



**Methods and Procedures:
Determining the Use Value of
Agricultural and Horticultural
Land in Virginia**

Revised November 2010

Virginia Cooperative Extension



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State Land Evaluation and Advisory Council (SLEAC)¹

¹ A complete list of members is available on the website for the Virginia's Use Value Assessment Program, URL: <http://usevalue.agecon.vt.edu/>

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Introduction

Virginia law allows for localities adopting a program of special assessments for agriculture, horticulture, forestry and/or open space lands for their land to be taxed based on the value of the land in one of these four uses (use value) instead of its market value. This document describes methods and procedures used to calculate use values for agriculture and horticulture land based on an income and rental rate approach.

The use value of agricultural land is defined as the net income one could expect to receive from crops (e.g., corn, alfalfa, pasture, and wheat) grown on the land, with the use value of horticultural land defined as the net income one could expect to receive from tree fruit (e.g., apple, peach, and pear). These special assessments only apply to what is produced on the land and not such things as livestock, buildings, and/or other improvements.

Use-value taxation is found in some form in all 50 states in the United States, suggesting support for the preservation of this land and for the reduction of tax burden on owners of land used in producing food, fiber, and timber. In 1974, Virginia passed legislation to enable localities to provide tax relief to land owners in order to preserve agricultural, horticulture, forestry and/or open space lands with the explicit purpose that the public would benefit from its preservation. An example of how estimates based on the income of agricultural land (*income approach*) and renting agricultural land (*rental rate approach*) are provided in a hypothetical farm example in Prince Edward County (Appendix A).

The purpose of this document is to explain the underlying assumptions behind the use-value program and the processes used in calculating use-value estimates for agricultural and horticultural land in the cities and counties participating in the program. This paper provides step-by-step explanations of the methods used in developing the final use-value estimates. Prince Edward County is used as the example to illustrate the process. All use-value reports (some of which also include rental rate estimates) generated in calculating estimates for Prince Edward County are provided in the appendices. Use-value estimates and reports for all counties and cities participating in the program are available at the use-value website.²

The rationale for the use-value program is provided in Section 58.1–3229 of the *Code of Virginia* declaring that “the preservation of real estate for agricultural, horticultural, forest and open space use is in the public interest and ... the classification, special assessment and taxation of such property in a manner that promotes its preservation helps foster long term public benefits.” Virginia law allows for eligible land in any of these categories to be taxed based upon the land’s value in *use* (use value) as opposed to the land’s *market* value.

In addition, Section 58.1–3239 of the code establishes the State Land Evaluation Advisory Council (SLEAC) and directs it to estimate the use value of eligible land for each jurisdiction participating in the land-use program. “The Advisory Council in determining such ranges of values, shall base the determination on productive earning power to be determined by capitalization of warranted cash rents or by the capitalization of incomes of like real estate in the locality or a reasonable area of the locality,” Section 58.1–3239.

Income and Rental Rate Approaches

As stated, SLEAC is required to base its estimates on the use of agricultural and horticultural lands. An *income approach* is used to calculate use-value estimates for each county participating in the use-value program by basing estimates on the capitalization of net income.

In 2009, published rental rates³ became available from NASS (National Agricultural Statistics Service). A *rental rate approach* is used to calculate use-value estimates for all counties based on the capitalization of rents. Each approach will be described.

SLEAC contracts annually with the Department of Agricultural and Applied Economics at Virginia Tech to develop an objective methodology and estimate the use value of land in agricultural and horticultural use for counties and cities participating in the use-value program and to report capitalized cash rents reported annually by NASS. A Technical Advisory Committee (TAC), comprised of professionals familiar with Virginia agriculture, was established in 1998 to provide

² <http://usevalue.agecon.vt.edu/>

³ Annual jurisdictional capitalized rental rates for cropland and pastureland are available at: http://usevalue.agecon.vt.edu/Agri_Hort_estimates.htm

guidance on the technical aspects of developing an appropriate methodology.

Individuals from the following organizations are represented on the TAC:

1. Virginia Department of Agriculture and Consumer Services.
2. Virginia Agricultural Statistics Service.
3. Virginia Department of Forestry.
4. Virginia Department of Conservation and Recreation.
5. Virginia Cooperative Extension.
6. Virginia Department of Taxation.
7. Department of Crop and Soil Environmental Sciences, Virginia Tech.
8. Department of Horticulture, Virginia Tech.
9. Department of Agricultural and Applied Economics, Virginia Tech.

The methodology for determining the use value of agricultural and horticultural land and the capitalization of cash rents described in this document represent the combined judgment of these individuals and has been officially sanctioned by SLEAC.

Section 1 - Estimating the Use Value of Agricultural Land: *Income Approach*

This section describes the methodology SLEAC uses in estimating the use value of agricultural land using an *income approach*, clarification is provided when necessary. *Prince Edward County* is used as an example, for the tax year 2011 (TY2011).

The Composite Farm

The agricultural sector in Virginia is very heterogeneous. A typical agricultural operation located along the Eastern Shore is very different from an operation in the Southwest. For this reason, an accurate estimation of agricultural use values required developing a composite (i.e. typical) farm for each jurisdiction⁴ participating in the use-value program. County level data on the total number of farms and acreage harvested for each crop are obtained from the most recent Census of Agriculture. To calculate the composite farm acreage for a crop within a county, the acreage for each crop is divided by the total number of farms in the county. If this division results in a value greater than or equal to 1, the crop is included in the composite farm. It is also necessary to calculate a county's double-cropped acreage because it is assumed that only one crop is grown annually on agriculture land. Winter annuals, e.g., winter wheat, barely, and rye crops, are assumed to always be crops followed by another crop, e.g., corn or soybeans. Therefore, they are considered double-crop acreage. Summing the total acreage of winter annuals and dividing by the number of farms, results in double-crop composite farm acres. The double-crop composite acreage is subtracted from the total, thus, reflecting true crop rotation acreage within a jurisdiction.

For example, in TY2011 *Prince Edward County* had 446 farms and 1,540 corn acres harvested. See Appendix C – Table 2.⁵ Therefore, *Prince Edward County* has 3 acres⁶ of corn in its composite farm. This process is continued for each single and double-cropped crop acreage yielding a composite farm having a mixture of corn, alfalfa, hay, and pasture, with a total of 79 acres.⁷

Net Farm Income

Net Return Budgets

The next step in the use-value estimation procedure is to determine net return budgets for each crop grown on the composite farm. Net returns are calculated by developing an enterprise budget⁸ for each primary crop grown. In TY2011, the primary crops used in the use-value estimation of agricultural land were corn, alfalfa, hay, wheat, barley, soybeans, potatoes, cotton, pasture, peanuts, tobacco, snap beans, cucumbers, pumpkins, sweet corn, tomatoes, and watermelons.⁹ By basing net return budgets on all primary crops, crop rotations are implicitly incorporated.

In TY2010, pasture was included as a crop within the use-value model.¹⁰ The use-value Technical Advisory Committee (TAC) approved the inclusion. Pasture yield is converted from hay (all) yield using the following formula¹¹:

$$\text{Pasture Yield} = (\text{Hay All Yield} / 0.75) * 0.5$$

Also, pastureland use values are imputed from net returns on lower productive lands in each jurisdiction. Use values for both cropland and pastureland are reported in Table 1a (Appendix B).

⁴ County or city

⁵ Crop acreages for the tax year (TY) 2011 are from the 2007 Ag Census. The census is updated every 5 years and lags the tax year in which it is initiated by 3 years (e.g., 2002 Ag Census initiated in TY2005; and the 2007 Ag Census initiated in TY2010).

Acreage calculations from a census include:

- Corn acreage = corn-grain acres + corn-silage acres; and

- Hay acreage = (all hay + all haylage, grass silage, greenchop) - (alfalfa hay + haylage or greenchop from alfalfa or alfalfa mixtures).

⁶ Composite farm crop acreages are rounded to the nearest whole number, e.g., 3.6202 is rounded to 4

⁷ Total composite farm acres sometimes do not add exactly due to rounding; and, some crop acres are not listed due to disclosure rules.

⁸ A complete listing of the enterprise budgets and data sources is available at <http://pubs.ext.vt.edu/>

⁹ Structural changes in production agriculture necessitate occasional changes in the primary crops. For TY2011, the primary crops were: corn, alfalfa, hay, wheat, barley, soybeans, potatoes, cotton, pasture, peanuts, tobacco, snap beans, cucumbers, pumpkins, sweet corn, tomatoes, and watermelons.

¹⁰ Pasture acreage is calculated from the Ag Census 2007. It is the sum of acreages for:

- Cropland used only for pasture and grazing;

- Pastureland and rangeland, other than cropland and woodland pastured; and

- Woodland pastured.

In determining the net return for a crop budget,¹¹ an annual per acre net return budget is derived for each crop grown on the composite farm. Enterprise budgets, largely derived from Virginia Cooperative Extension Farm Management crop budgets, and input costs from numerous government and industry sources are used to determine annual crop net return budgets. Much of the data lags the tax year by two years due to the availability of crop yields and prices reported by the Virginia Field Office of the National Agricultural Statistics Service. (VASS)¹²

Also, in TY2010, a process for merging annual pre acre crop net return budgets together was initiated.¹³ Currently, for some crops there is only one crop budget (e.g., alfalfa, hay, and cotton). However, for others (e.g. corn, soybeans, and tobacco) there can be two or more crop budgets which are combined. For example, a jurisdiction’s corn budget is a merger of its corn-minimum tillage budget and corn-conventional tillage budget.

Jurisdictional annual per acre crop net return budgets for the previous 7 years (each budget lags its corresponding tax year by 2 years) are averaged using a moving 7-year Olympic average. A moving Olympic average is defined as an arithmetic mean calculated after first dropping the highest and lowest values within a data series. The average is “moving” in that the data series used is relative to a given tax-year. For example, for TY2011 the use-value net return budget data series is from DY2003 to DY2009, for TY2010 the data series is from DY2002 to DY2008, and so on.

The Olympic averaging process helps mitigate fluctuations in the annual use-value estimates caused by unusually good or poor years. In the event a net return budget is negative, its value is set to zero. For example, the net return budgets for alfalfa in *Prince Edward County* were (negative values are set to zero):

Dropping the highest (\$191.94) and lowest (\$0.00) values and averaging the remaining five years, provides an estimated per acre average net return budget for alfalfa of \$48.71 (Appendix C, Table2 line3).

TY2011 Prince Edward County, alfalfa net return budgets (per acre)

Data Year	\$/acre	\$/acre Averaged
DY2030	135.21	135.21
DY2004	191.94	Dropped
DY2005	52.79	52.79
DY2006	55.54	55.54
DY2007	-\$33.43*	Dropped
DY2008	-\$164.95*	0.00
DY2009	-\$181.84*	0.00
Olympic Average		\$48.71

* Negative values are set to zero

Federal Direct and Counter-Cyclical Program Payments (Federal Payments)

In the absence of federal payments, the above process for estimating a net return from a crop enterprise is sufficient. However, when federal payments are made to farms in a county, they must be included as a source of farm revenue.¹⁴ Currently, federal program payments¹⁵ exist for corn, wheat, barley, cotton, and soybeans. Prior to TY2011, separate federal payments were available for each of these crops. However, beginning in TY2011, federal payments received by a county were not reported for specific crops. Rather, only a county’s total federal payment was available.¹⁶ To include federal payments in a county’s per acre average net return, its federal payment is divided by the total number of corn, wheat, barley, soybean, cotton, and peanut acres grown, which results in the county’s per acre federal crop payment. Next, the county’s percent of federal payment crop acres is calculated. This is done by dividing the county’s federal payment crop acreage by the total number of cropland harvested acres. The percent is multiplied times the previously calculated average federal payment (per acre) and added to the county’s average net return. (Appendix C, Table 2).

¹¹ Annual per acre crop budgets lag a given tax year by 2 years (e.g., TY2008’s annual per acre crop budget data is from DY2006).

¹² http://www.nass.usda.gov/Statistics_by_State/Virginia/index.asp

¹³ Merging weights for crop budgets are calculated for some crops from annual acreages reported by NASS. In TY2010, Tobacco and Potato budget merging weights were calculated. Merging other crops budgets (e.g., corn and soybeans), use historical tillage weights (percentages) which were updated in TY2007 by the Conservation Technology Information Center (CTIC).

¹⁴ The rationale for including federal payments is that this stream of revenue is capitalized into the value of the land. It is implicitly assumed that the past flow of these payments is an indicator of future payments.

¹⁵ Federal program payments are provided by Farm Service Agency (FSA) via an annual Freedom of Information request.

¹⁶ Crop acreages are taken from latest Census of Agriculture.

TY2011 Prince Edward County, federal payment calculation:

- 1. Average Federal Payment (per acre)**
= **Total Federal Payment/ Federal Payment Crop Acres**

Total County Federal Payment = \$114,700.06

Total County Federal Payment Crop Acres
= 2,012 acres

(Corn 1,540+ Wheat 143 + Barley 144 +
Soybeans 185 + Cotton 0 + Peanuts 0)

Average Federal Payments (per acre)
= \$114,700.06/2,012 acres

Average Federal Payments (per acre) = \$57.01

- 2. Percent of Federal Payment Crop Acres**
= **Total DCP Acres/Total Cropland Harvested Acres**

Total Cropland Harvested = 36,484 Acres

Percent Federal Payment Crop Acres
= 2,012 acres/36,484 acres

Percent of Federal Payment Crop Acres = 0.0551

- 3. Federal Payment Value (to be added)**
= **Average Federal Payments (per acre) x Percent Federal Payment Crop Acres**

Federal Payment Value (to be added)
= \$57.01 x 0.0551

Federal Payment Value (to be added) = \$3.14

Because of the change in federal payment methodology, a new price series was begun. The new series lags the current tax year by two years and will also be estimated by using a moving 7-year Olympic average.

Capitalization Rate

A basic capitalization rate is the sum of a property tax component and an interest rate component. In some jurisdictions, the capitalization rate can include a risk of flood component. Capitalization rate components are listed in Table 3 (Appendix C, Section 2).¹⁷

Interest-rate component

The interest-rate component of the capitalization rate is a weighted average of the long-term interest rates charged by Agricultural Credit Associations (ACA) serving Virginia. These data lag the tax year by 2 years. To reduce the variability of the annual use-value estimates, SLEAC elected to take a straight moving average of the weighted long-term interest rates over the 10-year period prior to a given tax year. For example, for **TY2011** data for long-term interest rates are from **2000 to 2009**. Therefore, the moving straight 10-year average of the long-term rate is **.0717** percent (Appendix C, Table 3 – line 2a). The same rate is used for all jurisdictions. This long-term interest rate average reflects an alternative return to owning agricultural land over an extended period of time. The same long-term interest-rate component used for agricultural land is also used for horticultural land.

Property-tax component

The property-tax component, also a moving straight 10-year average, is an average of the effective true real property tax rate published annually by the Virginia Department of Taxation. Property tax data lags the interest rate and net income data by three years. Therefore, the estimated property tax component applicable to **TY2011** relies on data from the years **1999 to 2008**. The property tax component used for agricultural land is also used for horticultural land. The sum of the interest rate and property tax rate equals the basic capitalization rate. For example, *Prince Edward County's* property-tax component is 0.0042 which, when added to the long-term interest rate component, results in a capitalization rate of 0.0760 (Appendix C, Table 3 – line 2c).

Risk component

Agricultural enterprises are subject to numerous risks. However, the risks associated with input costs, crop yields, and prices received are adequately accounted for by the net return component since these risks occur on an across-the-board basis and do not reflect individual land risk situations. The two primary types of risks explicitly considered in the use-value methodology are related to rainfall, either a shortage or an excessive amount. An important difference between the two is that the risk associated with drought *is not* land-related while the risk associated with excessive rainfall *is*

¹⁷ A complete listing of the capitalization rate components applicable in each jurisdiction is available for public inspection at the Virginia Department of Taxation.

land-related. The risk of drought is assumed to be distributed uniformly within a jurisdiction and, therefore, does not warrant special attention.

Because the risk associated with an excessive rainfall is land-related, it can vary within a jurisdiction. The risk associated with excessive rainfall is lower crop yields caused by flooding. This situation mainly occurs in the southeastern part of the state but also occurs in other regions, usually to a lesser extent. Because this risk is borne by specific areas of land within a jurisdiction, a special use-value estimate based on a capitalization rate reflecting the risk of flooding is calculated.

The size of the risk component will vary depending on the period over which a total crop loss is expected on lands subject to the effects of flooding. Use-value methodology assumes that a total crop loss will occur on land at risk of flooding once every 20 years. Therefore, the land’s capitalization rate is increased by 5%. For example in *Prince Edward County*, the risk component is calculated to be 0.0038 (Appendix C, Table 3 – line 2d). Adding this component to the without-risk capitalization rate results in a **with-risk** capitalization rate of 0.0798 (Appendix C, Table 3 – line 2e).

The estimated use values of agricultural land are provided in Table 1a. *The with-risk estimates should only be used when an individual land tract is known to have poor drainage which cannot be remedied by tiling or drainage ditches.* Land devoted to horticultural use will rarely be subject to these conditions. For this reason, SLEAC elected not to consider the risk of flooding in the use-value estimates for horticultural crops.

Calculating Use values

Once a per acre net return and capitalization rate for a jurisdiction have been estimated, calculating its use value is straightforward. The basic formula is

$$\text{Use value} = \frac{\text{Net Return}}{\text{Capitalization Rate}}$$

From this formula, changes in a use-value estimate are obvious. An increase in a jurisdiction’s use value is caused either by an increase in net return and/or a decrease in the capitalization rate. A decrease in use value is caused either by a decrease in the net return and/or an increase in the capitalization rate.

For example in *Prince Edward County*, the **without-risk** capitalization rate is **0.0760** (Appendix C, Table 3 – line 2c). Therefore, the initial use value for **without-risk** cropland harvested is

$$\text{Use value} = \frac{\$18.20}{0.0805} = \$226.17$$

This calculation is referred to as an unadjusted **without-risk** value because it has not yet been adjusted for variations in soil capability (Appendix C, Table 3 – line 3). The unadjusted **with-risk** value is simply a jurisdiction’s net return divided by its **with-risk** capitalization rate.

Adjusting for Variations in Capability

The initial unadjusted use-value estimate does not reflect different land characteristics within a jurisdiction. Section 58.1–3239 of the *Code* directs that

Statewide Land Capability Classifications

Class I	Soils have few limitations that restrict use.
Class II	Soils have some limitations that reduce the choice of plants or require moderate conservation practices.
Class III	Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.
Class IV	Soils have very severe limitations that restrict the choice of plants, require very careful management, or both.
Class V	Soils are subject to little or no erosion but have other limitations impractical to remove that limit their use largely to pasture, range, woodland, or wildlife food and cover.
Class VI	Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.
Class VII	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.
Class VIII	Soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply or to aesthetic purposes.

SLEAC annually publish use-value estimates for each of the eight Natural Resources Conservation Service (NRCS) land capability classifications.¹⁸

Agricultural professionals generally agree that Land Capability Classes I through III are most capable of producing cultivated annual crops. Land Capability Class IV is also capable of producing cultivated annual crops, but intensive conservation treatment is required. Land Capability Classes V through VII are generally suited for pasture and in some instances orchard. Land Capability Class VIII has practically no agricultural value. Therefore, land Capability Classes I through IV are designated as suitable for harvested crops (i.e. cropland harvested). Land Capability Classes V through VII are designated as suitable for other agricultural uses, primarily pasture.

The most direct way to adjust for differences in land capability would be to develop a set of enterprise budgets for each land class. Unfortunately, much of the data is not reported at this level. Therefore, SLEAC approved the use of an index to adjust use values for the various land capability classifications.

Class III land was chosen as the base class and assigned an index of 1.¹⁹ The use value of agricultural land in other classes is adjusted based on its income generating potential relative to the base class. SLEAC approved the following indices for each Land Capability Class to adjust use-value estimates relative to the base class.

Virginia Land Capability Class Index (Agricultural Land)	
Class I	1.50
Class II	1.35
Class III	1.00
Class IV	0.80
Class V	0.60
Class VI	0.50
Class VII	0.30
Class VIII	0.10

The scale implies that the expected net income from Class I is 1.5 times that of Class III; the expected net income from Class II is 1.35 times that of Class III land; the expected net income from Class IV is only .80 times that of Class III land; the expected net income from Class V is only .60 times that of Class III land, and so on.

Soil index factor

Since the mix of land classes differs among jurisdictions, it is not appropriate to simply use an unadjusted without-risk (or with-risk) use-value estimate (Appendix 3, Table 3 – Section 3) which would be used as the use-value estimate for Class III land.²⁰ An adjustment is made by calculating a soil index factor. The factor which is the weighted average of the land capability (productivity) indices (Classes I – IV) in each jurisdiction²¹ where cropland acreage of classes I – IV in the jurisdiction provides the weights.

In *Prince Edward County*, the soil index factor is calculated as **1.149** (Appendix 3, Table 3 – Section 4). This value means that a typical acre of land in *Prince Edward County* is between Class II (1.35) and Class III (1.00). Since the unadjusted *without-risk* use value of cropland harvested for *Prince Edward County* was **\$47.12** (Appendix 3, Table 3 – line 3), that value is divided by the soil index factor of 1.149. This yields a without-risk use-value estimate for Class III land of **\$41.03 per acre**. Multiplying this value by each of the other land class indices provides the remaining without-risk use-value estimates (Appendix C, Table 3 - Section 5). The same process is used in calculating a jurisdiction’s with-risk use-value estimates, by using the unadjusted with-risk use value. Note that the final estimated values are rounded to the nearest \$10, e.g., the use-value estimate for Class III of \$41.03 is reported as \$40 (Appendix B – Table 1a).

Using average use-value estimates

When the soil capability classes of an individual real estate tract are known, using the adjusted use-value estimates could improve equity. However, in many jurisdictions, these data do not exist.²² Therefore,

¹⁸ Agriculture Handbook No. 210 (Issued September 1961, Approved for reprinting January 1973) URL: http://soils.usda.gov/technical/handbook/contents/part622.html#cap_cls.

¹⁹ The decision to make Class III the base is arbitrary and has no impact on the final use-value estimates.

²⁰ Not adjusting use-value estimates in jurisdictions with high concentrations of land in classes I and II would overestimate Class III estimates while underestimating Class III estimates in jurisdictions with low concentrations of land in classes I and II.

²¹ Data on land acreage in each land class is available in the *Virginia Conservation Needs Inventory* (1967).

²² These data can be generated by using soil surveys and tax map overlays or through self-reporting but the process is costly and difficult to verify.

Appendix B Table 1a lists the weighted average use-value estimates for cropland harvested (land classes I through IV), pastureland (land classes V through VII), and total agricultural land (land classes I through VII). At the discretion of the assessing officer, the pastureland use value may be applied to land in any class that is strictly used for grazing.

Transfer-in data

The data used for estimating the use value of agricultural land are not published for all towns and for only a few of Virginia's independent cities. When data do not exist for a town or city participating in the use-value taxation program, data from an adjacent county are used. The process is referred to as "transferring-in data." For example, Chesterfield County uses transfer-in data from Amelia County (Appendix B, Table 1a).

Split-counties: Census and Net Returns

Transfer-in data are also used for jurisdictions that are split by the "Fall Line."²³ These split-counties are unique because their western side is comprised of *Piedmont* soils and crops and their eastern side is comprised of *Coastal Plain* soils and crops. Currently, Dinwiddie, Hanover, and Henrico counties are split-counties and data are transferred in from adjacent counties with similar soil. For example, Dinwiddie County's *Coastal Plain* region uses transfer-in data from Prince George County, while its *Piedmont* region uses transfer-in data from Nottaway County.

In a split-county, the county's own census data is used in calculating composite farm acreage. As a result, there are identical composite farm acreages for both regions within a split-county. As with other transfer-in counties, a split-county's crop net return budgets are

transferred-in from an adjacent county.²⁴ However, a split-county *does not* transfer-in federal payments. Rather, federal payments paid to the split-county are used for both regions. For example, both of Dinwiddie's *Coastal Plain* and *Piedmont* regions use federal payments paid to Dinwiddie County.

Transfer-in Jurisdictions: Effective Tax Rates

When a jurisdiction is **not** split and uses transfer-in data, the transfer-in county's **composite farm** and **average net returns** are identical to the receiving jurisdiction. But, the final use-value estimates for a receiving county and its transfer-in county will differ because each jurisdiction uses its own effective tax rate to arrive at the capitalization rate.

For example, Buena Vista City transfers-in data from Rockbridge County. Therefore, both Buena Vista and Rockbridge County have identical census data, composite farm acreages, crop net returns, and final Estimated Net Return. Thus, Buena Vista's **unadjusted** use-value estimates will differ from Rockbridge only because the moving straight 10-year average effective property tax rates are different (An explanation of these rates is provided in Section I – Capitalization Rate).

Transfer-in Jurisdictions: Soil Index

When a county uses transfer-in data (including split-counties), its unadjusted use-value estimates are divided by the **transfer-in county's soil index** factor to calculate its adjusted use-value estimates. For example, Buena Vista transfers-in data from Rockbridge County and uses Rockbridge County's soil index factor in calculating its adjusted use-value estimates.

²³ See the following URL for a definition of the Fall Line <http://www.virginiaplaces.org/regions/fallshape.html>

²⁴ When a transfer-in county designation changes, a jurisdiction's historical annual budget data for the previous 7 years must be adjusted to include annual budgets from all transfer-in counties for the previous 7 years. Calculations are performed outside the use-value system with all jurisdictional reporting updated (i.e., Brochure, Table 1a, Table 1b, Table 2, Table 3, and Table 5).

Section 2 - Estimating the Use Value of Agricultural Land: *Rental Rate Approach*

In 2009, USDA National Agricultural Statistical Service (NASS) began publishing cropland and pastureland cash rental rates for irrigated and non-irrigated cropland and pastureland for Virginia counties and some cities. These rental-rate values provide additional information for jurisdictions regarding agricultural land use-value assessment. Capitalized cash rental rates and the capitalized net income approaches are both State Land Evaluation Advisory Council (SLEAC) approved methods for jurisdictions to consider when setting annual Agricultural and Horticultural Values.

Values are derived from the existing methods for determining capitalization rates (see the section titled *Capitalization Rate* on page 6 of this document). Reported rental rates are divided by the capitalization rate for each jurisdiction to arrive at a per acre value for crop and/or pasture land. For an example rental rate report, see Appendix B, Table 1c (Selected Counties).

NASS rental rates are annual values in \$/acre summarized from NASS surveys for a crop year. The data can be found at: <http://quickstats.nass.usda.gov>. If there are

sufficient numbers of responses to meet NASS nondisclosure requirements for a jurisdiction then that value is published, for example, in TY2011 the county specific rental rate for *cropland* in Accomack was \$60 per acre. If there were not enough responses in a jurisdiction to meet NASS nondisclosure requirements, then all the non-disclosed jurisdictions within a crop reporting district are summarized and published as a Combined Counties value.

For example, in TY2011 the rental rate for cropland in Alleghany was \$30.50 per acre, which was the combined value for Western District counties. No jurisdictions in the Eastern Crop Reporting District met the non-disclosure requirements to allow for county-specific pastureland values; thus, only the district average is used for capitalization. For example, the rental rate for *pastureland* in Accomack (Eastern District) is \$36 per acre (the average for the district). A note of caution: Values based on Combined County averages cut across jurisdictional lines and may not fully reflect local market conditions.

Section 3 – Estimating the Use value of Horticultural Land

Unlike the *annual* investments made in traditional agricultural enterprises, most horticultural investments extend over many years. SLEAC provides use-value estimates of horticultural land devoted to orchard use. Unlike agricultural land, the data required for the estimation of orchard use values are largely unavailable from published, secondary sources. Therefore, these estimates are based largely upon the professional opinion of Virginia Cooperative Extension and Department of Horticulture personnel knowledgeable in the area of apple and peach production.

For land devoted to vineyards and nurseries where data limitations make the estimation of use values problematic, SLEAC does not provide explicit use-value estimates. Instead, it recommends that each jurisdiction impute vineyard and nursery use values²⁵ from the use-value estimates published for agricultural land. The use value of the vineyard or nursery items on the land (i.e. trees, plants, etc.) may be appraised by a jurisdiction's assessing officer and then added to the agricultural use value of the land.

The Composite Orchard

The composite orchard is based on a typical Virginia apple operation. The use values of other types of orchards (i.e. peach, cherry, pear, and plum) are imputed from the apple orchard values and adjusted by varying the depreciation rate. The profitability of apple orchards can vary substantially depending upon the type of operation (fresh or processed fruit), rootstock, planting density, age of the trees, and management practices. To further complicate matters, the data required to objectively establish a typical apple orchard are not available from secondary sources. Therefore, a typical apple orchard was subjectively defined by making the following assumptions:

1. The orchard is planted on a 20 year cycle with a planting density of 250 trees per acre using semi-dwarf rootstock.
2. The percent of the fruit sold to the Processed Market and Fresh Market is calculated annually as a

10 year moving average (3 year lag due to data availability).²⁶

3. The percent of trees in: pre-production (1-3 years), early production (4-7 years), full production (8-15), and late production age (16 -20 years) is calculated annually from yields/cycle provided by Virginia Cooperative Extension.

Local adjustments to the use-value estimates applicable to orchards (Appendix B Table 1b) may be necessary depending on the specific characteristics of the orchard being assessed.

Net Orchard Income

Unlike annual agricultural operations, perennial orchard enterprises require several years of capital investments prior to realizing any positive income flow. These initial investments greatly complicate the estimation of net returns. Capital investments made during the pre-production years are assumed to be borrowed through regular financial channels at the same long-term interest rate used in the agricultural budgets. It is assumed that this debt is paid down in later years when the annual net return to the orchard enterprise becomes positive.

Appendix C Table 4 shows the annual input costs incurred in the production of both processed and fresh market apples for the four production stages. The initial establishment costs are assumed to be the same for both production types and are averaged into the pre-production costs. Total revenue is calculated for each year within a cycle by multiplying the price received by yield (LBS/Acre). Annual production costs (Total Fixed and Variable Costs) are subtracted from annual total revenues to arrive at an *Annual Net Loss/Income* (values in parentheses represent a net *loss*). For example, in TY2011 a typical apple orchard in Virginia with a **pre-production (1-3 years)** orchard devoted to Processing Market Apple Production realized an annual net *loss* of (\$2,100.37) per acre. An orchard in **full production (7-15 years)** realized an annual net *loss* of (\$209.13) per acre (Appendix C, Table 4).

²⁵ SLEAC. Manual of the State Land Evaluation Advisory Council. 2003, p.45. URL: <http://usevalue.agecon.vt.edu/procedures.htm> [November 2, 2007].

²⁶ Utilization of Sales poundage (million pounds) from Virginia Agricultural Statistics Bulletin and Resource Directory.

Finally, the annual net loss/income values are discounted each year. The equation is:

$$\text{Income}/[(1+\text{Interest Rate})^{\text{Years}}]$$

Summing all the discounted values for 20 years gives a final annual per acre Net Return for Processed and Fresh apples. A 10 year average of the proportion of Processed versus Fresh apples in VA is used in weighting the two final Processed and Fresh Apple Net Returns resulting in an annual Weighted Average for apples.

A summary of the per-acre net returns for each of the four production stages as well as the discounting and weighting process is provided in Appendix C, Table 5 – Section 1.

Capitalization Rate

The capitalization rate used for determining the use value of orchards consists of the capitalization rate used for agricultural land²⁷ plus a depreciation component. The depreciation component provides for recovery of the capital invested in an asset that declines in productivity with age. The effect of the depreciation component is to assign lower use values to orchards comprised of trees with a shorter productive life. SLEAC assumes a productive life of 20 years for apple trees and 20 years for peach, cherry, pear, and plum trees. The resulting depreciation component is 0.033 for apple trees and 0.05 for other trees. The depreciation components are applicable only to trees since land value does not generally depreciate over time.

Calculating Use values

While per acre net returns and capitalization rates have been determined, the procedure is different than it was for agricultural land since the calculated orchard net return is for trees and land. A few more steps are required.

First, the depreciation components can only be applied to the net returns of **trees only**. Because the orchard net return (Appendix C, Table 5 – line 3a) is a combination of trees and land, the net return from equivalent agricultural land must be subtracted prior to capitalizing. The net return equivalent agricultural land is calculated by dividing a jurisdiction’s net return for agriculture land by its soil index factor (Appendix C, Table 5, line 3b). That value is then subtracted from the net return to

trees and land (Table 5, lines 3a) and results in the net return attributable to **trees only**.

Second, a separate land class index scale for orchards is applied. Orchard production is most successfully accomplished on land with specific attributes. Of particular importance is the landscape. General agreement among professionals familiar with the orchard industry is that Classes II through IV lands are best for commercial fruit production. Class I land often lacks adequate air drainage while the poor soil and steep slope of Class V through VII lands often make production costs prohibitive.

As with the use-value estimates for agricultural land, SLEAC elected to use an index to adjust the use value of land devoted to orchards for the various land classes. SLEAC approved the following index to adjust orchard use-value estimates for the various land classes relative to the base classes.

Virginia Land Class Index (Orchards)	
Class I	0.80
Class II – IV	1.00
Class V	0.75
Class VI	0.60
Class VII	0.40
Class VIII	0.00

These indices can be interpreted in the same fashion as the indices for agricultural land. Class II, III, and IV land is considered the base and, therefore, receives the index of 1. Net returns to orchards on Class I land are estimated at 80% of the base, net returns to Class V land are estimated at 75% of the base, and so on.

Calculating a jurisdiction’s use value of orchards land is outlined in the four steps presented below. Calculations are shown in Appendix C, Tables 3 and 5.

Step 1 – Calculate net returns for orchard land

The first step in estimating the use value of orchard land is to determine the average net returns per acre for the previous 7 years. Annual net return budgets for orchards are averaged using a moving 7-year Olympic average. For TY2011, Prince Edward County’s net return average for orchard land was \$6.81 (Appendix C, Table 5 – line 3a).

²⁷ See in this document: Section 1 – Capitalization Rates

Step 2 – Calculate the portion of use value attributable to trees only

The amount calculated in Step 1 represents the average net return per acre of **both trees** and *agricultural land*. Since the depreciation component of the capitalization rate applies **only to the trees**, net returns to *agricultural land* are subtracted prior to applying the capitalization rate.

For TY2011, Prince Edward County's Estimated Net Returns for *agricultural land* were \$3.60 (Prince Edward County TY2011 Table 2, see http://usevalue.agecon.vt.edu/Agri_Hort_estimates.htm) and its soil index factor was 1.149. Dividing the county's Estimated Net Return by its soil index factor, results in the Net Return for *only agricultural land*. For Prince Edward County, the Net Return for *only agricultural land* is \$3.12 (Appendix C, TY2011 Table 5 – line 3b). Subtracting \$3.12 from the TY2011 orchard net return of \$6.81 yields the portion of net return attributable to *trees only* which is a *net loss* of (\$3.70) (Appendix C, TY2011 Table 5 – line 3c).

Each jurisdiction uses two capitalization rates - one for apple trees and another for other trees. Each rate is the sum of the state's annual moving straight 10-year average of the long-term interest rates and the jurisdiction's moving straight 10-year average of its effective property tax rate (published annually by the Virginia Department of Taxation) plus a depreciation rate.

For TY2011 Prince Edward County's average long-term interest rate was 0.0717 and its average effective property tax rate was 0.0042 (Appendix C, TY2011 Table 5 – lines 4a and 4b), summing the two results in a capitalization rate of 0.0759. Then, separate depreciation rates for Apple Trees and Other Trees are added. For Apple Trees 0.0333 is added and 0.05 is added for Other Trees, resulting in final capitalization rates of 0.1093 for Apple Orchard and 0.1260 for Other Orchard (Appendix C, TY2011 Table 5 – lines 4e and 4f).

Step 3 – Multiply by the appropriate index number

Dividing the **net return** calculated for **trees only** by the Apple Orchard and Other Orchard capitalization rates results in Apple Trees and Other Trees estimates for Class II, III, and IV land. The remaining estimates (Class I and V-VIII) are calculated by multiplying the Class II – IV estimate (which are the same) by a corresponding Orchard Index.

For TY2011, in *Prince Edward County*, the net return attributable to trees only is a net *loss* of \$3.70 (Appendix C, TY2010 Table 5 – line 3c). Dividing this amount by the capitalization rates for Apple Orchards and Other Orchards (0.1093 and 0.1260) results in the reported use values for Apple Trees and Other Trees (TY2011 Table 5 - Section 5). The estimates for **Apple Trees** and **Other Trees** are shown as net *gains* of for Land Classes II, III, and IV (\$33.83 and \$29.34). Multiplying these amounts by the corresponding orchard index for the remaining land classes results in the county's estimates for Apple Trees and Other Trees (Appendix C, Table 5 – Section 5).

Step 4 – Add the appropriate agricultural land use-value estimate

The total use value of **Apple Orchard** real estate for a jurisdiction is calculated by combining the jurisdiction's use-value estimate attributable to **Apple Trees** and its use-value estimate attributable to **Agricultural Land**.

For TY2011, in the *Prince Edward County*, the **Apple Trees** estimates (Land Classes II, III, and IV) each show a net *gain* of \$33.83 (Appendix C, Table 5 – Section 5). This value is multiplied by the corresponding Orchard Index to calculate for the remaining land class estimates for Apple Trees.

Each Apple Tree value for Class I thru VIII (TY2011 Table 5 – Section 5) is then added to the corresponding Land Class use-value estimate for Agriculture Land (without-risk) (Prince Edward County TY2011 Table 3 – Section 5, see http://usevalue.agecon.vt.edu/Agri_Hort_estimates.htm). Summing the two provides the **Apple Trees and Land** estimate of \$88.60 (Land Class I); \$89.21 (Land Class II); \$74.85 (Land Class III) and so on (TY2011 Table 5 – Section 5).

Finally, each estimate is rounded to the nearest \$10, resulting in the use-value estimate of \$90 (Land Class I); \$90 (Land Class II); \$70 (Land Class III) and so on, which is the use-value estimate that is reported (Appendix B, TY2011 Table 1b for *Prince Edward County* – Apple). The same process is used in generating use-value estimates for each of the remaining capability classes.

The total use value of **Other Orchard** real estate for a jurisdiction is calculated the same way as is **Apple Orchard** except that use-value estimates attributable to **Other Trees** are used.

References

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Moore, L.A. 1962. Grass-legume silage. *IN. Forages - the science of grassland agriculture. H.D. Hughes, M.E. Heath, D.S. Metcalfe (ed.). Second Edition. The Iowa State Univ. Press. Ames, Iowa.*

Smith, D. 1981. Forage management in the North. Kendall Hunt Publishing Co. Dubuque, Iowa.

Appendix A - Farm Example

Consider a farm in **Prince Edward County** in **TY2011** with 349 acres. Assume the farm is comprised of 113 acres of Class I land, 130 acres of Class II land of which 82 acres has poor drainage, 5 acres of Class III land, and 1 acre of Class IV land with good drainage. It also has 100 acres of Class VI land with good drainage.

To understand all the details of this example requires knowledge of the procedures and methods employed in developing a county's use-value estimates. Some of the terms, for example, Class I Land and with-risk are explained in other sections of this document.

Option 1 – Income Approach (using separate land class estimates)

Using the abbreviated Table 1a (Appendix B) as reference to determine the per acre use value of the land with good drainage (without-risk) and with poor drainage (with-risk), the assessed value of the farm would be:

Class I Land	(113 acres)	X	(\$60/acre)	=	\$6,780
Class II Land					
Good drainage	(48 acres)	X	(\$60/acre)	=	\$2,880
Poor Drainage	(82 acres)	X	(\$50/acre)	=	\$4,100
Class III Land	(5 acres)	X	(\$40/acre)	=	\$200
Class IV Land	(1 acre)	X	(\$50/acre)	=	\$160
Class VI Land	(100 acres)	X	(\$30/acre)	=	\$3,000
Total Use-Value Assessment					\$17,010

Option 2 - Income Approach (using average land class estimates)

If the data on land class composition and drainage were not available, the average use value estimates (Average Ag. Land, I -VII) could be used. For this farm, the assessed value would be

Class I – VII Land	(349 acres)	X	(\$50/acre)	=	\$17,450
Total Use-Value Assessment					\$17,450

Option 3 – Rental Rate Approach

Using the abbreviated Table 1 (Appendix B) for rental rates as reference to determine the per acre use value of the land, the assessed value of the farm would be:

Land (cropland)	(249 acres)	X	(\$400/acre)	=	\$99,600
Land (pastureland)	(100 acres)	X	(\$180/acre)	=	\$18,000
Total Use-Value Assessment					\$117,600

The tax paid by the owner (assuming that the owner meets all eligibility requirements for use value assessment) of the 349 acres would be based on Prince Edward's real property tax rate times the total use-value assessment (Option 1, 2, or 3). If the land contained farm structures, e.g., a poultry house and/or grain bins, they would be taxed at their fair market value. Use-value assessment only applies to land.

In **Prince Edward County** the property tax rate for 2011 was \$0.42 per \$100 of assessed valuation of real estate for each option would be:

- Option 1 (*Income Approach*) \$71.44 (\$17,010 X 0.0042)
- Option 2 (*Income Approach*) \$73.29 (\$17,450 X 0.0042)
- Option 3 (*Rental Rate Approach*) \$493.92 (\$117,600 X 0.0042)

Appendix B – What is reported?

Each year, final use-value *income approach* and *rental rate approach* estimates²⁸ are provided to the Virginia Department of Taxation. Using an *income approach*, use-value estimates are provided for agricultural and horticultural lands for jurisdictions participating in the use-value taxation program. Using a *rental rate approach*, use-value estimates are provided for all counties and three cities (Chesapeake, Suffolk, and Virginia Beach).

All use-value taxation program participating jurisdictions receive a brochure with their income and rental rate based estimated use values. Included in the brochure are contacts with addresses and phone numbers as well as the URL for the use-value website.

Table 1a (Income Approach)

This is a report that lists the estimated use values of agricultural land for jurisdictions participating in the use-value taxation program. Use-value estimates are shown for each of eight Soil Conservation Service land capability classifications²⁹ as well as averages for:

Class I-IV (Average Cropland); Class V-VII (Average Pastureland); and Class I-VII (Average Agricultural land). Class VIII land is not included in any of the averages because it is considered to have practically no agricultural value. An example Table 1a (Selected Jurisdictions) is provided in this section.

Using estimates by soil classification can help improve equity in the tax system when data are available on land composition of individual land tracts within a jurisdiction. However, when capability classification acreage data are not available, the average estimates for cropland, pastureland, or total land should be used. At the discretion of the assessing officer, the pastureland use value may be applied to land in any class that is strictly used for grazing.

Separate use-value estimates are reported for land not at risk of flooding (without-risk) and land that is at risk of flooding (with-risk). The with-risk values should only be employed when an individual land tract is known to have poor drainage that cannot be corrected by tiling or drainage ditches.

²⁸ In Tables 1a and 1b, the Use-value *income approach* estimates are dollars per acre and have been rounded to the nearest \$10

²⁹ See Section 1 – Calculating Use values of this document, for an explanation of capability classifications.

Table 1a: Estimated use values of agricultural land by jurisdiction (Selected Jurisdictions)

Use values are estimated for each of the eight Soil Conservation Service Land Capability Classifications. Average values are reported for cropland (classes I - IV), pastureland (classes V - VII) and agricultural land (classes I - VII). Class VIII land is not included in the average use value of agricultural land because class VIII land is not considered suitable for agricultural purposes. The with-risk values refer to land that is at risk of flooding. These values should only be used when the soil has poor drainage that is not remedied by tiling or drainage ditches or when the land lies in a floodplain. See the end of the document for additional information.

Estimates apply to tax-year **2011**.

Jurisdiction		Cropland				Average	Pastureland			Average	Average	Other
		I	II	III	IV	Cropland	V	VI	VII	Pasture-	Ag. Land	land
		DOLLARS										
County of												
Chesterfield >	w/out risk	250	220	170	130	190	100	80	50	70	180	20
Amelia	w/ risk	240	210	160	130	180	90	80	50	70	170	20
Dinwiddie	w/out risk	400	360	260	210	340	160	130	80	150	340	30
County, Coastal												
Plain Region >	w/out risk	380	340	250	200	330	150	130	80	140	320	30
Sussex												
Dinwiddie	w/out risk	350	320	240	190	290	140	120	70	100	270	20
County, Piedmont Region >	w/out risk	340	300	220	180	270	130	110	70	100	250	20
Brunswick												
Prince Edward	w/out risk	60	60	40	30	50	20	20	10	10	40	0
	w/ risk	60	50	40	30	40	20	20	10	10	40	0
City of												
Buena Vista >	w/out risk	100	90	70	50	N.A.	40	30	20	N.A.	N.A.	10
Rockbridge	w/ risk	90	80	60	50	N.A.	40	30	20	N.A.	N.A.	10

End Notes

N.A.: Not applicable because data are transferred in, or data are not available to make estimate.

Without-Risk: These estimates apply to land that is not at risk of flooding.

With-Risk: These estimates apply to land with poor drainage that is at risk of flooding. Calculations are based on the assumption that a complete crop loss occurs once every 20 years due to flooding.

Average Land Values: The use value of each land class is weighted by the total acreage of agricultural land in that class, as reported by the 1967 Virginia Conservation Needs Inventory, prior to averaging.

Transfers (>): The data used for estimating the use value of agricultural land are not published for all towns and for only a few of Virginia's independent cities. When data do not exist for a town or city participating in the use-value taxation program, the estimated use values from an adjacent or surrounding county are used. This process is referred to as transferring-in. Transferring-in is also used for jurisdictions with large areas of land lying in more than one physiographic region, for example, Coastal Plain and Piedmont. When a transfer-in jurisdiction has been used, it appears after an arrow (>).

Table 1b (Income Approach)

This is a report that lists the estimated use values for orchard land in all jurisdictions participating in the use-value taxation program. Separate use-value estimates are made for apple orchards and other orchards. "Other" refers to orchards dedicated to peach, cherry, plum, and pear production. Differences in these estimates are the result of the lower depreciation rate used for apple orchards than are used for other types of orchard. Use-value estimates are reported for each of eight Soil Conservation Service land capability classifications. This level of information can help improve the equity of the tax system when data are available on the land class composition of each individual land tract in a jurisdiction. When no such data exist, it is recommended that the use value of Class III orchard be applied to all orchard operations within the jurisdiction.

Land devoted to horticultural use will rarely be at risk of flooding. For this reason, the SLEAC elected not to consider the risk of excess rainfall in the use-value estimates for horticultural crops.

Table 1b: Estimated use values of land in orchard by jurisdiction (Selected Jurisdictions)

The use values of apple and other orchards are estimated for each of eight Soil Conservation Service land capability classifications. Other orchard refers to peach, cherry, pear, and plum orchards. The values indicated represent the use value of both land and trees. See the end of the document for additional information.

Estimates apply to **TY2011**.

		I	II	III	IV	V	VI	VII	VIII
Jurisdiction		DOLLARS							
County of									
Accomack	Apple	660	490	260	130	100	90	40	60
	Other	700	540	310	180	140	120	60	60
Chesterfield >	Apple	200	170	110	70	60	50	30	20
	Other	210	170	120	80	60	50	30	20
Dinwiddie	Apple	300	230	140	90	70	60	30	30
County, Coastal									
Plain Region >	Other	310	250	160	100	80	70	40	30
Sussex									
Prince Edward	Apple	90	90	70	70	50	40	30	0
	Other	90	80	70	60	50	40	20	0
City of									
Buena Vista >	Apple	110	100	80	70	50	40	30	10
Rockbridge	Other	110	100	80	70	50	40	20	10

Table 1c (Rental Rate Approach)

This is a report that lists the estimated use values of cropland and pastureland land based on capitalized rental rates from NASS. Rental rates are not provided by NASS for every county. When a rate is not provided, the combined county rate for the NASS district where the county is located is used. Any county where a combined county rental rate is used is identified. Also included in this section is a listing of the counties located within a given NASS reporting district.

Table 1c: Rental Rates for cropland and pastureland values based on NASS¹ capitalized rental rates (Selected Jurisdictions)

County of	Capitalization Rate ²	Cropland		Irrigated cropland		Pastureland	
		Rental Rate \$/acre ¹	Value \$/acre ³	Rental Rate \$/acre ¹	Value \$/acre ³	Rental Rate \$/acre ¹	Value \$/acre ³
Chesterfield	0.0807	30.5 ^{cc}	380	--	--	19.5 ^{cp}	240
Dinwiddie	0.0781	34	440	57.5	740	15	190
Prince Edward	0.0760	30.5 ^{cc}	400	--	--	14	180

¹ National Agricultural Statistics Service (NASS) County-Level Cash Rent Data <http://quickstats.nass.usda.gov> Accessed 4/13/2010.

² Capitalization Rate (without risk) is a sum of the average interest rate component (interest rate component is 10-year state average (2 year lag) (from AgFirst)) and average property tax rate (property tax component is 10-year jurisdiction average (3-year lag) (from Dept of Taxation).

³ Values \$/acre = Land Rental Rate \$/ac ÷ Capitalization Rate. Values rounded to the nearest \$10.

Combined county rental rates by NASS district	Cropland \$/acre	Irrigated Cropland \$/acre	Pastureland \$/acre
Central District	30.5 ^{cc}	63.0	19.5 ^{cp}
Eastern District	54.5 ^{ec}	76.5	36.0 ^{ep}
Northern District	27.5 ^{nc}	53.5	20.5 ^{np}
Southeastern District	--	60.5	26.0 ^{sep}
Southern District	--	27.5	--
Southwestern District	42.5 ^{swc}	33.5	16.0 ^{sw}
Western District	30.5 ^{wc}	58.0	15.5 ^{wp}

Appendix B - What is reported?

Jurisdictions within NASS crop reporting districts				
Districts	Jurisdictions			
Central	Albemarle	Buckingham	Fluvanna	Louisa
	Amelia	Campbell	Goochland	Nelson
	Amherst	Caroline	Greene	Orange
	Appomattox	Chesterfield	Hanover	Powhatan
	Bedford	Cumberland	Henrico	Prince Edward Spotsylvania
Eastern	Accomack	James City	Lancaster	Northampton Nor-
	Charles City	King and Queen	Mathews	thumberland
	Essex	King George	Middlesex	Richmond
	Gloucester	King William	New Kent	Westmoreland York
Northern	Arlington	Fauquier	Page	Shenandoah
	Clarke	Frederick	Prince William Rap-	Stafford
	Culpeper	Loudoun	pahannock	Warren
	Fairfax	Madison	Rockingham	
Southeastern	Brunswick	Isle of Wight Meck-	Southampton	Suffolk City
	Dinwiddie	lenburg	Surry Sussex	Virginia Beach City
	Greensville	Prince George	Chesapeake City	
Southern	Charlotte	Halifax	Lunenburg	Patrick
	Franklin	Henry	Nottoway	Pittsylvania
Southwestern	Bland	Floyd	Montgomery	Smyth
	Buchanan	Giles	Pulaski	Tazewell
	Carroll	Grayson	Russell	Washington
	Dickenson	Lee	Scott	Wise Wythe
Western	Alleghany	Bath	Craig	Roanoke
	Augusta	Botetourt	Highland	Rockbridge

Questions regarding any *statutorily* related issues surrounding use-value assessment should be directed to Keith Mawyer or Tom Morelli at the Property Tax Unit, Virginia Department of Taxation. Questions regarding the *technical* aspects of the methodology used to produce the use-value estimates reported in this brochure should be directed to Lex Bruce or Gordon Groover at the Department of Agricultural and Applied Economics, Virginia Tech.

Land Capability Classifications	
Class I	Soils have few limitations that restrict use.
Class II	Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.
Class III	Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.
Class IV	Soils have very severe limitations that restrict the choice of plants, require very careful management, or both.
Class V	Soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife food and cover.
Class VI	Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.
Class VII	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.
Class VIII	Soils and land forms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply, or to aesthetic purposes.

TY 2008 USE-VALUE ESTIMATES

Table 1: Estimated use value of agricultural land in Prince Edward. (\$ / Acre)

Land Class	Use Value Without Risk ⁵	Use Value With Risk ⁵
I	300	280
II	270	250
III	200	190
IV	160	150
Avg. I - IV	230	210
V	120	110
VI	100	90
VII	60	60
Avg. V - VII	80	70
Avg. I - VII	200	180
VIII	20	20

⁵N.A. = not applicable

Table 2: Estimated use value of orchards land in Prince Edward. (\$ / Acre)

Land Class	Use Value of Apple	Use Value of Other
I	230	240
II	190	200
III	120	130
IV	80	90
V	60	70
VI	50	60
VII	30	30
VIII	20	20

Estimated Use Value of Horticultural Land in Prince Edward

Estimates apply to Tax Year 2008



November 29, 2007

State Land Evaluation and Advisory Committee (SLEAC)

Virginia Department of Taxation

For additional information regarding methods and estimation procedures for agricultural and horticulture land use values see <http://usevale.agecon.vt.edu>.

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USE VALUE TAXATION IN VIRGINIA¹

Virginia law allows for *eligible* land in agricultural, horticultural, forest, or open space use to be taxed at the value in *use* (use value) of the land as opposed to its *market* value. The State Land Evaluation and Advisory Council (SLEAC) was created in 1973 with the mandate to estimate the use value of eligible land for each jurisdiction participating in the use-value taxation program. SLEAC contracts annually with the Department of Agricultural and Applied Economics at Virginia Tech to develop an objective methodology for estimating the use value of land in *agricultural* and *horticultural* uses. A technical advisory committee, comprised of professionals familiar with Virginia agriculture, was established in 1998 to provide guidance on the technical aspects of developing an appropriate methodology. The members of SLEAC have officially sanctioned the use value estimates reported in this brochure.

ROLE OF THE SLEAC ESTIMATES

Section 58.1 - 3229 of the Code of Virginia requires each participating jurisdiction's assessment office to *consider* SLEAC estimates when assessing the use value of eligible land. However, the local assessing office is not required to use SLEAC estimates verbatim.

Under certain circumstances, adjustments to SLEAC estimates may be necessary to accurately reflect local conditions that affect the use values of eligible land parcels.

¹Information about Virginia's Use Value Assessment Program can be found at <http://usevalue.agecon.vt.edu>.

TY 2008 Use Value Estimates

Tables 1 & 2 list the estimated use values of agricultural and horticultural land. These estimates are based on the capitalized net income that a *bona-fide* agricultural or horticultural enterprise located in the county would be expected to earn. These values are updated annually for public information. Note, the local assessing office can only make changes to assessed property values during a reassessment year.

Table 1 lists the estimated use value for land in *agricultural* use for each of the eight Soil Conservation Service land capability classifications. Because data on the land class composition of individual parcels is often unavailable, average use values have also been provided². The average of land in classes I - IV represents the average use value of *cropland*. The average of land in classes V - VII represents the average use value of *pastureland*. The average of land in classes I - VII represents the average use value of *all agricultural land*³.

The **without risk** estimates apply to land that is not at risk of flooding. The **with risk** estimates should only be applied to land parcels that are at risk of flooding due to poor drainage that cannot be remedied by tilling or drainage ditches.

²Data limitations prohibited the computation of average use values in a few counties and in most independent cities and townships.

³Note, Class VIII is not considered suitable for agricultural production and is therefore not included in this average.

Table 2 lists the estimated use value of land in *orchard* use. Values are reported for both apple orchards and "other" orchards for each of the eight Soil Conservation Service land capability classifications. "Other" orchard refers to peach, pear, cherry, or plum production. Data limitations prohibit the computation of average use values for orchards.

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Appendix C – Prince Edward County: Tables 2, 3, 4, and 5

Table 2: The composite farm and average net returns in Prince Edward County

Annual net returns are determined through enterprise budgeting for crops that contributed one or more acres to the composite farm. The estimated net returns shown in the table below are “olympic” averages^a for each crop in the composite farm for years 2003-2009.

Additional information about these estimates can be found at Virginia’s Use Value Assessment Program website, <http://usevalue.agecon.vt.edu/>.

Average net returns applicable to tax-year **2011**.

	Total Acreage ^b	Composite Farm (Acres) ^c	Estimated Net Returns (\$/Acre)
1. Number of Farms	446		
2. Corn ^d	1,540	3	\$ 0.00
3. Alfalfa	326	1	\$ 48.71
4. Hay ^e	14,477	32	\$ 0.00
5. Wheat	143	0	---
6. Barley	144	0	---
7. Soybeans	185	0	---
8. Potatoes	2	0	---
9. Cotton	---	---	---
10. Pasture	19,793	44	\$ 0.00
11. Peanuts	---		---
12. Tobacco	156	0	---
13. Snap Beans	---	---	---
14. Cucumbers	D	---	---
15. Pumpkins	D	---	---
16. Sweet Corn	3	0	---
17. Tomatoes	2	0	---
18. Watermelons	D	---	---
19. Double-cropped ^f	(-) 287	(-) 1	
11. Totals	36,484	79	\$ 3.58 ^g

^a In an olympic average, the highest and lowest values are dropped prior to calculating the arithmetic mean.

^b Data taken from the 2007 Census of Agriculture

^c Some data do not add exactly due to rounding and some categories are not listed due to disclosure rules.

^d Corn acreage is corn-grain plus corn-silage acreages.

^e Hay acreage is (all hay + all haylage, grass silage, greenchop) – (alfalfa hay + haylage or greenchop from alfalfa or alfalfa mixtures).

^f Double-cropped acreage is calculated as the total acreage of wheat, barley, and rye; and subtracted to arrive at the total cropland harvested acreage.

^g Weighted average of crop estimated net returns by composite farm acreage.

n.a. = Not Applicable

D = Withheld to avoid disclosing data of individual farms.

Table 3: Worksheet for estimating the use value of agricultural land in Prince Edward County

Additional information about these estimates can be found at Virginia's Use Value Assessment Program website, <http://usevalue.agecon.vt.edu/>.

Estimates are applicable to tax-year **2011**.

1. Estimated net return		\$3.58			
2. Capitalization rates:					
a) Interest rate component ^a		0.0717			
b) Property tax component ^b		0.0042			
c) Rate without risk component		0.0760 (sum a and b)			
d) Risk component		0.0038 (0.05 times 2c)			
e) Rate with risk component ^c		0.0798 (sum c and d)			
3. Unadjusted use value					
	Without Risk^d	With Risk^e			
	\$ 47.12	\$ 44.88			
4. Soil Index					
	Cropland				
	Acreage	Productivity			
Class	(No Pasture)^f	Index			
I	418	1.5			
II	21,273	1.35			
III	10,617	1			
IV	8,196	.8			
Total:	40,504	46,519			
Soil Index Factor ^g : 1.149					
5. Agricultural use value adjusted by land class:					
Class	Land Index	Without Risk	Reported^h	With Risk	Reported^f
I	1.5	\$ 61.54	60	\$ 58.61	60
II	1.35	\$ 55.39	60	\$ 52.75	50
III	1.0	\$ 41.03	40	\$ 39.07	40
IV	0.8	\$ 32.82	30	\$ 31.26	30
V	0.6	\$ 24.62	20	\$ 23.44	20
VI	0.5	\$ 20.51	20	\$ 19.54	20
VII	0.3	\$ 12.31	10	\$ 11.72	10
VIII	0.1	\$ 4.10	0	\$ 3.91	0

^a The 10-year average of long term interest rates charged by the various Agriculture Credit Associations serving the state

^b The 10-year average of the effective true tax rates reported by the Virginia Department of Taxation

^c Rate should only be used when the soil has poor drainage that is not remedied by tiling or drainage ditches or when the land lies in a floodplain.

^d Estimated Net Return (Line 1) divided by Rate without risk (Line 2c)

^e Estimated Net Return (Line 1) divided by Rate with risk (Line 2e)

^f Data provided by the Virginia Conservation Needs Inventory (1967)

^g Index factor = (Total Weighted Acreage)/(Total Cropland Acreage)

^h Rounded to the nearest \$10 and reported in Table 1a.

Table 4: Input costs, revenues, and net income (loss) for processed and fresh market apple production.

Per acre costs, revenues, and net income assuming a planting density of 250 trees per acre using semi-dwarf rootstock.

Estimates apply to tax-year 2011

Establishment Costs (applicable to both processed market and fresh market orchards)

Land Clearing	\$380.00
Land Preparation (labor, machinery, material)	\$824.00
Planting (labor, machinery, trees)	\$2,305.00
Total Establishment Cost	\$3,509.00

	Processed Market Apple Production				Fresh Market Apple Production			
	Pre- 1-3 Yrs	Early 4-6 Yrs	Full 7-15 Yrs	Late 16-20 Yrs	Pre- 1-3 Yrs	Early 4-6 Yrs	Full 7-15 Yrs	Late 16-20 Yrs
Pre-Harvest Var Costs								
Fertilizer	\$140.35	\$128.00	\$83.24	\$83.24	\$140.72	\$128.00	\$144.00	\$144.00
Lime	\$55.00	\$25.00	\$12.50	\$12.50	\$55.00	\$25.00	\$25.00	\$25.00
Pesticides	\$157.58	\$350.86	\$701.72	\$701.72	\$157.58	\$595.04	\$881.65	\$881.65
Bee Rental	\$12.00	\$22.00	\$28.00	\$28.00	\$12.00	\$22.00	\$22.00	\$22.00
Pest Control	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00
Mulch	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Pruning	\$10.00	\$120.00	\$200.00	\$200.00	\$165.00	\$330.00	\$495.00	\$495.00
Hand Thinning	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$220.00	\$385.00	\$385.00
Supplies (replace lost wrenches, etc.)	\$9.00	\$8.00	\$6.50	\$6.50	\$9.00	\$8.00	\$6.50	\$6.50
Variable Machinery Cost (fuel, oil, & maintenance)	\$50.59	\$479.00	\$479.00	\$479.00	\$126.48	\$479.00	\$479.00	\$479.00
Permanent Labor	\$106.50	\$345.60	\$589.00	\$589.00	\$213.00	\$432.00	\$588.50	\$588.50
Insurance	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Harvest Var Costs								
Harvest Labor	\$27.00	\$175.50	\$756.00	\$756.00	\$62.00	\$404.00	\$869.50	\$869.50
Variable Machinery Cost (fuel, oil, & maintenance)	\$44.16	\$153.60	\$153.60	\$153.60	\$44.16	\$153.00	\$153.60	\$153.60
Storage, Packing, Transportaion, & Brokerage Fee	\$0.00	\$0.00	\$0.00	\$0.00	\$166.67	\$1,512.50	\$3,167.50	\$3,167.50
Total Var Costs (AVG/Cycle)	\$2,078.63	\$1,857.56	\$3,149.56	\$3,149.56	\$2,378.39	\$3,215.38	\$7,232.25	\$7,232.25
Fixed Machinery Costs	\$58.65	\$58.65	\$58.65	\$58.65	\$58.65	\$58.65	\$58.65	\$58.65
General Overhead (8%) (AVG/Cycle)	\$166.29	\$148.60	\$251.96	\$251.96	\$190.27	\$257.23	\$578.58	\$578.58
Total Fixed & Variable Costs	\$2,303.57	\$2,064.81	\$3,460.17	\$3,460.17	\$2,627.31	\$3,531.26	\$7,869.48	\$7,869.48
Gross Receipts								
Yield (LBS/Acre)	1,270	15,240	20,319	20,319	1,270	15,240	20,319	20,319
Price Received (\$/LB)	\$0.16	\$0.16	\$0.16	\$0.16	\$0.33	\$0.33	\$0.33	\$0.33
Total Revenue	\$203.20	\$2,438.40	\$3,251.04	\$3,251.04	\$420.37	\$5,044.44	\$6,725.59	\$6,725.59
Annual Net Loss/Income (AVG/Cycle)	(\$2,100.37)	(\$151.96)	(\$209.13)	(\$209.13)	(\$2,206.94)	\$176.14	(\$1,143.89)	(\$1,143.89)
Discounted (Loss/Income)					-\$7,247.49			-\$12,182.88

Table 5: Worksheet for estimating the use value of orchard land in Prince Edward County

The estimated net returns assume a planting density of 135 trees per acre. Additional information about these estimates can be found at Virginia's Use Value Assessment Program website, <http://usevalue.agecon.vt.edu/>.

Estimates apply to tax-year **2011**.

1. Estimated net returns (loss) per acre applicable to tax-year 2008 (see Table 4 for more detail).

	Age of Trees	Processed Fruit	Fresh Fruit	
Pre-production	1 - 3 years	(\$2,100.37)	(\$2,206.94)	
Early-production	4 - 6 years	(\$151.96)	(\$176.14)	
Full-production	7 - 15 years	(\$209.13)	(\$1,143.89)	
Late-production	16 - 20 years	(\$209.13)	(\$1,143.89)	
		Discounted (20 YR Cycle)	(\$7,247.49)	(\$12,182.88)
		Utilization of Sales (10 Yr Avg %)	61%	39%

2. Weighted Average Net Return values

a) 2009 ^a	(\$8,748.31)
b) 2008	\$1,615.75
c) 2007	(\$585.53)
d) 2006	(\$1,390.19)
e) 2005	(\$565.48)
f) 2004	\$14.54
g) 2003	\$19.52

3. Net Returns

a) Net return to "trees and land" (olympic average of 2a thru 2g) ^b	\$6.81
b) Net return attributable to "land only" (Class III) ^c	\$3.12
c) Net return attributable to "trees only"	(\$3.70) (3a minus 3b)

4. Capitalization Rate

a) Interest Rate ^d	0.0717
b) Property Tax ^e	0.0042
c) Depreciation of Apple Trees ^f	0.0333
d) Depreciation of "Other" Trees ^g	0.0500
e) Apple Orchard Capitalization Rate	0.1093 (sum 5a, 5b, and 5c)
f) "Other" Orchard Capitalization Rate	0.1260 (sum 5a, 5b, and 5d)

5. Use Value of Apple Orchard and "Other" Orchard

Land Class	Orchard Index ^h	Apple Orchard		"Other" Orchard	
		Apple Trees	Land ⁱ	Other Trees	Other Trees and Land ^h
I	0.80	\$ 27.06	\$ 88.60	\$ 23.47	\$ 85.01
II	1.00	\$ 33.83	\$ 89.21	\$ 29.34	\$ 84.73
III	1.00	\$ 33.83	\$ 74.85	\$ 29.34	\$ 70.37
IV	1.00	\$ 33.83	\$ 66.65	\$ 29.34	\$ 62.16
V	0.75	\$ 25.37	\$ 49.99	\$ 22.01	\$ 46.62
VI	0.60	\$ 20.30	\$ 40.81	\$ 17.60	\$ 38.12
VII	0.40	\$ 13.53	\$ 25.84	\$ 11.74	\$ 24.04
VIII	0.00	\$ 0.00	\$ 4.10	\$ 0.00	\$ 4.10

a This is the average net return of the eight orchard categories listed in Section 1 of this table. The weights are provided by the percent of total trees represented by each category.

b In an olympic average, the highest and lowest values are dropped prior to calculating the arithmetic mean.

c This is determined by dividing the unadjusted net return value (Table 3 - Line 1) by the soil index factor (Table 3 - Section 4)

d The 10-year average of long term interest rates charged by the various Agriculture Credit Associations serving the state

e The 10-year average of the effective true tax rates reported by the Virginia Department of Taxation

f The depreciation rate applicable to apple trees assumes that trees are replaced on a 30-year rotation.

g "Other" trees refers to peach, cherry, pear, and plum trees. The depreciation rate applicable to "other" trees assumes that trees are replaced on a 20-year rotation.

h The orchard index is applicable only in determining the value of the trees. The land index (Table 3 - Section 5) is applied to the land.

i The use value of trees and land is determined by adding the appropriate without-risk land-use-value (see Table 3 - Section 5) to the use value of the trees.

Appendix D – Data Sources

To insure the integrity of the use-value estimates, the SLEAC uses published, secondary data sources whenever possible. These secondary data have generally been collected in accordance with procedures uniformly applicable throughout Virginia. In a few instances, when published data are not available, the opinions of agricultural or horticultural professionals are solicited.

2002 Census of Agriculture

- Total number of farms in each jurisdiction, and
- Total number of acres devoted to the various crop enterprises in each jurisdiction.

Virginia Cooperative Extension Service

- Recommended amounts of fertilizer and seed for each crop,
- Recommended number of custom applications,
- Seed, fertilizer, and chemical prices, and
- Machinery costs.

Farm Service Agency

- Federal Agricultural Marketing Transition Act payments made in each jurisdiction and
- The price of lime in each jurisdiction.

Conservation Till Institute

- Percentage of land in conventional and reduced till for each crop in each jurisdiction.

AgFirst

- Long term interest rates used for the interest-rate component of the capitalization rate, and
- Short term interest rates used for calculating interest on production capital.

Federal Crop Insurance Corporation

- Insurance premiums, subsidies, and indemnities made in each jurisdiction to each crop.

Market News

- Regional prices received for barley, corn, wheat, and soybeans.

Virginia Agricultural Statistics

- Average farm wages and
- Prices received for alfalfa, hay, tobacco, cotton, peanuts, and potatoes.

Virginia Crop Reporting Service

- Crop yields.

Virginia Conservation Needs Inventory

- Total acreage of each land class in each jurisdiction.

Virginia Department of Taxation

- Property tax component of the capitalization rate.



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