



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*



# BRIEFING

Briefing No. 7 (Revised)

October 2003

## Federal Crop and Crop Revenue Insurance Programs: Determining APH Yields

Vincent H. Smith

Agricultural Marketing Policy Center  
Linfield Hall  
P.O. Box 172920  
Montana State University  
Bozeman, MT 59717-2920  
Tel: (406) 994-3511  
Fax: (406) 994-4838  
email: [ampc@montana.edu](mailto:ampc@montana.edu)  
website: [www.ampc.montana.edu](http://www.ampc.montana.edu)

Federal crop insurance against individual farm yield losses in the form of multiple peril policies has been available for some crops since 1938. Following the 1980 Federal Crop Insurance Act, the number of crops and the geographic coverage of the federal crop yield loss insurance program was greatly expanded. Beginning in the late 1980s, in addition to traditional multiple peril policies, new policies were developed based on yield losses at the county level and offered for a limited number of crops in a limited number of counties.

Following the 1994 Crop Insurance Reform Act, a wider range of federally subsidized insurance policies were introduced that provided protection against revenue losses and catastrophic losses.

Today, producers face a wide array of crop insurance alternatives including yield based Actual Production History (APH) insurance policies and Revenue Insurance policies. Not all insurance policies are available for every crop in any given county. In some counties, Risk Management Agency (RMA) approved insurance policies are not available for some crops. In these circumstances, producers can either utilize the Noninsured Disaster Assistance Program (NAP) or make a request for actuarial change.

Yield based insurance policies include Multiple Peril Crop Insurance (MPCI) and Group Risk Plan (GRP) policies. Under MPCI policies, indemnity payments are triggered by low yields on an individual producer's insured acres. Under GRP policies, indemnity payments are triggered by low county-wide yields.

Revenue insurance policies that provide indemnities for revenue losses caused by either low yields, low prices, or both include Group Revenue Insurance Policy (GRIP) policies, Crop Revenue Coverage Policies (CRC),

Revenue Assurance (RA) policies, and Income Protection (IP) policies. Under CRC, RA, and IP revenue insurance policies, indemnities are triggered by low revenues for an individual producer (caused either by low yields, or low prices, or both). Under GRIP policies, indemnity payments are triggered by low average revenue for the crop in the country.

Indemnities for losses paid under both the GRIP and GRP policies are determined in large part by expected county yields and actual county yields in any given crop year.

Indemnities for losses paid under MPCI, RA, CRC, and IP policies for a given planted unit in any given crop year are determined in large part by the APH approved yield for the insured unit and the actual yield realized on that unit. This Briefing describes how county expected yields and APH yields for individual units are determined.

### County Expected Yields

Group Risk Plan (GRP) policies provide producers with indemnities when the county average yield for an insured crop in the current crop year is low relative to the long term average county yield for the crop. Group Revenue Insurance Plan (GRIP) policies provide producers with indemnities when the county revenue for an insured crop in the current crop year is low relative to the long term average county revenue for the crop. In the former case, the county expected yield is used as the measure of the long term county average yield. In the latter case, the expected county yield is a major component of the measure of the long term average county revenue for the insured crop. The county average revenue per acre against which the policy provides insurance is equal to the expected county yield multiplied by the expected price for the crop in the crop year. Expected county yields are determined using historical county yields reported by USDA's

### Contact:

**Vince Smith**  
(406) 994-5615  
[uaevs@montana.edu](mailto:uaevs@montana.edu)

**Objective  
Analysis  
for Informed  
Decision Making**

**Table 1: Computing APH Yields When Acceptable Production Records Are Available**

Crop Year	Producer A Proven Yield	Producer B Proven Yield
1994	NA <sup>a</sup>	52
1995	NA	22
1996	NA	30
1997	NA	43
1998	NA	52
1999	NA	30
2000	45	44
2001	20	34
2002	30	38
2003	25	15
<b>APH Approved Yield<sup>b</sup></b>	<b>30</b>	<b>34</b>

<sup>a</sup> NA denotes that acceptable production records are not available for that crop year.

<sup>b</sup> The APH approved yield is the arithmetic average of the actual yields for each of the years for which acceptable records are available.

National Agricultural Statistical Service (NASS), as adjusted by the Federal Crop Insurance Corporation. The records of individual producers play no role in the process by which expected county yields are determined. The procedures used to compute expected county yields account for many factors that influence long run yields, including long run trends in yield growth, the impacts of atypical adverse weather events on yields in recent years, and linkages between yields for different crops.

#### **Actual Production History Approved Yields**

Under MPCCI, CRC, RA, and IP insurance policies, producers insure either against yield shortfalls (MPCCI) or revenue shortfalls (CRC, RA, and IP). Under an IP policy, producers must insure all acres of a crop raised in the same county as one unit; that is, they must insure their entire acreage of a crop as an enterprise unit. Under MPCCI, CRC and RA policies producers may choose optional units, or basic units. Under CRC the choices include basic, optional, and enterprise units.<sup>1</sup>

Under MPCCI, CRC, RA, and IP the producer must establish an Actual Production History or APH approved yield for all units to be insured.

A producer's actual production history or approved yield may be established through two general methods. The first relies on the availability of production records for the planted unit to be insured that are acceptable to the FCIC. For records to be acceptable, the producer must have records of marketed or stored production from each separate unit kept in a manner that enables FCIC to verify production from that unit. The second method is used when such records are not

available for a sufficient number of years. In this case, transition or T-yields are used for those years for which the producer has inadequate records.

#### **If Acceptable Production Records are Available**

If the producer has acceptable production records for between four and ten consecutive crop years for the unit to be insured (beginning with the year previous to the year for the insurance policy) then the producer's APH approved yield is simply equal to the average yield for those years.

Two examples are presented in Table 1. Producer A only has records for four consecutive crop years prior to the 2002-2003 crop year and producer B has records for ten consecutive crop years prior to the 2002-2003 crop year. Producer A's APH yield of 30 bushels per acre is therefore the arithmetic average of his "proven" yields for the past four years. Producer B's APH yield of 34 bushels per acre is the arithmetic average of his "proven" yields for the ten previous crop years.

#### **If Acceptable Records are Not Available for Some or All of the Previous Four Years**

If approved actual production history yield data are not available for at least the four most recent crop years, then an FCIC determined transitional yield or T-yield is used to establish a producer's yield for each missing year. T-yields are then used to complete the four years of records needed to calculate a producer's APH approved yield. Typically, nationwide the T-yield is closely related to the expected county yield computed by FCIC (In Montana, Wyoming, and North and South Dakota, many T-yields are area based; that is, there may be multiple T-yields within a county). However, the approved APH yield for producers who are

unable to supply any records is limited to 65 percent of the applicable T-yield for the first year in which the producer is insured.

If, however, producers have acceptable production records for one, two, or three of the past four years, they use higher percentages of the applicable T-yield for the missing years. For crops such as wheat, if the producer has one year of acceptable yield records, the APH yields for the three missing years are set equal to 80 percent of the applicable T-yield. If the producer has acceptable yield records for 2 years, then the APH yield for the missing two years is 90 percent of the applicable T-yield. If the producer has acceptable yield records for three years, then the APH yield for the missing year is 100 percent of the T-yield

Two examples of the use of T-yields are presented in Table 2. Producers C and D are located in the same county where the T-yield for the crop they want to insure is 30 bushels per acre.

Producer C provides acceptable production records for the last three of the previous four crop years while producer D provides no acceptable production records. Producer C's APH approved yield is computed by using the full 30 bushel per acre T-yield as a substitute for the missing 1998 crop year production records. Producer D is simply allocated 65 percent of the county T-yield.

<sup>1</sup> Optional, basic, and enterprise are described and discussed in detail in Briefing 6 (revised November 2002), *Federal Crop and Crop Revenue Insurance Programs: Optional, Basic, and Enterprise Units*.

Thus, the APH approved yield becomes 20 bushels per acre for the insurance policy ( $0.65 \times 30 = 19.5$  which is rounded to the nearest bushel).

A new producer provision is available for operations that have not grown the crop for more than two years.

### Issues

As the APH yield for an insurable unit increases, typically the dollar amount of the premium for any specific coverage level will also increase because the maximum indemnifiable loss (the indemnity payment the producer receives when a total crop loss occurs) will also be higher. However, many producers prefer to have higher APH approved yields because insurance policies based on higher APH approved yields enable them to obtain more protection when actual yields or revenues are low.

An important issue for many producers in the Northern Great Plains has been the impact of a sequence of poor harvests on their APH approved yields because of extended drought. These producers may find it beneficial to use a provision that allows the use of 60 percent of the applicable T-yield for years when actual yields are less than 60 percent of the T-yield.

**Table 2. Computing APH Approved Yields with Transition Yields**

Crop Year	Producer C	Producer D	Applicable T-Yield (bushels)
	Proven Yield (bushels)	Proven Yield (bushels)	
2000	NA <sup>a</sup>	NA	30
2001	36	NA	30
2002	28	NA	30
2003	34	NA	30
	<b>32<sup>b</sup></b>	<b>20<sup>c</sup></b>	

An example of this use of T-yields is presented in Table 3. Suppose the applicable T-yield for producer E is 30 bushels per acre and, thus, 60 percent of the applicable T-yield is 18 bushels per acre. Producer E has ten years of acceptable yield records that includes three years of very poor harvests when actual yields were less than 18 bushels per acre. Using the farm's actual yields, producer E's proven yields would be 33 bushels per acre. Substituting 60 percent of the applicable T-yield for the three of the yield years increases producer E's proven yield to 36 bushels per acre. In this example, using 60 percent of the applicable T-yield enables producer E to increase the APH yield by 3 bushels per acre (a 9 percent increase).

**Table 3: Computing APH Approved Yields When Actual Yields are Poor in Same Years**

Crop Year	Producer E Proven Yield (bushels)	Applicable T-yield (bushels)	60% of Applicable T-yield (bushels)	Producer E Proven Yield Using 60% T-yield provision
	1994	50	30	18
1995	20	30	18	20
1996	32	30	18	32
1997	8	30	18	18 <sup>a</sup>
1998	43	30	18	43
1999	67	30	18	47
2000	10	30	18	18 <sup>a</sup>
2001	63	30	18	63
2002	7	30	18	18 <sup>a</sup>
2003	<u>50</u>	30	18	<u>50</u>
	33			36 <sup>b</sup>

<sup>a</sup> These are years in which it is advantageous for producer E to use 60% of the applicable yield instead of the actual yields obtained in the form.

<sup>b</sup> The computed APH is rounded to the nearest whole bushel.

<sup>a</sup> NA denotes that acceptable production are not available for that crop

<sup>b</sup> The APH for producer C is computer by substituting the transitional yield of 30 bushels for the missing yield data for 1997-1998 crop year and then computing the four year APH average yield; that is C's APH yield  $= (30 + 36 + 28 + 34) / 4 = 32$  bushels per acre

<sup>c</sup> The APH for producer D is simply equal to 65% of the county T-yield; that is D's APH  $= 0.65 \times 30 = 19.5$  bushels per acre, which RMA rounds to the nearest bushel.



The programs of the MSU Extension Service are available to all people regardless of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, LeRoy Luft, Vice Provost and Director, Extension Service, Montana State University, Bozeman, MT 59717.