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Polish Phosphorus Index - characterization of conceptual model's crucial components

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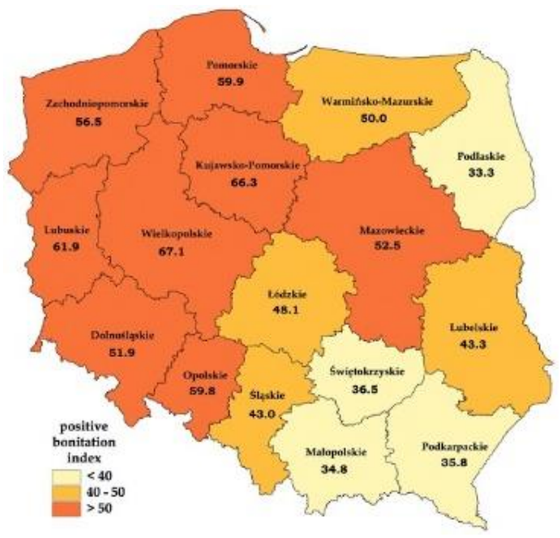
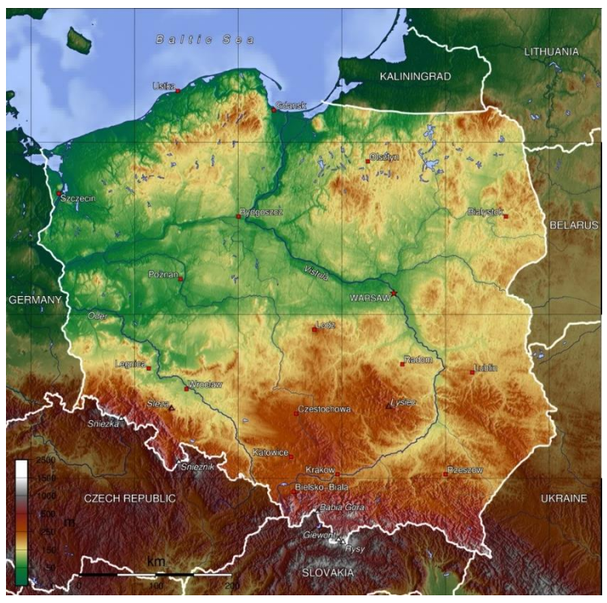
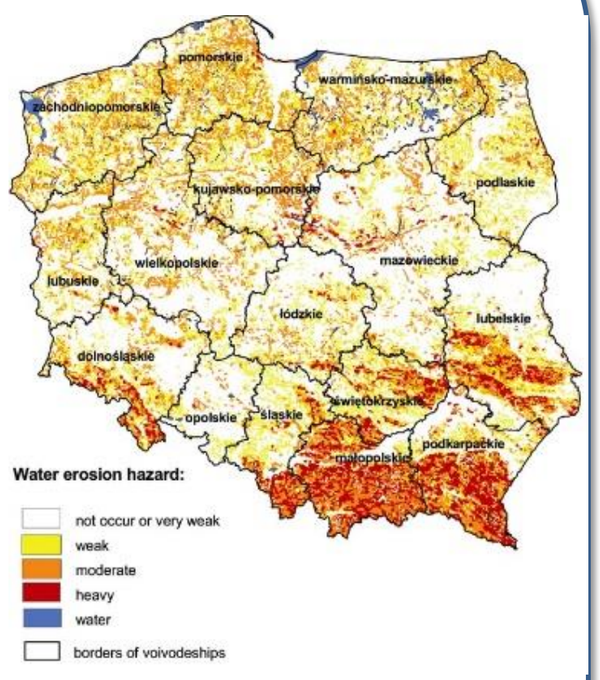
Characterization of Polish agricultural conditions - Phosphorus management



- ✓ 41% of the soils show high and very high P content and 33% of soils - low and very low (Kopiński et al., 2013)
- ✓ In the 2011/2012 a 24.6 kg P per hectare of arable land were used (CSO 2013)
- ✓ P-balance for the period 2004-2006 showed a diffusion of P from agriculture up to 92 thousand tons of P, with direct losses to water - 23.5 thousand tons of P (Fotyma and Igras, 2009).



agricultural land covers 60.3%
arable land – 45.5%
meadows and pastures – 12.5%



Background

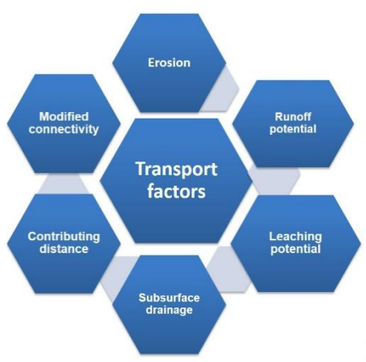
1. Resource scarcity vs peak of population growth
2. Economic impact of lost P for farmers
3. Environmental impact
4. Depletion issues

Phosphorus Index P-Index

- ✓ qualitative predictor of field scale vulnerability to P loss in surface runoff or subsurface flow
- ✓ based on available input data & uses real farm structure
- ✓ made in US by Gburek and Gilbert (1993) - many modification in the US and Europe
- ✓ designed to identify specific areas within the catchment that contribute most to P loss "critical source areas"
- ✓ provides site-specific (flexible!) management options to minimize P emission

1. Screening part

Evaluation category		
Soil Test P	> 200 mg $P*kg^{-1}$	If ***yes*** to either factor then proceed to main assessment part
Contributing distance	<45 m	
Contributing distance	>45 but field artificially drained	



2. Main assessment

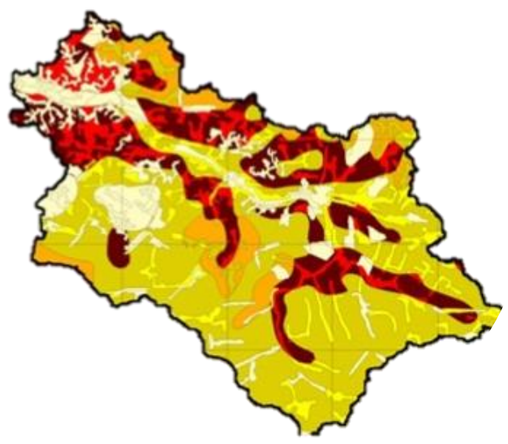
What is done so far?

Water, soil (Mehlich 3) sediments sample collection + flow velocity measurements

based on average monthly P conc. annual TP emission will be calculated

point source emission is evaluated & includes: sewage plantsindividual householdsillegal discharges

P-Index will be calculated for 7 subcatchments and for Bystra catchment



Challenges

1. Lack of fertilization plans
2. Soil sample analysis is yet not obligatory
3. Numbers of farms
4. Deficit of farmers need for pro-environmental actions
5. Country altitude differentiation - many erosion schemes
6. Different buffer zones width
   - 5 m for fertilizers near "smaller" waterbodies
   - 20 m for fertilizers near "larger" waterbodies
   - 10 m for slurry application