



SESSION #3

SOIL HEALTH: BASICS, PRACTICES, BENEFITS, & BARRIERS

PART 1 - REVIEW SUMMARY

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April 26, 27, 28, 29 2022

**SOIL HEALTH STEWARDS:
PROMOTING SOIL HEALTH ON PROTECTED AGRICULTURAL LANDS**

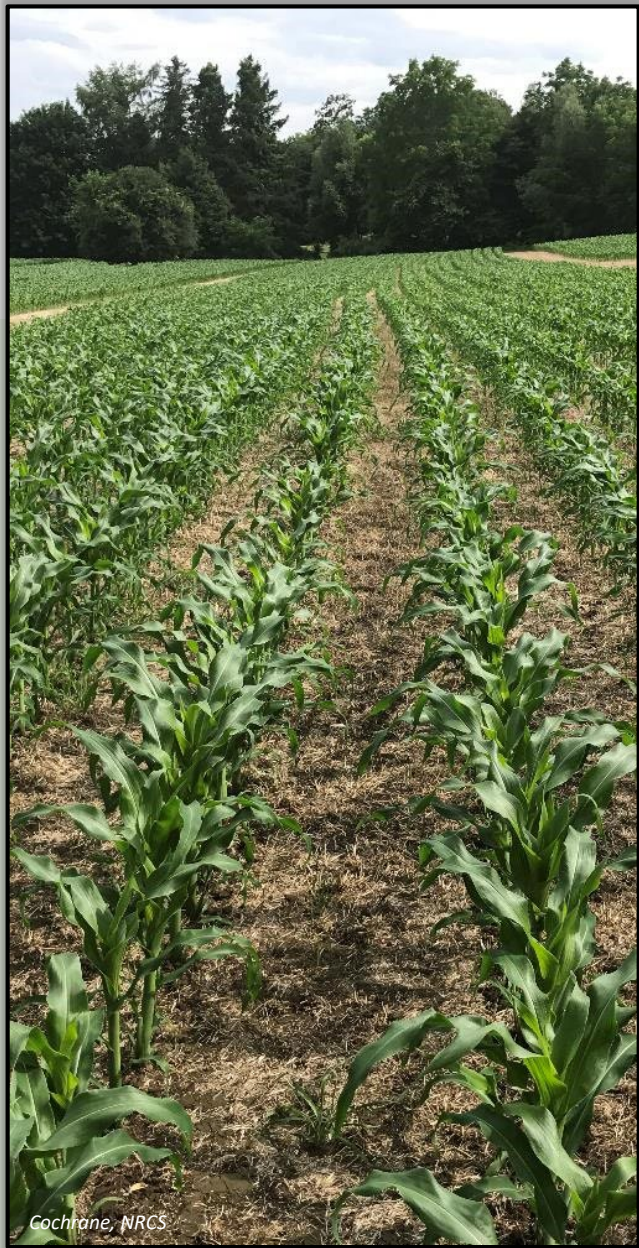


WIN-WIN SOLUTIONS BY BUILDING HIGH FUNCTIONING, RESILIENT SOIL AND REGENERATIVE SYSTEMS



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WHAT FUNCTIONS WOULD WE LIKE OUR SOIL TO PROVIDE?

- **PRODUCE FOOD, FEED, FIBER, BIOFUELS & MEDICINE**
- **CAPTURE, FILTER, AND STORE WATER**
- **CYCLE AND RECYCLE NUTRIENTS**
- **RESILIENCE TO DROUGHT, FLOOD & TEMP EXTREMES**
- **PROTECT PLANTS FROM PATHOGENS AND STRESS**
- **DETOXIFY POLLUTANTS**
- **STORE C AND MODERATE RELEASE OF GASES**
- **RESIST EROSION FORCES**

DEFINING SOIL HEALTH

THE CONTINUED CAPACITY OF THE SOIL TO FUNCTION AS A VITAL LIVING ECOSYSTEM THAT SUSTAINS PLANTS, ANIMALS, AND HUMANS.

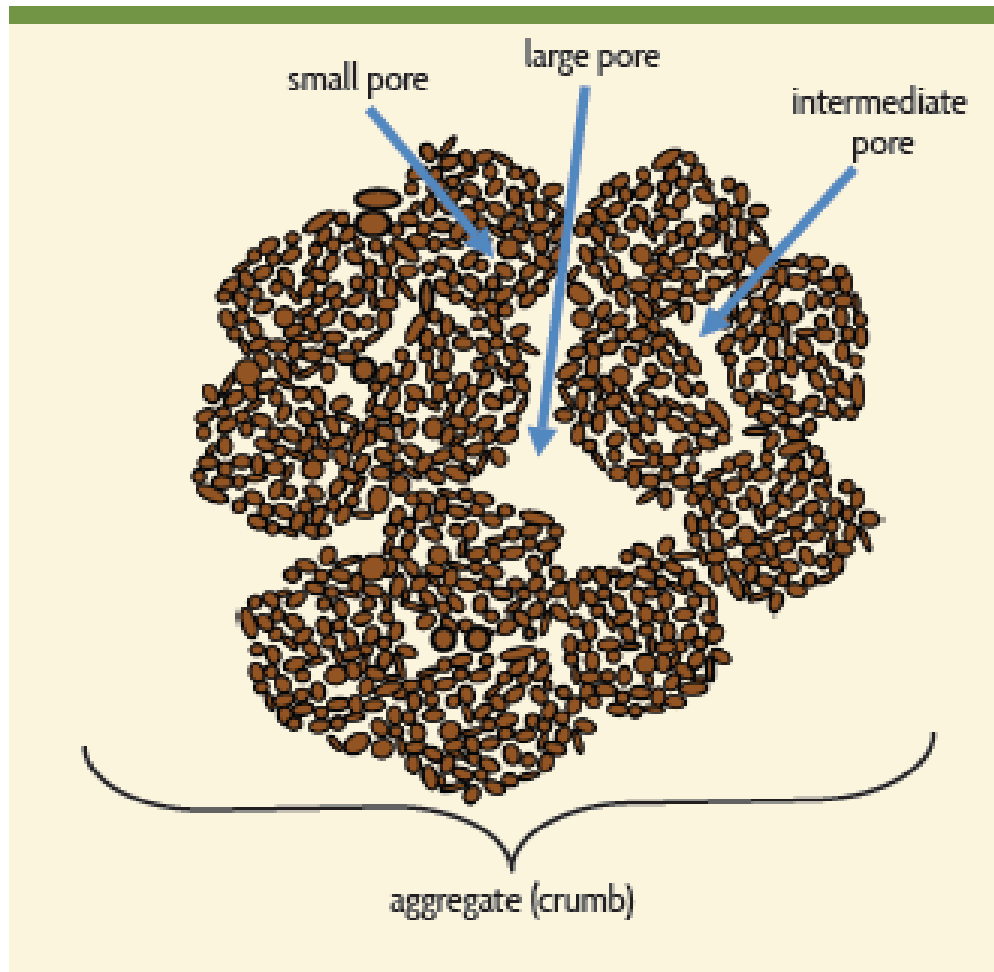


Randy Mayers



AN AGGREGATE IS LIKE A HOUSE

THE INTERESTING STUFF IS GOING ON IN THE “EMPTY” SPACES!



CHARACTERISTICS OF SOIL FUNCTION LOSS



Lynn Betts, USDA-NRCS



Lynn Betts, USDA-NRCS



Bob Nichols, USDA



Inflation Solutions



Case IH

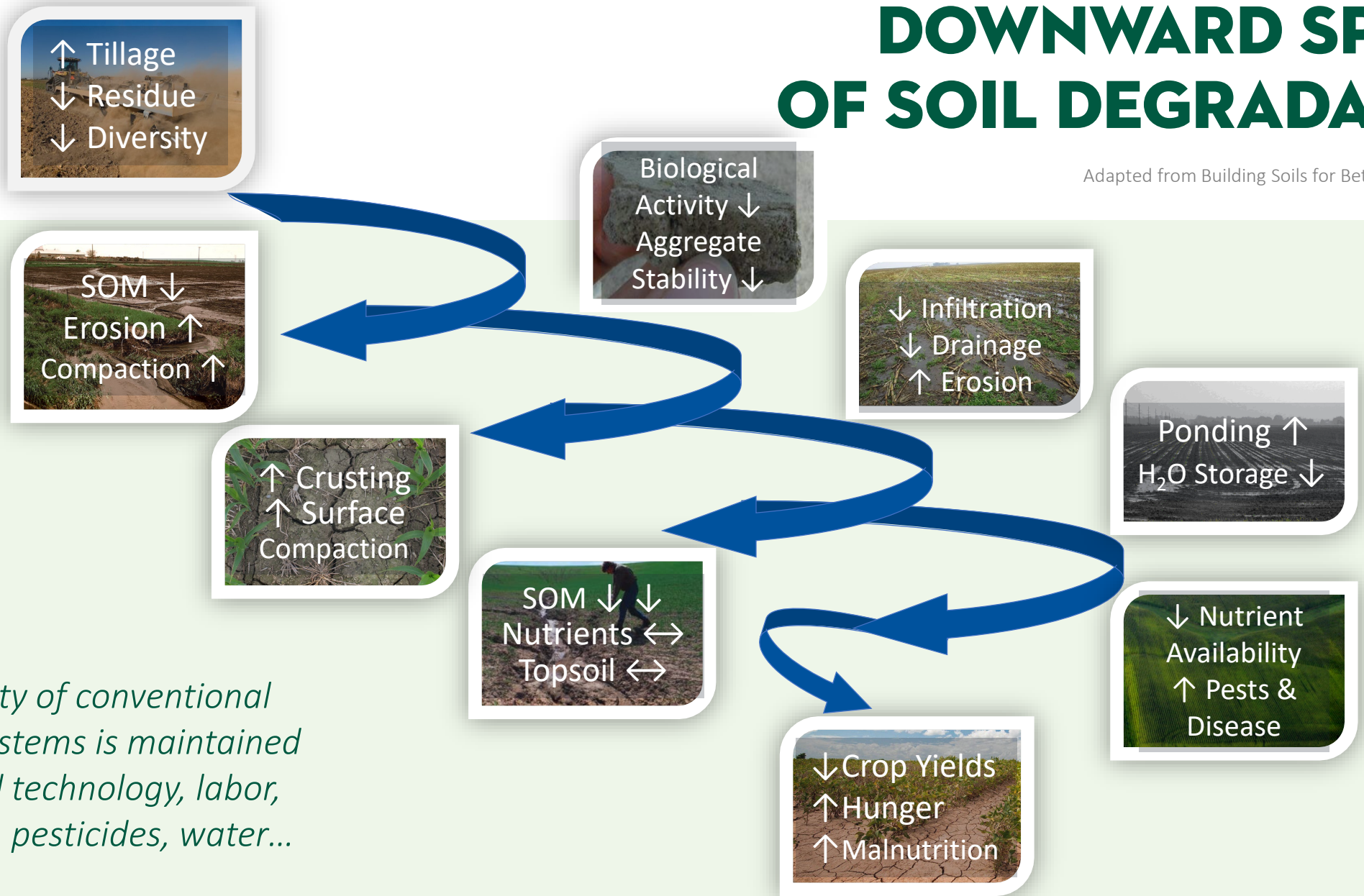
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DOWNWARD SPIRAL OF SOIL DEGRADATION

Adapted from Building Soils for Better Crops, 3rd ed.



The productivity of conventional agricultural systems is maintained with increased technology, labor, fuel, nutrients, pesticides, water...

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SOIL HEALTH PRINCIPLES TO SUPPORT HIGH FUNCTIONING SOILS

Feed diverse, continuous inputs: C sources, energy, nutrients

- Stimulate diversity
- Break disease cycles
- Increase SOM and nutrient cycling
- Enhance plant growth
- Increase beneficials



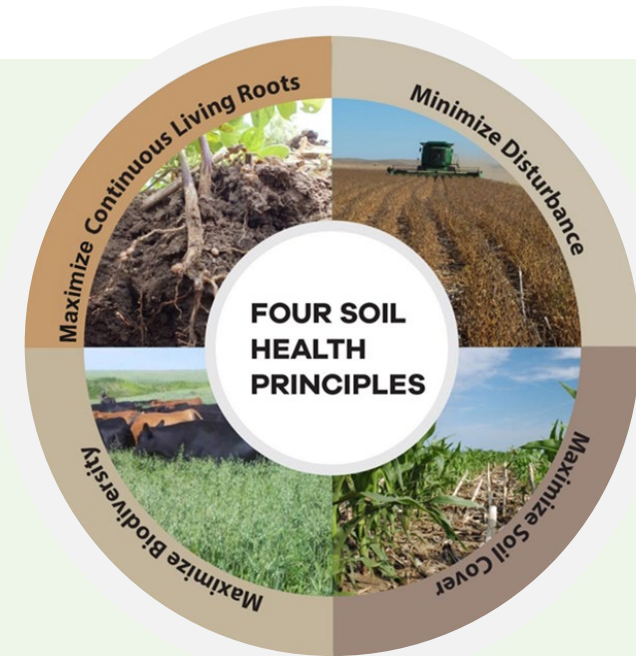
Protect habitat aggregates, structure, water, air, temperature

- Maintain SOM & aggregates
- Reduce erosion & runoff risk
- Buffer temperature
- Reduce evaporation

Plus adapted use of technology, nutrient and pest management to the unique production system, soil, climate, and farmer/rancher

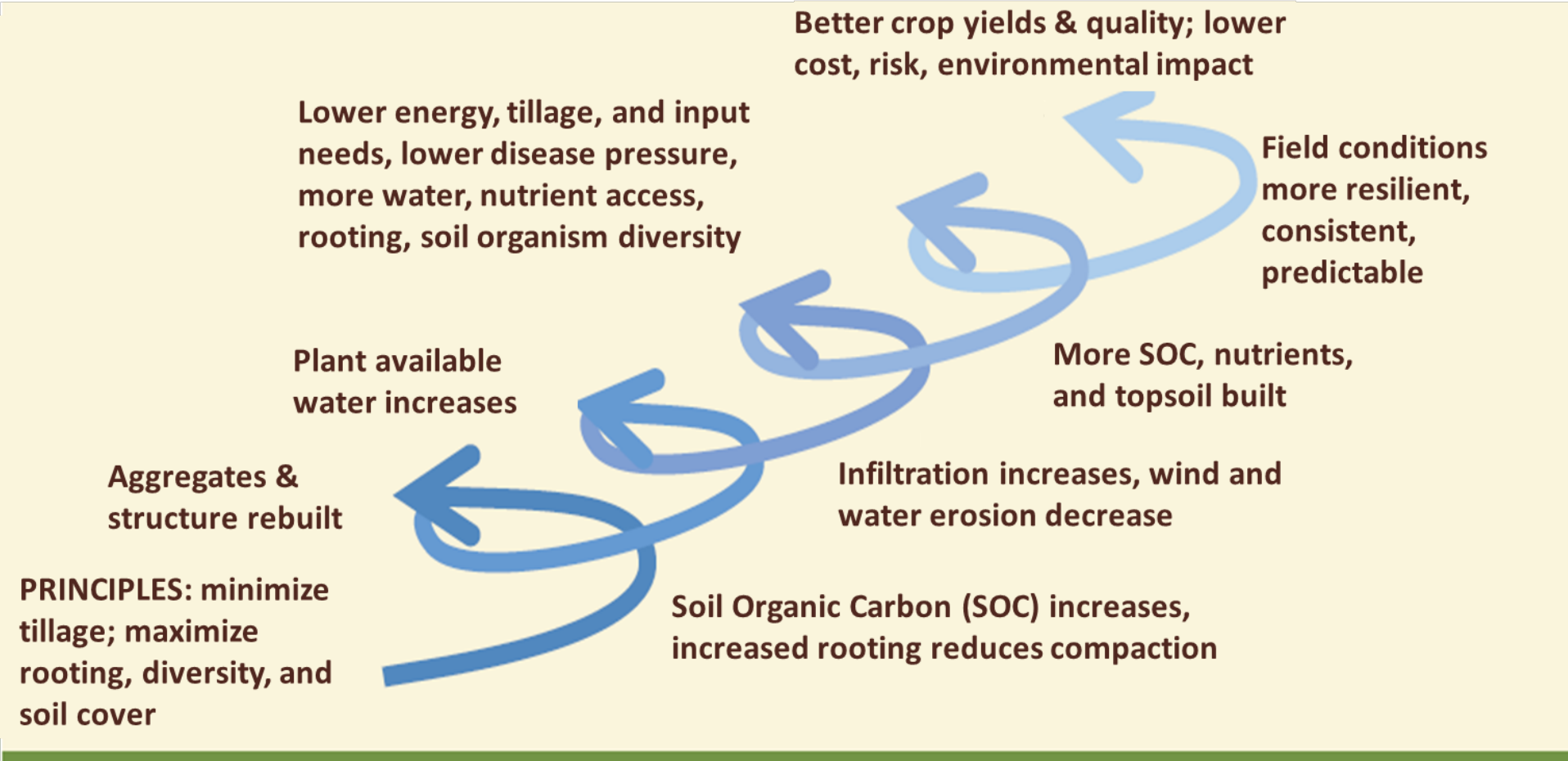
WHAT IS A SOIL HEALTH MANAGEMENT SYSTEM?

A COLLECTION OF MANAGEMENT PRACTICES THAT FOCUSES ON INCREASING SOIL CARBON LEVELS AND IMPROVING (OR REGENERATING) SOIL HEALTH BY ADDRESSING ALL FOUR SOIL HEALTH MANAGEMENT PRINCIPLES.



- **PRINCIPLES APPLY TO ALL PRODUCTION SYSTEMS, BUT MUST BE ADAPTED**
- **WHEN IMPLEMENTED TOGETHER, ADAPTED TO PRODUCTION SYSTEM, PRINCIPLES ARE SYNERGISTIC AND REGENERATE (REBUILD) AND MAINTAIN SOIL HEALTH AND THE MANY ECOSYSTEM SERVICES SOILS PROVIDE.**
- **SPECIFIC COMBINATIONS AND APPLICATIONS OF PRACTICES CHOSEN TO SUCCESSFULLY IMPLEMENT THE PRINCIPLES STILL NEED DEVELOPMENT AND INNOVATION TO BE SUCCESSFULLY ADAPTED TO DIVERSE PRODUCTION SYSTEMS, CLIMATES, ECOSYSTEMS, AND SOILS TO EFFECTIVELY BUILD HEALTHY, FUNCTIONING SOIL.**

GOAL: WIN-WIN SOIL HEALTH MANAGEMENT SYSTEMS ARE COMMONPLACE



Modified by Moebius-Clune and Cox from *Building Soils for Better Crops*

SOME BARRIERS TO SOIL HEALTH ADOPTION



Social/Psychological	Paradigm shift – why to adopt?
	Landlord/tenant relationships – lack of land tenure, perception
	Lack of community support – socially, economically, inter-agency organizational barriers and miscommunications
	Recovery from failures
	Risk aversion
Technical	Understanding the soil/plant processes and how management can influence them
	How to adopt management successfully – how do you start and build up for a production system? (e.g. crop rotation, cover crop management, pest management, equipment purchase and set it up, livestock integration).
	How to solve problems/failures
Financial	Lack of information on economic costs vs. benefits and risk
	Installation/initial investment cost (equipment, seed, learning time)
	Markets
	Impacts of policies
OTHER?	

WHAT ARE SOME SOLUTIONS TO THESE BARRIERS?



- **FACILITATE PARADIGM SHIFTS - BUILD RELATIONSHIPS**
- **MENTORS**
- **DEVELOP COHORTS AND PEER-TO-PEER NETWORKS**
- **DEVELOP TECHNICAL ASSISTANCE NETWORKS**
- **DEVELOP FINANCIAL ASSISTANCE NETWORKS**
- **TRAIN ON BENEFITS AND AGRONOMIC SKILLS/KNOWLEDGE**
- **TRAIN ON HOW TO TRANSITION SUCCESSFULLY, HOW TO USE TECHNICAL AND ECONOMIC DECISION SUPPORT TOOLS**
- **CONNECT PRODUCERS TO AVAILABLE RESOURCES, AND WHERE THEY LACK: HELP PRODUCERS DO THEIR OWN LEARNING AND EXPERIMENTING**

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MOVING FROM AWARENESS TO ADOPTION



- **WORK TO DEVELOP RELATIONSHIPS WITH PRODUCERS**
- **PURSUE OPPORTUNITIES FOR PRODUCER EDUCATION**
- **INVITE AND ACCOMPANY THEM TO SOIL HEALTH-RELATED EVENTS, COFFEE SHOP DISCUSSIONS, SOCIAL MEDIA GROUPS**
- **INVITE THEM TO THE FIELD AND DO THE ASSESSMENT TOGETHER.**
- **CONDUCT DEMOS AT MEETINGS, FIELD DAYS, EQUIPMENT AUCTIONS, FAIRS, THEIR FARMS, ETC.**

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INVEST IN MANAGING FOR SOIL HEALTH FOR A LONG LIST OF BENEFITS:

- **CONSISTENT GOOD PRODUCTION**
- **HEALTHY CROPS**
- **REDUCED RISK DURING WEATHER EXTREMES**
- **FIELD TRAFFICABILITY**
- **REDUCED RUNOFF, EROSION, FLOODING**
- **REDUCED TEMPERATURE EXTREMES**
- **CLEAN AND PLENTIFUL WATER**
- **DROUGHT RESILIENCE**
- **AIR QUALITY**
- **HEALTHY ENVIRONMENT**
- **HABITAT FOR BENEFICIAL ORGANISMS**
- **REDUCED DISEASE & PEST PRESSURE**
- **IMPROVED SOIL ORGANIC MATTER**
- **IMPROVED NUTRIENT AND CARBON CYCLING**
- **CARBON SEQUESTRATION**
- **ENERGY SAVINGS**
- **LONG-TERM ECONOMIC, SOCIAL, ENVIRONMENTAL VIABILITY**
- **SUSTAINED RELIABLE PRODUCTIVITY - TO FEED 9**

SOIL HEALTH STEWARDS:

BILLION

PROMOTING SOIL HEALTH ON PROTECTED AGRICULTURAL LANDS



THINGS TO REMEMBER



1. **ADOPTING A SOIL HEALTH MANAGEMENT SYSTEM IS A LONG-TERM INVESTMENT.**
2. **SOIL DEGRADATION DOES NOT HAPPEN OVER NIGHT, IMPROVING SOIL HEALTH ALSO TAKES TIME.**
3. **THERE ARE AGRONOMIC BENEFITS THAT RESULT IN ECONOMIC BENEFITS THAT MAY NOT BE EASILY MEASURED, SUCH AS REDUCED RISK OF YIELD VARIABILITY.**
4. **TO REALIZE THE GREATEST BENEFITS FROM A SHMS, WE MUST FIND WHAT WORKS BEST FOR A PRODUCER GIVEN THEIR OBJECTIVES AND**