1.0 PROJECT PROPOSAL SUMMARY SHEET

Project title:	**Menoken Farm Minimizing Pesticide Use In Urban and Rural Food Production Project**
Lead project sponsor:	Burleigh County Soil Conservation District
Contact persons:	
Project director:	Darrell Oswald, District Manager Burleigh County Soil Conservation District 701-250-4518, ext. 3, or darrell.oswald@nd.nacdnet.net
Other contacts:	Seth Boechler, Menoken Farm Manager Burleigh County Soil Conservation District 701-250-4518, ext. 3, or seth.boechler@nd.nacdnet.net
State:	North Dakota
Hydrologic unit code:	Statewide
High priority watershed:	***NIA***
Project type:	Information and education
Waterbody types:	Other - crosscuts all categories
NPS category:	Other - crosscuts all categories; emphasizes nutrient management
Project location:	Burleigh County, North Dakota

Summarization of major goal: Demonstrate and educate how developing diversified cropping rotations with covers that allow for the reduction or elimination of pesticides can provide benefits such as improved water quality; increased food safety; and improved soil, plant and animal health. Reduction or elimination of pesticides in food production would mitigate nonpoint source pollution impacts caused by these chemicals and seed treatments in both urban and rural landscapes.

Project description: Burleigh County (SCD) will monitor and provide information and education on minimizing the use of pesticides in cropping rotations. This relatively new concept will be conducted at Menoken Farm, Burleigh County SCD's 150-acre soil health demonstration site.

Developing cropping rotations that reduce or eliminate the use of pesticides will work hand in hand with the five major soil health principles: 1) soil armor; 2) minimizing soil disturbance; 3) plant diversity; 4) continual live plant/root; and 5) livestock integration. Plant Brix comparisons will be completed weekly for corn, wheat and soybeans. Crop nutrient density comparisons will be completed during harvest for corn, wheat and soybeans.

The SCD will inform and educate the urban and rural community on the benefits of minimizing pesticide use to soil, plant and animal health, resulting in enhanced water and nutrient cycles.

FY2022 Section 319 funds requested:	$ 182,760
Match:	$121,840
Other federal funds:	$ 0
Total project cost:	$ 304,600
319 funded personnel:	**0.** 5FTE

2.0 STATEMENT OF NEED

2.1 Water quality priorities

The primary target audience will consist of farmers, ranchers, landlords, educators, agriculture lenders, foresters, wildlife conservationists, urban clients and gardeners.

The use of pesticides has increased dramatically in agricultural food production from pre-emergent herbicide use to multiple fungicide, herbicide applications and/or seed treatments. Applications occur as seed treatments while the crop is actively growing and/or towards the end of the growing season (spraying a desiccant) to ensure a timely harvest.

Pesticides applied to urban gardens and lawns can enter water systems through runoff.

Pesticide safety is a concern that impacts soil, plant, animal and human health. Pesticides inhibit or kill soil biology. Increasing the risk of reduced crop nutrient density and plant Brix levels. Pesticide drift can cause many health issues such as interfering with respiration, irritating exposed skin, neurological disorders and cancer.

Water quality can be jeopardized through runoff of pesticides if not used appropriately. Wetlands, ponds and adjacent streams can all be impacted and both surface water and groundwater are susceptible to contamination. Seed treatments are water soluble and move easily to areas that can be negatively impacted. Aquatic life can be harmed as well.

The benefits of minimizing pesticide use are as follows:

- *Improved ·water quality:* Less chance of contamination to surface and ground water with reductions in pesticide use. Less potential of urban runoff reaching city water supplies.
- *Increased aquatic species within waterbodies:* The health of aquatic species populations would benefit.
- *Protection of riparian areas:* Reduced pesticide use would provide less opportunity for run off of pesticides contaminated water to reach riparian areas.
- *Improved plant health:* Vigor and nutrient density of plants will likely increase along with improved Brix levels.
- *Improved animal health:* General animal health will improve due to increased forage quality with a reduction in the use of pesticides.
- *Increased food safety:* Minimizing or eliminating the use of pesticides in agricultural food production would ensure a healthier food supply for the world.
- *Increased crop diversity:* Utilizing cover crops in conjunction with developing diversified crop rotations will help to minimize the need for herbicide to control weeds.
- *Improved human health:* Less potential for exposure to pesticide drift and actual mixing of the chemicals.
- *Improved soil health:* Reducing the use of pesticides will result in improved soil biology both in population and diversity resulting in increased water infiltration and less runoff and soil erosion to impact wetlands, ponds and streams.

There is a need for the relatively new concept to minimize pesticide use in urban and rural food production. Utilizing diversified crop rotations along with cover crops provide benefits such as improved water quality; increased food safety; and improved soil, plant and animal health. These benefits are consistent with the intended results for many of the practices promoted and supported by the ND NPS Pollution Management

Plan. *(See Attachment B for a map of the farm site)*

3.0 PROJECT DESCRIPTION

3.1 Goal

The primary goal of this project is to demonstrate and educate how developing diversified cropping rotations along with cover crops allow for the reduction or elimination of pesticides and seed treatments in urban and rural food production. Water quality will improve with reduced runoff and less chances of contamination to wetlands, ponds, streams, riparian areas and city water supplies due to limited use of seed treatments. Improved soil health will increase water infiltration thereby reducing wind and water erosion. Reduced use of pesticides will help to safeguard the world's food supply plus improve the nutrient density of the food. Animal and human health will benefit from less risk of exposure to toxic chemicals. *(See Attachment C for Menoken Farm History)*

Minimizing pesticide use in urban and rural food production project's activities will be monitored and shared as part of the overall Burleigh County SCD/Menoken Farm natural resources educational program. Outreach will consist of hosting groups and entities, speaking requests, articles and multiple videos. The methodology, design and outcomes of this project will be shared locally, regionally and nationally.

3.2 Objectives and tasks

OBJECTIVE 1 - *Develop and deliver a cropping plan that minimizes or eliminates the use of pesticides;*
The Burleigh County SCD team will design a cropping plan that includes crop diversity, cover crops, the use of compost and vermiculture compost extract in the outdoor gardens, the high tunnel garden and the cropland fields. Burleigh County SCD will annually provide one full-time employee for technical assistance, day-to-day practice and system implementation to manage and maintain a Menoken Farm cropping system and gardens.

***Task** I -Seed and maintain. fields and gardens:* After seeding/planting, the Burleigh County SCD team will manage weed control, harvesting and trucking. This task will also include annual crop rotation and reduced use of pesticides.

Product: A work plan that is carried out for seeding/planting, annual crop rotation, weed management, harvesting and trucking

Estimated cost: $29,400 from 319 grant and $19,600 match

$15,000/seed; $9,000/seeding; $3,000/weed control; $9,000/harvesting; $6,000/trucking; $7,000/other materials and labor

Task 2 - *Manage and maintain compost materials:* The Burleigh County SCD team will perform all composting duties, such as adding new materials, aerating the pile, curing the compost and distributing the final compost to fields and the garden. Maintain and enhance vermicompost leachate used as a bio-inoculant for garden and cropland seed and as a foliar applied during the growing season.

Product: Successful management and maintenance of compost materials

Estimated cost: $6,900 from 319 grant and $4,600 match

$7,500/compost materials; $1000 compost turning; $3,000/labor

Task 3- *Maintain and manage high tunnel and outdoor garden:* The Burleigh County SCD will annually provide management and maintenance for the high tunnel, along with the outdoor garden. All produce will be donated to the Bismarck/Mandan food pantries.

Product: Properly maintained high tunnel and outdoor garden

Estimated cost: $3,000 from 319 grant and $2,000 match

$1500/seed; $2,200/labor; $800/cover crops; $500/water

OBJECTIVE 2 - ***Develop and deliver a grazing plan that minimizes or eliminates the use of pesticides:*** The Burleigh County SCD team will design a grazing plan that addresses such things as the green cover crops, animals and rotational grazing. It will include planning to graze animals on fields with crops and covers that have had little to no pesticide use. Burleigh County SCD will annually provide one full-time employee for technical assistance, day-to-day practice and system implementation to manage and maintain a Menoken Farm grazing system.

Task 4- *Care for and handle animals:* The plan of work for the farm will include proper watering and feeding of the animals.

Product: Successful and proper care of animals

Estimated cost: $4,200 from 319 grant and $2,800 match

$2,500/yearlings; $1,500/sheep; $3,000/labor

Task 5 - *Manage cover crop rotational grazing:* The plan will cover the proper schedules for cover crop grazing rotations during this reduced pesticide use project.

Product: Successful management and use of grazing animals

Estimated cost: $6,300 from 319 grant and $4,200 match

$7,500/labor; $2,500/cover crops; $500 fencing

OBJECTIVE 3 ***-Monitor reduced pesticide use benefits:*** We will gather and analyze pertinent monitoring information, which will speak directly to NPS pollution and water quality. Brix readings will be taken during the growing season to determine nutrient density of food on fields and gardens that have had little to no pesticide use. Burleigh County SCD will partner with Bismarck State College to provide one part-time intern for taking Brix readings and notes which will be summarized in an annual report.

Task *6-Annually monitor impacts from all reduced pesticide use Menoken Farm fields:* Approximately 384 samples will be taken and analyzed over the three-year period of this project for plant Brix, plant SAP and 30 samples over the same period for crop nutrient density.

Product: Approximately 414 completed and analyzed plant samples

Estimated cost: $ 1 0,500 from 319 grant and $7,000 match

$10,000/ sample analysis; $7,500/labor

OBJECTIVE 4- ***Inform and educate the agricultural community:*** The Burleigh County SCD will provide information, education and demonstration activities for specific groups, such as farmers, ranchers, gardeners, small landowners, lenders, educators, wildlife groups, forestry groups, urban clients and landlords. Educational events will be held at the Menoken Farm site east of Bismarck so participants can tour the fields, view the gardens and compost pile, and take part in the on-site demonstrations, including the reduced pesticide use project.

Task 7 - *Conduct three major educational/demonstration events:* One major workshop/tour will be held each year, for a total of three major events. Local speakers, nationally recognized speakers and the Menoken Farm team will provide information and education for these educational events.

Product: A total of three major education and demonstration events that provide education and training on the management of systems and technology that minimizes or eliminates pesticide use that can be implemented to improve soil health, plant and animal biodiversity, and other practices that ultimately protect and improve water quality.

Estimated cost: $9,000 from 319 grant and $6,000 match
$10,000/speaker fees; $5,000/marketing materials

Task 8 *-Arrange and host 30 summer tours.* We will plan and carry out 10 summer tours per year at the Menoken Farm site. These workshops/tours are primarily for farmers, ranchers, gardeners and urban clientele. Infiltration, rainfall simulator, slake, crop and grass root boxes and tabletop runoff demonstrations will be conducted.

Product: A total of 30 completed summer tours
Estimated cost: $14,100 from 319 grant and $9,400 match
$16,000/outreach and marketing; $7,500/labor

Task *9-Produce three educational videos:* We will work with a local video company to produce three videos of the three annual major workshops. These videos will be posted on YouTube and the Web sites of Menoken Farm, Burleigh County SCD, the North Dakota Department of Environmental Quality, NRCS and others.

Product: Three professionally produced videos posted on YouTube and Web sites
Estimated cost: $9,000 from 319 grant and $6,000 match
$15,000/contractual

Task 10 *-Develop and maintain a rain garden:*

Products: A new rain garden will be developed and maintained next to the new SCD building for water containment purposes utilizing no pesticides.
Estimated cost: $14,400 from 319 grant and $9,600 match
$24,000 Maintenance, event postings, video postings, etc.

3.3 Project schedule

The Burleigh County SCD proposes a project work plan that begins July 1, 2025 and ends June 30, 2028. *(See Attachment D for A Milestone Table)*

3.4 Appropriate entity

Burleigh County SCD has a long history of operation. It is considered a leader in its field and is one of the first organizations in North Dakota to embrace new and innovative ideas to test in the area. Burleigh County SCD employs five full-time employees and has technical assistance on this project from two retired NRCS employees. The SCD has a proven history of innovative projects, knowledgeable employees and detailed tracking of data and outcomes of its projects.

3.5 Plan for proper operation and maintenance

The Burleigh County SCD has ongoing discussion on this project at monthly board meetings. At these meetings the project and expenses are discussed and approved by the board. At the end of each year the project staff has planning sessions for additions/changes to the farm for the coming season. The plan is presented to the board for approval and is put in its annual work plan, which is the SCD's primary work document.

4.0 COORDINATION PLAN

4.1 Lead project sponsor and cooperating organizations

The Burleigh County SCD will implement all activities of the project and will have the primary responsibility for project planning, contracting, coordination, implementation, financial assistance and timely submission of project payment applications.

Bismarck State College (BSC)

BSC will partner with Burleigh County SCD to take Brix readings and provide documentation for use in reporting as needed. These activities will be conducted in accordance with the agency's mission.

North Dakota State University (NDSU) Extension Service

A representative from the NDSU Extension Soil Health team will provide technical assistance for project workshops, tours and demonstrations. These activities will be conducted in accordance with the university's mission.

North Dakota Department of Environmental Quality

Personnel will oversee 319 funding and assist with planning and implementation of educational events when possible.

4.2 Local support for the project

There is widespread support for the project by farm groups and agencies throughout North Dakota. As a sample, the SCD has procured three letters of support by its closest partners which have been included in Attachment E. Two additional letters of support are on file with the Burleigh County SCD and can be obtained by request. A summary of each follows:

1. *USDA Agricultural Research Service:* David Archer, research leader, pledges technical assistance for the minimizing of the use of pesticides in urban and rural food production project. The ARS will provide technical assistance as needed for project workshops, tours, and demonstration events at Menoken Farm. We will also coordinate and pa11ner with BCSCD on planning activities.
2. *NDASCD:* Rhonda Kelsch Executive Director, states Menoken Farm has a proven and impeccable record of delivering conservation programs incorporating sound research and concrete deliverables. Their demonstrations have accelerated conservation practices that are now being implemented by land stewards.
3. *Bismarck State College:* Marko Divinic Assistant Professor of Ag, Technology & Natural Resources, states

Menoken Farm has been a valuable resource, both locally and throughout North Dakota. The combination of natural resource education and systems approach conservation at Menoken Farm continues to capture the attention and interest from people not only through North Dakota but the United States and the world.

4.3 Coordination with other education programs

Burleigh County SCD will coordinate with other active 319 information and education projects, such as the North Dakota Grazing Lands Coalition and the ND Game & Fish Dept.. The outcomes and data will be shared with other organizations and agencies. Information will be exchanged on tours, workshop's and by personal contact.

4.4 Similar activities in project area

To the SCD's knowledge there is not another program in North Dakota that measures the pesticide impacts and demonstrates the "whole" concept of restoring soil health on a field scale.

5.0 Evaluation and monitoring plan

5.1 Plans for evaluating project goals, objectives and tasks

The following evaluation measures will be conducted for the products outlined in this proposal:

a) Personnel and support: Hours spent on each activity will be documented and actual costs for training and supplies will be tracked with receipts.
b) Deliver a cropping plan: Burleigh County SCD will record this information on the Project Outcome section of the reimbursement for each activity.
c) Deliver a grazing plan: Burleigh County SCD will record this information on the Project Outcome section of the reimbursement for each activity.
d) Monitor reduced pesticide use benefits: Through either or both observation or collecting numerical data, each of the benefits listed in section 5.2-5.4 will be documented annually and compared.
e) Inform and educate the agricultural community: The number of tours and workshops implemented, the date held and the number of people in attendance will be recorded for each event.
t) Reporting: The information obtained from the evaluation measures will be compiled by Burleigh County SCD.

5.2-5.4 Demonstration project monitoring

This reduced pesticide use demonstration project will be actively monitored and data recorded on the following expected benefits and means collected:

1. *Improved water quality:* Numerical data
2. *Increased aquatic species within waterbodies:* Observation
3. *Protection of riparian areas:* Observation
4. *Improved plant health:* Numerical data and observation
5. *Improved animal health:* Observation
6. *Increased food safety:* Numerical data
7. *Increased crop diversity:* Numerical data and observation
8. *Improved human health:* Observation
9. *Improved soil health:* Numerical data and observation

5.5 How and when data will be stored, managed and reported

The SCD will compile all information obtained and both keep on file at the offices of Burleigh County SCD and submit it to the North Dakota Department of Environmental Quality in annual reports and the final report. This information will include the number of individuals reached and the number of organizations and counties represented throughout the project period.

Plant Brix and crop nutrient density readings will be recorded, evaluated and used to document final results.

5.6 Any models used

Non applicable.

5.7. Long-term funding plans for the operation and maintenance of activities

Burleigh County Soil Conservation District general operating budget.

USDA

United States Department of Agriculture

Research, Education, and Economics
Agricultural Research Service

October 7, 2024

Emilee Novak
Program Coordinator
North Dakota Department of Environmental Quality/Water Quality
4201 Normandy Street
Bismarck, ND 58503-1324

Dear Ms. Novak:

The USDA, Agricultural Research Service (ARS) agrees to participate as a collaborator on the proposed Menoken Farm project application submitted by Burleigh County Soil Conservation District (BCSCD).

The ARS NGPRL portion of the work will be under the primary direction of Drs. Andrea Clemensen and Claire Friedrichsen and will include providing technical assistance related to the role of plant secondary metabolites in pest management and organic production systems. The ARS will provide technical assistance as needed for project workshops, tours, and demonstration events at Menoken Farm. We will also coordinate with BCSCD on planning activities.

The proposed collaboration has been reviewed and approved by the appropriate personnel at the ARS. If the proposal entitled "Menoken Farm Minimizing Pesticide Use in Urban Rural Food Production", is selected for funding, it is the Agency's intent to collaborate with each other and/or commit resources as described above.

We appreciate the opportunity for this collaboration.

Sincerely,

David Archer
Research Leader
Authorized Representative

Plains Area • Northern Great Plains Research Laboratory
P O Box 459 • 1701 10th Avenue SW• Mandan, ND 58554-0459
Voice: 701-663-6445 • FAX 701-667-3054
https://www ars usda gov/plains-area/mandan-nd/ngprl/

BSc Bismarck State College — North Dakota's Polytechnic Institution

Bismarck State College, PO Box 5587, Bismarck, ND 585066-5587

September, 19, 2024

Ms. Emilee Novak, NSP Program Coordinator
Watershed Management Program
4201 Normandy Street
Bismarck, ND 58503-1324

Dear Ms. Novak,

Bismarck State College Agriculture, Technology and Natural Resources department supports and encourages you to fund the "Minimizing the Use of Pesticides in Urban and Rural Food Production" project application submitted by Burleigh County Soil Conservation District (BCSCD).
BCSCD, through its Menoken Farm conservation demonstration site and partners, has had a tremendous success providing students, agricultural producers, researchers, conservationists and gardeners with innovative practical solutions to the issues faced by the agricultural and gardening communities.

Two-year Agriculture Industry and Technology and Farm and Ranch programs at Bismarck State College prepare students for multiple positions within the agricultural industry. Coursework is concentrated in crop and soil science and students are exposed to various applications of technology related to business management, animal, and crop production. Our animal, crop and soil science courses rely heavily on Menoken Farm conservation information and demonstrations for innovative and truthful active-learning opportunities we at college cannot obtain anywhere else in this state.

BSC Ag Department faculty supports the Burleigh County SCD's proposed grant "Minimizing the Use of Pesticide in Urban and Rural Food Production" which will study the benefits of minimizing (or eliminating) pesticide use on crop and garden production in Burleigh County. We believe that this project represents an important educational tool that would advance our independence from pesticides and help our students visualize the benefits of sustainable agriculture practices in North Dakota.

Sincerely,

Dr. Marko Davinic

Associate Professor of Agriculture, Technology & Natural Resources
Bismarck State College
PO Box 5587
Bismarck, ND 585066-5587
(701) 224-5409

NORTH DAKOTA ASSOCIATION
OF SOIL CONSERVATION DISTRICTS
OWNER AND OPERATOR OF LINCOLN-OAKES NURSERY
3310 University Drive
Bismarck, ND 58504
(701) 223-8518 • 223-8575

September 20, 2024

Mrs. Emily Novak, NPS Coordinator
North Dakota Department of Environmental Quality
4201 Normandy Street
Bismarck, ND 58503-1324

Ref: Project Support Letter for Burleigh County Soil Conservation District
"Minimizing Pesticide Use in Urban and Rural Food Production"

Dear Emily,

The North Dakota Association of Soil Conservation Districts want to express their support towards the Burleigh County Soil Conservation District for funding consideration through the ND Environmental Quality NPS Section 319 program.

The Burleigh County Soil Conservation District has a proven and impeccable record of delivering conservation programs incorporating sound research and concrete deliverables. North Dakota is very fortunate to have a local connection "boots on the ground" approach while addressing best management practices adapting to change and sustainability. There programs are being modeled on a state, regional and national platform. The projects they have been involved in through various funding avenues has brought attention to those from all over the world. They have hosted various state, regional and national tours at the Menoken Farm. Their research has accelerated conservation practices that are now being implemented by land stewards.

The NDASCD strongly supports continued funding for the Burleigh County SCD. This grant request will bring the next phase of education, sustainability, and practice installation to North Dakota's conservation legacy.

Sincerely,

Rhonda Kelsch
Executive Director
NDASCD

BUDGET TABLE FOR MENOKEN FARM MINIMIZING PESTICIDE USE IN URBAN AND RURAL FOOD PRODUCT!

Part 1 - Funding Sources	**2025/26**	**2026/27**	**2027/28**	**TOTAL**
EPA SECTION 319 FUNDS				
1) FY2018 Section 319 Funds	$60,920	$60,920	$60,920	$182,760
Subtotals	**$60,920**	**$60,920**	**$60,920**	**$182,760**
STATE/LOCAL MATCH				
1) Burleigh County SCD*	$40,613	$40,613	$40,614	$121,840
Subtotals	**$40,613**	**$40,613**	**$40,614**	**$121,840**
TOTAL BUDGET	**$101,533**	**$101,533**	**$101,534**	**$304,600**

SCD: Soil Conservation District

* Volunteer labor and BCSCD general budget

Section 319/Non-Federal Budget	2025/26	2026/27	2027/28	Total Costs	Cash Match	In Kind	319 Funds
PERSONNEUSUPPORT							
Salary (Menoken Farm labor)	18,720	37,440	37,440	93,600	37,440	0	56,160
Grants administration	5,000	5,000	5,000	15,000	6,000	0	9,000
Menoken Farm utilities and other overhead expenses	6,000	6,000	6,000	18,000	7,200	0	10,800
Subtotals	**$29,720**	**$48,440**	**$48,440**	**$126,600**	**$50,640**	$0	**$75,960**
OBJECTIVE 1: Develop & deliver a cropping plan that minimizes or eliminates the use of pesticides:							
Task 1: Seed and maintain fields and gardens	16,333	16,333	16,334	49,000	19,600	0	29,400
Task 2: Manage and maintain compost materials	0	5,750	5,750	11,500	4,600	0	6,900
Task 3: Manage and maintain high tunnel and outdoor gardens	1,666	1,667	1,667	5,000	2,000	0	3,000
Subtotals	**$17,999**	**$23,750**	**$23,751**	**$65,500**	**$26,200**	$0	**$39,300**
Object 2: Develop and deliver a grazing plan that minimizes or eliminates the use of pesticides.							
Task 4: Care for and handle animals	2,333	2,333	2,334	7,000	2,800	0	4,200
Task 5: Manage cover crop rotational grazing	3,500	3,500	3,500	10,500	4,200	0	6,300
Subtotals	**$5,833**	**$5,833**	**$5,834**	**$17,500**	**$7,000**	$0	**$10,500**
OBJECTIVE 3: Monitor reduced pesticide use benefits:							
Task 6: Annually monitor impacts from all reduced pesticide use Menoken Farm fields	5,833	5,833	5,834	17,500	7,000	0	10,500
Subtotals	**$5,833**	**$5,833**	**$5,834**	**$17,500**	**$7,000**	$0	**$10,500**
OBJECTIVE 4: Inform and educate the agricultural community							
Task 7: Conduct three major educational /demonstration events	5,000	5,000	5,000	15,000	6,000	0	9,000
Task 8: Arrange and host 30 summer tours	7,833	7,833	7,834	23,500	9,400	0	14,100
Task 9: Produce three educational videos	5,000	5,000	5,000	15,000	6,000	0	9,000
Task 10: Develop and maintain a rain garden	4,000	16,000	4,000	24,000	9,600	0	10,800
Subtotals	**$21,833**	**$33,833**	**$21,834**	**$77,500**	**$31,000**	$0	**$46,500**
TOTAL 319/Non-Federal Budget	**$81,218**	**$117,689**	**$105,693**	**$304,600**	**$121,840**	$0	**$182,760**

ATTACHMENT A

Past Accomplishments

PAST ACCOMPLISHMENTS

Menoken Farm Soil Foodweb I, II, and Planting Green I, II, Information & Education Program

Burleigh County Soil Conservation District completed Menoken Farm Soil Foodweb I, II and Planting Green I. Planting Green II is in its fourth and final year of the Menoken Farm Planting Green Project.

Accomplishments to date under the four projects under this program are as follows:

Program coordination and administration services

The Burleigh County Soil Conservation District has ongoing discussions on Menoken Farm projects at monthly SCD board meetings. At these meetings the project and expenses are discussed and approved by the board. At the end of each year the project staff has planning sessions for additions/changes for the farm for the coming season. The plan is presented to the board for approval and is put in its annual work plan, which is the SCD's primary work document.

Outreach information

Events, articles and videos were posted on the Burleigh County SCD Web site as events occurred. These items are posted on the web site for Menoken Farm, www.menokenfarm.com, which was completed during the summer of 2017.

On the Menoken Farm Web site are 150 videos from the major educational events held. The three Planting Green videos were completed. Two planting green videos were shot in August 2020 with Dana Fletcher, who farms near Courtney and Tony Fisher, who farms near Ypsilanti. The third planting green video was shot in 2021 with Robert Heidrich, who farms near Strasburg. The three edited videos, titled "The Benefits of Planting Green," are edited and posted on the Menoken Farm website at https://menokenfarm.com/videos.

Under the Planting Green I, II projects to date, 42 flyers or brochures were created and distributed to market the 48 major workshop events that have been planned and successfully held.

Two major brochures have been completed and have been widely distributed. The first was a general Menoken Fann informational brochure. The second was a brochure that features the five soil health principles: 1) Soil armor; 2) minimizing soil disturbance; 3) plant diversity; 4) continual live plant/root; and 5) livestock integration. The brochure, which was written by Jay Fuhrer, is posted on the Menoken Fann Web site and is also available at the Burleigh County SCD and NRCS offices. The Burleigh SCD has also employed the use of a Soil Health flash drive which has been distributed to thousands of attendees at Menoken Fann and distributed around the country at various soil health events.

Workshops and field events

A total of 48 major events to provide education and training on the management of systems and technology that can be implemented to improve soil health, plant and animal biodiversity and other practices that ultimately protect and improve water quality have been held to date under the twelve-year projects of Soil Foodweb I; Soil Foodweb II; and Planting Green I & II. A total of 5,893 attended the 48 major workshops, which are as follows:

2012 events

■ *Soil Health Garden Tour:* This major garden tour was held July 25. It covered topics that included: **1)** Soil demonstration with slake test; 2) infiltration and rainfall simulator; 3) making compost and applying compost tea; 4) cover crops for the garden; 5) mulch planted potatoes; and 6) combination plants and pollinators. This event was attended by 102 people.

2013 events

■ *Soil Health Workshop:* Held Jan. 8, this "Advancing Soil Health" was held in Bismarck. Guest speaker was David Brandt of Brandt Farms of Carroll, Ohio, who talked about "Building Better Soils." Other speakers included Paul Brown, Joshua Dukart, Jay Fuhrer and Dr. Jonathan Lundgren. The workshop drew 424 participants of which 100 were students and three were instructors.

■ *Soil Health Garden Tour:* The 2013 garden tour was held Aug. 14. Covered topics included: 1) Soil demonstrations with slake tests; 2) infiltration and the rainfall simulator; 3) making compost and applying compost tea; 4) cool season cover crop combinations; and 5) growing com, squash and pole beans together. This event was attended by 116 people.

2014 events

■ *Soil Health Workshop:* This one-day Jan. 23 event taught building healthy soils and improving nutrient efficiency to producers, college students and agency personnel. The theme was "Finding Our Path" and the event was held in Bismarck. Main speakers were Dr. Rick Haney,' an ARS soil scientist from Texas, and Ray Archuleta, a soil health specialist/agronomist from North Carolina. A total of 370 attended this event.

■ *Soil Health Garden Tour:* Jay Fuhrer presented an activity that involved adults and children explaining soil during the Aug. 5 Garden tour. Topics were presented on 1) Brix testing; 2) planning for pollinators; 3) insects in North Dakota; and 4) diversity. The garden tour was attended by 80 people.

2015 events

■ *Soil Health Garden Tour:* Following an opening welcome and soil scum demonstration during this July 23 event, rotating topics and speakers were: **1)** High tunnel production, Lori Martin; 2) compost and cover crops, Ken Miller; 3) flowering shrubs, Darrell Oswald; 4) food and nutrition, Karen and Duane Ehrens; and 5) new strategies for controlling bugs in gardens, Tom Kalb. About 65 attended the event.

■ *Agricultural Lenders and Landowners b1formational Meeting:* The agenda for this Oct. 22 event included: 1) Investing in long-term farm and ranch sustainability; 2) no-till equipment; 3) livestock watering systems; 4) crop diversity and cover crops; 5) grazing systems; and 6) conservation practices. About 45 people attended, including 10 bankers; 21 landowners; 3 BCSCD board members; 4 BCSCD staff members; 3 NRCS staff members; and 1 RC&D staff member.

2016 events

■ *Winter Grazing and Feeding Tour:* This Feb. 16 event drew 55 participants to the Ken Miller Ranch near Fort Rice and the Agricultural Research Service Station south of Mandan. The event, "Waste Not, Want Not: Benefits of Building Soil Biology," covered winter grazing strategies; building soil health with bale grazing; animal performance review; nutritional requirements for livestock in winter; grazing com stalks and winter grazing alternatives.

■ *Soil Health Garden Tour:* Held July 21 with 83 in attendance, the annual garden tour featured an opening session by Joshua Dukart. The five rotating topics and presenters were: I) High tunnel opportunities, Peter Gulleson; 2) planning your garden, Jackie Buckley; 3) environmental lawn care, Tom Kalb; 4) the role plants and insects play, Dave Dewald; and 5) understanding the soil resource, Susan Samson-Liebig.

■ *Forestry/Wildlife Workshop:* This Sept. 15 event featured Jay Fuhrer as the moderator. Presenters and their topics were: I) ground preparation and site consideration for tree plantings, Rhonda Kelsch; 2) tree species selection, Darrell Oswald; 3) tree planting demonstration with machine planter and hand planting, Chad Thorson; 4) providing food and cover, Dave Dewald; and 5) tree care and maintenance, Craig Stange. The event drew 50 people.

■ *Cover Crop Tour:* A total of 80 people attended the annual cover crop tour held Sept. 28. The tour hosts were Jay Fuhrer, Darrell Oswald and Ken Miller. Topics included: I) Why plant cover crops; 2) designing cover crop mixtures; 3) crop rotations with cover crops; 4) grazing cover crops; and 5) season long cover crops and fall cover crops.

2017 events

■ *Grazing/cover crop workshop:* Johann Zeitsmann, a renowned grazer from Zimbabwe, was the featured speaker during "Ranching in Dynamic Times" on Jan. 16. A total of 35 attended the event.

■ *Soil health workshop:* Held March I, "Building the Soil Health Foundation" drew 122 people to hear featured speaker Paul Jasa. Jasa in an Extension engineer at the University of Nebraska-Lincoln.

■ *Planter clinic:* About 25 people attended this March 2, 2017, event that featured Paul Jasa.

■ *Trading Biodiversity for Pest Problems:* Dr. Jonathan Lundgren led this public event that was held July 12, 2017, with about 30 in attendance.

■ *Entomology and Agricultural Landscapes:* This crop and pasture walk featured Dr. Johnathan Lundgren identifying pests and beneficials in live ecosystems. A total of 45 participated in this July 13, 2017, event.

■ *Menoken Farm Garden Tour:* The July 13, 2017, annual garden tour featured Dr. Jonathan Lundgren speaking on entomology. Other topics and speakers were: I) Pollinators, Darrell Oswald and Chad Thorson; 2) Hugelkultur, Derek Lowstuter; and soils, Jay Fuhrer. A total of 75 attended.

■ *Northern Plains Grasslands Symposium:* Allan Savory, grasslands leader and founder of the Savory Institute, presented "How Livestock & Grassland Soils Can Save Civilization" at a major educational event July 19, 2017. It was followed by a Q&A session and Savory reception. In attendance were 332 people from North Dakota and surrounding region.

■ *Agricultural Policy Discussion with Allan Savory:* Farm institutions and government agencies were invited to attend a July 19 session with Allan Savory titled "Agriculture Policy: America's Achilles Heel." A total of 40 attended the event.

■ *Resource Management on a Working Ranch:* Led by Allan Savory and Savory Institute colleague Byron Shelton, this July 19, 2017, event took place at Black Leg Ranch owned and operated by Jerry and Renae Doan and family. A total of 197 people attended.

■ *Restoring Perennial Grasslands to Support People, Crops & Wildlife:* This second working ranch tour featuring Allan Savory and Byron Shelton, was held July 20, 2017. A total of 175 people attended this event, which was held at the Ken and Bonnie Miller Ranch near Fort Rice.

■ *Cover Crop Tour:* Justin Zahradka, a crop consultant and fanner from Lawton, was the featured speaker at the Sept. 14, 2017, cover crop tour. A total of 62 people were in attendance.

2018 Events

■ *Soil Health Summit:* "Regenerating Soil With Diversity" was held at the National Energy Center of Excellence on the campus of Bismarck State College, Bismarck, ND November 7 and November 8, 2018. A total of 398 attended the two- day event. Featured speakers on the first day included: 1) Loran Steinlage, Iowa farmer; 2) Jeremy Wilson, North Dakota farmer; 3) Dr. Kris Nichols, KRIS Systems Educating and Consulting; 4) Blaine and Kent Schmaltz, North Dakota farmers; 5) Russell Hedrick; 6) Alan Newport, editor of the Beef Producer Magazine; and 7) Gabe Brown, North Dakota farmer. Featured speakers on the second day included: 1) Jason Mauck, Indiana farmer; 2) Jimmy Emmons, Oklahoma farmer; 3) Derek Axten, Saskatchewan farmer; 4) Dr. Jonathan Lundgren, South Dakota farmer and entomologist; 5) Lon Tonneson, editor of the Dakota Fanner Magazine; 6) Dr. Dwayne Beck, Dakota Lakes Research Farm and South Dakota State University; and 7) Francis Akolbila, Ghana. Jay /Fuhrer, a soil health specialist with NRCS, led Q&A sessions both days.

2019 Events

■ *Menoken Farm Garden Tour:* "Composting & Gardening: Just Do It!" featured Dr. David Johnson and Hui-Chun Su Johnson of New Mexico. They developed an inexpensive do-it-yourself bioreactor for producing fungal-rich compost for gardens and rangelands. They led an afternoon event on static compost management and compost application. Then, for the early evening session, they were part of five 20-minute rotating learning stations. The other four learning station speakers were Dr. Marko Davinic, soil biology; Keith Knudson, aquaponics, Casey Williams; high tunnels; and Joe Zeleznik, trees and shrubs. New for the 2019 annual garden tour was a children's session from 5:30 to 7:30 p.m. It was led by Nolan Swenson of Burleigh County SCD. A total of 169 attended the 2019 Garden Tour events.

■ *Menoken Farm Cover Crop and Grazing Tour:* "Crops, Covers and Cows" was held from 4 to 7 p.m. at Menoken Fann July 23, 2019. The three featured speakers were 1) Steve Groff, who farms in Lancaster County and is the founder of Cover Crop Solutions; 2) Justin Zahradka, a fanner and rancher near Lawton, ND, who is also a crop consultant; and 3) Aaron Steckler, a farmer and rancher near St. Anthony, N.D., who is also a supervisor for Morton County SCD. A total of 132 attended the event.

■ *Soil Health Summit:* "Edible Landscapes" was held from 9 a.m. to 6 p.m. November 6, 2019 and from 9 a.m. to 3:15 p.m. Nov. 7, 2019 at the National Energy Center of Excellence on the campus of Bismarck State College. The keynote speaker was Dan Kittredge with the Bionutrient Food Association. Other speakers included Jon Stika, Jonathan Moser, Raychel

Santo, Lindsay Rebhan, Lyle Perman, Morgan Jacobs, Lana Shaw, Shanon and Melinda Sims, David Bailey, and Steve Tucker. Speaker panels were held at the end of each day with Nolan Swenson moderating the first day and Darrell Oswald moderating the second day. A total of 135 attended over the two days.

2020 Events

■ *Farming and Ranching for the Bottom Line:* "Discover the Triple Botton Line: Economics, Ecology & Society" was held from 9 a.m. to 4:30 p.m. Feb. 25, 2020 and from 9 a.m. to 4 p.m. Feb. 26, 2020 at the National Energy Center of Excellence on the campus of Bismarck State College in Bismarck. Burleigh County SCD staff helps plan and sponsor the second day of this annual conference. They work in collaboration with USDA Agricultural Research Services/Northern Great Plains Research Lab. The featured 2020 speaker was Dr. Fred Provenza, author of the book *"Nourishment: What Animals Can Teach Us about Rediscovery Our Nutritional Wisdom.* " Other speakers on Feb. 26 included Dr. David Toledo, John Pfaff; Laura Edwards; Greg Busch and Dr. Jerry Hatfield. A total of 400 attended the event over the two days.

■ *Holistic Management Course:* Joshua and Tara Dukart led this three-day workshop March 3 through 5, 2020 at Menoken Fann. Burleigh County SCD and the North Dakota Grazing Lands Coalition each provided $100 scholarships for each participant. A total of 36 attended the training.

■ *Build your Own Rain Barrel or Compost Tumbler Workshop:* Nolan Swenson of Burleigh County SCD led this event at Menoken Fann May 16, 2020. One hands-on session was held in the morning and one in the afternoon. Participants were supplied a 55-gallon plastic barrel, and the supplies needed to build either a rain barrel or compost tumbler, which they then took home. Registration was limited due to the Covid-19 pandemic and social distancing was practiced. The event was livestreamed for those who wanted to register and pick up a barrel kit but did not want to attend in person. A total of 24 participants attended the event in person. The rest completed their projects at home. A total of 36 rain barrels were constructed and 16 compost tumblers were constructed.

■ *Menoken Farm Garden Tour:* The annual Garden Tour at Menoken Fann June 25, 2020, featured Jon Stika, author of the book, *"A Soil Owner's Manual: How to Restore and Maintain Soil Health.* " Because of the Covid-19 pandemic, registrations were limited, and the event was livestreamed for those who could not attend in person. Stika, Jay Fuhrer and Darrell Oswald led a "Walk of Life" event from 3 to 5 p.m. for those who wanted to come early to tour the farm and its fields. The evening session, held from 5:30 to 7:30 p.m. included the topics of making garden soil healthy, composting; milpa gardening; and high tunnel production. A total of 90 people attended the 2020 Menoken Fann Garden Tour.

■ *Permaculture Workshop: Focusing on the Home and Homestead:* A total of 25 attended this introductory to permaculture workshop held via Zoom October 9 and 10, 2020. Instructors were Bill and Becky Wilson who created Midwest Permaculture as a hub for education to share with their community and students. Topics covered included: 1) An introduction to ethics and principles; 2) sequential steps and priorities for design; 3) how to assess your property; 4) creative ideas, solutions and examples; and 5) our individual role in creating a more permanent culture.

2021 Events

■ *Farming and Ranching for the Bottom Line:* "Linking Soil to Well-Being" was held Feb. 23 and 24, 2021 via Zoom due to the Covid-19 pandemic. A total of 872 registered for the electronic event. Burleigh County SCD planned and sponsored the second day (Feb. 24) of this event. The five featured speakers were John Kempf; Derek and Tannis Axten; Chris Teachout; and Darrell Oswald. Kempf is the founder of Advancing Eco Agriculture, a plant nutrition and bio stimulants consulting company founded in 2006. His three presentations on Feb. 24 were: 1) Reducing Fertilizer Use; 2) Water Use Efficiency; and 3) Using Inoculants Effectively. The Axtens and Teachout were part of "An Innovative Producer Panel: Bringing Life Back to the Farm Using Bioinoculants." The Axtens are third-generation owners of "Axten Farms, a diversified grain farm near Minton, Saskatchewan. Teachout is a fifth-generation producer on a farm near Shenandoah, Iowa, that dates back in his family to 1876. Oswald, a Burleigh County SCD employee, has managed Menoken Farm since 2016. His presentation was titled "What's Going on at Menoken Farm?"

■ *Reconnect With Your Food:* This event was held from 10 a.m. to 3 p.m. May 22, 2021, in Burleigh County with 73 people attending. This event was the first in a four-part food/gardening series planned for 2021. The series featured the following topics: 1) Planning and planting; 2) growing and tending; 3) nutrition; and 4) harvesting and preserving. Speakers and locations for "Reconnect With Your Food" were as follows: Wanda and Dennis Burrer farm near Wing, ND; Ella and Nolan Swenson farm near Wing; and Kara and Austin Winkler farm near Menoken, ND. Bus transportation was provided for attendees.

■ *Local Treasures, 2021 Garden Tour:* This event, which was held June 22, 2021, at Menoken Farm was the second in the four-part food/gardening series. Attendance at the afternoon "Walk of Life" session was 108. Attendance for the evening "Gardening Local Treasures" was 139. Keith Knudson of the Entrepreneurial Center for Horticulture at Dakota College at Bottineau, and Jay Fuhrer led a walking tour of the gardens and trailers rides to the fields for the 2 to 4 p.m. event. The evening event from 5 to 7 p.m. featured four rotating stations that featured the following speakers and topics: 1) Knudson; Summer Horticultural Projects at Dakota College at Bottineau; 2) Lori Martin, Roving Donkey Farm: High-value Crop Production in Protected Environments; 3) Jonathan Moser, Forager Fann; Successional Planting for Constant, Consistent Harvests; and 4) Roberta Thorson, Thorson Gardens: Matching Produce Varieties to your Environment and Business.

■ *Crops, Covers & Cows:* A total of 189 people attended this tour July 29, 2021, at Menoken Fann. The event was from 4 to 7 p.m. The five featured speakers were Jimmy Emmons, Steve Kenyon, Chris Teachout, David Bauer and Cody Kologi. Bauer and Kologi are Burleigh County SCD board members. Emmons farms and ranches 2,000 acres near Leedey, OK. Kenyon operates Greener Pastures Ranching Ltd. Near Busy, Alberta (Canada), Teachout is a fifth-generation farmers in Southwest Iowa.

■ *The Future of Food:* This third event was held August 4, 2021 from 5 to 7:30 p.m. at the North Dakota Heritage Center in Bismarck, N.D. A total of 162 attended the event. The three high-profile speakers were Dan Kittredge, Joel Salatin and Mark Schatzker. Kittredge has been an organic fanner for more than 30 years and is the founder and executive director of the Bio nutrient Food Association. Salatin raises livestock on his Polyface Farm near Swoope, Va. He has authored 13 books. Schatzker is an award-winning writer based in Toronto. He is the author of "*The Dorito Effect*": The Surprising New Truth about Food and Flavor."

■ *North Dakota Leopold Conservation Award Tour:* Burleigh County SCD, along with its partners, Morton County SCD and NRCS, helped sponsor the North Dakota Leopold Conservation Award

Winner Tour at the Dockter-Jensen Ranch at 1 p.m. August 25, 2021. About 110 people attended the event. The featured speaker was Doug Peterson, an NRCS employee in Missouri for more than 32 years, along with Kevin Sedivec, Rangeland Specialist - NDSU. Tour highlights included rotational grazing; crop rotation; no-till and cover crops; and erosion prevention. A dinner was held at 5 p.m. at the Ducks Unlimited Coteau Ranch.
■ *Food Presentation Workshop:* A total of 143 people attended the fourth event, "Food Preservation Workshop" that was held August 26, 2021 from 5 to 7 p.m. at Menoken Farm. The three speakers and their presentation titles were 1) Sue Balcom "Pressure Canning vs. Water Bath Canning;" 2) Diane Schmidt, "How to Make Sauerkraut;" and 3) Shaundra Ziemnn-Bolinske, "Freezing & Drying Fruits and Vegetables and the Latest and Greatest in Canning." Balcom and Schmidt are longtime gardeners and farmers market sellers and Ziemann-Bolinske works as an NDSU Extension agent for Burleigh County.

2022 Events
■ *Farming and Ranching for the Bottom Line:* "Building Soil Health: Processing the Microbiome" was held from 9 am to 4:30 pm on February 22nd 2022 at the National Center of Excellence on the campus of Bismarck State College in Bismarck. The Burleigh County SCD staff helped organize, plan and sponsor the first day of this annual conference. They work in collaboration with USDA Agricultural Research Services/Northern Great Plains Research Lab. The featured speaker was Joel Willams. The conference also featured "An Innovative Producer Panel" on day one.
■ *Gardening 101: 4 Part Series* The garden series kicked off on February 17, 2024 at 6 pm. Topics covered were starting seeds, starting a no-till garden and a discussion on tree cultivars for ND. May 5th at 6 pm was the second garden event. The discussion centered around tips and tricks of gardening, no dig potatoes, how to attract pollinators and the use of natural pesticides. Garden tour number three was a drive yourself follow the leader style tour that featured 5 different stops including the Menoken Farm. The other stops included The Root Sellers, Dianes Home Creations, DayDreams and Podoll Farms. The final garden event was the "End of the Growing Season" which included how to harvest and clean up your garden. A discussion was held on preservation of the garden produce harvested. With a wrap up on cover cropping your garden. These four events were very well received and drew in 189 people wanting to learn.
■ *Crops, Covers & Cows:* A total of 174 people attended this event starting at the Menoken Farm. Greg Judy, a farmer and rancher from Missouri who is an expert on mob grazing and has written three books was the headlining presenter. After lunch stops were made at Prairie Hills Ranch operated by Cody and Medora Kologi. Participants were led on a field tour of the Kologi's grazing system. The day wrapped up with a social and dinner at Black Leg Ranch with presentations from Jerry Doan and a final wrap up from Greg Judy.
■ *Urban Conservation and Outreach Workshop: UCOW* An Urban Conservation workshop was hosted at the Menoken Fann by the Burleigh SCD. 43 people attended the event from across North Dakota. The topics focused on information and education related to urban conservation practices.

2023 Events
■ *Grazing Summit:* The Burleigh SCD held a workshop with an emphasis on grazing on March 1, 2023 at the National Energy Center of Excellence on the Bismarck State College campus. The event was headlined by David Montgomery and Anne Bikle'. Dave is an author and

professor at University of Washington. Will Winter a holistic veterinary was a presenter. Cooper Hibbard was also a speaker from the Sieban Livestock Company. The event had 234 preregistered but inclement weather conditions caused the event to be delayed and attendance dropped. We did end up with 72 participants in person and over 200 online.

■ *Garden Series:* The garden workshop season kicked off on March 16th 2023 at the Career Academy on the campus of Bismarck State College. Greg Morgenson former Lincoln Oakes Nursery manager and NDSU Woody Plant Research Specialist kicked off the evening with a discussion on ornamental trees for the home landscape. Tom Kalb, Extension Horticulturist presented on apple varieties for North Dakota. Joe Zeleznik the Extension Forester wrapped up the evening speaking on the topic of tapping for maple syrup. 72 individuals took in this very interesting and informative event. May 2nd saw the second garden education event. "Soil Health to Human Health" again took place at the Career Academy at Bismarck State College. Jesse Frost a no-till gardener from Kentucky and the co-founder ofNotillgrowers.com kicked off the evening and spoke on using regenerative practices on limited acreage. Dan Kittredge founder of the Bionutrient Food Association and an organic farmer presented on food quality and what are the implications for society. The evening was well attended with 112 enjoying the event. "Landscaping For Pollinators at the Menoken Farm took place on June 29th, 2023. The evening event featured Esther McGinnis talking about bee lawns, Sandy Bieber leading a discussion on the Monarch butterfly and then a trip to the arboretum with Chad Thorson was an evening highlight. Kelsey Deckert closed out the evening with diagnosing tree problems. 92 participants enjoyed the very informative evening. July 22nd, 2023 was the very popular drive yourself garden tour featuring 3 outstanding gardens and the Menoken Farm garden. 70 people participated beginning with the Lyndon Anderson garden and a noon lunch to follow at Menoken Farm. The group then headed to Joseph Roll's garden and learned about sub-irrigated garden boxes with automatic watering and recovery. The day wrapped up with a trip to Third Day Farms to look at specialty cut flower production. The garden series workshops concluded on August 24t\ 2023 starting at 5 pm at Sixteen 03 Main Events on Main Avenue in Bismarck. Jill Trygg began the evening demonstrating how she makes salsa. She turned it over to Erin Martin from Oklahoma who spoke on using regenerative food as prescribed medicine. Erin is the founder of FreshRx a produce prescription program. Courtney Hoikkala an NDSU Extension agent presented on making strawberry freezer jam. 85 people took in this final garden event for 2023.

■ *Crops, Covers & Cows:* The annual Burleigh SCD event was held on August 10, 2023 and used the follow the leader driving format. The SCD was fortunate to have two of our supervisors step up and open their farms and ranches up to the 120 participants. The morning started near Regan ND at the Bauer Fann. Participating as speakers were Blake Vince, Steve Groff and Lance Gartner. Blake is a producer from Merlin Ontario and soil health expert. Steve Groff is the" Cover Crop Guy" and is from Lancaster Pennsylvania. Steve is known internationally for his work with cover crops and no-till agriculture. Lance Gartner from Glen Ullin ND and owner of Spring Valley Cattle was the 2022 Leopold Conservation Award winner for North Dakota. Next stop was the Saemen/Bosch JV. After visiting 3 field sites the group traveled to Menoken Fann for a recap of the days information and education and a sit-down supper.

2024 Events

■ *Bottom Line Ag Summit The Currency of Carbon:* This event took place on February 21st, 2024 at the National Energy Center of Excellence at Bismarck State College. The event was

extremely well attended with 249 participants. The full day event kicked off with Dr. Rattan Lal, via zoom. Dr. Lal is from Ohio State University and is universally known as a carbon expert. His work focuses on using regenerative agriculture to resolve global issues such as climate change, food security and water quality. Dr. Tom Dykstra an entomologist from Florida spoke on how he is teaching farmers and ag consultants how to raise healthy crops using brix as a guide. Zach Smith a farmer and inventor from Iowa also spoke on the development of his Stock Cropper. An autonomous livestock grazing tool. An on the ground producer panel was also included in the day's events. Two SCD supervisors from Burleigh SCD and two from Morton SCD stepped up and participated in the panel discussion led by moderator Josh Dukart.

■ *Holistic Management School:* The "Regenerate" school was held March 19-21, 2024 at the Menoken Farm. The school was led by certified holistic educator Joshua Dukart and his wife Tara. The 3-day event focused on regenerating your land, relationships and improving wealth. 22 participated in this educational opportunity.

■ *Garden Series:* The 20024 garden series kicked off on May 21st,at Menoken Farm. Featured presenters were Lindsay Rebhan and Theresa Podoll. Lindsay is an expert in permaculture and owns Ecological Design. She is a specialist in agroecology, land use, land design and land management. Theresa, along with her husband own Prairie Road Organic Seed. They produce certified organic seed. The "Growing With Gardening" youth camp on May 3ot11, 2024 at Menoken Fann was a huge success and fun was had by all. 38 young people took part in a fun, hands on experience. They learned about growing plants, soils, and pollinators. The drive yourself garden tour was July 19th, 2024. 44 participants took part in the informational and educational journey to 4 different stops. This afternoon event started at Laura Kourajians perennial garden. This 600 square foot garden is shaped like North Dakota. Laura has been a certified master gardener for 12 years. The group then moved on to view some organic produce and Brandy Vartys garden. Brandy is co-owner of Jyh's Honey and Heat. They grow over 200 varieties of chili peppers. Next stop was Kara Winkler's garden. Where she showed the group her tips on growing and selling market vegetables. The last stop was Menoken Fann for a tour and early supper. 2024's garden series wrapped up with a preservation workshop on September 24th at the Bismarck Career Academy on the campus of Bismarck State College. Marvin Baker talked about making horse radish. Marvin is from Minot and an avid gardener that sells produce at the North Prairie Famers Market. Mark Meier, founder and executive director of Heavens Helpers Ministry talked on preserving and storing all the types of food that are donated by individuals. The evening wrapped up with Jayson Parsons presenting. Jason is the owner of Jaydobo and specializes in seasonings and hot sauce.

■ *Crops, Covers & Cows:* This highly anticipated annual event took place on August 8th at the Menoken Farm. Two headliners were added to the lineup this year as Colin Seis and Jimmy Emmons were able to present at this event. Colin from Australia is a world-renowned grazer and owns and operates his 2000-acre ranch Winona. Colin has developed a methodology to sow annual crops into his perennial grass. Maximizing the use of all five soil health principles. Jimmy Emmons is a long-time friend of Menoken Farm and a huge soil health advocate. Jimmy has been monitoring soil health since 2011 utilizing cover crops. Jimmy and his wife Ginger own and operate Emmons Farm in Leedey Oklahoma. Jimmy also leads Trust in Food's Partnership for Climate Smart Commodities Movement and Trust In Beef. The day's events ended with a social and supper at Black Leg Ranch.

Information and education

A total of 256 tours have been hosted at Menoken Farm since the beginning of the Menoken Farm Soil Foodweb I project, under the Foodweb II project, and under the Planting Green phase I and II project to date. Groups from North Dakota and throughout the United States, along with grade schools, high schools and colleges, have toured Menoken Fann. These 256 events represent 5,893 people who have toured Menoken Farm to date since May 1, 2012, the start of Foodweb I.

The number of tours each year and the total people they represent are as follows:

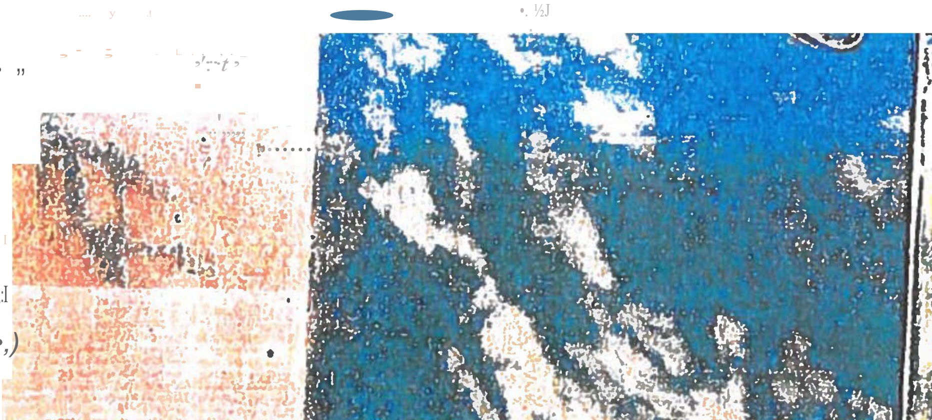
- *2012 summer tours:* Menoken Farm hosted 18 tour groups, which represented 359 people receiving soil and water quality information and education.
- *2013 summer tours:* Menoken Farm hosted 18 tour groups, which represented 852 people receiving soil and water quality information and education.
- *2014 summer tours:* Menoken Farm hosted 17 tour groups, which represented 476 people receiving soil and water quality information and education.
- 2015 *summer tours:* Menoken Farm hosted 21 tour groups, which represented 447 people receiving soil and water quality information and education.
- *2016 summer tours:* Menoken Farm hosted 30 tour groups, which represented 625 people receiving soil and water quality information and education.
- *2017 summer tours:* Menoken Farm hosted 22 tour groups, which represented 403 people receiving soil and water quality information and education.
- *2018 summer tours:* Menoken Farm hosted 10 tour groups, which represented 209 people receiving soil and water quality information and education.
- *2019 summer tours:* Menoken Farm hosted 24 tour groups, which represented 641 people receiving soil and water quality information and education
- *2020 summer tours:* Menoken Farm hosted 6 tour groups, which represented 45 people receiving soil and water quality information and education
- *2021 summer tours:* To date, Menoken Farm has hosted 16 tour groups, which represented 464 people receiving soil and water quality information and education
- *2022 summer tours:* Menoken Farm hosted 27 tour groups, which represented 534 people receiving soil and water quality information and education
- *2023 summer tours:* Menoken Farm hosted 20 tour groups, which represented 408 people receiving soil and water quality information and education
- *2024 summer tours:* Menoken Farm hosted 27 tour groups, which represented 414 people receiving soil and water quality information and education

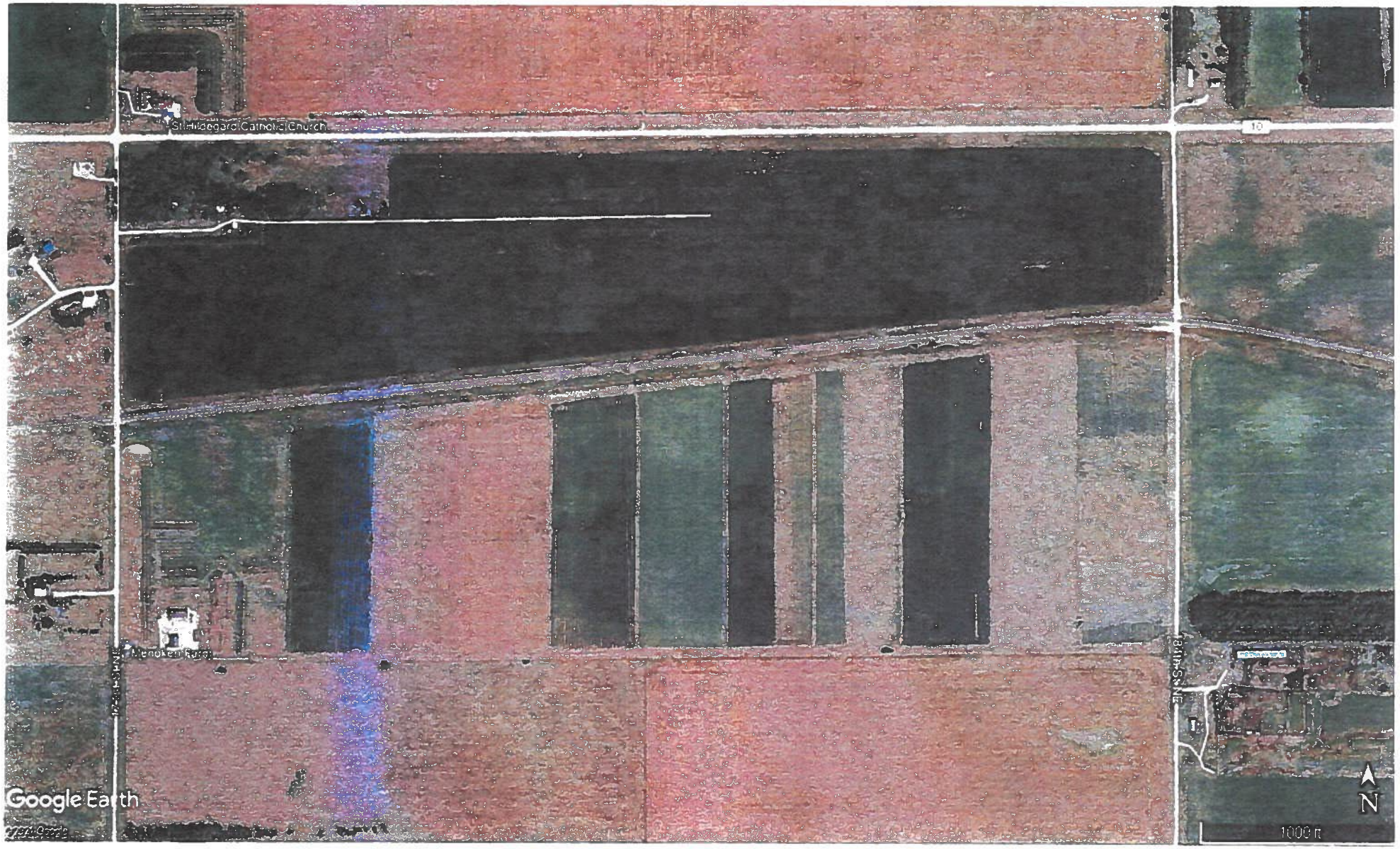
ATTACHMENT B

Map of Menoken Farm Site

Conservation District

Field 1	Field 2	Field 6	Field 8	Field 7	Field 8	Field 9	Field 10
11.1ac	11.3ac	11.5ac	12.4ac	13.0ac	13.0ac	13.2ac	12.8ac




St Hildegard Catholic Church
Menoken Rural
Google Earth
1000 ft
N

ATTACHMENT C

Menoken Farm History

Advancing Soil Health

The Menoken Farm

Advancing Soil Health
Established 2009

Introduction.

The Menoken Farm Is an educational site consisting of 150 acres of cropland owned and operated by the Burleigh County Soll Conservation District. The purpose Is to restore the health of the soils and move production agriculture toward sustainability; by eliminating fungicides, Insecticides, GMOs, and commercial fertilizer; minimizing herbicides, soil disturbance, and fossil fuel Impacts wherever feasible; all while Increasing the health and resiliency of the entire ecosystem. The Soll Foodweb Is enhanced by applying compost, compost extract, compost teas, fish emulsion, and seed inoculants on the east half of each field each year. Production method decisions mimic native rangeland with crop diversity, combination cover crops, a continuous live root allowing for maximum sunlight harvest, and appropriate animal Impact. Native pollinators and beneficial Insects are also encouraged In the holistic management strategy of the Menoken Farm.

Addressing Resource Concerns

The Burleigh County Soll Health Team Identified a number of resource concerns across this landscape upon initial purchase. These included a lack of soil surface armor, minimal biological diversity, poor nutrient cycling, slow infiltration, collapsed soil **aggregates,** minimal soil organic matter composition, and little beneficial Insect habitat.

2009: Concentrated on providing the basic building blocks to improve soil health; these included Increasing soil cover (armor) and crop diversity by crop rolling and seeding cover crop mixes with high amounts of diversity. Feeding the soil a diverse and expanded diet was a key in jump starting the biological activity. A complete biological soils analysis was completed, with plans for future monitoring utilizing the baseline data.

2010: Focused on seeding annual crops and cover crop mixtures. With the cover crop mixtures, we also added a very dynamic component in the form of pollinators. We felt that if we continue to build a healthy and diverse environment and supply It with a continual food source, it will attract the right balance of organisms, both above and below the soil surface. In addition, we applied compost, compost teas, compost extracts, and raw milk. Cattle were also Introduced to provide additional diversity and utilize the tools of grazing and animal Impact to place residue on the soil surface and cycle nutrients. We also started using compost that utilized our own raw materials from the farm along with some carbon and/or nitrogen-based Ingredients from nearby farms.

2011: Sheep were added to the Menoken Farm to serve multiple purposes. First, they provided a method of weed control that eliminated the need for herbicide use. Secondly, they provided another source of diversity to the environment. Their grazing preferences differ from those of cattle which have been and will continue to be used at the Menoken Farm. Additionally, the hoof impact that the sheep administered to the land varied in form and Intensity from the cattle, and therefore contributed to the increased functionality of the mineral cycle. In addition, a no-till garden was established at the Menoken Farm. The garden also serves multiple purposes. First, it serves as another educational tool. The concepts learned from gardening, cropping, and grazing can all be used to Improve our understanding of the whole farm. Secondly, the garden represents the direct connection between our soils and our food source. Although It Is small scale, it serves as a method of experimenting with Ideas before they are taken to the larger scale cropping production level.

2012: Poly-grain cover cropping mixtures are being added with the intent to harvest multiple annual crops simultaneously, along with having a cover crop already established. The garden is being moved to an adjacent location to share its biological benefits with additional areas of the farm. The diversity of the garden is also being enhanced by planting multiple species of fruits and vegetables together to further our efforts to Improve soil health. Additionally, with the continued use of mob grazing of sheep and cattle, we feel we can take the next step towards creating a sustainable landscape for food and fiber production. More trees were also added to the landscape to further enhance the biological diversity of the farm as a whole.

2013: Additional plant and animal diversity and their respective production techniques highlight the plan for the coming year. An Inter-seeding planter was purchased in order to utilize cover cropping with row crop plant species, as well as being able to put down compost tea directly with the seed. In addition, two additional growing environments are being created to produce food directly. One, a high tunnel hoop house, will allow more weather sensitive food crops, such as tomatoes and peppers, to be grown at the farm; and two, conditioned straw bales are being used to provide a carbon rich, space efficient, raised bed garden for growing onions and potatoes. Chickens and hogs are two new livestock species being explored for their ability to bring additional biology to the soil health system. Lastly, we are Initiating our "conservation biological control" process. For Instance, we are seeding sunflowers with an understory of plants which provide a habitat for predator and parasitoid insects; thus, eliminating the need for insecticides. This companion plant community will also supply nutrients and weed suppression.

2014: A new addition to the Menoken Farm has been added in the form of perennial grasses, legumes, and forbs. These higher succession level plants have been Introduced to repair soils In dire need of a continuous live root every hour of every day possible. This sustained, yet ever evolving and diversifying plant community provides Insect habitat and nutrition over a greater window of time each year, allowing for a heavier Influence of predator and pollinator insect species in the ecosystem as a whole. As permanent forage Is added to this annual cropping-based farm, we believe an ever-greater level of health and self-sufficient function can be achieved. The combination of so many levels of living organisms being attracted to this site should no doubt create greater diversity and ensure ever strengthening resiliency.

2015: First year for grazing the rotational perennials. Used a twice over grazlng plan, usually the paddocks were approximately half an acre in size. The top half of the forage was grazed and the bottom half was trampled to the soil surface. Seeded the second field to rotational perennials, trying to maintain 20% of the land base in rotational perennials. Soll cores were taken to a 4foot depth on all fields and archived, with the assistance of ARS-Mandan. Crop diversity continues to be expanded with sunflowers interseeded with cover crops. Soll food web comparisons are continuing on all fields; with a comparison between rolled cover crops vs grazed cover crops. Spread wood chips from the PMC on the east half of field 2; will monitor the soil Impacts.

2016: Concentrated on crop diversity and cover crops. Nutrient export was addressed for the first time by1razlng a corn field In lieu of harvestln1and exporting the corn. The livestock recycle the vast majority of the carbon, nitrogen, phosphorous, potassium, etc. The SCO now purchased Its own livestock, combining the cattle and sheep into one herd. Second year of grazing the rotational perennials. The livestock are weighed before and after the grazing plan Is completed. Soll aggregates are forming rapidly on the perennial fibrous root mass. The field the livestock are grazing records a higher PLFA amount, when grazing cover crops vs crop rolled cover crops is compared. Follow up on the wood chips spread on the east half of field two indicate the soil food web-PIFA levels have doubled vs the west half without wood chips.

2017: Set the stage for Planting Green by seeding rye at various fall stages. Early stages were seeded as cover crop mixtures with flowering plants, forage pea, radish, turnip, and phacelia. Later stages will be seeded as a rye monoculture. Will plan to seed broadleaf crops into the spring rye cover to address erosion, salinity, water quality, and lack of diversity. Will attempt to have landscapes with green plants during the usual fallow periods, before spring seeding and after harvest. Added dry distillers grains to the compost process this year. Will monitor the compost when completed, appears to be an excellent fertility source. The high tunnel was converted from an overhead sprinkler system to a drip line. Greatly increasing the water use efficiency and plant survival. Captured long term Soll Food Web results from animal impact, losses, corrections, and gains. Third year of grazing the rotational perennials.

2018: Planted the first crops green at the Menoken Farm. Started with both soybean and canola with good results; easy to open and close the seed trench. The soybeans had excellent pod set. Built a static compost windrow using the tree fabric cardboard tubes for aeration. Fall cover crops included winter camelina, with seed secured from the University of Minnesota. Goats were Introduced and were grazed separate from the yearlings and sheep, as their fencing requirement Is greater. During the late fall/early winter 30 plastic shuttles were obtained locally at no cost, filled with organic materials, and the addition of red wigglers and European nightcrawlers. Worm Juice was extracted over the winter and stored in a separate shuttle.

2019: Roof runoff rainwater was captured and stored in large plastic tanks. It was used to water the static compost/worm bins, and the high tunnel garden. 60" corn with perennial covers was introduced: along with 15" wheat planted1reen. Cured compost was placed in rectangular livestock tanks, which sloped to one end. The liquid worm juice was then collected and used as a seed coating in both the annual crop production and the garden. A grain hopper and auger were added. The high tunnel garden now has the addition of herbs. A second year of goats also became the last year, with the decision to stay with yearlings and dry ewes. Crimped a cereal rye field and then seeded soybean, with poor results due to the late date and dry condition which followed.

2020: Drought conditions occurred with the year ending at approximately 45% of normal precipitation. Covid 19 significantly reduced the number of outreach activities, as most events switched to virtual or were postponed. A livestock scale was added, with the yearlings being weighed after 7 different forages. Developed both pounds of beef produced per acre and individual yearling rate of gain data. Added annual flowers to the high tunnel for pollinators and rotation benefits; also added one fruit tree. Milpa was added to the outdoor garden, watering was necessary. Expanded the number of bins to three for vermicompost liquid extract collection; once again, used it as a blo inoculant on the annual crop seed and the garden seed.

2021: A second year of drought conditions with triple digit heat and a smokey atmosphere. The precipitation was once again around 45% of average. Farm tours increased compared to 2020, although Covid 19 was still making a suppressive impact. 60" corn with covers appeared to fair better than the 30" corn with no covers; the covers were seeded with the Truax drill at about the VS stage. Sunflowers with covers also managed the dry and hot conditions. Increased the plant diversity in the high tunnel with companion crops such as onion-carrots-flax, and cucumber-flax. Added more fruit trees to the high tunnel, it now Includes apple, cherry, and peach. The outdoor garden was planted to 8 rows of sweet corn with drip line irrigation, along with milpa In between the rows.

The Future

Production, profit, and the health of plants, animals, and people all directly relates to the health of the soils we manage. We expect to see a continuing positive trend In soil health as we introduce more and more diversity and focus on addressing the real problems in the ecosystem. With the holistic management approach taken at the Menoken Farm, we feel it can play a crucial and beneficial role In the experimentation and demonstration of sustainable agriculture and food production.

ATTACHMENT D

Milestone Table

ATTACHMENT E

Letters of Support

MILESTONE TABLE
Minimizing Pesticide Use In Urban and Rural Food Production

TASK/RESPONSIBLE ORGANIZATIONS	OUTPUT	QUANTITY	Year 1	Year 2	Year3
Objective 1: Deliver a cropping plan to minimize pesticide use					
Task 1 - Seed and maintain the 10 12-acre fields Group 1	Successful planting of all 10 fields and garden	10	10	10	10
Task 2 - Manage and maintain compost materials Group 1	Large compost area used for the entire Menoken Farm	1		X	X
Task 3 - Plant and maintain high tunnel and outdoor gardens Group 1	Successful planting of high tunnel garden and outdoor garden	3	X	X	X
Objective 2: Deliver a planting green grazing plan					
Task 4 - Care for and handle animals	IIHealthy livestock herd	1	X	X	X
Task 5: Manage cover crop rotational grazing Group 1	Successful cover crop rotational grazing	1	**X**	**X**	**X**
Objective 3: Monitor reduced pesticide benefits					
Task 6 - Monitor impacts from all 10 Menoken Farm fields Group 1	Complete and analyze soil samples, brix & nutrient density	120	40	40	40
Objective 4: Inform and educate the agricultural community					
Task 7 - Conduct three maior workshops Groups 1 and 2	Complete three major workshops at Menoken Farm	3	1	1	1
Task 8 - Arrange and host 30 summer tours Group 1	Complete 30 summer tours at Menoken Farm	30	10	10	10
Task 9 - Produce three educational videos Group 1 and 2	Completion and posting of 3 educational videos	3	1	1	1
Task 10 - Develop and maintain rain garden Groups 1 and 2	Maintain new building site rain garden	1	**X**	**X**	**X**

Group 1 - Burleigh County Soil Conservation District (SCD): Lead all work activities

Group 2 - North Dakota Department of Health: Assist with data collection and dissemination