Soil Change Working Group

Objective:

- **To evaluate and initiate ongoing and planned soil change activities as part of the National Cooperative Soil Survey.**

Management Can Change Soil Properties

Soil	Grassland	Cultivated	Soil Survey
	Organic Matter (%)		
Askarben (NE)	6.0	3.0	2-4
Monona (IA)	3.6	2.9	2-4
	Hydraulic Conductivity (in/hr)		
Askarben	0.3	0.02	0.6-2
Monona	0.13	0.07	0.6-2

(Grossman, unpublished)

Who Needs Soil Change Information? What for?

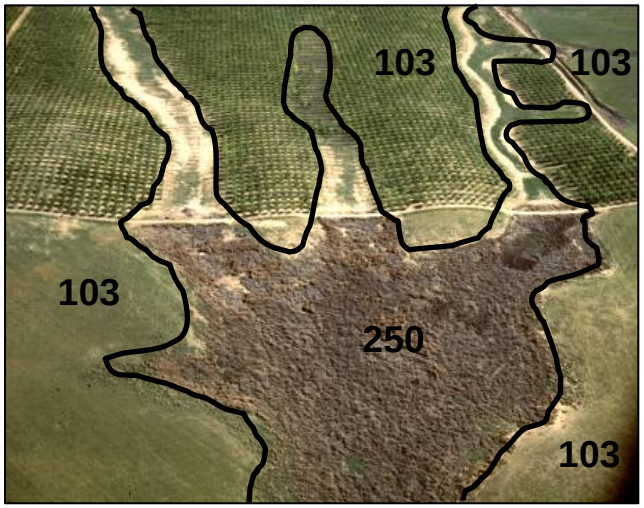
- Decision-makers, land managers, policy makers
  - Plan for long-term productivity
  - Protect, maintain and restore soil functions and ecosystem services
  - Design assessment and monitoring programs and interpret results
  - Predict effects of management on soil and adjust management accordingly

Soil Change Concepts and Terms

– Soil change: Variation over time

– Human time scale: Centuries, decades, and less

– Dynamic soil properties



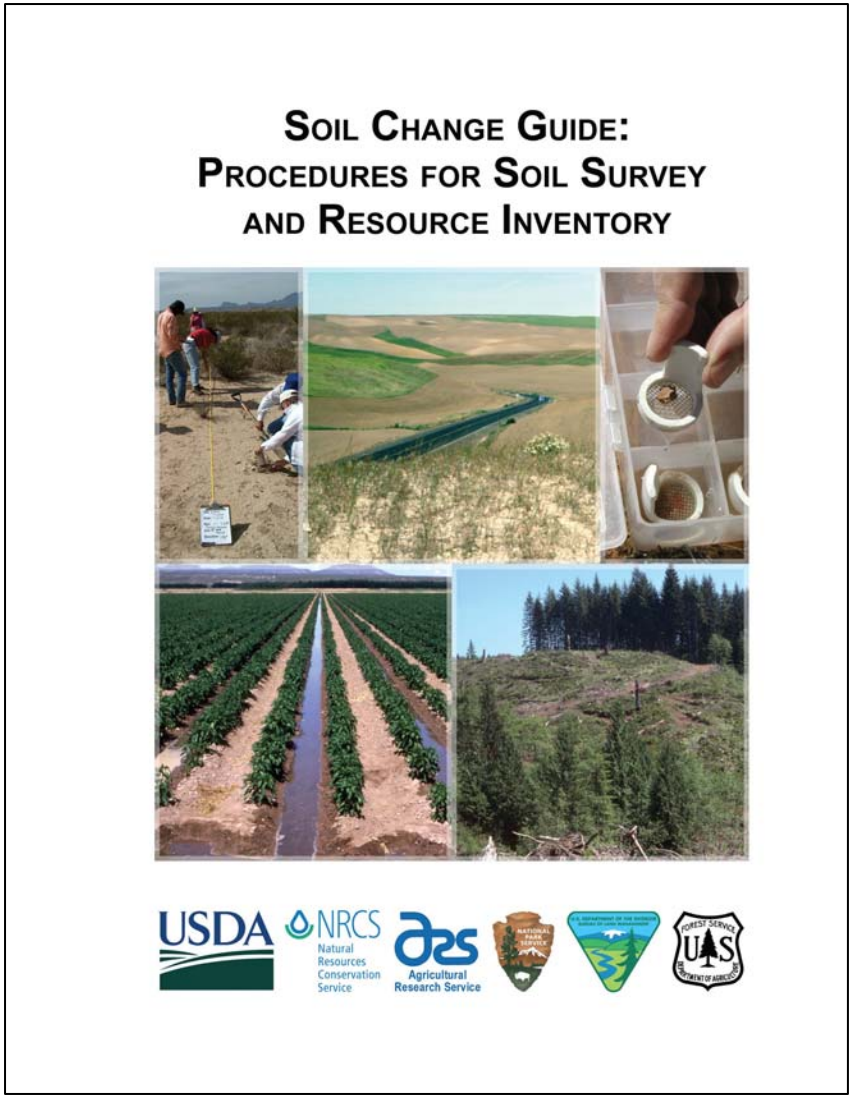
Dynamic soil properties =

Soil properties that change over the human time scale.

- Organic matter, soil organisms
- Structure (bulk density, aggregate stability, crusts)
- Chemical properties (nutrients, pH, salinity)
- Infiltration, soil water

Soil Change Guide

http://soils.usda.gov/technical/soil_change/index.html



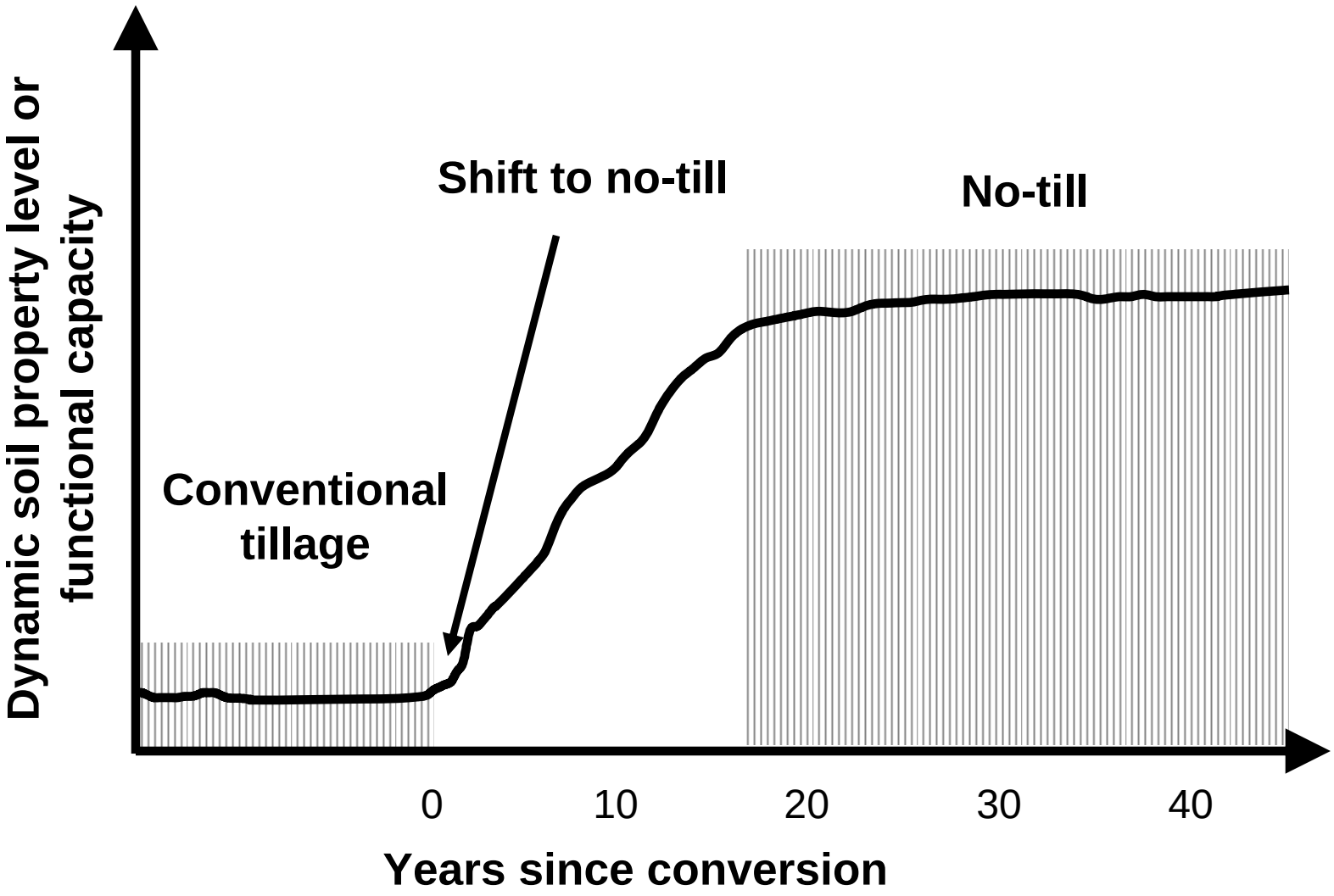
How to conduct a comparison study

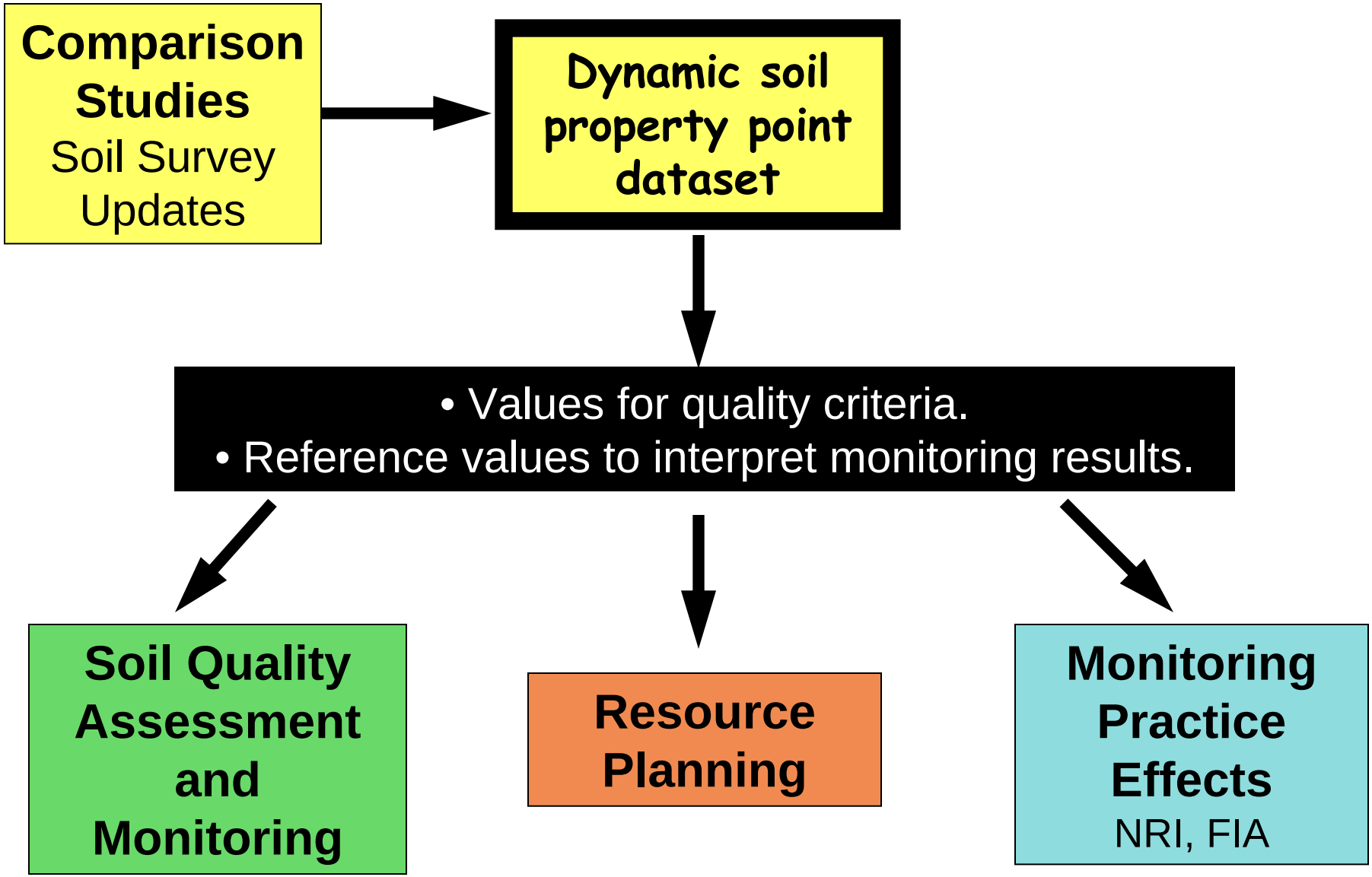
- Project planning
- Data collection and analysis
- Interim storage

Project objective

Document attainable levels in dynamic soil properties for specific management systems on the same kind of soil.

Figure 4.2-1


Dynamic soil property level or functional capacity
Shift to no-till
No-till
Conventional tillage
0
10
20
30
40
Years since conversion


Comparison Studies
Soil Survey Updates
Dynamic soil property point dataset
• Values for quality criteria.
• Reference values to interpret monitoring results.
Soil Quality Assessment and Monitoring
Resource Planning
Monitoring Practice Effects
NRI, FIA

Charges

1. Review and evaluate soil, landscape, and vegetation/biomass parameters to be collected as part of the soil change inventory, especially for pasture and cropland management systems. Properties are currently identified in the Soil Change Guide (2009).

    1. Parameters suitable for field data collection
    2. Parameters measured in laboratory
    3. Hydraulic properties?
    4. Biological properties?

2. Propose criteria for selection of soils and management systems that should be highest priority for soil change inventory. Recommend specific management information that should be collected and stored in the database.

Charges

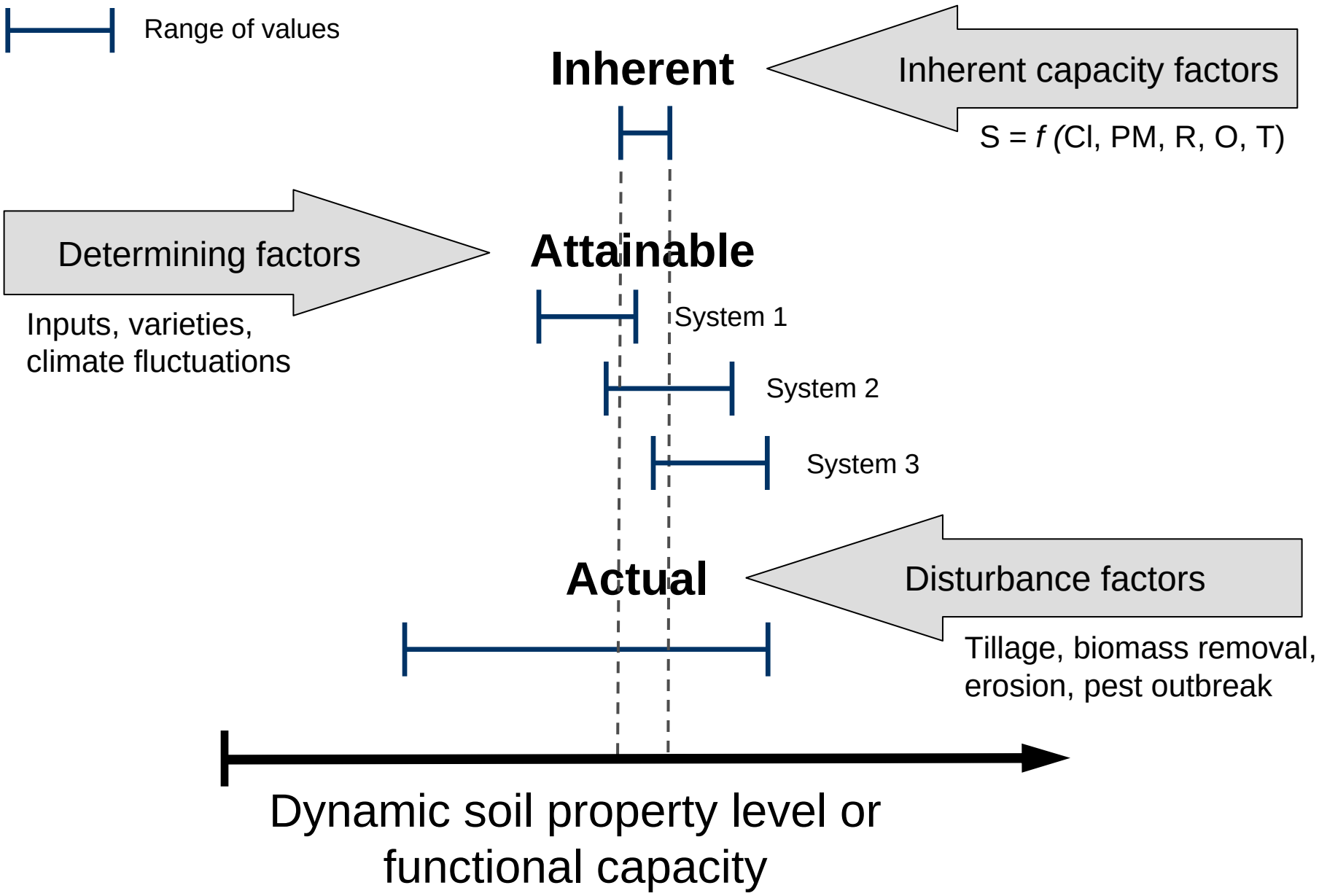
3. Recommend methods to directly relate soil change data to soil function and ecosystem services.

4. Recommend methods to extend or extrapolate soil change data to soils where measured data are not available. Include identification of soil variables needed for such interpolations for various soils and management systems.

5. Recommend soil and landscape interpretations that incorporate management dependent soil change data as related to soil function and ecosystem services.

6. Partner with the SSSA Soil Change Working Group wherever objectives overlap

Figure 5-3


Range of values
Inherent
Inherent capacity factors
S = f (Cl, PM, R, O, T)
Determining factors
Inputs, varieties,
climate fluctuations
Attainable
System 1
System 2
System 3
Actual
Disturbance factors
Tillage, biomass removal,
erosion, pest outbreak
Dynamic soil property level or
functional capacity