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Assessing Environmental and Economic Aspects of Farming; Livestock Outlook

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ASSESSING ENVIRONMENTAL AND ECONOMIC ASPECTS OF FARMING

by
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Farmers are becoming increasingly aware of the environmental consequences of certain farming practices that have become "conventional" over the last 30 to 40 years. As agricultural producers, they are concerned about erosion, ground water contamination, and personal health considerations from chemical use. At the same time, farmers are concerned about the economic viability of their operations. Farmers are limited in being able to sacrifice net farm income to meet stricter environmental regulations.

A new software package named PLANETOR has been developed that can be used to examine interrelationships between economic sustainability and environmental safety. Researchers working on the Big Sioux Aquifer (BSA) Demonstration Project at SDSU are among the first to have used this new software package.

BSA Demonstration Project

The BSA is a shallow glacial outwash aquifer underlying approximately 1000 square miles of prime agricultural land in eastern South Dakota. The aquifer is extremely important since supplies water for domestic as well as agricultural use. Because of the important and varied use of the water from this aquifer, people are concerned that this source of water continue to be of high quality.

The BSA demonstration project was initiated to address non-point sources of contamination within the Brookings, Moody, and Minnehaha County areas. The goal of the demonstration project is to implement Best Management Practices (BMPs) on agricultural land and develop other

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LIVESTOCK OUTLOOK

by

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Cattle

The price outlook for the cattle industry hinges on two major external factors: (1) the supply and price of competing meats and (2) the supply and price of corn. There will be plenty of poultry and pork for consumers to buy. That, along with almost as much beef as last year, will keep prices for fed cattle close to $70. Prices under $70 are possible this Fall. Some improvement to the mid-$70's is possible for late 1992 and early 1993.

Low corn prices, low interest rates, and a somewhat limited supply of feeders should help keep feeder cattle prices close to current levels, especially if fed cattle prices hold above $70. Prices in the $90's for 400-500 pound calves and the $80's for yearlings are expected. Changes in corn prices are possible and that will have an effect.

Hogs

More hogs available for slaughter will pressure prices this Fall and early in 1993. Prices below $40 are possible this Fall and even the mid-$30's cannot be ruled out. Some recovery late in 1992 may push prices up to the mid-$40's. That price level also is forecast for early in 1993.

Lower corn prices will lower breakevens for hog producers and should help feeder pig producers. Even then, prices in the $1.00 per pound area will be difficult to achieve. Much will depend on how low slaughter hog prices go and how long they stay low.

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measures at the local level to protect private and public water supplies and shallow ground water aquifers from contamination (Big Sioux Demonstration - Project Summary, 1991).

A major impetus for development of Best Management Practices for agricultural land has been awareness of the environmental impacts of farming practices by farmers, policy makers, and the public.

Today, BMPs of farmers can be judged by both economic and environmental criteria, such as farm profitability, soil erosion, groundwater contamination, and personal health. Additionally, concern is being raised about the economic viability of the farming operations. Farmers are continually examining ways to meet environmental standards without sacrificing net farm income considerations.

In the past, it has been difficult to evaluate both the environmental and economic effects of alternative farming systems at the same time. Recently, a software package called PLANETOR has been developed for such a task. PLANTETOR is the centerpiece of the Sustaining and Managing Agricultural Resources for Tomorrow (SMART) micro-computer package being developed by the University of Minnesota. PLANETOR is specifically designed to help farmers and ranchers evaluate their present farming operations as well as proposed changes for the future.

PLANETOR was chosen for the BSA project because it is one of the few packages that integrates environmental and economic data. Much was learned from this initial use of PLANETOR. To help future potential users benefit from this experience, we describe in this newsletter PLANETOR, some of PLANETOR's virtues and shortcomings, and answer some questions potential users may have about PLANETOR.

PLANETOR

PLANETOR uses both soil and budget data to report environmental and economic results of a particular farming system. PLANETOR presents environmental results in three areas: 1) erosion, 2) water quality, and 3) pesticide toxicity. Results can be shown on both a whole farm and per field basis.

Using PLANETOR requires that a soils data base and a variety of crop enterprise budgets be developed. The soils database is prepared from county-level soils surveys. This information is available from the Soil Conservation Service. PLANETOR cannot be used if soils information is not available for the area to be examined.

Crop and livestock enterprise budgets are also necessary for the use of PLANETOR. The enterprise budgets are often assembled by agricultural specialists using BUDGETOR, a tool to summarize crop and livestock budget information. The budgets are "average" or "typical" budgets corresponding to the same area represented by the soils database. These budgets are similar to other conventional budgets, but with some addition information so that economic AND environmental consequences of a particular farming system can be analyzed.

Illustrations of such additional information are: 1) crop budgets on a rotational basis (up to 12 years, if desired), 2) budgets developed for various cropping systems employing different fertility and pesticide rates and tillage systems, 3) pesticides specifically identified by trade name so that the effects on water quality and human toxicity can be determined, 4) nitrogen requirements and application rates, and 5) risk factors for each enterprise and those relating to diversification.

Many of the budget data necessary for the development of BUDGETOR for PLANETOR for the BSA were obtained through the budget generator called CROPBUDGET. Livestock budget data were obtained primarily from budgets previously developed by the exten-sion service. Soils data for the BSA were provided by the Soil Conservation Service.

PLANETOR uses red, yellow and green lights to indicate the impact of a cultural practices on the environment. Red indicates potential that a cultural practice(s) may have severe negative environmental effects. Green indicates that a practice(s) is within established tolerable limits. Yellow indicates the need for caution and consideration of possible alternative practices. The indicator lights and their meaning are discussed in greater detail below.

Environmental Implications

Erosion indicator lights displayed by PLANETOR are for water erosion only. The potential for wind erosion is shown in the farm data input section of PLANETOR. The color of the water erosion light is determined by applying the Universal Soil Loss Equation (USLE) to the soil type, slope, slope length, and cultural practice values. Most or all of this information is contained in the soils data base as part of PLANETOR.

The color of the lights for erosion is determined by comparing the calculated USLE value for erosion to the SCS "T" value. "T" is defined as the Tolerable soil loss limit. If soil loss is less than nine-tenths of "T" for that soil type, the low or green light is turned on. If soil loss is greater than nine-tenths, but less than twice "T", the yellow or medium light is turned on. If soil loss is twice "T" or greater, the red or high light is turned on.

Water quality is indicated by a combined light for nitrogen use, pesticide leaching, and pesticide runoff effects. Each area also has a separate underlying indicator light that is not shown in the output. When the lights are combined, only the light indicating the most detrimental effect is shown. Therefore, with PLANETOR it is possible to improve the environmental impact of a farm plan based on water quality by improving one or two of the underlying water quality lights.

Pesticide toxicity indicates the toxicity of pesticides used in terms of human exposure. Pesticide toxicity ratings are taken from the individual chemicals label and are classified as high, medium, or low corresponding to red, yellow, or green indicator lights. Pesticide toxicity data is contained in the chemical data base in PLANETOR.

Economic Implications

Economic data calculated by PLANETOR consist of two types: traditional financial income measures and measures of balance between farm resources and their use. Economic data are available from PLANETOR on a whole farm basis as well as a crop and livestock enterprise basis.

Traditional financial income measures shown by PLANETOR include direct costs, net farm income, and net worth. A diversification effect is also calculated by PLANETOR. The diversification effect shows the reduction in income variability from having multiple enterprises on the farm.

Economic resources results show how five major farm resources (feed, labor, energy, water, and manure) are balanced against farm requirements.

A production summary is also provided by PLANETOR. Items in the summary include acres by crop, total production by crop, corn equivalents (bushels), hay equivalents (tons), silage equivalents (tons), pasture (AUMS), and livestock. These are shown on a per year basis.

One of the primary strengths of PLANETOR is the ability to test alternative cultural practices for a given field to determine if those practices are (1) as environmentally damaging as other available alternative practices and (2) economically feasible. However, changing cultural practices on a given field is not easy. For example, if a certain pesticide is indicated to be potentially harmful to the environment, alternative pesticides can be chosen from the PLANETOR data base. However, costs do not change when the alternative pesticide is chosen. PLANETOR users presently need to calculate by hand and enter the changes in cost. This can be quite time consuming if many pesticides are substitutable and need to be considered as part of an alternative system.

Conclusion

Agriculture's impact on the environment has became a focal point in recent years for farmers, researchers, extension personnel, and the general public. Many conventional farming practices are blamed for contamination of the water supply and deterioration of the environment. Alternative farming systems such as Ridge-Till, No-Till, Minimum-Till, and Sustainable Agriculture have been promoted as alternatives to the present predominantly used farming systems.

It is difficult to compare alternative farming systems on both an environmental and economic basis. PLANETOR is a valuable first step and could prove useful in the

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future for comparing farming system alternatives from both environmental and economic standpoints. This type of information will likely prove useful at the farm level as well as for research and extension.

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(Livestock ... cont'd from p.1)

Sheep

Recent declines in sheep prices are not easy to explain. Lower supplies and fairly good retail movement should support a better price picture than currently exists. In general, price forecasts in the low $60's for slaughter lambs this Fall and maybe $5 higher early in 1993 seem to be reasonable. Feeder lamb prices could average $5 or a little more above slaughter lamb prices.

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