events)

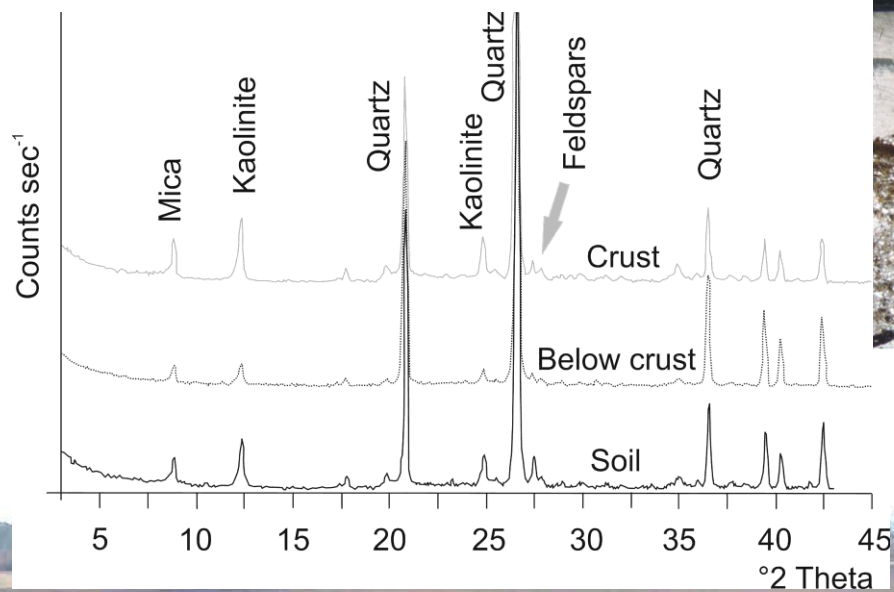
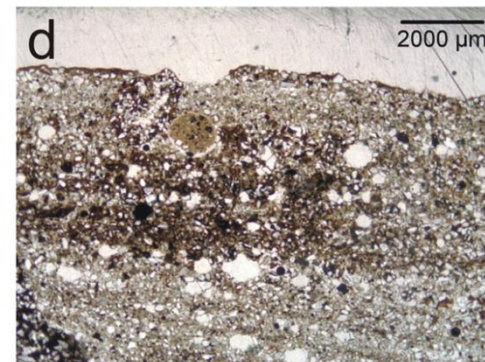
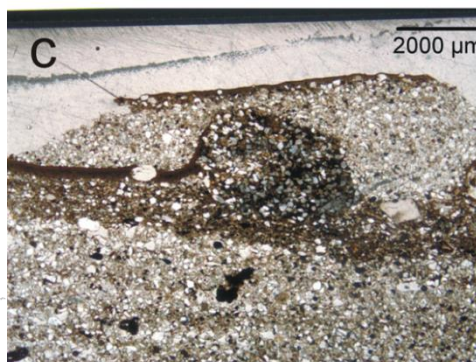
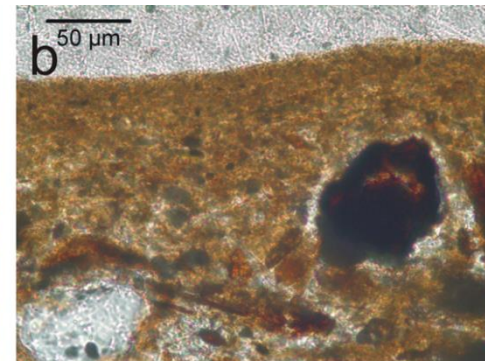
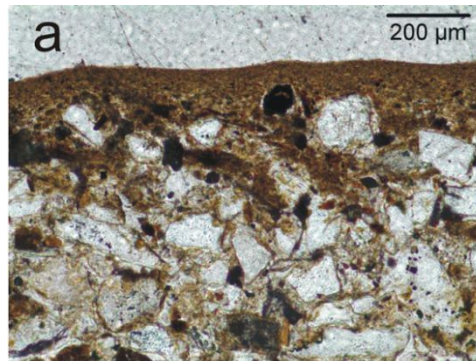
Soil loss prediction maps



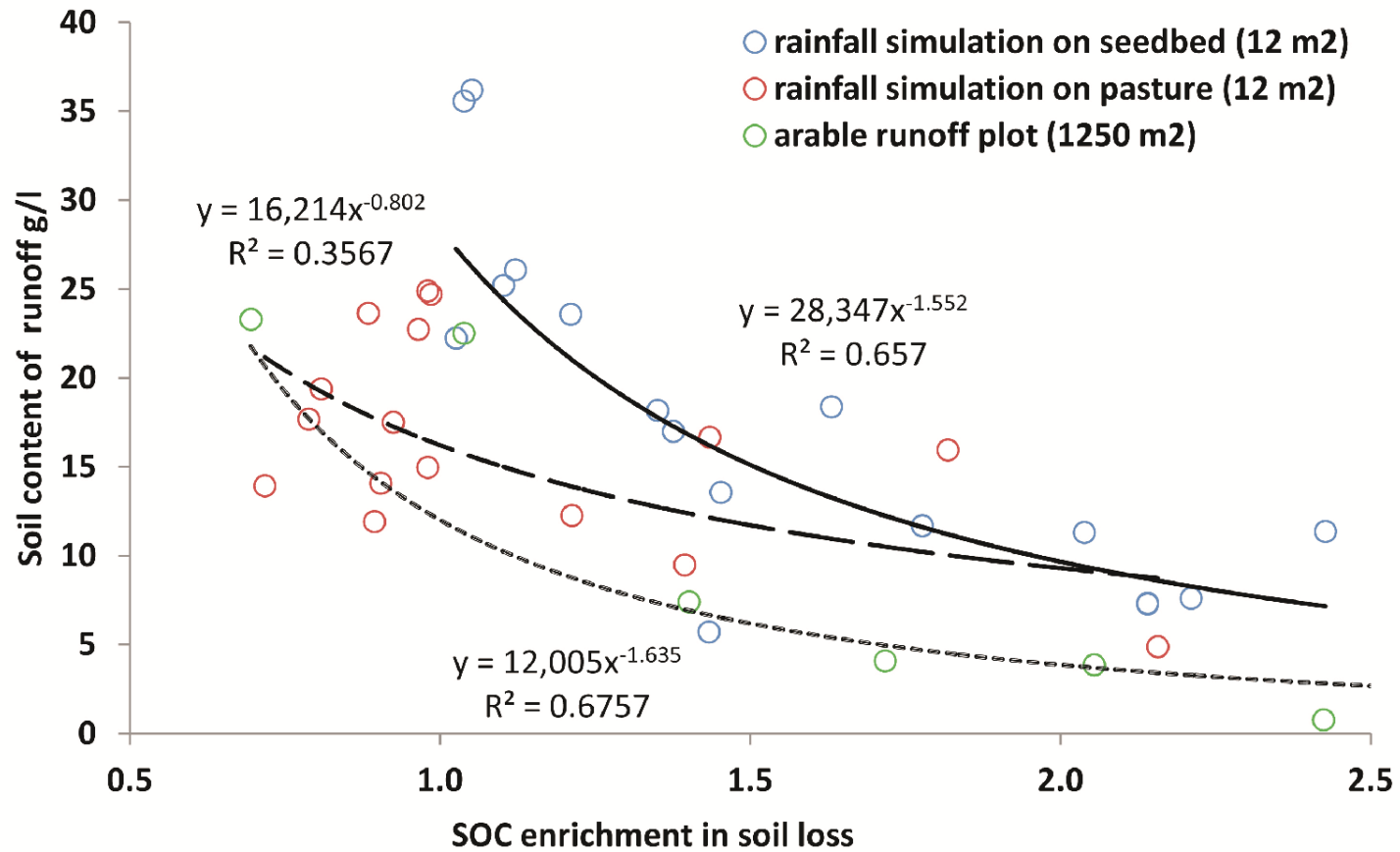
Validations



Splash erosion



Selective erosion



Gullying

- Cannot be predicted
 - Hardly measurable
 - Produces the majority of net soil loss
-
- Cs 137 tracer in 100 km² catchment
 - Reservoir siltation due to gully and sheet erosion 50-50%



Prevention

Decrease soil loss to tolerable???

Less or equal than soil forming

Everything is tolerable that not decreases soil functions (fertility)

- Grassed buffer stripes
- Grassed waterways
- Greening
- Runoff collection with trenches
- Maintenance of these

Policy
Subsidies

How can we get the farmers to do it?

Thank you



