

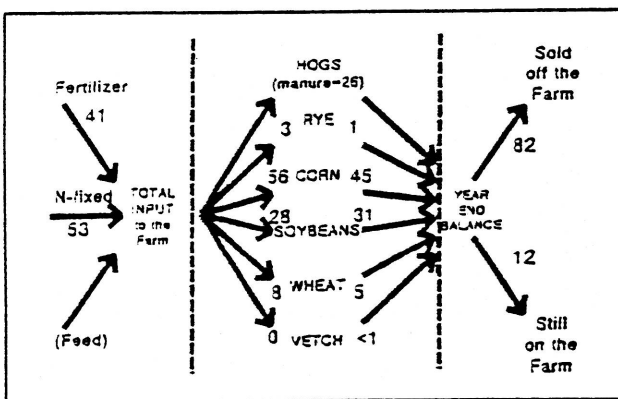
Nutrient Budget is Focus for Farm Plan in Ohio

Rich Bennett learned how to use cover crops from his father on their northwest Ohio farm, but he has taken his cover cropping practices to a new level, integrating his knowledge with modern farming practices. His goals are to rely on cover crops in a long term farming system to cycle nutrients, build soil organic matter, and improve soil quality, and at the same time, of course, to return a reasonable profit. A son's hog operation has recently been added to the system, cycling nutrients from corn into hogs, and manure back into crops. Using a nutrient budget in a whole farm plan is a springboard to evaluate farming practices and generate more nutrients at lower costs from within the farm.

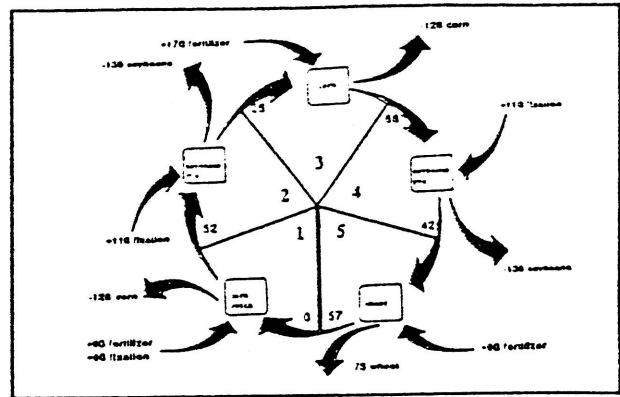
The Bennetts farm 600 acres in northwestern Ohio. Like others in the region, they raise corn, soybeans, and wheat. While yields are generally good, they deal with considerable water management problems, mostly involving drainage, but in recent years drought as well. There are also increased concerns about the potential for agricultural chemicals to enter waterways, contributing to pollution in Lake Erie. Ever present are concerns about low grain prices and narrow profit margins.

Rich Bennett is widely regarded as an innovator with cover crop farming. He plants appropriate cover crops and crops in a five-year rotation that involves intricate timing but is manageable. Cover crops can be fall seeded after harvest of a previous crop like wheat, over-seeded into a growing crop like corn, or planted right along with a faster growing crop like oats. The cover crop grows through the fall, protects soil over the winter, and starts growing right away in spring. It is then disked into the soil prior to planting the new crop.

Bennett's rotation starts with hairy vetch into which corn is planted, followed by rye and soybeans, then corn alone, then a repeat of rye and soybeans, concluding with wheat followed by fall-planted vetch and rye. On his better soils this rotation is shortened to three years.



One of Rich's nutrient budget worksheets: whole-farm nitrogen flow—crops and livestock.



Another of Rich's nutrient worksheets: five-year crop rotation—nitrogen circulation in lbs/ac/yr.

Cover crops increase nutrient availability to crops, build soil quality by improving drainage and tilth of seasonally wet soils, add greater ease in no-till planting, aid in weed management—lowering production costs—and extend the growing season.

Although the Bennetts had had hogs on the farm for many years, they terminated their hog operation two years ago because of chronic mastitis problems. Rich's son Craig recently started a contract finishing program with Cargill, to generate income for college expenses. Craig finished between 200 and 300 hogs last year. The hogs were fed corn grown on the farm mixed with a purchased concentrate. Rich contemplated how best to integrate the hog operation into the soil fertility management on the farm. The opportunity to use a considerable amount of manure is an opportunity to reduce fertilizer costs and increase profit to the farm.

A yearly nutrient budget was calculated to reflect differences between overall inputs and outputs of nutrients on the farm. The purpose of looking at a nutrient budget is to assess where all nutrients come from (including fixation in the soil, purchased fertilizer, and manure), and where they go (whether sold off the farm as grain and meat or left in the soil), as a way to assess how to reduce or eliminate fertilizer purchases.

Before taking into consideration hog manure additions, the Bennett's whole farm nutrient balance had a surplus of nitrogen and potassium and was somewhat deficient in phosphorus. However, if manure credits were taken into account, based on the amounts from the previous hog operation, the farm has a surplus of all three nutrients. On the basis of the number of hogs now being maintained on the farm with the new contract operation, approximately 35,000 pounds N, 12,500 pounds P and 16,000 pounds K could be cycled through the manure within a five-year cropping cycle.

(Nutrient Budget, continued on page 5.)

Nutrient Budget, *from page 4.*

Looking at nitrogen circulation within a five-year rotation sequence allows Rich to view the cropping cycle as a whole and to address soil fertility as a long-term process throughout the rotation sequence. Hairy vetch and rye cover crops have contributed significantly to the cycling of nitrogen throughout the five-year period.

Another one of Rich's goals is to increase soil organic matter. Estimates of the amount of carbon contributed by the cover crops, as a percentage of the overall crops, demonstrated that cover crops contribute an appreciable amount to the farm carbon budget.

Finally, the farm plan places nutrient management within an economic context. The cost of fertilizer on the farm relative to gross farm income and other money flows was calculated. Fertilizer represents a relatively large expense for Rich, approximately 19% of gross income, indicating that cutting fertilizer costs should contribute significantly to increasing net profits from the farm.

Note that testing the actual levels of nutrients available in the soil in different fields is a separate management practice, more like a single snapshot in time. A nutrient budget is a form of long term ecosystem management that helps the farm assess the total value of farm-derived nutrients, minimize fertilizer costs, and oversee organic matter and other soil quality factors.

Rich developed his farm plan with his Extension agent and a professor at Ohio Agricultural Research and Development Center in Wooster. Now he has helped form a new group of farmers, the Cover Crop Council for Northwest Ohio, where farmers gather regularly to share ideas and help each other look at their nutrient budgets.

—Adapted from "The Bennett Farm: Integrating Cover Crops and Livestock into a Grain Farming System" by Ben Stinner, Anu Rangarajan, Mike Cote, and Deb Stinner. For a copy of the full case study, contact Jeff Dickinson at the Stratford Ecological Center (614-363-2548). Jeff represents Ohio on the steering committee of the Great Lakes Basin Farm Planning Network.

Two Whole Farm Planning Projects Funded

We are happy to report that the Great Lakes Protection Fund has awarded funds to continue building the Great Lakes Basin Comprehensive Farm Planning Network for two more years. The Network is governed by a Steering Committee of representatives from each Great Lakes state and Ontario which have established Whole Farm Planning Working Groups or Task Forces to implement the project. During this next phase, Network states and Ontario will continue to host on-farm demonstrations of whole farm planning tools. These state and Ontario activities will show farmers and other interested people how whole farm planning can result in environmental and economic improvements. The Network will also keep compiling stories and successes into communications materials, *The*

Whole Farm Planner, and internet articles. John Lamb will continue to coordinate the Network.

The Minnesota Project is working with an interdisciplinary team of farmers, environmentalists, and University personnel on developing an instructional Goal Setters' Handbook for farmers. The Minnesota Institute for Sustainable Agriculture has awarded a one-year grant to support this work. The team has chosen to focus on goal setting because it's one of the most important steps in pulling together a whole farm plan, yet in many ways one of the most difficult. Plans include surveying farmers about how they currently establish goals, analyzing those details, and producing the handbook by early 1998. Watch for future details about both these projects.

Conservation Training on the Web

A self-paced conservation planning course is being offered by the Natural Resource Conservation Service by computer over the internet. The targeted audience is NRCS staff and conservation district officials. You need a password and some training prerequisites to access the nine course modules on a computer. However, anyone can check out the course overview and learn more about it. Just hit the "training" button on the NRCS homepage (www.ncg.nrcs.usda.gov/).

According to the course overview, it trains staff to assist clients in developing comprehensive conser-

vation plans considering all of the resources (soil, water, air, plants, and animals) and the human concerns (economic and social). Part 1 of the course provides the background and framework for conservation planning. Part 2 includes hands-on application of the nine-step planning process. Part 3 includes actually preparing a plan under supervision. Participants will be trained to independently apply the NRCS planning process and assist clients in making decisions, resulting in conservation plans that protect, conserve, and enhance resources while meeting the client's needs.