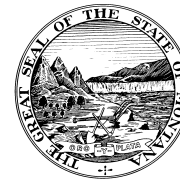




**Dan Bucks**  
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# Montana Department of Revenue



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## **Agricultural and Forest Land Valuation Formula** **August 2010**

The Revenue and Transportation Interim Committee (RTIC) asked for a review of the information used to determine the value of agricultural land. In addition the RTIC requested a review of the valuation formula and the sources of information used in the valuation formula, as well as examples of the practical application of the agricultural land valuation formula. The following information is prepared for RTIC consideration.

**Agricultural Land Classification:** The Montana Legislature, in Section 15-7-201, MCA directs that agricultural land must be classified according to its use and thus Montana classifies agricultural land into one of five (5) agricultural land use classes. Those land use classes are: non-irrigated summer fallow farmland, non-irrigated continuously cropped farmland, grazing land, non-irrigated hay land and irrigated land.

**Determination of Value:** The Montana Legislature, through statute, also established several criteria that the Department follows in the determination of agricultural value. These criteria include:

1. Within each land class, the land must be sub-classified by production categories based on the productive capacity of the land based on yield.
2. The value is the per-acre productive capacity value in each land use and production category.
3. The per-acre net income must be determined separately in each land use and production category and is based on commodity price data.
4. The statutory source of information for the commodity price data is the seven (7) year Olympic average commodity price obtained from the Montana Agricultural Statistical Services.
5. Crop share and livestock share arrangements are based on typical business practices and average landowner costs.
6. The formula used to determine the per-acre value of agricultural land is  $V=I/R$  where:
  - a.  $V$  = per-acre productivity value of agricultural land
  - b.  $I$  = per-acre net income associated with ag use<sup>1</sup>
  - c.  $R$  = capitalization rate. The rate converts an on-going income stream into value; by law the rate is 6.4%

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<sup>1</sup> A crop share approach is used to determine the net income attributable to agricultural production. In a crop share approach, a percentage of the income from production (the share) is attributed to the landlord (owner) of the land. The remaining percentage is considered the tenant's share and includes expenses of production. For grazing land the gross income associated with the grazing lease is reduced by 25% to reflect landowner inputs and costs.

Examples of the Determination of Value for Agricultural Lands  
(as per legislative direction codified as statutory formula)  
**Land value based on yield expressed as bushels of spring wheat per acre**

**Examples of Non Irrigated Summer Fallow Farmland Valuation Formula**

**Yield = 15 bushels per acre**

7 Year Olympic Avg. price for spring wheat = \$4.58/bu.  
Example Productivity = 15 bu/ac  
Gross Income/ac. = 15 bu/ac. \* \$4.58 = \$68.70/ac  
Net Income = \$68.70 \* 0.125 cropshare = \$8.59  
**\$8.59/.064 = \$134.22 Productivity Value/Acre**

**Yield = 20 bushels per acre**

7 Year Olympic Avg. price for spring wheat = \$4.58/bu.  
Example Productivity = 20 bu/ac  
Gross Income/ac. = 20 bu/ac. \* \$4.58 = \$91.60/ac  
Net Income = \$91.60 \* 0.125 cropshare = \$11.45  
**\$11.45/.064 = \$178.91 Productivity Value/Acre**

**Yield = 25 bushels per acre**

7 Year Olympic Avg. price for spring wheat = \$4.58/bu.  
Example Productivity = 25 bu/ac  
Gross Income/ac. = 25 bu/ac. \* \$4.58 = \$114.50/ac  
Net Income = \$114.50 \* 0.125 cropshare = \$14.31  
**\$14.31/.064 = \$223.59 Productivity Value/Acre**

**Examples of Non Irrigated Continuously Cropped Farmland Valuation Formula**

**Yield = 15 bushels per acre**

Avg. price for spring wheat = \$4.58/bu  
Example Productivity = 15 bu/ac.  
Income/ac. = 15 bu/ac. \* \$4.58 = \$68.70/ac.  
Net Income = \$68.70 \* .25 cropshare = \$17.18  
**\$17.18/.064 = \$268.44 Productivity Value/Acre**

**Yield = 20 bushels per acre**

Avg. price for spring wheat = \$4.58/bu  
Example Productivity = 20 bu/ac.  
Income/ac. = 20 bu/ac. \* \$4.58 = \$91.60/ac.  
Net Income = \$91.60 \* .25 cropshare = \$22.90  
**\$22.90/.064 = \$357.81 Productivity Value/Acre**

**Yield = 25 bushels per acre**

Avg. price for spring wheat = \$4.58/bu  
Example Productivity = 25 bu/ac.  
Income/ac. = 25 bu/ac. \* \$4.58 = \$114.50/ac.  
Net Income = \$114.50 \* .25 cropshare = \$28.63  
**\$28.63/.064 = \$447.34 Productivity Value/Acre**

Examples of the Determination of Value for Agricultural Lands  
(as per legislative direction codified as statutory formula)  
**Land value based on yield expressed as carrying capacity (grazing land only)**

**Examples only: Grazing Land Valuation Formula**

**Carrying Capacity = .15 AUM/Ac (6.67 Ac/AUM)**

7 Year Olympic Avg. private grazing lease	= \$15.72/AUM
Operating Expense = \$15.72 * .25 Expense	= \$3.93/AUM
Adjusted Gross Income = \$15.72 - \$3.93	= \$11.79/AUM
Example Productivity	= .15 AUM/Ac
Net Income/ac. = \$11.79/AUM * .15 AUM/Ac	= \$1.77/ac.
<b>\$1.77/.064 = \$27.66 Productivity Value/Acre</b>	

**Carrying Capacity = .31 AUM/Ac (3.23 Ac/AUM)**

7 Year Olympic Avg. private grazing lease	= \$15.72/AUM
Operating Expense = \$15.72 * .25 Expense	= \$3.93/AUM
Adjusted Gross Income = \$15.72 - \$3.93	= \$11.79/AUM
Example Productivity	= .31 AUM/Ac
Net Income/ac. = \$11.79/AUM * .31 AUM/Ac	= \$3.65/ac.
<b>\$3.65/.064 = \$57.03 Productivity Value/Acre</b>	

**Carrying Capacity = .45 AUM/Ac (2.22 Ac/AUM)**

7 Year Olympic Avg. private grazing lease	= \$15.72/AUM
Operating Expense = \$15.72 * .25 Expense	= \$3.93/AUM
Adjusted Gross Income = \$15.72 - \$3.93	= \$11.79/AUM
Example Productivity	= .45 AUM/Ac
Net Income/ac. = \$11.79/AUM * .45 AUM/Ac	= \$5.31/ac.
<b>\$5.31/.064 = \$82.97 Productivity Value/Acre</b>	

Examples of the Determination of Value for Agricultural Lands  
(as per legislative direction codified as statutory formula)

**Land value based on yield expressed as tons of non-irrigated alfalfa hay per acre**

**Examples of Non-Irrigated (Dry) Hay Land Valuation Formula**

**Yield = .75 tons of non-irrigated alfalfa per acre**

7 Year Olympic Avg. price for alfalfa	= \$63.04/ton
Example Productivity	= .75 tons/ac
Gross Income/ac. = \$63.04 * .75 tons	= \$47.28/acre
Net Income = \$47.28 * .25 cropshare	= \$11.82/acre

**\$11.82/.064 = \$184.69 Productivity Value/Acre**

**Yield = 1.25 tons of non-irrigated alfalfa per acre**

7 Year Olympic Avg. price for alfalfa	= \$63.04/ton
Example Productivity	= 1.25 tons/ac
Gross Income/ac. = \$63.04 * 1.25 tons	= \$78.80/acre
Net Income = \$78.80 * .25 cropshare	= \$19.70/acre

**\$19.70/.064 = \$307.81 Productivity Value/Acre**

**Yield = 1.75 tons of non-irrigated alfalfa per acre**

7 Year Olympic Avg. price for alfalfa	= \$63.04/ton
Example Productivity	= 1.75 tons/ac
Gross Income/ac. = \$63.04 * 1.75 tons	= \$110.32/acre
Net Income = \$110.32 * .25 cropshare	= \$27.58/acre

**\$27.58/.064 = \$430.94 Productivity Value/Acre**

Examples of the Determination of Value for Agricultural Lands  
(as per legislative direction codified as statutory formula)  
**Land value based on yield expressed as tons of irrigated alfalfa hay per acre**

**Examples of Irrigated Land Valuation Formula**  
(All examples assume the minimum water cost deduction)

**Yield = 2.2 tons of irrigated alfalfa per acre**

7 Year Olympic Avg. price for alfalfa	= \$63.04/ton
Example Productivity	= 2.2 tons/ac
Gross Income/ac. = 2.2 tons/ac.* \$63.04	= \$138.69/ac
Net Income = \$138.69 * .25 cropshare	= \$34.67/acre
Deduct water cost \$20.00 Water Cost (\$22.50)	= \$12.17/ac

**\$12.17/.064 = \$190.16\* Productivity Value/Acre – a value of \$411.48 will be used.**

\*Irrigated land is statutorily allowed water cost allowances of \$15 base cost, labor cost specific to irrigation type and energy cost. Based on Legislative recommendations and 15-7-201(7)(f) MCA, the minimum value of irrigated land is established at \$411.48 per acre. When the valuation formula calculates a per-acre value that is less than \$411.48, the minimum value is used. In the example calculation, \$411.48 would be used as the per-acre value of this irrigated land instead of the calculated value of \$190.16.

**Yield = 3.2 tons of irrigated alfalfa per acre**

7 Year Olympic Avg. price for alfalfa	= \$63.04/ton
Example Productivity	= 3.2 tons/ac
Gross Income/ac. = 3.2 tons/ac.* \$63.04	= \$201.73/ac
Net Income = \$138.69 * .25 cropshare	= \$50.43/acre
Deduct water cost \$20.00 Water Cost (\$22.50)	= \$27.93/ac

**\$27.93/.064 = \$436.41\* Productivity Value/Acre**

\*An increase of an additional \$5.00 in the allowable water cost in this example would require the application of the minimum value of irrigated land. Allowable water costs are statutorily established and can include allowable expenses up to \$50.00 per acre.

**Yield = 4.2 tons of irrigated alfalfa per acre**

7 Year Olympic Avg. price for alfalfa	= \$63.04/ton
Example Productivity	= 4.2 tons/ac
Gross Income/ac. = 4.2 tons/ac.* \$63.04	= \$264.77/ac
Net Income = \$264.77 * .25 cropshare	= \$66.19/acre
Deduct water cost \$20.00 Water Cost (\$22.50)	= \$43.69/ac

**\$43.69/.064 = \$682.66\* Productivity Value/Acre**

\*An increase of an additional \$20.00 in the allowable water cost in this example would require the application of the minimum value of irrigated land. Allowable water costs are statutorily established and can include allowable expenses up to \$50.00 per acre.

Allowable irrigated water cost components include:

1. Base Cost = \$15.00 per acre, statutorily established and allowed on all irrigated land
2. Labor cost, statutorily established and specific to irrigation type
  - Flood = \$15.00 per acre
  - Sprinkler = \$10.00 per acre
  - Pivot = \$5.00 per acre
3. Energy cost is statutorily recognized but is specific to the landowner. The default value of energy cost is zero unless the information is provided by the landowner.

All water cost components are added together and the total cost becomes a reduction to net income in the calculation when determining the value of irrigated land.