

LAND VALUATION TECHNIQUES

In making appraisals for Ad Valorem Tax purposes, it is generally necessary to estimate separate values for the land and the improvements on the land. In actuality, the two are not separated and the final estimate of the property as a single unit must be given prime consideration. However, in arriving at the final estimate of value, aside from the requirements for property tax appraisals, there are certain other reasons for making a separate estimate of value for the land:

As estimate of land value is required in the application of the Cost Approach.

An estimate of land value is required to be deducted, from the total property sales price in order to derive indications of depreciation through market-data analysis. (Depreciation being equal to the difference between the replacement cost new of a structure and the actual price paid in the market place for the structure.)

As land is not a depreciable item, a separate estimate of land value is required for bookkeeping and accounting purposes; likewise, the total capitalization rate applicable to land will differ from the applicable to the improvements on the land.

Since land may or may not be used to its highest potential, the value of land may be completely independent of the existing improvements on the land.

Real Estate is valued in terms of its highest and best use. The highest and best use of the land (or site), if vacant and available for use, may be different from the highest and best use of the improved property. This will be true when the improvement is not an appropriate use and yet makes a contribution to total property value in excess of the value of the site. Highest and Best Use (Highest and Most Profitable Use; Optimum Use) is that reasonable and probable use which will support the highest present value as of the date of the appraisal. Alternatively, it is the most profitable likely use to which a property can be put. It may be measured in terms of the present worth of the highest net return that the property can be expected to produce over a stipulated long run period of time. (American Institute of Real Estate Appraisers' Terminology Handbook, 1981 edition.)

As appraiser's opinions are based on data derived from the market, it is necessary to study and adapt, if possible, procedures used by those closest to everyday transaction.

COMPARABLE SALES METHOD

The most frequently used method in estimating the value of land is the comparable sales method in which land values are derived from analyzing the selling prices of similar sites. This method is in essence the application of the market data approach to value and all the considerations pertaining thereto are equally applicable here.

The appraiser must select comparable and valid market transactions, and must weight and give due consideration to all the factors significant to value, adjusting each to the subject property. The comparable sites must be used in the same way as is the subject property, and subjected to the same zoning regulations and restrictions. It is also preferable, whenever possible, to select comparable sales from the same or a similar neighborhood. The major adjustments will be to account for variations in time, location, and physical characteristics to include size, shape, topography, landscaping, access, as well as other factors which may significantly influence the selling price, such as the productivity of farm land.

Although it is always preferable to use sales of unimproved lots for comparison, it is not always possible to do so. Older neighborhoods are likely to yield a sufficient number of representative sales of unimproved lots to permit a valid analysis. In such cases, in order to arrive at an estimate of land values using the comparable sales approach, it is necessary to consider improved property sales and to estimate the portion of the selling price applicable to structure. The procedure would be to estimate the replacement cost of the building as of the date of sale, estimate the accrued depreciation and deduct that amount from the replacement cost resulting in the estimated selling price of the buildings, which can be deducted from the total selling price of the property to derive the portion of the selling price which can be allocated to the land. The equation is as follows:

$$\begin{array}{r} \text{Selling Price of Property} \\ - \text{Estimated Depreciated Value of Building} \\ \hline = \text{Indication of Land Value} \end{array}$$

In some of these older neighborhoods, vacant lots will exist often as a result of fire or normal deterioration. Since the desirability as a new building site is restricted, value is generally determined by adjoining property owners who have a desire for additional land area.

In order to apply the comparable sales method, it is first necessary to establish a common unit of comparison. The units generally used in the valuation of land are price per front foot, price per square foot, price per acre, price per lot or site or home site price per apartment unit, and price per motel unit. The selection of any one particular unit depends upon the type of property being appraised, frontage being commonly used for platted, uniform type residential lots, and square footage and acreage for larger, unplatted tracts, as well as irregularly shaped lots lacking in uniformity. Use of square footage is especially desirable in Central Business Districts where the entire lot maintains the same

Level of value: depth factor adjustments have a tendency to distort this concept. Commercial arteries are also best valued on a square foot basis.

The utility of a site will vary with the frontage, width, depth, and overall area. Similarly, the unit land values should be adjusted to account for differences in size and shape between the comparable and the subject property. Since such an adjustment is generally necessary for each lot, it is beneficial that the appraisal adopts and/or develops variations. It is not uncommon for all lots within a development to market at the same price. Should data indicate this, it is necessary to make alterations or adjustment to maintain this value level. In some cases, a “site value” concept has advantages. Site value tables provide for uniform pricing of standard sized lots within homogenous neighborhoods or subdivisions. Some of the techniques commonly employed are as follows:

Standard lot sizing techniques provide for the adjustment of the frontage, width and depth of irregular shaped lots to make the units of measurement more comparable with uniform rectangular lots. Incremental and decremented adjustments can be applied to account for size differences.

Standard Depth Tables provide for the adjustment of front foot unit values to account for variations in depth from a predetermined norm.

Frontage Tables provide for the adjustment of front footage unit values to account for variations in the relative utility value of excessive or insufficient frontage as compared to a predetermined norm.

Acreage or Square Footage Tables provide for the adjustment of unit values to account for variations in the relative utility value of excessive or insufficient land sizes as compared to a predetermined norm.

During the process of adjusting the comparable sales to account for variations between them and the subject property, the appraiser must exercise great care to include all significant factors and to properly consider the impact of each of the factors upon the total value. If done properly, the adjusted selling prices of the comparable properties will establish a range in value in which the value of the subject property will fall. Further analysis of the factors should enable the appraiser to narrow the range down to the value level that is most applicable to the subject property.

THE SOIL PRODUCTIVITY METHOD

This method involves the classification of agricultural tracts according to a productivity index, and establishing corresponding unit land values either by the analysis of comparable sales or the capitalization of income yields. The method requires a great deal of data and time, and its application for ad valorem tax purposes, is generally limited to the appraisal of predominantly agricultural jurisdictions, in which soil productivity is either the primary influence to buyers and sellers, or in which sold productivity is the legal basis for the assessment of farm land.

There is a second condition which presupposes the use of the soil productivity method: the availability of current soil maps and related data. Soil productivity refers to the capacity of a soil to produce crops. Its productive capacity is basically dependent upon the properties and characteristics inherent in the soil; the prevailing environmental and climatic conditions; and the level of management input. Since the appraiser, for tax purposes, generally is neither provided with the time nor the resources to survey, analyze, the availability of reliable soil maps and data compiled from scientific soil surveys. Such surveys are generally conducted and reported under the auspices of the agricultural departments at the various state universities.

Providing then, that the value of the farm land as evidence^{3d} in the market place, or a mandated by law, is directly related to its capacity to produce, and that current soil maps and related data are available, it follows that soil productivity should be given prime consideration in the valuation of farm land.

The following is a suggested procedure for establishing unit land values based upon the relative productivity of the soil. Whereas precise terminology may differ from state to state, the general procedure should prove to be fairly applicable to any region.

1. Obtain soil maps. Soil maps prepared by soil surveyors should provide an accurate inventory of the soil resources of an area. The soil mapping units delineated on the maps provide a basis for soil-use suggestions and for crop-yield and/or soil productivity estimates.
2. Obtain or develop soil productivity index ratings for each soil mapping unit. Soil productivity is generally expressed in terms of yield per acre. In developing a productivity approach to value, it is necessary to compare the productivity of means of expressing the productivity of different soils in relative units of comparison.

Table 1 shows the calculation of a productivity index for Muscatine silt loam at a high management level. The yield estimates are related to a base yield. The same base yield is used for all soil, but the crop-yield estimates and acreage ratio will vary with each soil. The acreage ratio is an expression of the percentage of the soil productivity index provides a measure of the soil contribution in crop production. Such ratings may be prepared for cropland, pasture, and timber.

TABLE 1. EXAMPLE CALCULATION OF SOIL PRODUCTIVITY INDEX

CROP	(1) Average Yield (Per Acre)	(2) Base Yield (Index -100)	(3) Relative Yield (1)/(2)	(4) Average Ratio	(5) Cost Contribution (3) x (4)
Corn	145 Bu	90 Bu	161%	.55	88
Soybeans	46 Bu	30 Bu	153%	.30	46
Wheat	56 Bu	30 Bu	186%	.08	15
Oats	86Bu	60 Bu	143%	.07	10

**The Soil Productivity Index (Sum of Crop Contribution) = 159
Rounded to the nearest multiple of 5 = 160**

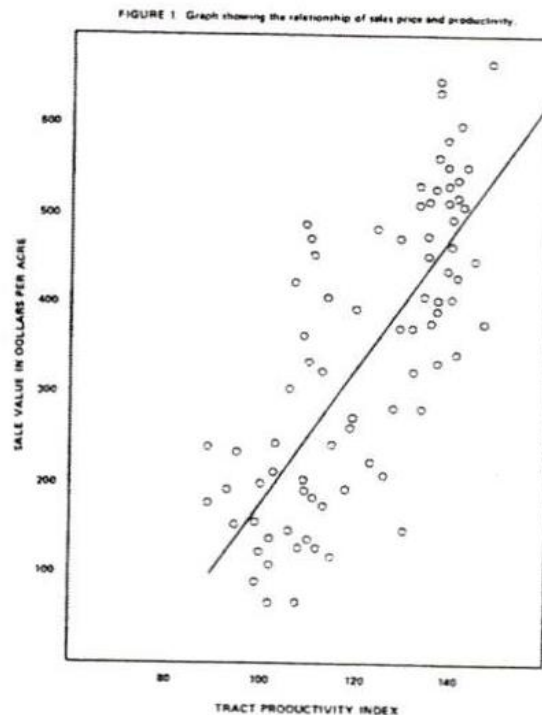
- Determine appropriate soil-use categories. Separate soil-use categories may be established for each significant use. However, in many areas, it is often more practical to consider only cropland, and to establish the necessary guidelines for adjusting land in timber, brush, or pasture accordingly.
- Compile data on the selling prices and/or income yields or agricultural land in representative soil areas.
- Either obtains or measure and record the acreage of each soil-use mapping unit category for each tract of land in the sampling compiled in Step 4. If measured, a plainimeter, grid, or electric area calculator should be used.
- Calculate a tract-productivity index for each tract of land in the sampling. A tract productivity index may be calculated by using the acreage and soil-productivity index for each soil-mapping unit in a tract. The acreage is multiplied by the soil-productivity to obtain a soil contribution for each mapping unit. The soil contributions are added together, and the resulting sum is divided by the number of acres in the tract. The result is a weighted index of the soil productivity of the tract. Table 2 shows an example calculation.

TABLE 2 EXAMPLE CALCULATION OF TRACT PRODUCTIVITY INDEX

(1) Soil	(2) Mapping Unit (Form Soil Map)	(3) Acreage	(4) Soil Productivity Index	(5) Soil Contribution (3) x (4)
Stable	68 AO	14	150	2100
Denny	45 AO	2	110	220
Muscatine	41 AO	17	160	2720
Tama	36 AO	7	130	910
Totals	-	40	-	5950

Tract Productivity Index = Sum of (5)/Sum of (3) = 5950/40=149

- Determine the relationship of productivity and selling price and/or income yields per acre for each of the tracts included in the sampling. A curve (or graph) may be prepared by plotting the measure of dollar value along the vertical axis, and the productivity along the horizontal axis as shown in figure 1.



8. Either obtains or measure and record the acreage of each soil-use mapping unit category for each tract of agricultural land to be appraised.
9. Calculate a tract productivity index for each tract of agricultural land to be appraised and determine an estimate of its value from the graph generated in Step 7. Once the productivity of the tract is known, the base value of the tract can be determined from such a graph, or if preferred, a table can be prepared from the graph showing the tract productivity in one column and the estimated corresponding base unit level values in an adjoining column.

Note: the base unit land values obtained in Step 9 will often require adjustments to account for factors such as location, accessibility, special soil conditions, etc., which influence land value, but which cannot be measured by productivity.

In such cases where soil productivity is a prime factor in determining the value of the land (as indicated by the linear relationship between selling prices and soil productivity in Figure 1), the procedural steps outlined above should provide a sound basis for establishing equitable values.

It should be noted, however, that the procedure is not a formula for appraising farm land, but only a method of establishing unit values based upon a soil productivity index. Soil productivity is but one value-influencing factor to be considered, and depending upon the area in which the farm land is located, it may or may not have significant bearing upon the market value of the property.

In the final analysis, each farm appraisal must stand the test of comparison with competing properties. Intelligent buyers may be assumed to know of the existence of similar properties. Intelligent buyers may be assumed to know of the existence of similar properties as well as the bidding prices or asking prices for such properties. It is also reasonable to assume that well informed buyers of competing properties have examined the characteristics of the property, in a practical, if not scientific way before establishing the value of the property to them as investors.

Similarly, the appraiser must rely heavily upon the comparison process in determining the relation of a farm property of unknown value, but of known characteristics (subject farm); to comparable farms of known value as well as known characteristics (bench-mark farms). Each value-influencing factor must be analyzed in order to determine its individual contribution to the overall value. In the process, consideration must be given to such factors as the time and condition of the sale, the size of the property, the suitability and productivity of the soil, the value of the buildings, property in relation to market accessibility, and the location of the property in relation to its suitability for higher land uses.

Only after determining the contribution value of each of these factors can the appraiser determine the proper basis or criteria for establishing unit land values which will accurately reflect the action of the market.

THE LAND RESIDUAL TECHNIQUE

In the absence of sufficient market data, income-producing land may be valued by determining the portion of the net income attributable to the land and capitalizing the net income into an indication of value. The procedure is as follows:

1. Determine the highest and best use of the land, which may be either its present use or hypothetical use.
2. Estimate the net income which the property can be expected to yield.
3. Estimate the replacement cost new of the improvements.
4. If the case involves the present use, estimate the proper allowance for depreciation, at an estimate of their depreciated value.
5. Develop appropriate capitalization rates.
6. Calculate the income requirements of the improvements, and deduct the amount from the total net income to derive that portion of the income that can be said to be attributable to the land.
7. Capitalize the residual income attributable to the land to an indication of value.

RATIO METHOD

A technique useful for establishing broad indications of land values is a “typical” allocation or ratio method. In this technique, the ratio of the land value to the total value of improved properties is observed in situations where there is good market and/or cost evidence to support both the land values and total values. This market abstracted ratio is then applied to similar properties where the total values are known, but the allocation of values between land and improvements are not known. The ratio is usually expressed as a percentage that represents the portion of the total improved value that is land value, or as a formula:

$$\frac{\text{Total Land Value}}{\text{Total Property Value}} \times 100\% = \% \text{ Land Is of Total Property Value}$$

This technique can be used on most types of improved properties, with important exceptions being farms and recreational facilities, provided that the necessary market and/or cost information is available. In actual practice, available market information limits this technique primarily to residential properties, and to a much lesser extent, commercial and industrial properties such as apartments, offices, shopping centers, and warehouses. The ratio technique cannot give exact indications of land values. It is nevertheless useful, especially when used in conjunction with other techniques of estimation land values because it provides an indication of the reasonableness of the final estimate of land value.

The ratio should be extracted from available market information and applied to closely similar properties. It should be noted that any factor that affects the value could also affect the ratio of values. Zoning is particularly important because it may require more or less improvements be made to the land, or may require a larger or smaller minimum size. This tends to have a bearing on the land values, and may influence the ratio of values considerably from community to community.

The following is an example of a residential land valuation situation:

Market information derived from an active new subdivision

Typical Lot Sale Price (most lots equivalent)				\$15,000
Improved Lot Sales (range)				\$65,000 to \$75,000
Indicated Ratio	$\frac{\$15,000}{75,000}$	To	$\frac{\$15,000}{65,000}$	X 100% 20% to 23%

Similar subdivision, but 100% developed

Typical Lot Sale Price (most lots equivalent)	Unavailable
Improved Lot Sales (range)	\$85,000 to \$105,000
Broadest Indicated Range of Lot Values (20% x \$85,000 to 23% x \$105,000)	\$17,000 to \$24,150
Narrowest Indicated Range of Lot Values (23% x \$85,000 to 20% x \$105,000)	\$ 19,550 to \$21,000

If both lots and improvements vary considerably, the broadest range is most appropriate. If most lots vary little and are judge equivalent but the improvements vary somewhat, the narrowest range is appropriate. Most subdivisions exhibit a combination of the two ranges, showing a narrow typical range, but a wider actual range of land values.