The Use of
SOIL PRODUCTIVITY RATINGS FOR ASSESSMENT EQUALIZATION
Among Townships in Eddy County

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Equity in property tax assessments became a goal throughout the United States in the latter part of the 19th century. Equitable assessment is defined as the fair or just appraisal of each individual property. The goal of equity in assessing has become so widely accepted that many states have incorporated it into their constitutions.

Inequity in real estate tax assessment, including farm and ranch lands, is one of the major problems in real estate tax administration in North Dakota. Accordingly, in 1969 the Legislative Assembly directed that each county employ a Director of Tax Equalization to establish procedures for equalizing assessments within the respective counties.

Strict adherence to the law in general property tax administration calls for assessing properties at a uniform proportion of their going market value (1). This goal is difficult to achieve in actual practice because property values tend to fluctuate, and even the most competent assessors may disagree on what constitutes fair market value. Also, most assessors do not have the training needed to prepare high-quality assessments. The result is that overassessment of low-valued properties relative to high-valued properties is a common occurrence in many classes of property. This is particularly evident in farm and ranchland assessments.

Inequities in average per-acre values among townships within a county and among counties within a state are presumably reduced to some extent by county and state assessment equalization procedures. In these instances, equalization corrects differences among taxpayers in different districts only when the review and equalization process at the township or county level eliminates errors made by the assessor. Unless errors in the original assessment are corrected, equalization at the state or county level increases the inequalities among individual taxpayers. Improvement in the local assessment procedure is, therefore, basic to greater uniformity in property taxation.

The underlying obstacle to attaining equitable assessment of farmland is determining the market value of each parcel of land. Sales data are frequently not available or inadequate. When an assessor lacks knowledge of market value, he often copies the previous assessment or makes a casual estimate of the value of a particular parcel of land, and the result is inequitable assessment of farmland for tax purposes.

One method commonly used by professional appraisers to estimate farmland values is to capitalize net income from it. The capitalized values are in turn compared with data on sales of comparable or representative properties. If the estimated values based on capitalized net incomes are similar to farmland prices based on current sales, the two approaches serve to reinforce each other in estimating values of the farmland. Capitalizing net income can also provide a more objective basis for equitable assessment of farmland when market data are inadequate or unavailable.

Estimates of Township Average Per-Acre Value

Soil productivity ratings for each township and county in the state were completed in 1969 by the Department of Soils, North Dakota Agricultural Experiment Station (2). A pilot project to study the feasibility of using the township soil productivity ratings as a method to estimate township average net income per acre was completed in 1971 for Eddy county, North Dakota (3).

The township soil productivity ratings are estimates of long-term gross physical productivity of small grain (principally hard red spring wheat) and native pasture under average management. Product prices and production costs were not consid-

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ered in computing the soil productivity ratings. Therefore, the relative values of the soil productivity ratings by themselves do not indicate a corresponding relationship in net income from farming. Accordingly, the objective of the pilot project was to estimate township average net incomes per acre in Eddy county. The estimated net incomes were subsequently capitalized into corresponding township average per-acre farm land values to be used as guides for intertownship assessment equalization.

Eddy county was selected for the project because the Director of Tax Equalization and the county commissioners expressed an interest in cooperating with the Department of Agricultural Economics and the Department of Soils, North Dakota Agricultural Experiment Station, to study the use of soil productivity ratings for equalizing farmland assessments.

Data on production costs and returns were obtained from the Department of Agricultural Economics at North Dakota State University. Costs and returns were computed as an average of the data for a two- and three-year crop rotation. The average of the two crop rotations was used because about half of the hard red spring wheat grown in Eddy county is planted on fallow ground.

The township average yield of hard red spring wheat in bushels per acre was estimated by the following formula:

$$\frac{\text{Township soil productivity rating}}{\text{County Soil productivity rating}} \times \text{County average yield of wheat} = \text{Estimate of average wheat yield/acre in the township.}$$

A price of $1.47 per bushel of wheat was estimated which might be expected in the foreseeable future. No government payments were included. The price per bushel was multiplied by the estimated average wheat yield in each township to estimate the gross return per acre. This procedure provided an estimate of gross return per acre relative to the soil productivity rating of each township.

Average net income per acre for each township was estimated by subtracting the appropriate costs of production from estimated gross income. The estimated average net income per acre for each township also measures its average net income-producing capacity relative to the other townships within the county.

The estimated average net income per acre for each township was capitalized in perpetuity using an eight per cent capitalization rate.

$$\frac{\text{Estimated net income per acre}}{.08} = \text{Estimated value per acre}$$

This provided an estimate of the average value per acre of farmland for each township based solely on its estimated net income-producing potential for the production of hard red spring wheat.

Relationship Between Capitalized Net Income Value and Current Sales Price

To justify using the capitalized net income approach to farmland valuation, it was necessary to determine the relationship between the net income approach and market data for the comparable sales approach.

Ninety-seven bonafide farmland sales which occurred between 1961 and 1969 in Eddy county were obtained from sales records used in developing the North Dakota sales-ratio study (4). The price of each sale of farmland in Eddy county was adjusted to represent the average productivity rating of the soil in the township where the land sold was located and to the 1969 farmland price level.

Average adjusted market sale price of farmland sold from 1961 through 1969 in Eddy county (adjusted to the 1969 price level) was $70.71 per acre, and the average capitalized net income value per acre for 1970 according to this study was $78.11. Thus, the average adjusted market sale price of farmland in Eddy county was 90.5 percent of the capitalized net income value when the capitalization rate was eight per cent.

The data in Table 1 show estimates of the average per-acre net income and the corresponding capitalized value per acre of taxable farmland for the respective township soil productivity ratings in Eddy county. This schedule is based upon the average net income-producing capacity of the farmland in each township as estimated from the use of the soil productivity ratings developed by the Department of Soils and cost and return data developed by the Department of Agricultural Economics at the North

Table 1. A schedule of farmland incomes and values based on township soil productivity ratings in Eddy county, North Dakota, 1971.

Township Soil Productivity Rating	Estimated Township Average Net Income Per Acre	Estimated Township Average Per-Acre Value*	Average Per-Acre Value as a Per cent the Highest Township Per-Acre Value
			(Per cent)
62	$10.54	$131.00	100.0
58	9.54	119.00	90.5
54	8.28	103.00	78.5
49	6.95	87.00	65.9
46	6.05	76.00	57.4
44	5.57	70.00	52.8
43	5.33	67.00	50.5
42	5.01	63.00	47.5
41	4.74	60.00	44.9
35	3.01	38.00	28.5

*Net income shown in previous column capitalized at 8 percent.

Dakota Agricultural Experiment Station. The data in Table 1 apply only to estimates of township average per-acre net income from farmland and do not include any evaluation or appraisal of the effects on value of location, roads, markets, or other amenities.

Conclusion

The research in Eddy county shows that soil productivity ratings are a useful tool to estimate net income and the corresponding average per-acre value for each township, and to determine the average amount per acre which one township should be assessed relative to other townships in the county. If the estimated average net income per acre of the most productive township is twice that of the least productive township, it can be inferred that the farmland in the most productive township has twice the market value, all other things being equal, and on the average should be assessed twice the amount per acre of the least productive township. Townships with estimated net incomes per acre between the two extremes should be ranked accordingly. However, after the initial estimate of market value is made, the other variables which influence farmland values within a township must be evaluated and the final results compared with market data.

In using soil productivity ratings for equalizing farmland assessments among townships, property tax administrators must know production costs and returns and the techniques of capitalizing net income. It cannot be expected that this approach will provide an absolute measure of farmland market value, but it is intended to be used as a basis for objectively estimating market value. Other variables which affect value must be identified and evaluated to estimate more accurately the market value of farmland.

It is apparent that the real estate tax will remain the primary source of local government revenue for a long time. Therefore, it is essential that all tools available, including soil productivity ratings and comparable sales, need to be used to insure equitable treatment for property tax-paying citizens.

References

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