

CARRINGTON RESEARCH EXTENSION CENTER

Carrington, North Dakota

North Dakota is one of the most farming dependent states in the country. Over 64 percent of the land is in crops. The type of practices used and the crops raised as well as changing economic trends and agricultural policy have had a broad impact on the health of its land, air and water and the economic viability of farming.

The Carrington Research Extension Program in central North Dakota has played an important role in influencing choices. Unlike traditional research centers it employs a multi-disciplinary whole-system approach linking agricultural science with economics. The Carrington research and education programs go far beyond basic crop research by developing “value-added” products and new partnerships to meet the needs of farmers, processors and consumers. According to John Gardner, Superintendent of the Center, “We want farmers and consumers to understand each other’s needs.”

Originally conceived as an irrigation research facility, the Carrington station opened in 1960. Its original mission was to develop new ways for farmers to use water more efficiently, develop irrigated agriculture and to do research on specific vegetable crops. Livestock research was added to help farmers use farm-raised crops, often by-products, to feed cattle. In the 1990s, the focus shifted to an approach that examines a variety of ways to help farmers economically as well as to introduce more environmentally sound farming practices. Now it is more of a community-based land grant institution that intertwines applied science with community education programs in order to set up a mutually beneficial agenda.

The Carrington Station is located on 1,200 acres. Its staff of 24 carries out more than 36 crop and livestock projects within an annual budget of \$1 million. It is important to note that about half of its funding comes from the sale of seed and livestock and from foundation, government and

industry grants. The remaining comes from the state general fund.

Expanding sustainable agriculture

Carrington Center is no ordinary research center. Here sustainability is in evidence throughout the programs with John Gardner a leading proponent. He believes that “sustainability means taking into account how a crop or other agricultural product fits into the social and economic system. We look at the social, economic and environmental impacts, as well as agro-

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nomie profiles, of our research.” This means that all the aspects of production, processing and consumption are factored into its approach. The focus is on partnerships and whole systems that help to encourage the development of new crops and markets, the reduction of pesticide and fertilizer use, and the potential for increasing the number of local value-added crops.

The Center uses a variety of methods to implement these ideas:

- Variety and yield tests are run under different controlled conditions at the research facility (dryland, irrigated land) as well as under real-life conditions on farms both on- and off-site.
- Diverse crops are raised (oilseeds, grain legumes, and grasses) so that the farmer can choose what is best suited to the land rather than continuing to grow traditional crops that deplete the soil.
- Research is conducted on the cost-effective use of herbicides. In the future this will include the use of integrated pest management strategies.
- Experiments in processes that add value

to crops such as uses for agricultural by-products for cattle and fish feed, fuels and fertilizer are carried out.

- Under the livestock program, cattle act as “recyclers” of the crop residues; all manure is composted.
- Programs, consultations, and educational extension meetings are carried out statewide.

Two examples illustrating these methods are the growing of crambe as an alternative crop and the introduction of aquaculture for value-added potential.

■ **Crambe:**

Over 50 percent of the crops in North Dakota are wheat and barley. In recent years, the Center has been influential in persuading some farmers to experiment with crambe, a cousin of the mustard family. It was first introduced by Carrington in 1990 as an alternative oilseed crop for use both as an oil (lubricants, plastic coating, hair conditioner, and a chocolate additive) and as a meal (for cattle). As many as 60,000 acres have been planted.

Its assets are many: it is pest-resistant, high-yielding, environmentally desirable as a nontoxic lubricant, and suitable for rotations and less fertile land. It requires fewer purchased inputs and has low production costs. It has the additional advantage of saving taxpayers money by reducing subsidies which currently represent 30% - 40% of the region’s income. In certain cases the yields have been more profitable than wheat.

■ **Aquaculture:**

To develop a new economic alternative as well as a new value-added agricultural product, Carrington recently opened a Northern Aquaculture Center in conjunction with the North American Fish Farmers Cooperative using a grant of \$250,000 from the Rural Development Administration. This fish farming venture is set up as a processing/marketing cooperative as well as a research facility to study the feasibility of closed-loop indoor aquaculture. Consistent with its whole-system philosophy, Carrington is researching the use of alternative crops and manufacturing byproducts for fish feeds, thus increasing demand and price for the traditional and alternative crops grown in the state. The effect of these feeds on water quality and the cost of production will be among the factors monitored.

Elements for success

The defining elements of the Carrington

Center are the focus on sustainability, participatory processes, and a whole-system approach that expands its role into a forward-looking, interdisciplinary facility. As a governmental institution it is unusually experimental — in its words, “taking from test tube to landscape and everything in between.” As in many successful enterprises, leadership is key, and John Gardner is a passionate advocate of sustainability above and beyond the reach of the Center. He has adopted many other environmentally-beneficial practices on the state farm and modelled social sustainability by transforming an historic house into a thriving cultural center.

According to Dr. Gardner, “The concept [of sustainability] has not been a hard sell.” Much of the environmental interest in these approaches has come from the large contingent of state residents who have longstanding wildlife and environmental interests. Many are concerned about water quality and the health of their families. Practitioners of organic farming who work with the Center are already practicing sustainable agriculture. Others have recently adopted more sustainable practices for the social and economic benefits.

Admirers of the Center cite one of its main accomplishments as the process of *partnership with farmers and participatory research* which weaves applied science into community education and visioning. It has been effective in working with farmers on long-term, whole farm approaches that reduce costs and identify opportunities to add value to farm products. It has also helped smaller producers find niche markets and partner with processing plants and marketing services for alternative crops.

The Center has also *facilitated collaborations*. It has opened communications between and engaged the university, government and private sectors in collaborative undertakings. By creating an informal network that can address problems, it provides a more coordinated framework for problem-solving. It has also worked with the Northern Plains Sustainable Agriculture Society, a grassroots educational organization that promotes ecologically- and socially-sound food production that currently covers roughly 22,000 acres in organic production.

Additionally, the Carrington Center has *influenced the work at other research stations* as well as that of its staff. In its experiments with alternative pest control,

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Scope: Statewide
Inception Date: 1960
Participants: Researchers, farmers, processors, consumers, Native Americans
Project type: Sustainable agriculture, partnerships, market development
Methods used: Whole-systems approach; development of alternative crops; variety in testing methods; value-added projects; team approach of researchers, educators, farmers, processors, and consumers
Lessons learned: Integration of research into applied farming. Emphasis on whole system approach and sustainability. Support from state government agricultural leadership.

for example, where chemicals are seen as a last resort, it attracted interest from other centers, resulting in the adoption of biological pest control. Indirectly, it has influenced the sustainability of the family farms by offering a greater diversity of crops that are best suited to the specific aspects of the land and that will offer a good return on investment.

Challenges

There is more work to be done in certain areas. For example, in the past, market research has been limited for alternative crops and little emphasis put on their development. New crops are often developed before potential uses or markets are defined. This can influence the receptivity of farmers to being in the vanguard of those who are willing to make the switch to lesser-known varieties. Traditional family farm values and generations who have always grown the same crops also play a role.

Unpredictable changes in processing facilities and market partners have presented other difficulties. In the case of

crambe, the processing company’s operations were halted when the parent company wanted to be in the more lucrative parts of food production. Finally, public policies that determine the economic distribution of wealth among input producers and the processing and marketing sectors also present difficulties.

Carrington’s leadership in research and education has already helped to meet these challenges and needs of farmers in North Dakota. As additional potential profits are obtained from farming sustainably and as assistance in developing markets for new crops and by-products becomes available, more farmers are likely to make the transition.

—CONCERN, Inc.

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The Carrington Center continues to research and support sustainable agriculture that promotes the economic profitability of North Dakota farming. Its data collection and outreach are helping farmers understand the advantages of rotating alternative crops, such as canola and field peas, in order to break pest cycles, improve soil, reduce fertilizer use and expenditures, and diversify cash crops. Under Carrington’s guidance and as a result of a partnership of farmers, university researchers and industry, field pea cultivation has increased statewide from 5,000 to 70,000 acres, providing farmers with another commodity for the marketplace.

The aquaculture project is developing an educational program and will use its training equipment and professional staff to teach interested parties the necessary skills for starting their own businesses. The Pew Charitable Trust has funded Carrington to evaluate the condition of the land that has rotated out of the ten-year Conservation Reserve Program. Much of this land is in the prairie pothole area and is highly erodible. An environmental byproduct has been an increase of wildfowl.

Blaine Schatz has replaced John Gardner as superintendent. John Gardner now directs the development of a local oilseed processing plant to serve the niche commodity market of such speciality oilseeds as crambe, organic flax, safflowers, sunflowers, and canola—all North Dakota crops.

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