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Goals:

1. Improved assessment and mapping of C stock
2. Compute a soil quality index (SQI) in relation to land management.

Rationale: Soil quality determines human/environmental health, and has a direct link with the climatic trends

Hypothesis: Soil Organic Carbon (SOC) concentration, is the highest under no till management.

For statistical analyses, natural vegetation (i.e., forest) is considered as baseline.

Experimental sites and data: The data was collected at different farm locations within the state of Ohio. For each soil series, the sampling was conducted at the same landscape position at depths of 0-10, 10-20, 20-40, and 40-60 cm, within each field site in April, and early May 2012 . The data processing is ongoing.

Sampled sites	Site description
Miami county: 9555 Casstown, Sidney Rd, Piqua, OH 45356	Soil Series: CrA (Crosby silt loam, 0-2 % slopes). Management: NT with CC, NV, CT, NT without CC Crops CT: soybean-corn-soybean NT: corn-soybean-corn Surface residue weighed/determined
Seneca county: Coords 41° 00' 25" N, 85 °16' 21" W	Soil Series: kbA (Kibbie fine sandy loam, 0-2 % slopes). NT with manure & CC, NT with CC without manure, NV, CT Crops: corn-soybean Surface residue weighed
Seneca county: section 16, County Rd 32, Thompson Township	Soil Series: GWA (Glynwood silt loam, 0-2 % slopes). Management: NV, NT with CC, CT Crops: corn-soybean Surface residue weighed/determined
Preble county (Eaton): Coords: 39° 46' 09" N, 84 °36' 52" W	Soil Series: CtA (Crosby Celina silt loams, 0 -2 % slopes) Management: CT and NV Crops: corn-hay Surface residue weighed/determined
Preble county: Coords: 39° 41' 45" N, 84 °40' 36" W	Soil Series: CtA (Crosby Celina silt loams, 0 -2 % slopes) Management: NTCC (with manure) Crops: corn Surface residue weighed/determined
Auglaize county: 7535 St Rt 364, New Bremen.	Soil Series: Pw (Pewamo silty clay loam) Management: NTCC (with manure), NV, CT

Some measured soil quality indicators under no till (NT), conventional till (CT) i.e. with or without manure and cover crops(CC), and natural vegetation (NV)

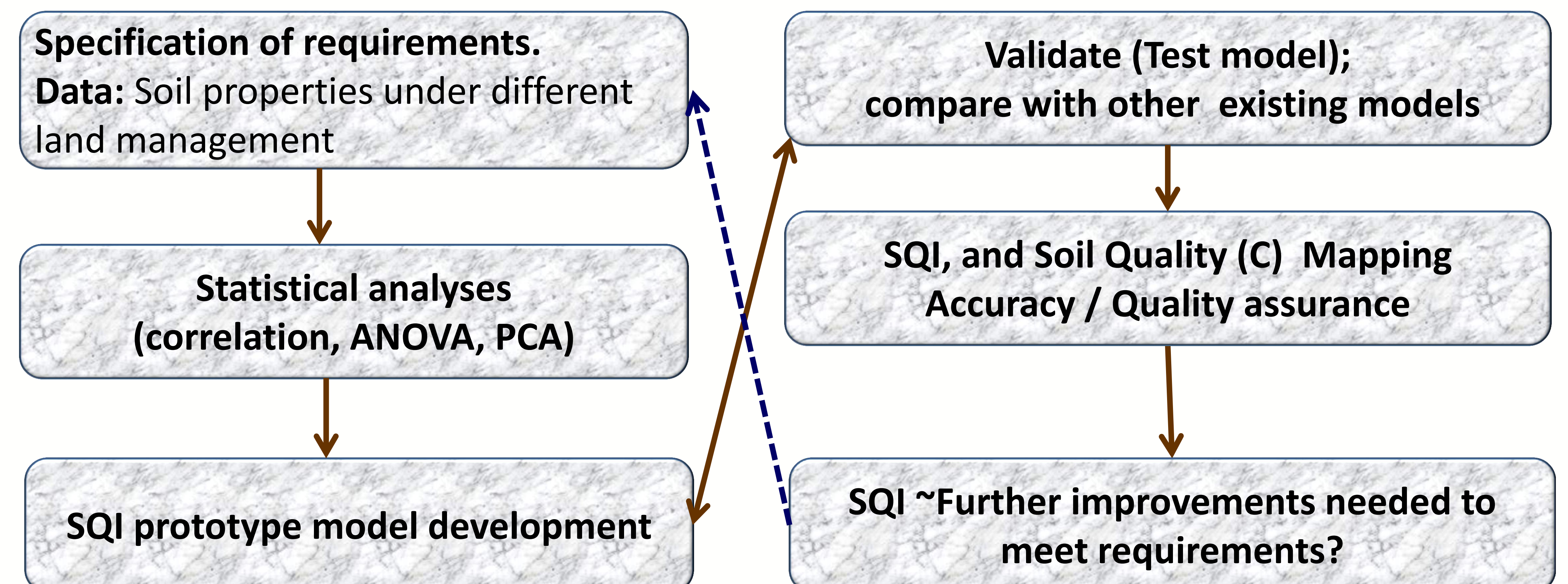
Indicator	Relationship to Soil Health
Soil organic Carbon (SOC)	Major indicator of soil quality, soil fertility, soil structure, nutrient retention. The C/N was determined by dry combustion
Physical: soil water retention, infiltration and bulk density; aggregate stability, penetrability	Retention and transport of water and nutrients; habitat for microbes; compaction, water movement; porosity; workability
Chemical: pH; electrical conductivity; extractable N-P-K	Biological and chemical activity thresholds; plant and microbial activity thresholds; plant available nutrients, and potential for N and P loss
Yield	Estimate of soil productivity potential. Pending: To be measured/determined in the fields

Soil quality Index (SQI):

SQI = function of (Soil properties × Yield) + Constant (Other factors)

Other factors assumed constants may include biologic diversity (e.g., earthworms, microbial activity).

Conceptual framework for SQI



References

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