TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE
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CONSERVATION PLANNING TECHNICAL NOTE NO. 2:

SUSTAINABLE AGRICULTURAL SYSTEMS PLANNING, EVALUATION AND OUTREACH

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1.) Sustainable Systems Approach

The key approach to achieving integrated sustainable management is to think system (ecosystem, whole farm, and watershed), think critically (connect the dots), actively seek resource opportunities, emphasize technology "exchange" vs. "transfer" with other producers and partners, plan creatively and flexibly, and focus on keeping energy flow through the integrated system. A reemphasis on biological factors is also necessary since recent agriculture has essentially forgotten biological, but rather focused on chemical and physical factors. Using agro-ecological principles and improving soil health is key to improving soil, water, air, plant, and animal resources. Case studies, field trials, on-farm research/demonstrations, field days, farmer-to-farmer networks are some of many important components of successful technology exchange and outreach. Interdisciplinary teams including producers and partners are essential in developing integrated sustainable farming systems. Development, implementation, and ongoing evaluation of a comprehensive conservation plan and accurate recordkeeping serve as necessary management tools.

Sustainable agriculture must be made up of farming and ranching systems that can maintain productivity and protect the environment indefinitely. Sustainable systems must be resource conserving, socially supportive, commercially competitive, and environmentally sound. A sustainable agriculture reduces adverse effects to on-site and off-site environments, while providing a sustained level of production and profit. Sustainable agriculture should be considered a goal, not a practice. Sound resource conservation is an integral part of sustainable agricultural systems. Sustainable agriculture must be considered a system that addresses unique environmental, economic and social needs and conditions, and a system that exists in a larger context of varying local, national, and even international conditions. These systems are defined by the balanced, systematic integration of technologies, management strategies, and methods which have been selected to meet the environmental, economic, and social criteria of sustainability.

Understanding that we are part of a complex, interconnected system comprised of soil, water, air, plant, animal, and human components/resources, which are constantly changing, interacting, and through which energy is flowing, is the first step to achieving sustainable systems.
The formation of interdisciplinary, interagency team networks, including producers, is essential for developing sustainable farming systems and communities, in order to identify and resolve resource problems/opportunities together.

Team members must come to the table/field in active listening/learning mode and with open mind, keen observational skills, and be ready to adapt to change. Technology "exchange" (vs. a one-way "transfer") is also essential. By actively engaging in the entire process, team members can better understand the issues/concerns and can provide more sustainable solutions. Planners working alongside producers must look at each resource condition and consider how it relates to the management unit as a whole. They must also consider how management options will complement each other and interact with existing systems on adjoining management units.

Effective application of sustainable agricultural systems requires looking beyond resource problems. While examining the whole operation, planners and producers need to be alert to potential resource opportunities that exist on the land and in the watershed. Planners and producers must think in terms of resource efficiency. Effective planning for sustainable agriculture seeks to use locally available resources as production inputs and reduce use of external or remote resources. This promotes reduced input costs and improved efficiency of resource use. Planners and producers must consider both on-site and off-site effects of conservation management systems, in order to reduce adverse effects to the environment.

2) Developing Conservation Plan

Development, implementation, and ongoing evaluation of a comprehensive conservation plan and accurate recordkeeping serve as necessary management tools for sustainable systems. A reemphasis on biological factors is also necessary since recent agriculture has essentially forgotten biological, but rather focused on chemical and physical factors. Using agro-ecological principles and improving soil health is key to improving soil, water, air, plant, and animal resources, as well as reducing energy costs and maintaining energy flow through the ecosystem. Planning creatively and flexibly to accommodate changing resource conditions and producer objectives is necessary.

A complete inventory and analysis of soil, water, air, plant, animal, social, and economic conditions is the vehicle that moves the producer and conservation planner to a position where feasible management alternatives can be developed and sound resource management decisions made. To evaluate existing or benchmark conditions, sufficient information must be gathered during the inventory phase on all land uses to assist in determining the status of the resources on the whole farm/ranch.

On lands used primarily for field and forage crop production, orchards, and ornamental crops, the client's inputs and management practices may have a significant impact on the current and future conditions of SWAPA + H. As well as soils, rainfall and other natural resource information, cropland inventory needs to include a description of current crops, crop rotations, tillage or grazing operations, wildlife, nutrient and pest management inputs, livestock numbers and class, available equipment, and the timing and management of other important activities. Resource concerns and opportunities are identified, including for soil, water, air, plant, animal, human, and energy.

The best source for this information is best collected when the producer and the planner work together on-site in the planning area (field, tract or farm). A successful inventory process will "set the stage" for planning steps 4. Analyze Resource Data, 5. Formulate Alternatives, 6. Evaluate Alternatives, and 7. Make Decisions.

Agronomy Tech Note 70 provides conservationists with a series of worksheets to assist with the inventory process when providing integrated systems planning assistance on cropland and animal feeding operations land uses. They are designed to record and organize information from the producer in a manner that documents current crop and livestock management and provide for the inventory necessary to analyze benchmark conditions and develop feasible alternatives.

Agronomy Tech Note 76 provides conservationists with comprehensive guidance and integrated tools for developing integrated cropping systems. Range Tech Note 106 similarly provides conservationists with a grazing lands conservation planning tool. Inventory, planning and evaluation worksheets/tools, and conservation practices for all land uses can be found on the NRCS homepage: http://www.nm.nrcs.usda.gov/technical/. Contact NRCS field offices for conservation technical assistance, developing a conservation plan, maps, and potential funding sources for private landowners.

3) Evaluation and Outreach

Evaluation of need, design, implementation and impact are all essential to the process; yet, often most of these are omitted from the comprehensive process. Without proper evaluation at all phases, a plan/project may not properly function and address the needs/concerns/issues identified. Criteria, tools, and ongoing mechanisms should be established for each type of evaluation. Recordkeeping is an excellent management and evaluation tool so that changes can be made when needed.

Prior to developing a sustainable agriculture plan/project, an evaluation of need should be conducted. This can be done by numerous methods, including producer surveys, observation, scoping meetings, etc. An evaluation of design should always be fully studied also to ensure that the objectives are clearly defined and will be met and that the plan/project will have positive impacts. Implementation evaluation is the phase which is most clearly understood and most conducted. It ensures that a practice/system is constructed/applied according to design, but does not address how effective or how well designed it is. Evaluation of impact or evaluation of the success and effectiveness of the sustainable system is based partially on achieving a loop effect or a balanced ecosystem. Potential and actual negative and positive impacts should be evaluated. It is often the most forgotten and costly of the evaluations, yet one of the most important, since this can lead to a multiplier effect of negative results.

Case studies, field trials, on-farm research/demonstrations, field days, farmer-to-farmer networks are some of many important components of successful technology exchange and outreach. These can also serve in assisting in several of the evaluation types.

There are many types of case studies, including comparing a benchmark condition to a planned condition and showcasing integrated approaches/practices/systems/technologies. Criteria, target audience, method should be established prior to developing case studies to ensure achieving targeted objectives.

Field trials and on-farm research/demonstrations serve to ground-truth on-station research and provide an effective method for planners, consultants, universities to exchange/test technology with producers. Farmer-to-farmer networks, tours, international exchanges are also very effective outreach methods.