

# Contracting and Production Risk Management for Specialty Crops

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Interactive Video Conference***

**Collaborating Partners: Montana MarketManager  
Billings RMA Regional Office  
Fort Peck Community College  
Chief Dull Knife College**



**February 2006**

# WORKSHOP OUTLINE

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1. **Diversification and Risk**
2. **Production Risk**
  - a. **RMA Insurance Products**
  - b. **Written Agreements**
  - c. **NAP**
3. **Contracting**
  - a. **Why Contracts?**
  - b. **Contract Use And Design**

# Diversification and Risk

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## Diversification Issues

1. **Actions Which Reduce Risk Without Loss Of Mean Returns**
2. **Is The Adoption Of An Additional Crop A Diversification Strategy?**
3. **Maybe:**
  - a. **Stock Portfolio Example**

# Diversification and Risk

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1. **Two Diversification Aspects Of Additional Crop Enterprises**
  - a. **Rotational Effect: Can *Enhance* Returns And Productivity**
    - » **Improve Soil Characteristics**
    - » **Break Weed/Insect Cycles**
    - » **Reduce Disease Vectors**
    - » **Source of Nitrogen**

# Diversification and Risk

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## b. Diversification Effects:

- » Additional Enterprises Can Reduce The *Variation* Of Returns While Maintaining Average Returns
- » But, Diversification Can Increase Costs
  - Machinery Complements
  - Timeliness
  - Learning Curves

# Diversification and Risk

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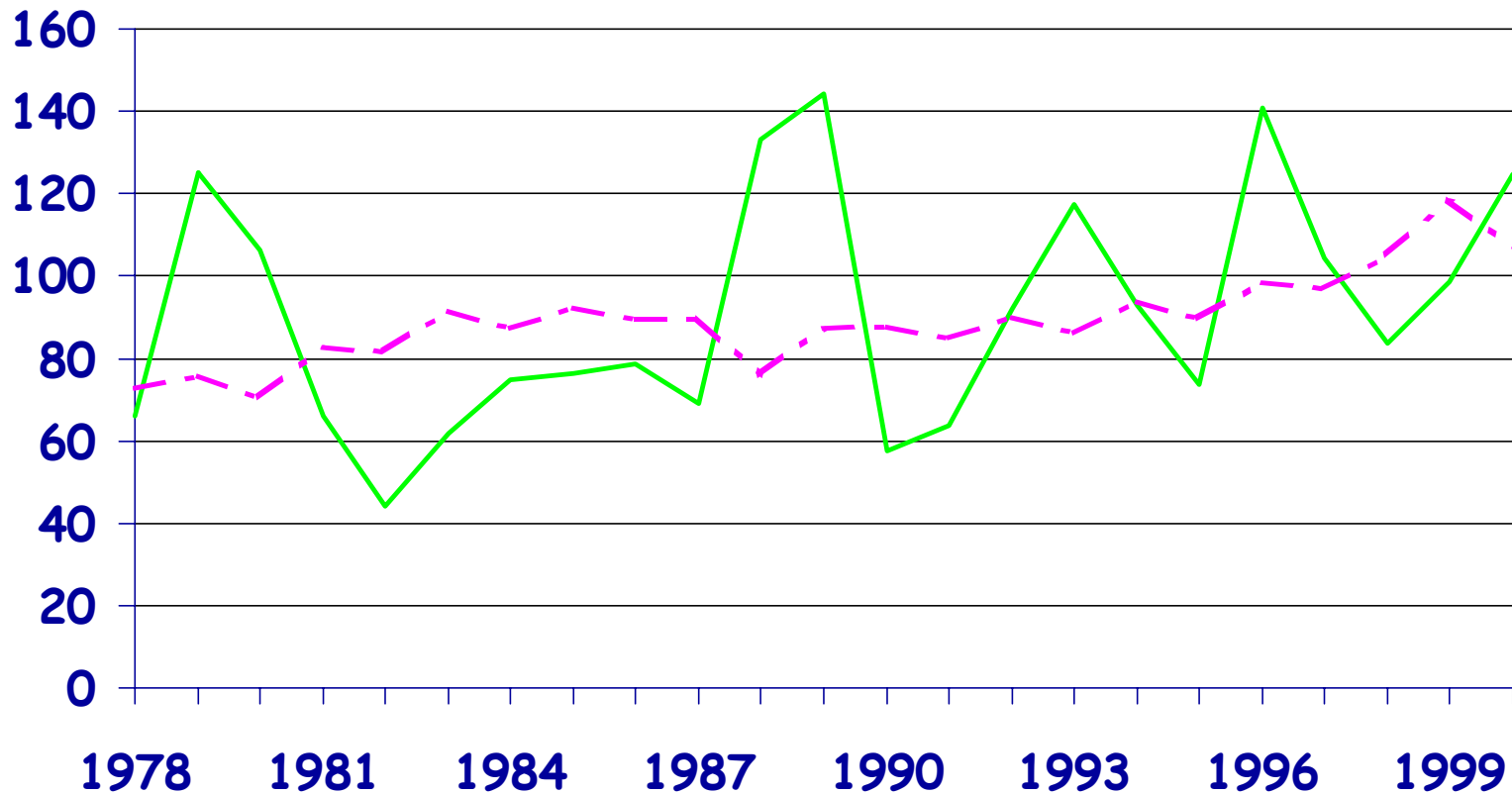
## Example:

1. Consider Returns To Land From Two Crops
  - a. *Exotic Peas*: \$91/acre
  - b. Malting Barley: \$89/acre
2. Own A 200 Acre Farm
  - a. Rent To A Producer Of Malting Barley?
  - b. Rent To A Producer Of Both In The Interest Of Diversification?

# Returns to Specific Crops

## Returns to Land (\$/acre)

\$/acre



— Exotic Peas    - - - Malting Barley

# Diversification and Risk

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## Average Returns For the Farm

1. **200 Acres Of Malting Barley**
  - a.  **$\$89 * 200 \text{ Acres} = \$17,800$**
2. **100 Acres Of Malting Barley And 100 Acres Of Exotic Peas**
  - a.  **$(\$89 * 100) + (\$91 * 100) = \$18,000$**
3. **About The Same Returns**

# Diversification and Risk

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## Variation of Returns

### 1. 200 Acres Of Malting Barley

a.  $V(k_1 Y_1) = k_1^2 * \text{point} \sigma_1^2$

b.  $(200)^2 * 118 = 4,720,000$

c. **Standard Deviation = \$2,173**

# Diversification and Risk

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## Variation of Returns

1. 100 Acres Of Malting Barley And 100 Acres Of Exotic Peas
  - a. Linear Combination Of Random Variables
2.  $V(Y_1 Y_2) = (k_1^2 * \sigma_1^2) + (k_2^2 * \sigma_2^2) + (2k_1 k_2 \sigma_{12})$ 
  - a. Where  $\sigma_{12}$  is the covariance of  $Y_1 Y_2$
  - b.  $(100^2 * 118) + (100^2 * 799) + (2 * 100 * 100 * 36) = 9,890,000$
  - c. Standard Deviation = **\$3,145**
3. 50% More Variation Than Malting Barley Alone

# Diversification and Risk

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## Variation of Returns

1. **200 Acres Malting Barley = \$2,173**
2. **100 Acres of Malting Barley and  
100 Acres of Exotic Peas = \$3,145**
3. **180 Acres of Malting Barley and  
20 Acres of Exotic Peas = \$2,098**

# **Adding Chickpeas To A Traditional Rotation**

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- 1. Diversifies A Rotation**
- 2. Does It Increase Income?**
- 3. Does It Diversify Income?**
- 4. Many Specialty Crops Offer High Returns In Some Years**
  - a. Often Adds More Risk**
- 5. We Evaluate Adding Large Kabuli And Desi Chickpeas To A Traditional Rotation**

# Research Methodology

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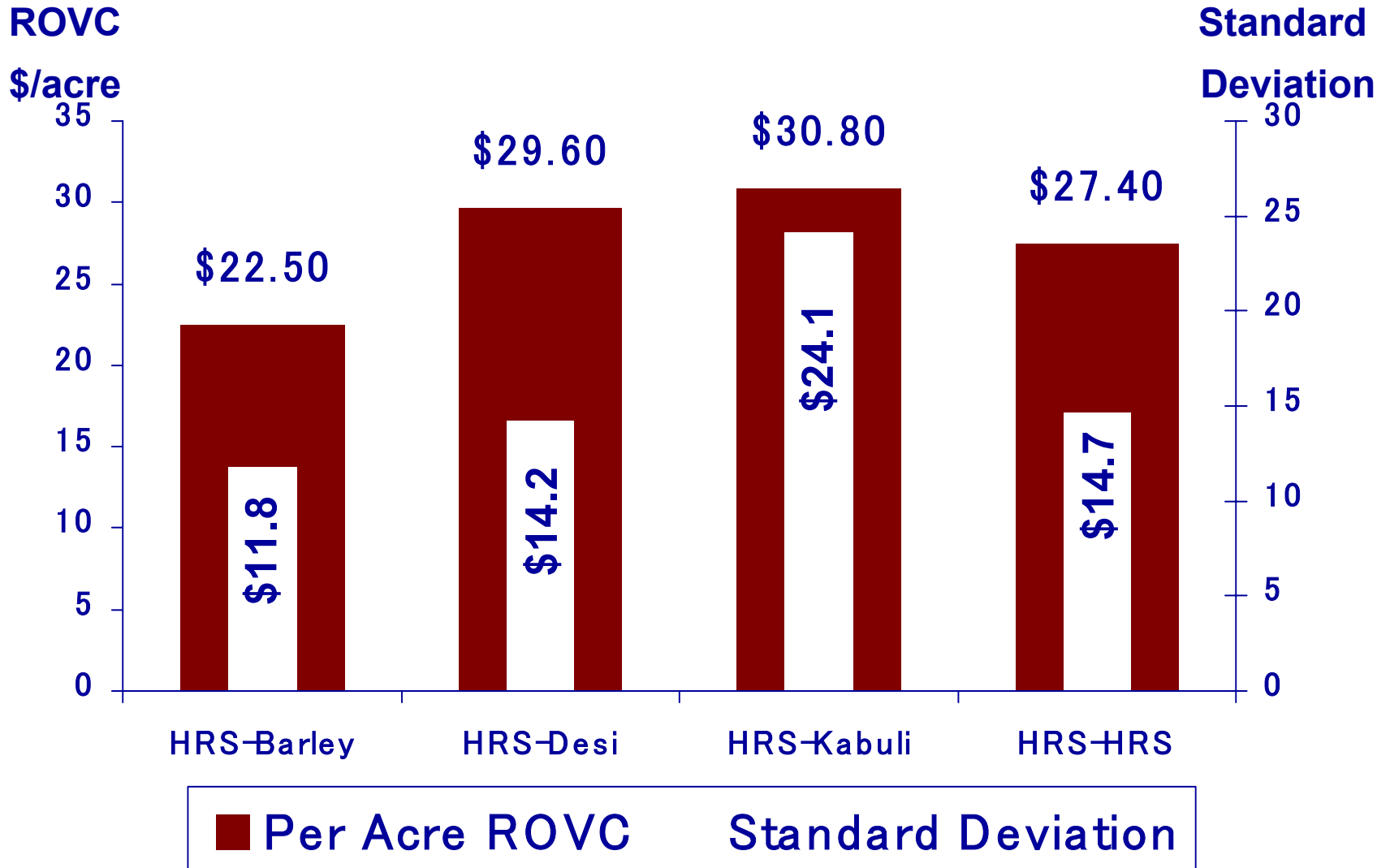
1. **Whole Farm Net Return-Over-Variable Costs Of Three-Year Rotations On 1,500 Acres In Northeast Montana**
2. **Consider Only Operating Costs**
3. **Use Surveys Of Standard Practices**
4. **Base Budgets On 2004 Input And Output Prices**
5. **We Estimate Price And Yield Distributions Using Historical Data**
  - a. **Account For Loan Rates And Crop Insurance**

# Research Methodology

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6. **Consider Four Rotations**
  - a. **HRS – Barley – Chem Fallow**
  - b. **HRS – Desi – Chem Fallow**
  - c. **HRS – Kabuli – Chem Fallow**
  - d. **HRS – HRS – Chem Fallow**
7. **Simulate ROVC Using 1,000 Random Draws Of Yields And Prices**

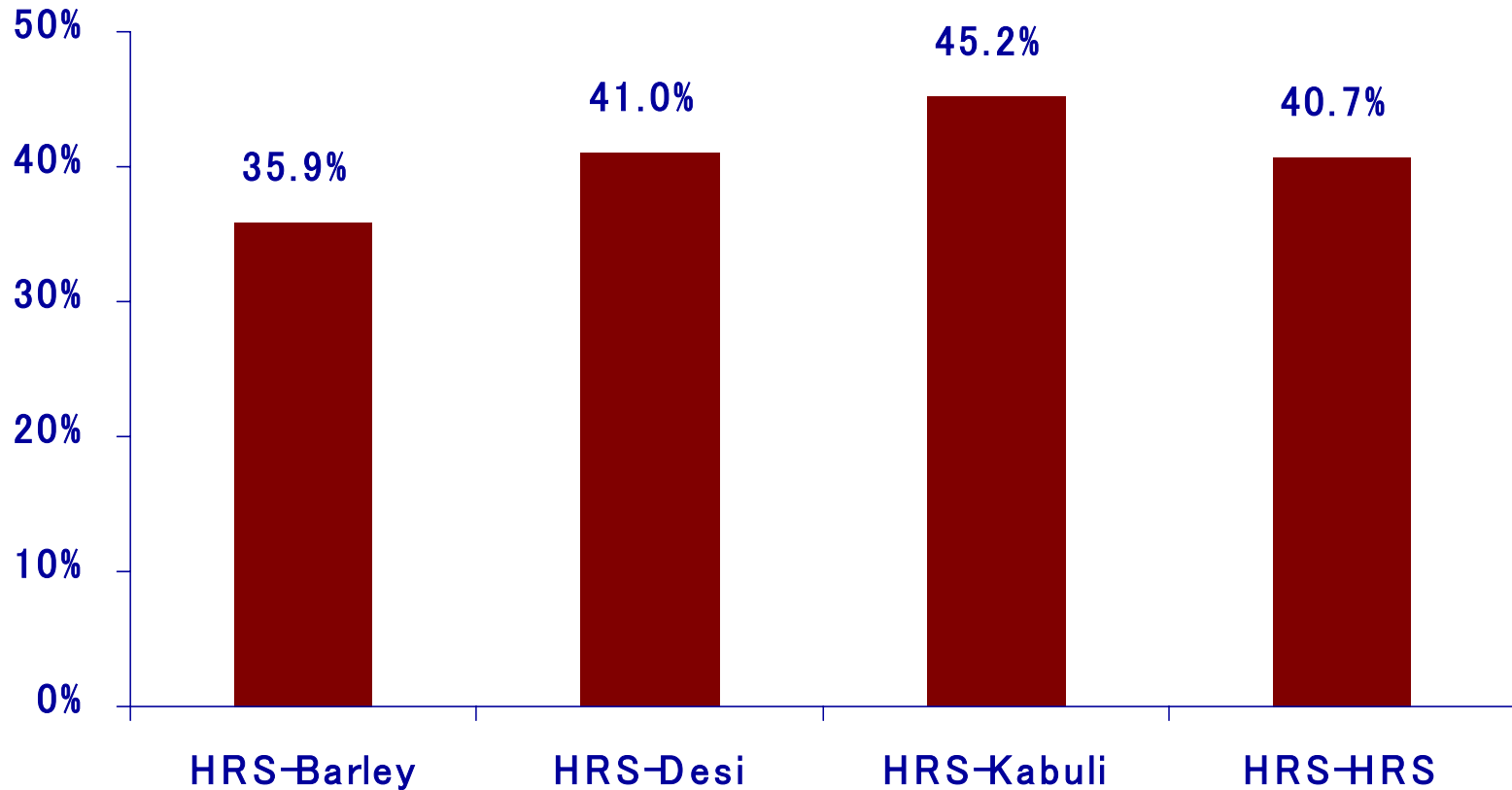
# Per Acre ROVC By Rotation



# Probability Of Receiving At Least \$30 Per Acre ROVC

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Probability



# Summary Of Diversification

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1. **Many Crops Face Similar Production Risks**
  - a. **Must Consider The Ability To Manage Production Risk**
    - **Crop Insurance?**
    - **Herbicides?**
  - b. **Must Consider Opportunities To Manage Price Risk**
    - **Futures Markets?**
    - **Contracting?**
    - **Storage?**

# Summary Of Diversification

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2. **Many Traditional And Alternative Crop Prices Move Together Over Time**
3. **Some Alternative Crops Prices Are Quite Variable**
4. **Some Alternative Crops Have Additional Inherent Risks**
  - a. **Yields**
  - b. **Expected Net Returns**
  - c. **Labor & Machinery Utilization**

# WORKSHOP OUTLINE

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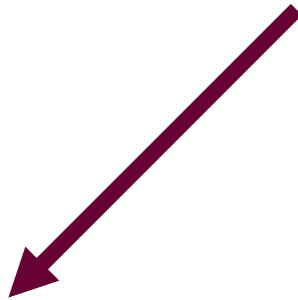
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# Production Risk Management Options

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**Choices When RMA**

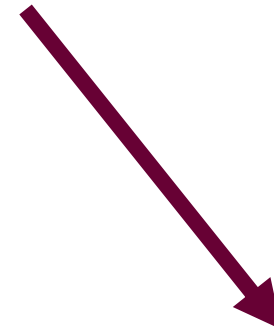
**Offerings Are Available**



**Self-Insure**



**Single-Peril  
Insurance**



**RMA Multiple  
Peril Offerings**

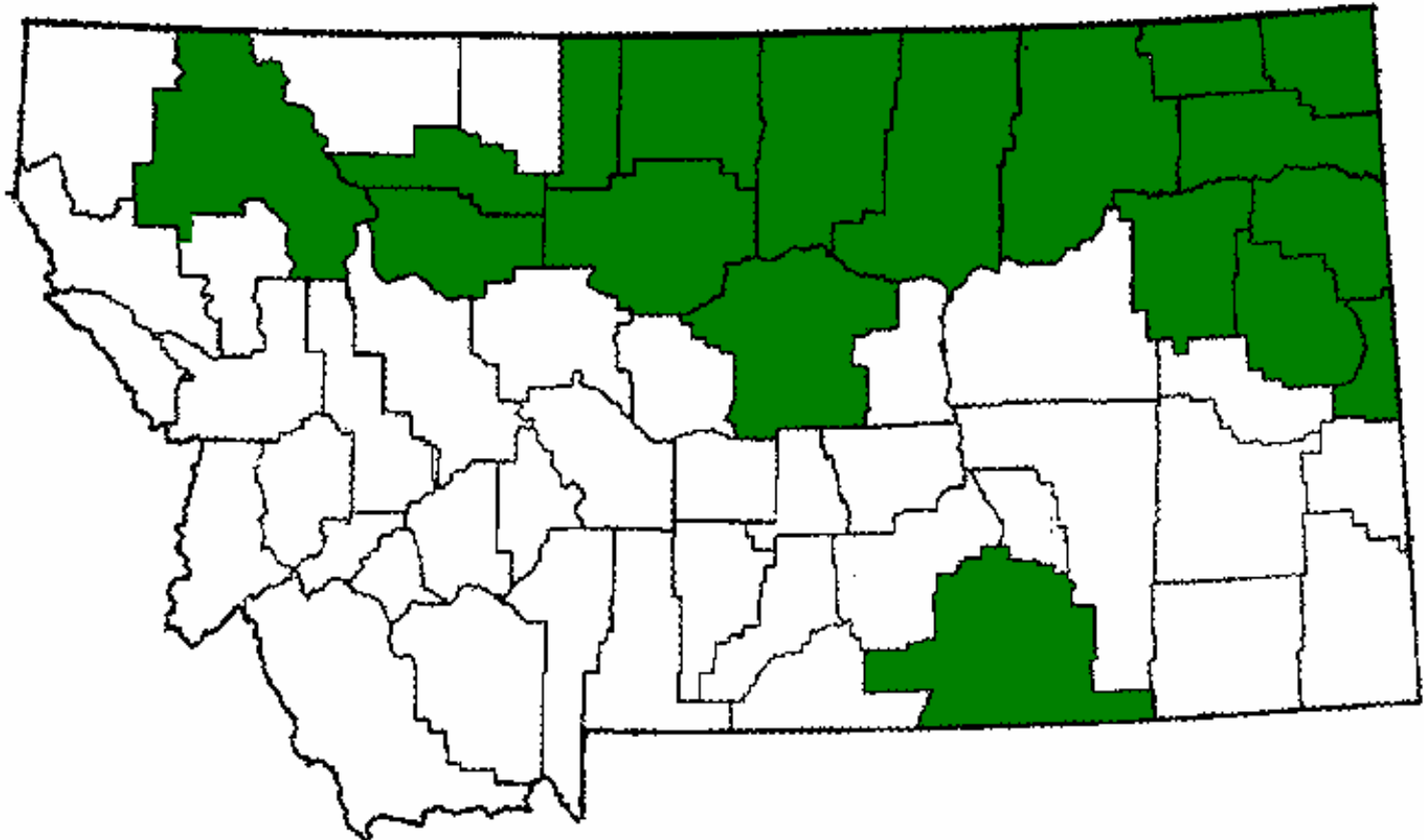




# Dry Peas And Lentils

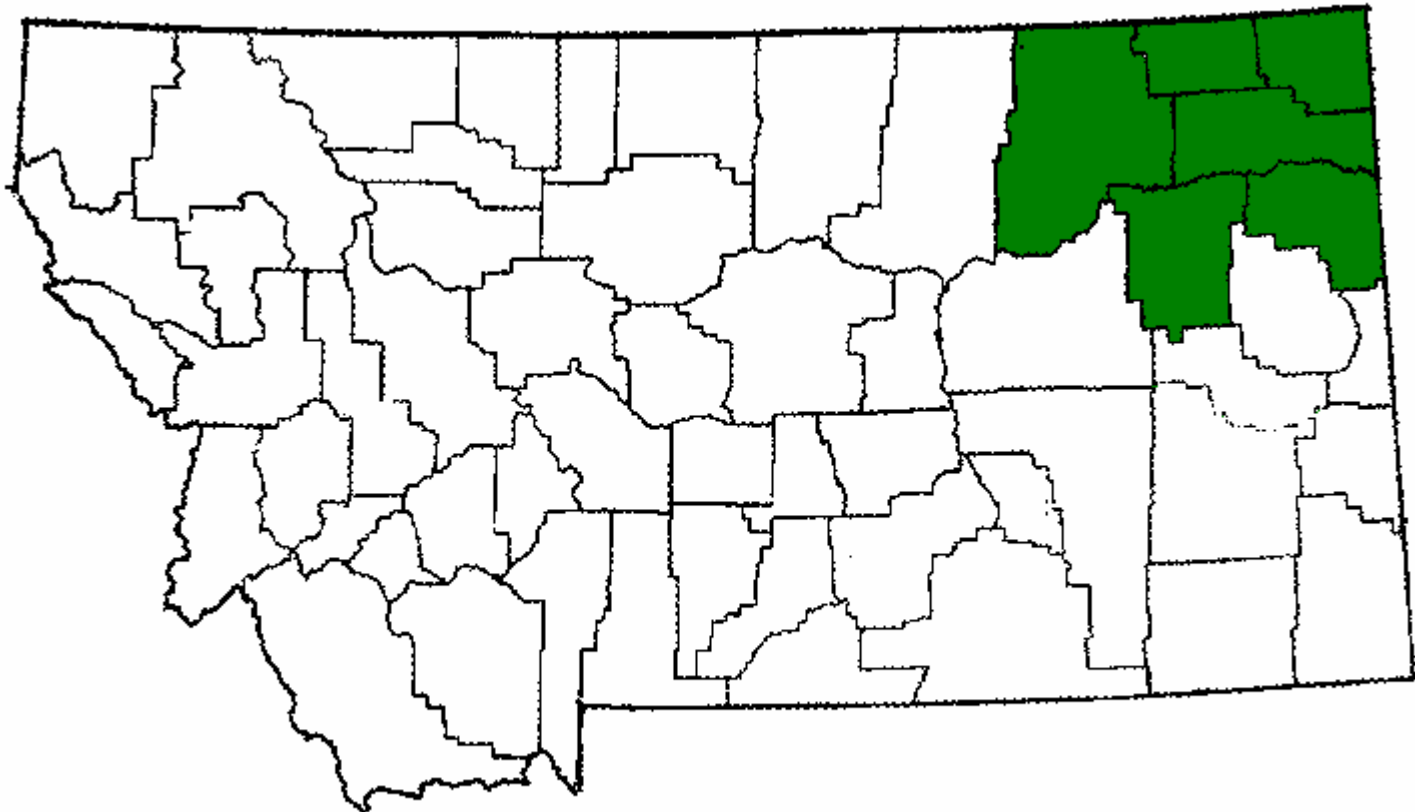
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**Counties In Which Insurance Coverage  
For Dry Peas and Lentils Is Available For 2006**



# Mustard

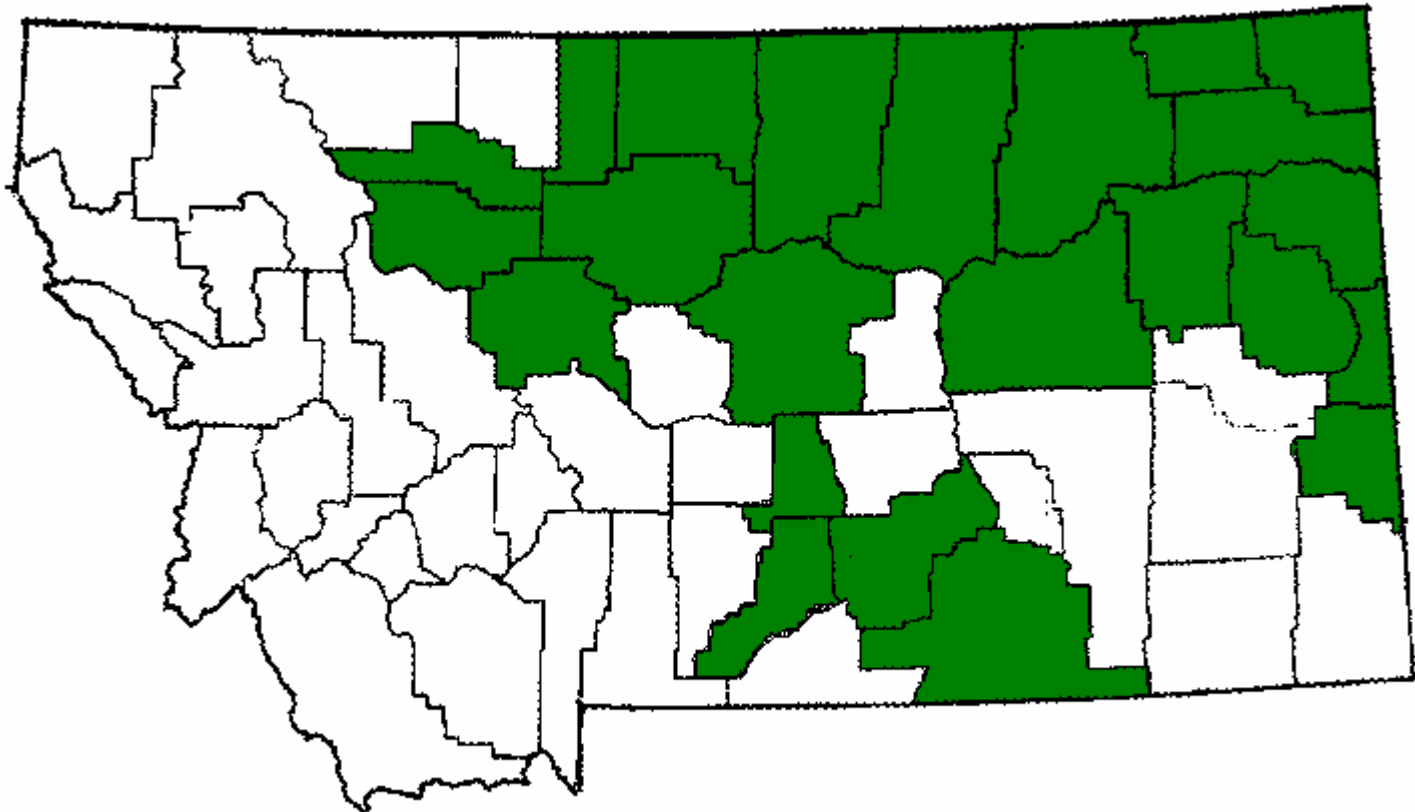
**Counties In Which Insurance Coverage  
For Mustard Is Available For 2006**



# Safflower

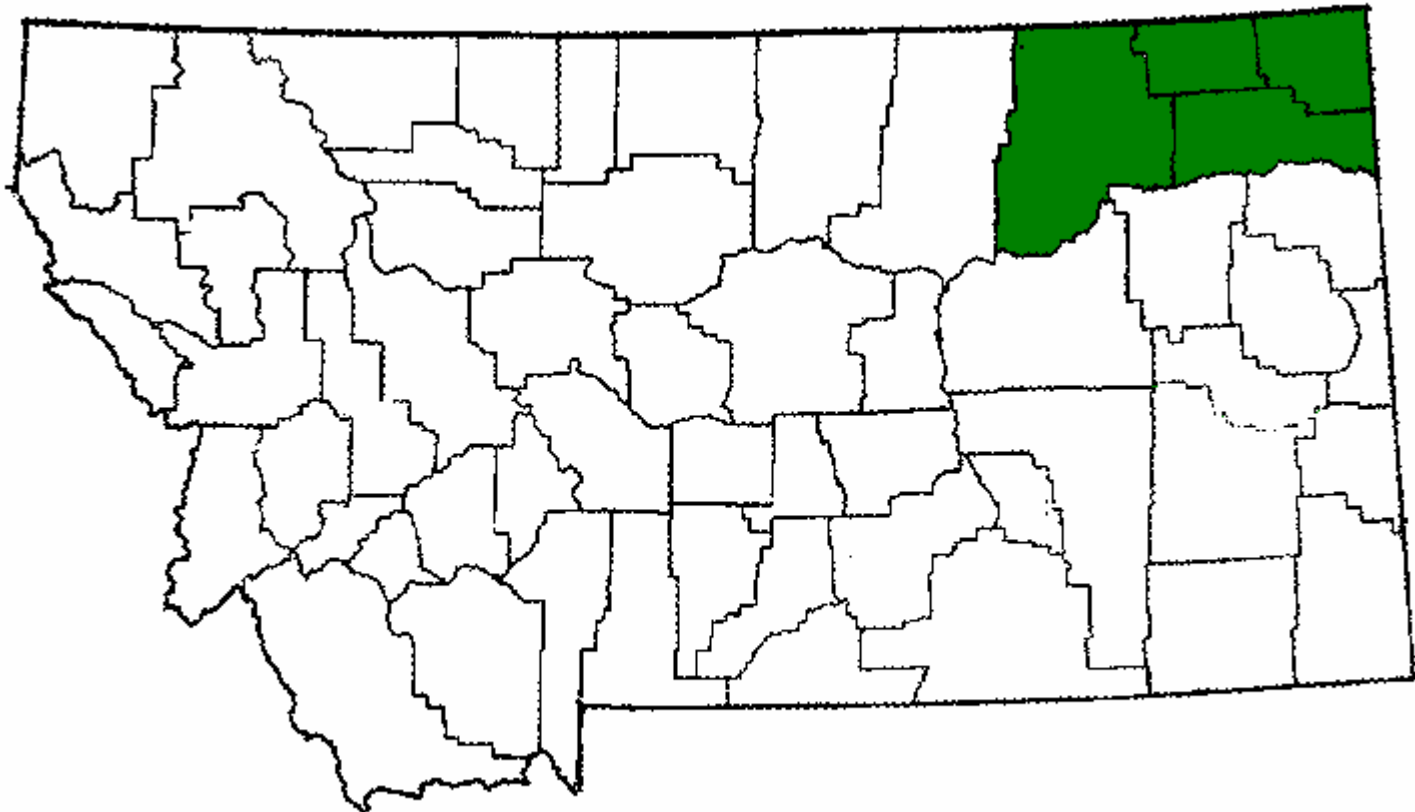
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**Counties In Which Insurance Coverage  
For Safflower Is Available For 2006**



# Flax

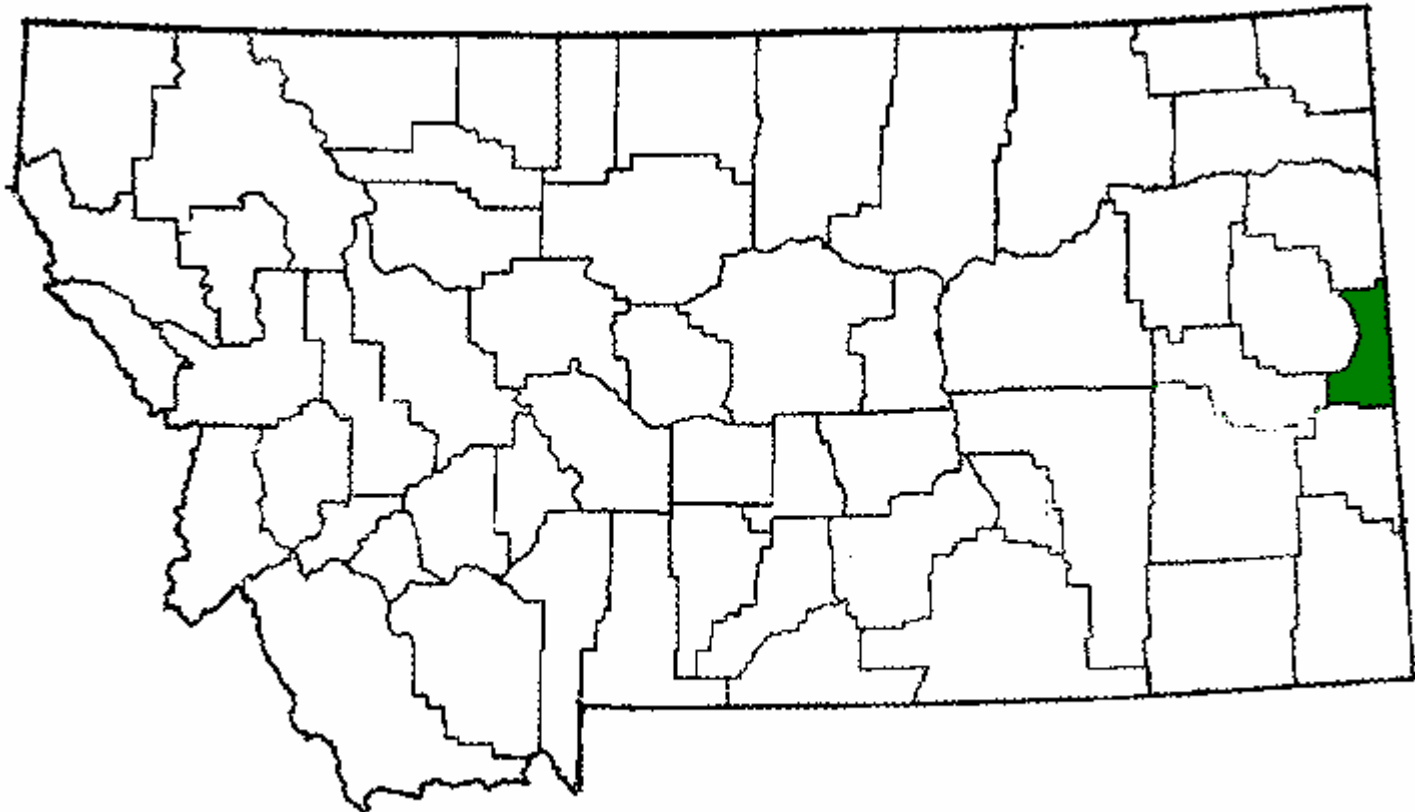
## Counties In Which Insurance Coverage For Flax Is Available For 2006



# Sunflower

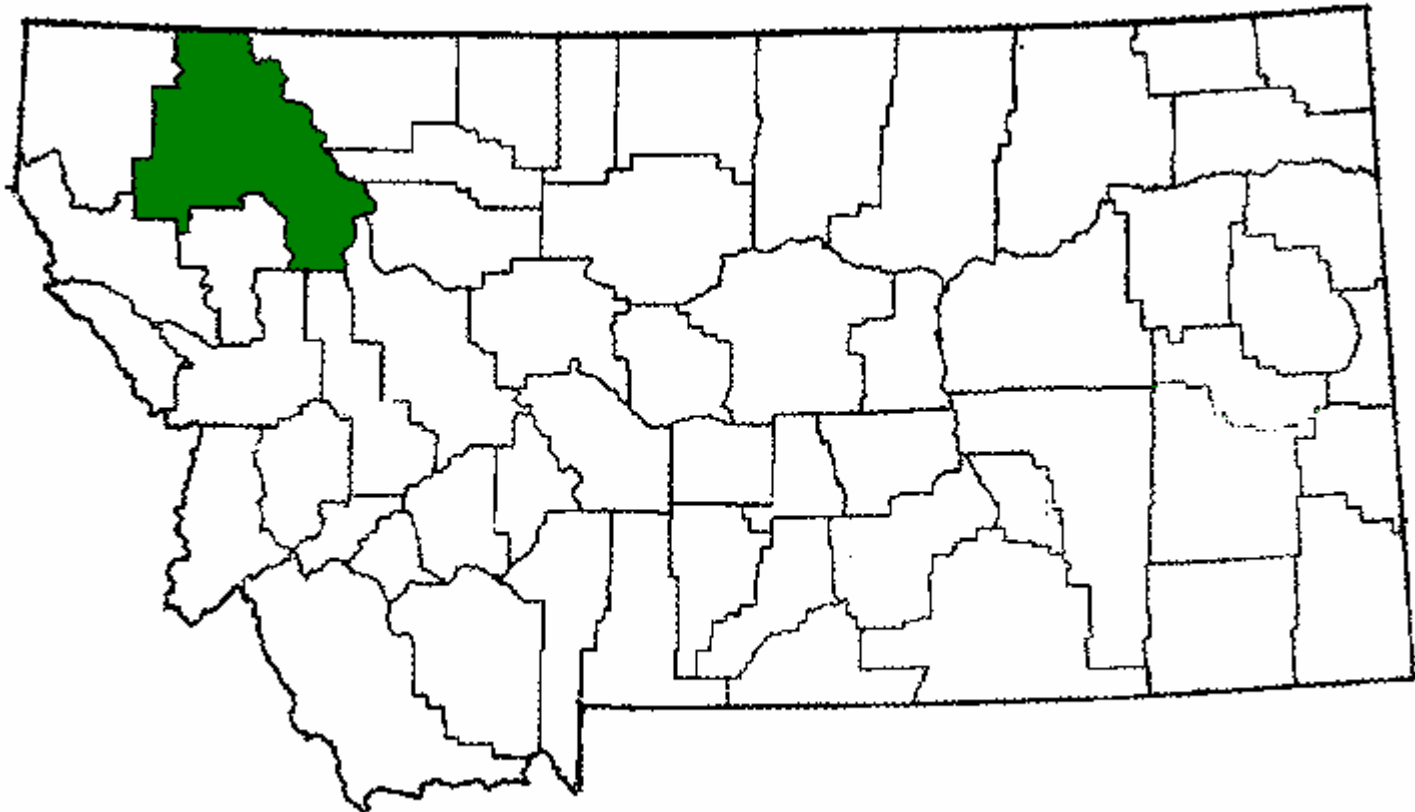
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**Counties In Which Insurance Coverage  
For Sunflower Is Available For 2006**



# Mint

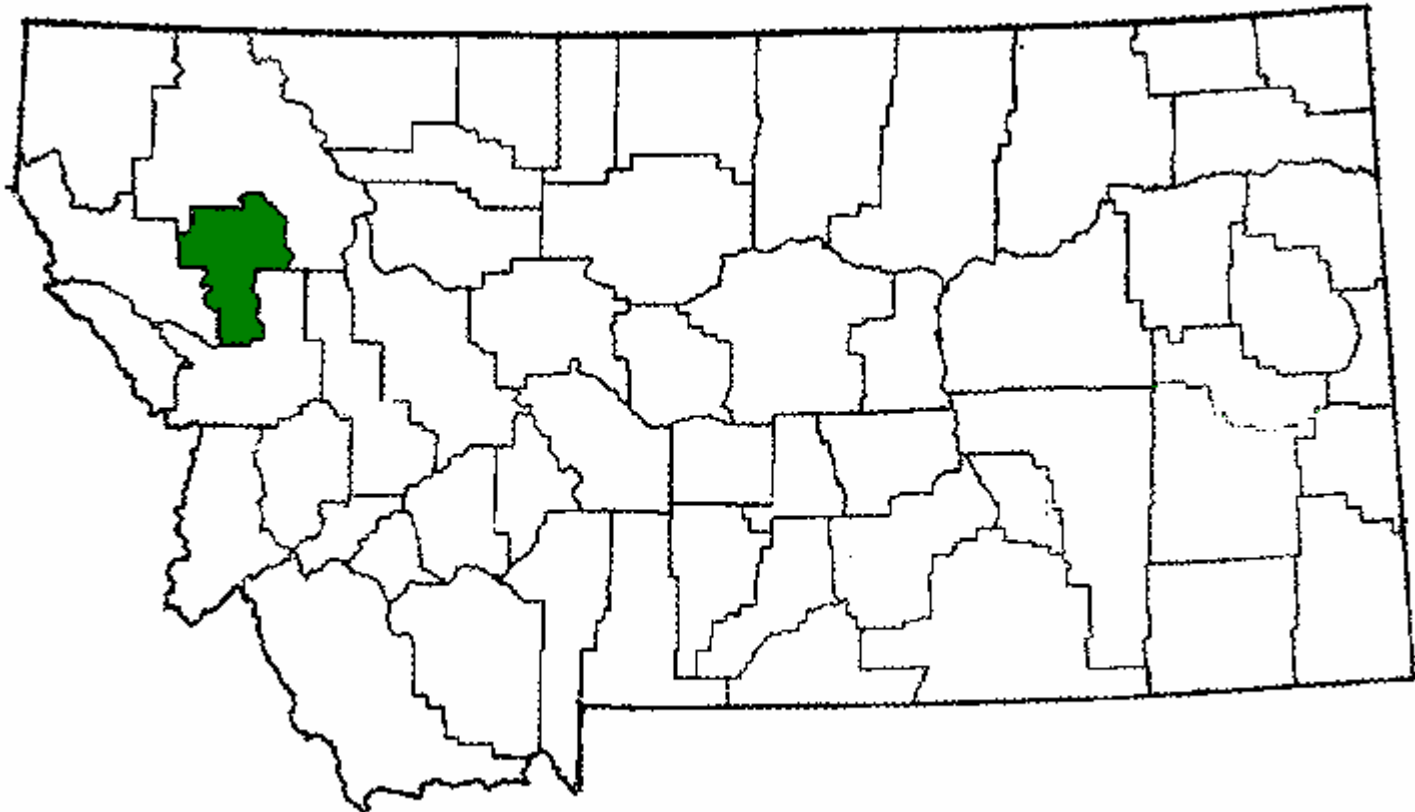
## Counties In Which Insurance Coverage For Mint Is Available For 2006



# Cherries

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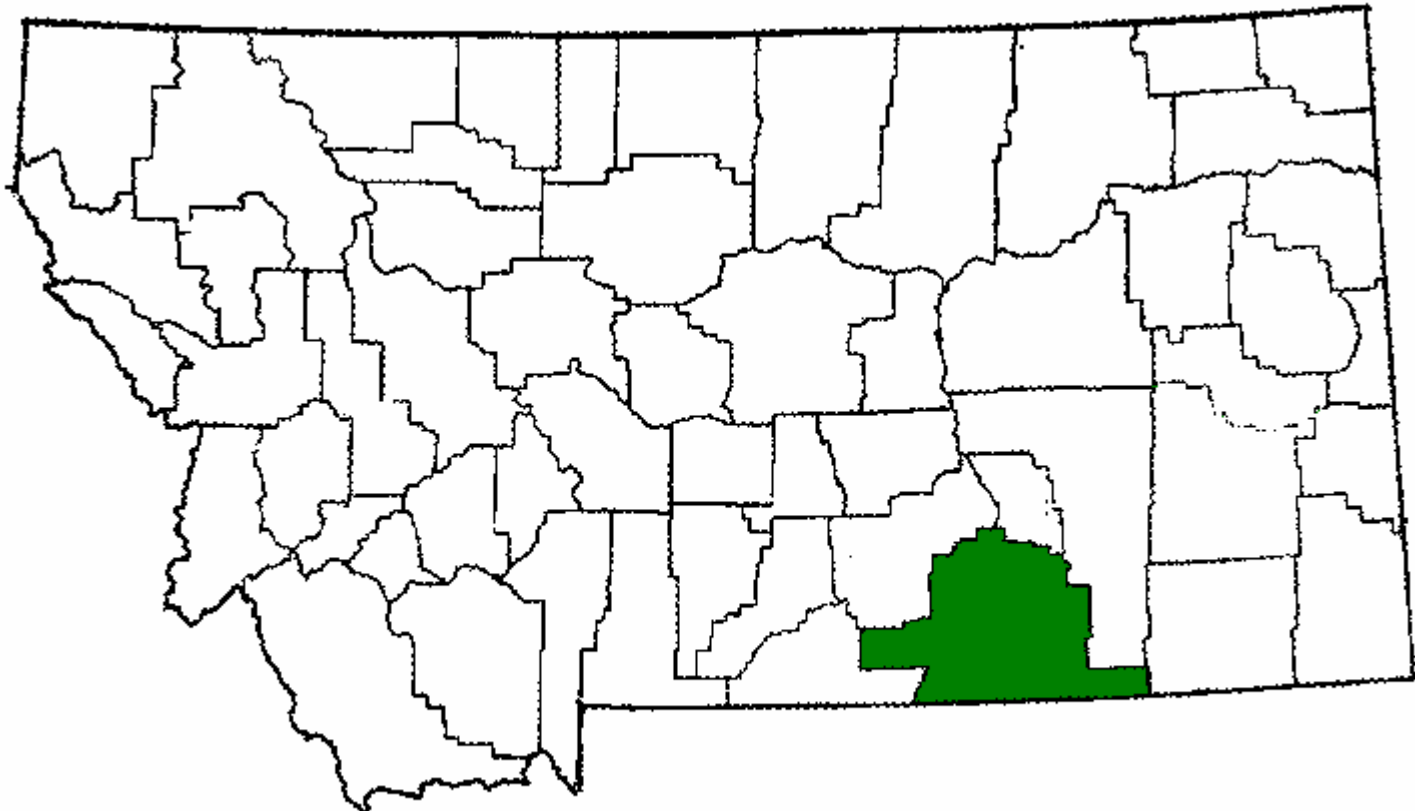
**Counties In Which Insurance Coverage  
For Cherries Is Available For 2006**



# Alfalfa Seed

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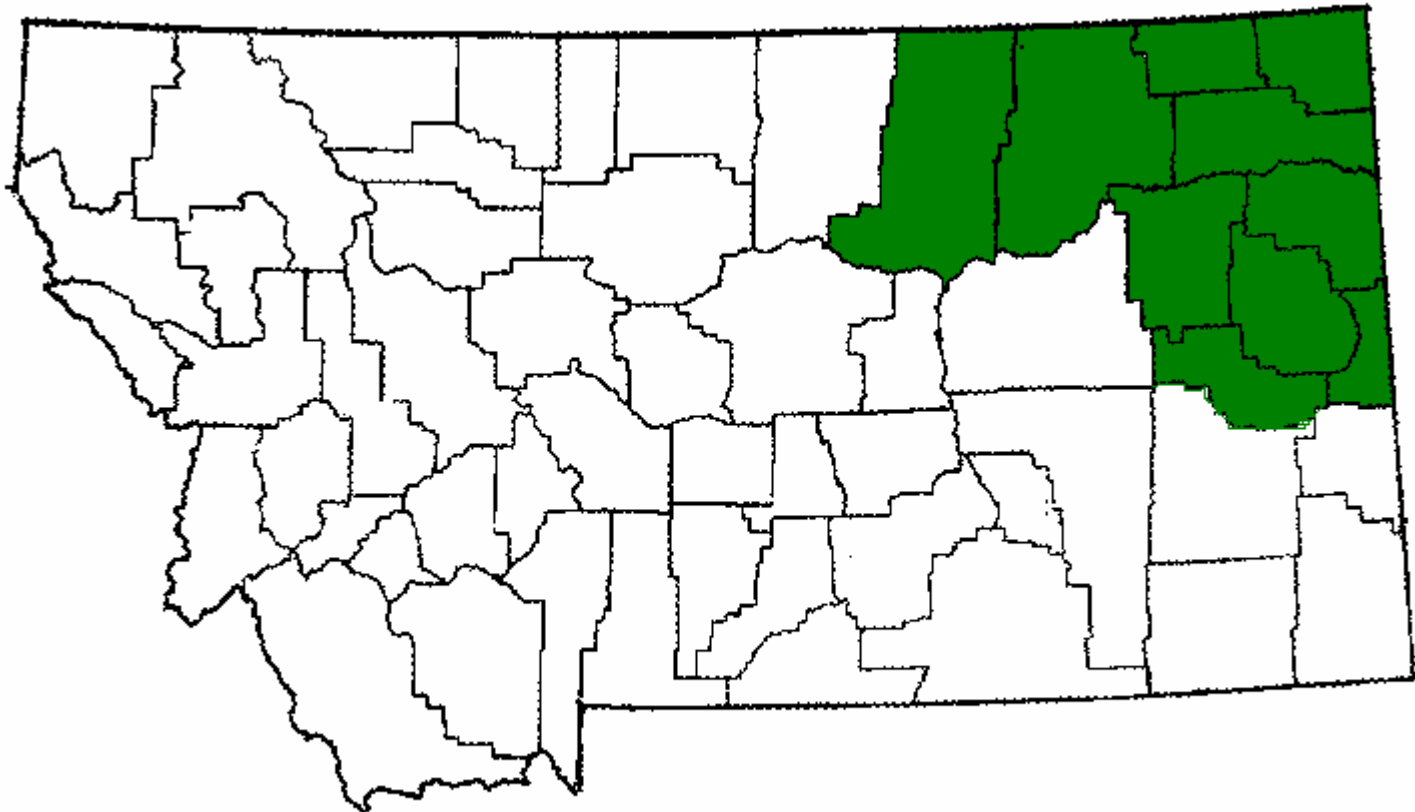
**Counties In Which Insurance Coverage  
For Alfalfa Seed Is Available For 2006**



# Garbanzo Beans

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**Counties In Which Insurance Coverage  
For Garbanzo Beans Is Available For 2006**



# Basics Of Multiple Peril Crop Insurance

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1. **Insured Losses Include:  
Weather, Insects, Fire, Disease, Loss  
Of Irrigation Water**
2. **Coverage Is Differentiated By  
Practice And Type: Irrigation, Silage**
3. **Producer Establishes Actual  
Production Histories By Unit**
4. **Producer Chooses A Coverage  
Election Of 50, 55, 60, 65, 70, Or 75%**
  - a. **The Percentage Applied To The  
APH Is The Yield Guarantee**

# Basics Of Multiple Peril Crop Insurance

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5. **Producer Chooses A Price Election From 55 – 100% Of An RMA Price**
6. **Receive An Indemnity If Actual Yield Is Less Than The Yield Guarantee**
  - a. **Indemnity Equals The Yield Difference Multiplied By The Price Election**
7. **CAT Coverage Refers To A 50% Coverage Level And A 55% Price Election**

# Basics Of Multiple Peril Crop Insurance

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8. **Replant Options Exist For Annually-Planted Crops**
9. **Gross Premium Is Found By Multiplying Maximum Liability By A Premium Rate**
  - a. **Producer Premium Is The Difference Between The Gross Premium And The Subsidy**
  - b. **Subsidy Rates Vary By Coverage Levels**

# Basics of Multiple Peril Crop Insurance

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Coverage Level	Premium Subsidy Factor
50%	0.67
55%	0.64
60%	0.64
65%	0.59
70%	0.59
75%	0.55
80%	0.48
85%	0.38

# Chickpeas: MPCFI

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1. **Desi And Small Kabuli**
  - a. **AMIT, B-90, ChiChi, Chico Varieties**
2. **Basic Units And Optional Units By Type**
3. **Coverage Levels Of 50, 55, 60, 65, 70, Or 75% Of APH**
4. **Replant Option: If Stand Cannot Produce 90% Of APH**
  - a. **Receive The Lower Of 10% Of The APH Or 120 Pounds Of Chickpeas<sup>36</sup>**

# Chickpeas: MPCCI

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## 5. Restrictions

- a. **Only Ascochyta-Resistant Varieties Are Insurable**
- b. **Seed Must Be Treated To Prevent Ascochyta Blight, Pythium, And Other Diseases**
- c. **Cropland Cannot Be Planted To Chickpeas In Any Of The Most Recent Three Crop Years**

# Chickpeas: MPCFI Example

<b>Contract Data</b>	<b>Value</b>	<b>Calculation</b>
<b>APH Yield</b>	<b>1,600 lbs/ac</b>	<b>Producer</b>
<b>Coverage Level</b>	<b>75%</b>	<b>Producer</b>
<b>Yield Guarantee</b>	<b>1,200 lbs/ac</b>	<b>1,600 lbs/ac x 0.75</b>
<b>RMA Desi Price</b>	<b>\$0.09</b>	<b>RMA</b>
<b>Price Election</b>	<b>100%</b>	<b>Producer</b>
<b>Elected Price</b>	<b>\$0.09/lb</b>	<b>1.00 x 0.09 per pound</b>
<b>Maximum Liability</b>	<b>\$108/ac</b>	<b>1,200 lbs/ac x \$0.09</b>
<b>Premium Rate</b>	<b>0.06</b>	<b>RMA</b>
<b>Gross Premium</b>	<b>\$6.48/ac</b>	<b>\$108/acre x 0.06<sub>38</sub></b>

# Chickpeas: MPCFI Example

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1. **Suppose This Producer Actually Harvests 700 Pounds Per Acre**
2. **Will The Producer Receive An Indemnity?**
3. **Calculate The Indemnity In Bushels Per Acre**
4. **Calculate The Indemnity In Dollars Per Acre**

# Chickpeas: MPCFI Example

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5. The Producer Receives An Indemnity Because Actual Production Of 700 Pounds Per Acre Is Less Than The Yield Guarantee Of 1,200 Pounds Per Acre
6. The Producer Receives The Difference In Yield
  - a.  $1,200 \text{ lbs/ac} - 700 \text{ lbs/ac} = 500 \text{ lbs/ac}$
7. This Difference Is Valued At The Elected Price
  - a.  $500 \text{ lbs/ac} \times \$0.09/\text{lb} = \$45.00/\text{ac}$

# WORKSHOP OUTLINE

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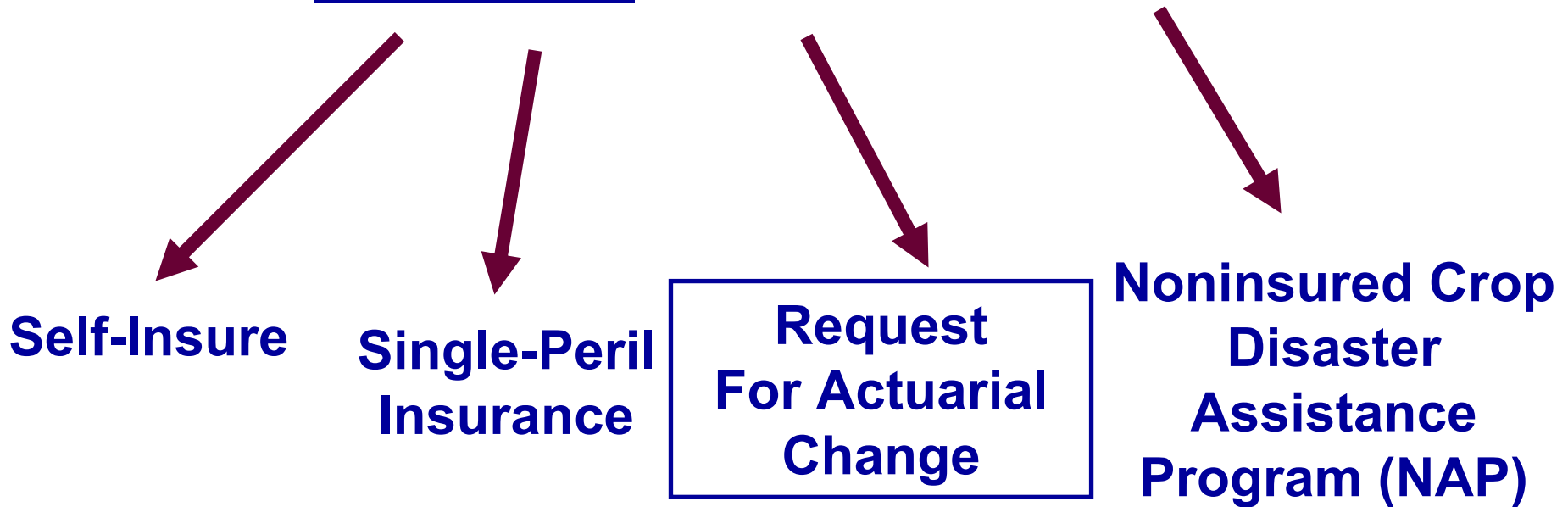
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# Production Risk Management Options

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## Choices When RMA

### Offerings Are NOT Available



# **Request For Actuarial Change**

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- 1. This Is Only An Option IF RMA Products Are Not Available In A County**
  - a. However, An RMA Product For This Crop Must Be Offered Somewhere**
- 2. The Process Results In A Customized Insurance Agreement**
- 3. Producer Provides Production And Marketing Information Through Their Crop Insurance Agent**
- 4. RMA Reviews The Application**

# Request For Actuarial Change

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5. **RMA May Then Provides A Written Agreement With**
  - a. **Premium Calculation Noted.**
  - b. **Crop Price Established**
  - c. **APH Yield**
  
6. **Producer Then Chooses A**
  - a. **Price Election (55-100%)**
  - b. **Coverage Level (50-75%)**

# Request For Actuarial Change

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- 7. Producer Decides Whether To Accept The Written Agreement**
- 8. The Process Must Be Repeated Each Year**
- 9. The Process Takes Some Time**

# **Request For Actuarial Change: Chickpea Example**

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- 1. Suppose A Dry Bean RMA Policy DOES EXIST In A County, But A Chickpea Policy Does Not**
  - a. Producers Of Desi Or Small Kabuli Chickpeas May File A Request For Actuarial Change**
- 2. Supply Two Years Of Production History**
- 3. Evidence Of A Market**

# **Request For Actuarial Change: Chickpea Example**

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- 1. Suppose A Dry Bean RMA Policy DOES NOT Exist In A County**
  - a. Producers Of Desi Or Small Kabuli Chickpeas May File A Request For Actuarial Change**
- 2. Supply Three Years Of Production History**
- 3. Anticipated Planting And Harvesting Dates**
- 4. Name, Location, And Distance To A Market**

# WORKSHOP OUTLINE

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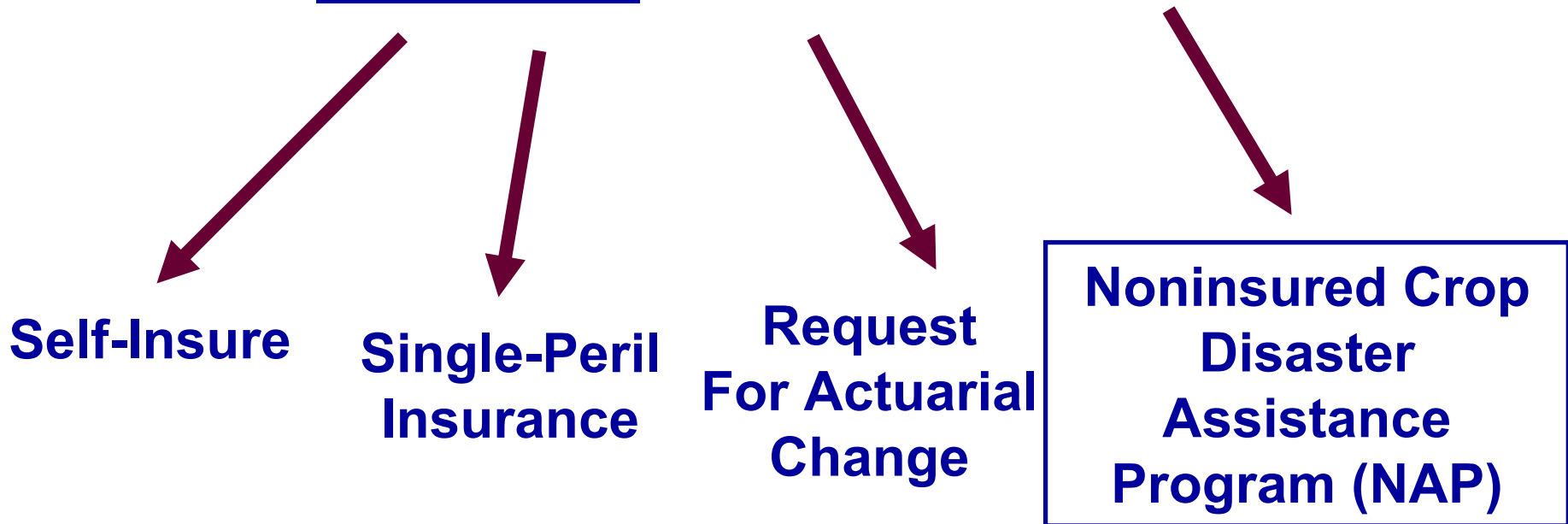
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# Production Risk Management Options

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## Choices When RMA

### Offerings Are NOT Available



# NAP Program

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1. **Offered By The Farm Services Agency (Not An RMA Product)**
2. **Only Available IF CAT Coverage Is Unavailable**
3. **Apply At FSA Offices**
4. **Costs \$100 Per Crop Per County**
5. **Not To Exceed \$300 Per Producer Per County**
6. **Offered At The Basic Unit Level Only**

# NAP Program

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- 7. Covers Losses In Excess Of 50% Of Expected Production**
- 8. Payment Rate Is 55% Of Average Market Price**
  - a. Specified By State FSA Committee**
- 9. Payments May Be Reduced To Reflect Decreases In Production Costs If The Crop Is Not Harvested**

# Chickpeas: NAP Example (RMA Product Not Available)

<b>Contract Data</b>	<b>Value</b>	<b>Calculation</b>
<b>APH Yield</b>	<b>1,600 lbs/ac</b>	<b>Producer or FSA</b>
<b>Coverage Level</b>	<b>50%</b>	<b>FSA</b>
<b>Yield Guarantee</b>	<b>800 lbs/ac</b>	<b>1,600 lbs/ac x 0.50</b>
<b>RMA Desi Price</b>	<b>\$0.09</b>	<b>FSA</b>
<b>Price Election</b>	<b>55%</b>	<b>FSA</b>
<b>Elected Price</b>	<b>\$0.05/lb</b>	<b>0.55 x 0.09 per pound</b>
<b>Administrative Fee</b>	<b>\$100</b>	<b>FSA</b>

# Chickpeas: NAP Example

---

1. **Suppose This Producer Actually Harvests 700 Pounds Per Acre**
2. **Will The Producer Receive An Indemnity?**
3. **Calculate The Indemnity In Bushels Per Acre**
4. **Calculate The Indemnity In Dollars Per Acre**

# Chickpeas: NAP Example

---

5. **The Producer Receives An Indemnity Because Actual Production Of 700 Pounds Per Acre Is Less Than The Yield Guarantee Of 800 Pounds Per Acre**
6. **The Producer Receives The Difference In Yield**
  - a.  **$800 \text{ lbs/ac} - 700 \text{ lbs/ac} = 100 \text{ lbs/ac}$**
7. **This Difference Is Valued At The Elected Price**
  - a.  **$100 \text{ lbs/ac} \times \$0.05/\text{lb} = \$5.00/\text{ac}$**  <sup>54</sup>

# WORKSHOP OUTLINE

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# Specialty Crop Markets and Marketing Channels

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- 1. Most Alternative Crop Markets Are Global In Nature**
- 2. Price Behavior In Many Of These Markets Is Not Well-Understood**
- 3. The Role Of The U.S. In Many Of These Markets Is Quite Different From Traditional Food And Feed Grains**

# Specialty Crop Markets and Marketing Channels

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4. **The U.S. Has A Small Share Of Most Alternative Crop Markets**
  - a. **These World Markets Are Relatively Small**
5. **Alternative Crop Prices Are Largely Driven By Production Shocks In Other Countries**
6. **The U.S. Is Often The “Residual Supplier” Rather Than The Primary Player**

# Specialty Crop Markets and Marketing Channels

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7. **Alternative Crops Are Often Marketed Through Forward Contracts**
  - a. **Many Spot Markets Are Very “Thin”**
  - b. **Prices Tend To Be Quite Variable**
8. **Alternative Crops *May* Provide Opportunities For Income Diversification**
  - a. **FSRI May Enhance Returns**
  - b. **Crop Insurance May Reduce Risk**

# WORKSHOP OUTLINE

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# Contract Basics

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1. **Voluntary Contracts Exist Only When**
  - a. **Both Parties *EXPECT* To Benefit From the Contract**
2. **It Is The *EXPECTED* Benefits That Matter**
3. **Some Contract Terms Provide Benefits**
  - a. **Other Terms Impose Costs**
4. **Buyers And Sellers Care About The Overall Net Benefits**

# **Contract Benefits To Producers**

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- 1. Risk Management**
  - a. Guaranteed Market Access**
  - b. Price Risk Management**
    - Guaranteed Price**
    - Guaranteed Basis**
    - Guaranteed Price Based On A Formula (Spot Or Futures Price)**

# **Contract Benefits To Producers**

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## **2. Other Benefits**

- a. Access To Production And Marketing Information**
- b. Provision Of Inputs, Technology, Or Management**
- c. Access To Financing**

# **Contract Costs To Producers**

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- 1. Commitment To A Single Buyer**
- 2. Commitment Of A Specific Amount In The Absence Of “Act Of God” Clauses**
- 3. Risk Of Buyer Default**
- 4. Restrictions On Input Use**
- 5. Quality Discounts May Exist**
- 6. Following Rules Of The Contract**

# **Contract Benefits To Buyers**

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- 1. Guarantees Key Input Supplies**
- 2. Improved Quality Reliability**
- 3. Shared Price Risk**
- 4. Costs Of Inputs Are More Predictable**
- 5. Identity Preservation Can Help Establish Niche Markets**

# **Contract Costs To Buyers**

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- 1. Financial Commitment To Purchase Specific Quantities**
- 2. Risk Of Quantity Shortfalls**
- 3. May Not Be Able To Transfer Price Risk**

# WORKSHOP OUTLINE

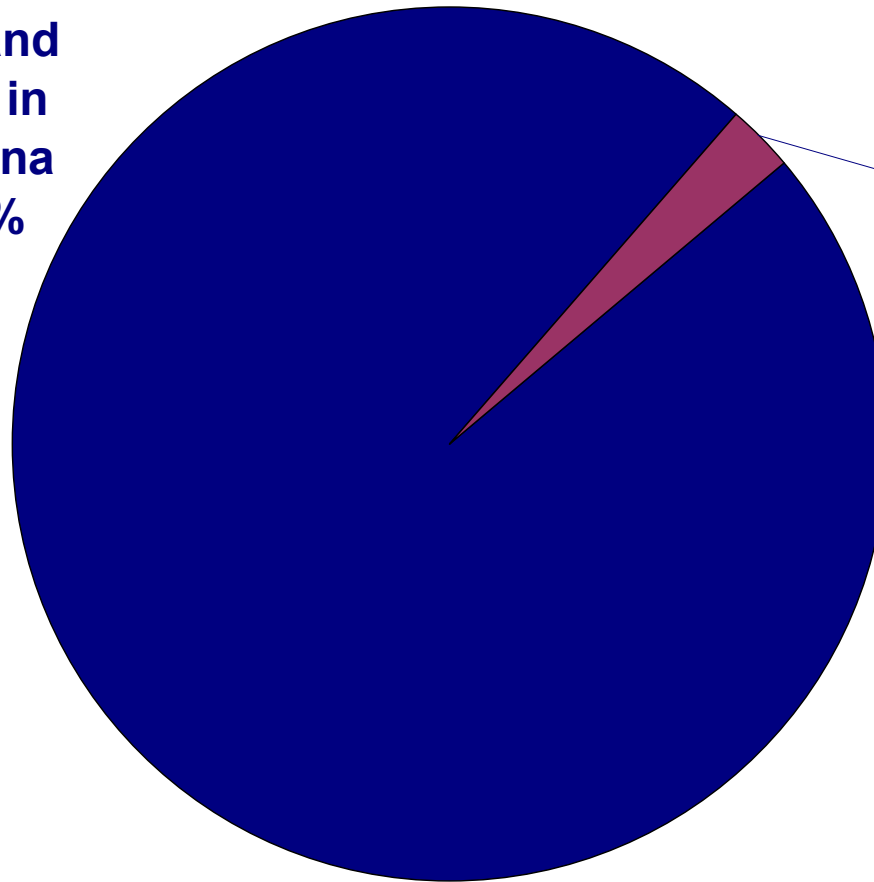
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# Allocation Of Cropland In Montana: 2003

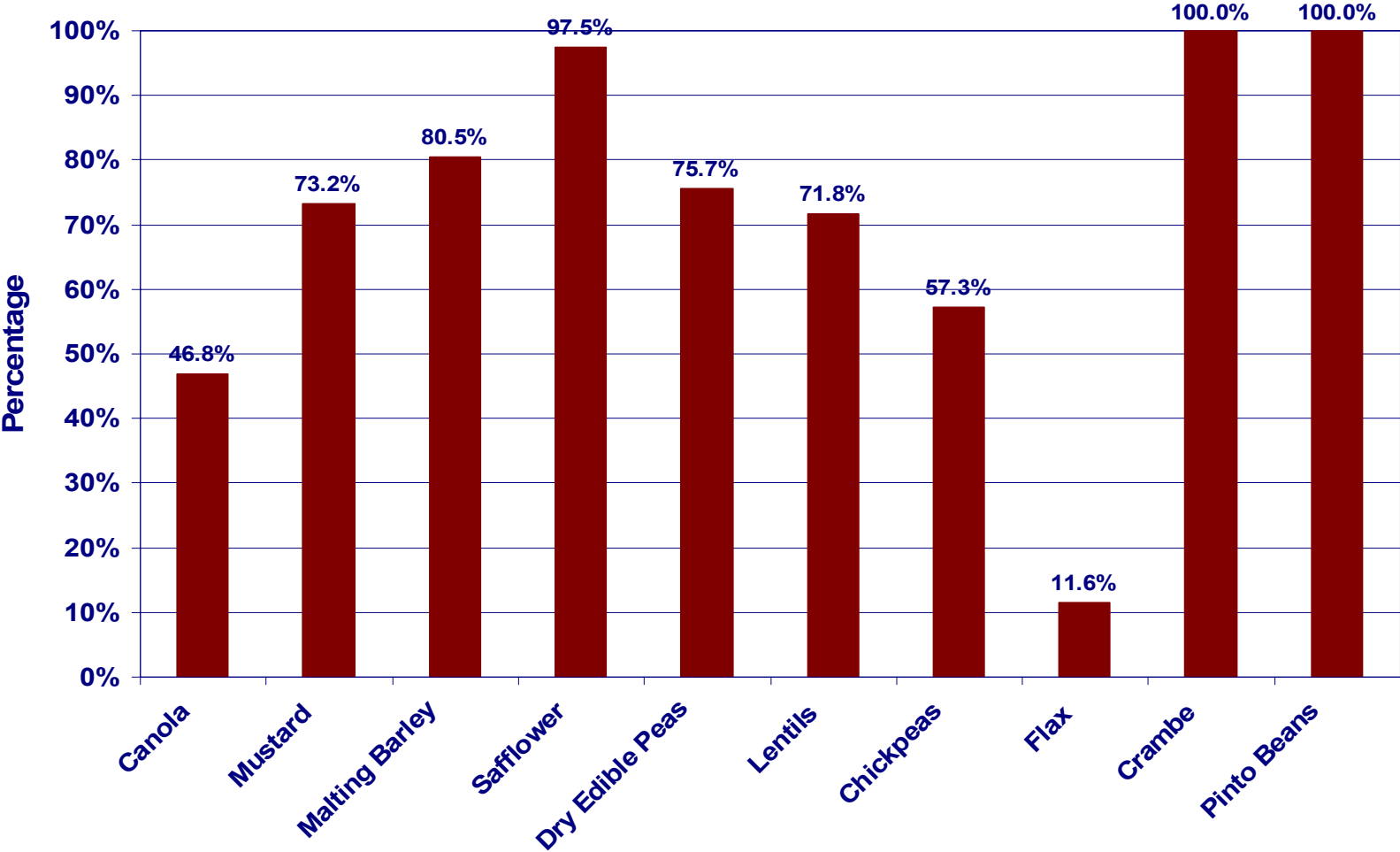
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**All Other  
Cropland  
Acres in  
Montana  
97.5%**



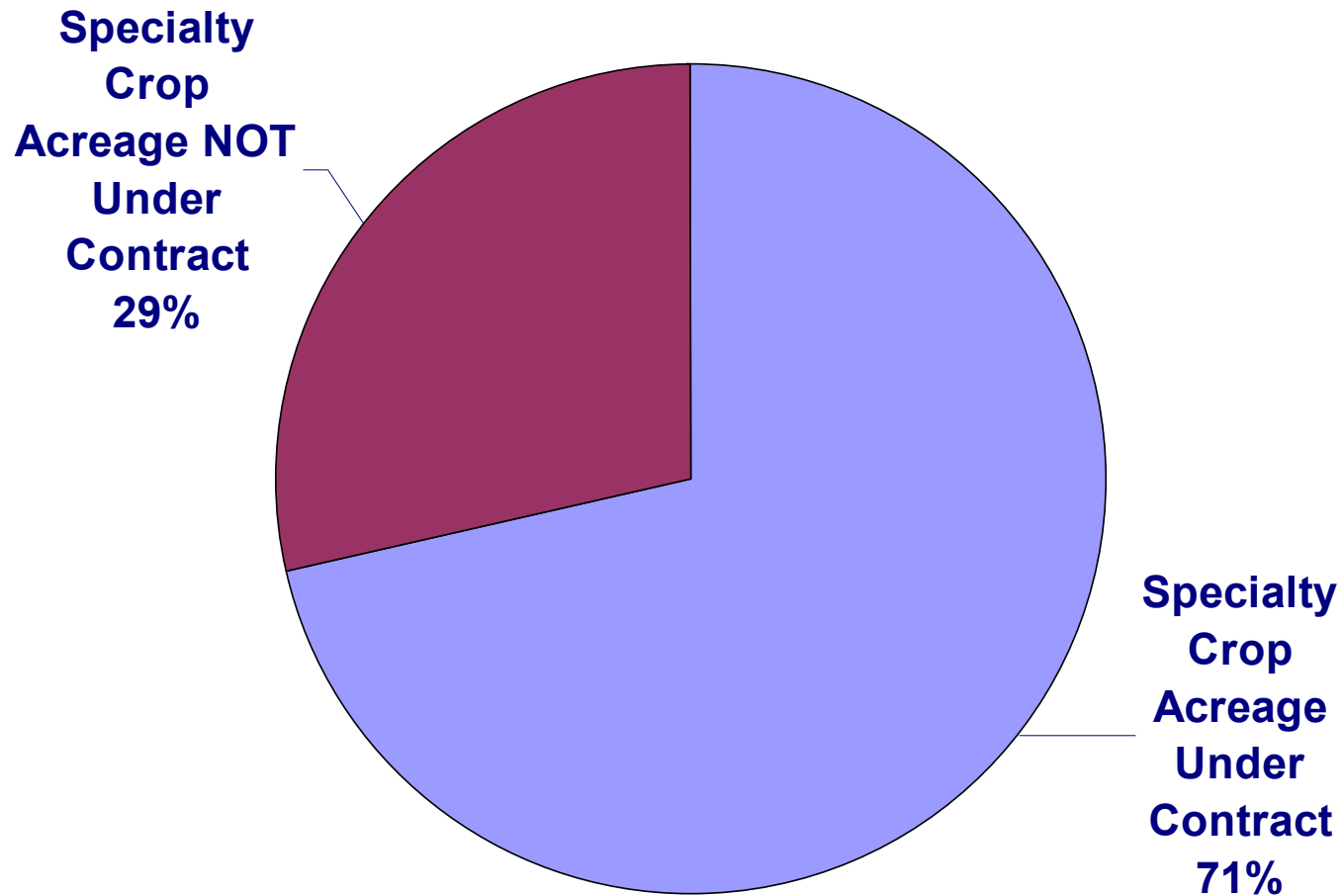
**Total  
Specialty  
Crop Acres in  
Montana  
2.5%**

# Specialty Crop Acreage Sold Under Contract In 2003 (Source: MSU/MGAA 2004 Survey)



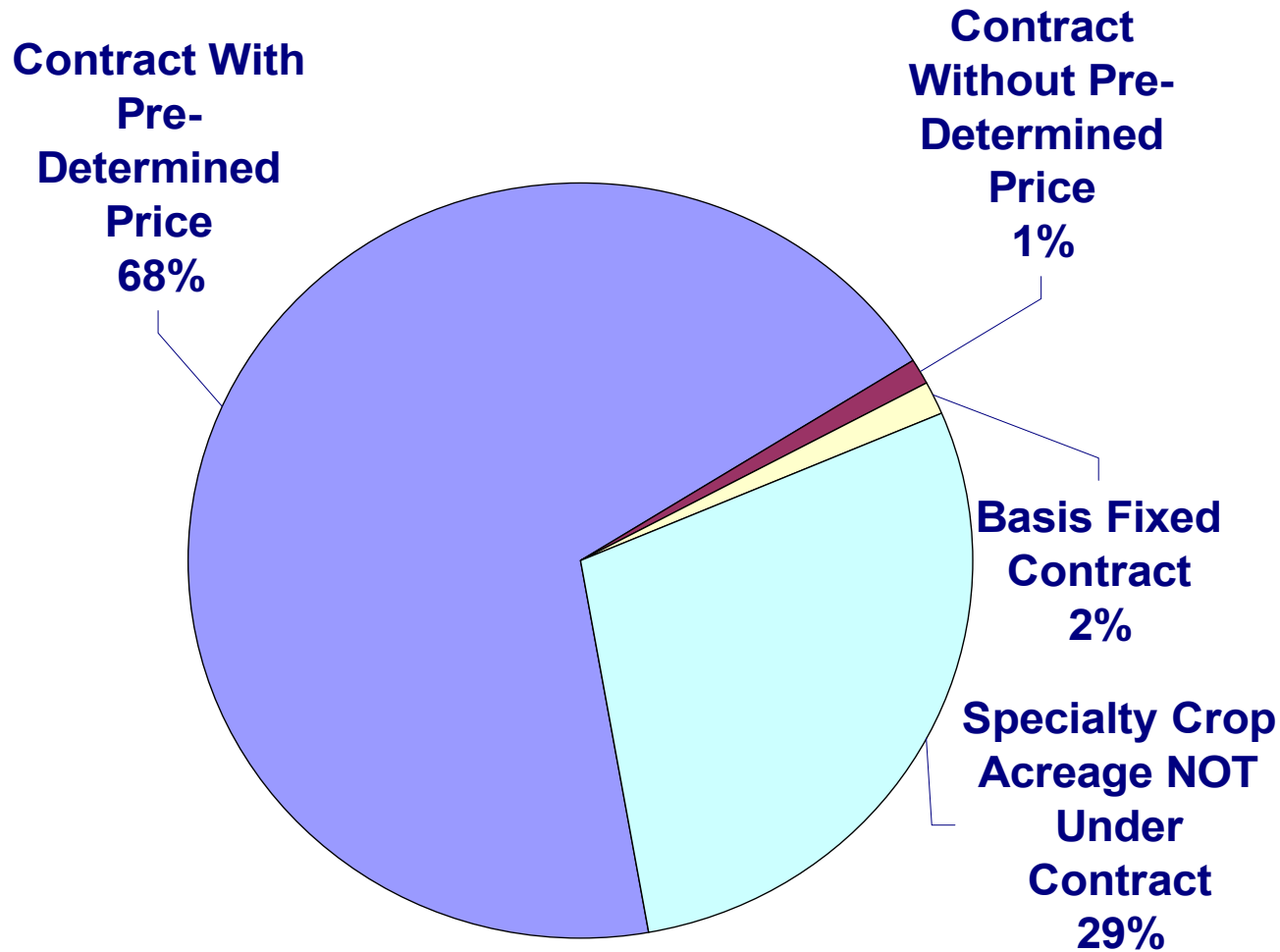
# Percentage Of Specialty Crop Acreage Sold Under Contract

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# Percentage Of Specialty Crop Acreage By Contract Type

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# Structural Elements Of Contracts

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1. **MSU Survey Of Specialty Crop Buyers**
2. **Contract Provisions Vary Among And  
Within Crops**

# Summary Of Structural Elements

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<b>STRUCTURAL ELEMENTS</b>	<b>% of Contracts</b>
<b>Specific Quality Requirements</b>	<b>62</b>
<b>General Discounts/Rejection</b>	<b>62</b>
<b>Specific Discounts/Rejection</b>	<b>38</b>
<b>Specific Premiums</b>	<b>23</b>
<b>Act of God Clause-Producers</b>	<b>69</b>
<b>Act of God Clause-Buyers</b>	<b>31</b>

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# Summary Of Structural Elements

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<b>STRUCTURAL ELEMENTS</b>	<b>% of CONTRACTS</b>
<b>Sell 100% of Crop to Buyer</b>	<b>31</b>
<b>Sell Specific % of Crop to Buyer</b>	<b>62</b>
<b>First Right of Refusal</b>	<b>31</b>
<b>Last Right of Refusal</b>	<b>23</b>
<b>Chemical Restrictions</b>	<b>54</b>
<b>Contract Breach Penalties</b>	<b>31</b>
<b>Price Forward-Determined</b>	<b>23</b>
<b>Price Spot-Determined/Determined at Signing</b>	<b>77</b>

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# QUESTIONS?

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