

# **Evaluation of the North Dakota Personal Transitional Yield Insurance Program and Feasibility Study for National Expansion**

## **Deliverable 2 Feasibility Study for National Expansion of the Personal Transitional Yield Insurance Program Report**

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## SECTION I. EXECUTIVE SUMMARY

The United States Department of Agriculture (USDA) Risk Management Agency (RMA) engaged the Contractor to evaluate the North Dakota Personal Transitional Yield (PTY) Pilot Program. The contracted evaluation addresses three unique elements. The first was an assessment of the impact of requiring use of the PTY within the pilot area, as opposed to allowing insureds to elect the use of the PTY program as an option. The second was an assessment of an alternative PTY calculation approach using a weighted average in the PTY summary database. These two elements are specifically addressed in Deliverable 1 of this contract. The third element of this contracted evaluation, an assessment of the feasibility of expanding the program beyond North Dakota using either the existing PTY calculation procedures or the alternative PTY calculation procedures, is addressed in this report.

In this deliverable, the Contractor evaluates the effects of using a Personal Transitional Yield (PTY) on all eligible crops nationwide. As mentioned previously, the first written deliverable dealt with North Dakota, where the PTY was introduced as a pilot program effective for the 2007 crop year and each subsequent year. In that deliverable, it was possible to separately examine the impact upon experience for those units where PTY was chosen versus units where the PTY was not used. The present deliverable can only provide a comparison of effects of PTY against the effects of T-yields actually available during the years included in the analysis.

The Contractor cautions that the PTY values constructed for this deliverable were necessarily based only on the data reported by Approved Insurance Providers (AIP) and included in the Type 15 database. Any additional records available to the AIP, but not submitted to RMA because the unit was not planted for a particular crop year, were not included. However, the effect is not believed to be substantive and most likely affects only units where relatively few yields were included in the Type 15 database and additional yields were included in the policyholder files.

The Contractor included crop years 2007 through 2009 in the research for this deliverable. These are the same years the PTY pilot was available as a pilot program in North Dakota. At the time of the analysis, crop year 2010 data were not yet available. The intent was to examine the same time frame to eliminate any anomalies that may have existed in a single crop year. Data for the Category B crops were converted to an Actual Production History (APH) equivalent basis for this deliverable. That is, the amount of premium for all units was calculated using APH premium calculation procedures. Add-on premium for revenue loads was not included. Indemnities similarly were converted to a loss of yield basis, meaning the indemnities for the revenue products attributed to price changes were eliminated. The purpose of this approach was to develop data consistent with the data used to determine the base premium rates by eliminating the effect of price changes.<sup>1</sup> While the insurance experience data were not “normalized” to the 65 percent coverage level for preliminary analyses, they provide a representative indication of the impact on loss cost ratios (as well as for other insurance attributes) of changing to PTY.

The effects of introducing a PTY were analyzed separately for Category B and Category C crops for this deliverable. PTY has a greater impact on the Category C crops in terms of an increase in loss cost ratios. The analysis first considered units that used T-yields in any form (as a substitute for a missing actual yield, for yield substitution, or to determine a floor) separately from units

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<sup>1</sup> Revenue loads are a separate premium rating determination and are a function of the underlying base premium rate.

that were based on all actual yields. This provides a measure of change (impact) specific to such units (Table 1). The overall indication from the analysis shows a small effect upon crop insurance experience if either a simple average PTY or an acreage-weighted PTY is used. However, the differences between these two alternatives are small, leading to a legitimate question as to whether the added complexity of the acre weighting is compensated by improvements in program performance when measured by the loss cost ratio. A production-weighted PTY resulted in higher loss cost ratios relative to the status quo (i.e., relative to the current T-yield approach). These results are consistent with the earlier findings from North Dakota. Specific results are included herein for units that used a T-yield for any purpose during 2007 through 2009.

**Table 1. Change in All Category B and C Crops Loss Cost Ratios on Units that Used T-yields for any Purpose when Alternative Transitional Yield Approaches Are Employed, United States, 2007 through 2009**

Weighting	Category B	Category C
Simple Average	-2.23%	+ 1.52%
Acreage-weighted	-2.21%	+ 0.34%
Production-weighted	+4.65%	+12.72%

All units were then classified according to the yield limitation flag (APH, floor (Category B only), cup, and yield substitution). The effects of alternative approaches to calculating the PTY were analyzed on a total book of business basis with this categorization of the data. This approach reduced the percentage impacts of the substitutions relative to the first approach due to the larger liability included in the analysis. Those insurance experience for units included in the “no T-yield use” group included in this stage of the analysis were impacted only if the PTY created a floor or opportunity for yield substitution. Otherwise, such units were unaffected and the liability, premium, and indemnity do not change relative to the base. Results of this analysis are presented in Table 2.

**Table 2. Change in All Category B and C Crops Loss Cost Ratios on all Units when Alternative Transitional Yield Approaches Are Employed, United States, 2007 through 2009**

Weighting	Category B	Category C
Simple Average	-1.64%	+1.38%
Acreage-weighted	-1.94%	+1.11%
Production-weighted	+4.29%	+6.53%

In addition to the limitation on inclusiveness of the estimated PTY values, another limitation of the analysis is related to the nature of yield substitution. This action is voluntary on the part of the producer. The Contractor needed a “rule” to conduct the analysis. The rule established was: if an eligible actual yield was flagged by the producer so substitution was not performed in the original data that flag continued to be honored. However, if a yield eligible for substitution did not have a flag, the yield substitution was made. This may overstate the number of substitutions that will occur as some of these producers may have opted not to substitute. However, the original data indicate that substitution is predominant. Hence, the impact of the rule is not considered to be large. The results are believed to be indicative of the outcomes that would have been observed had PTY been the procedure rather than the T-yields actually offered.

## SECTION II. PERSONAL TRANSITIONAL YIELDS – NATIONAL ANALYSIS

This report examines the impact of using a Personal Transitional Yield (PTY) considering all relevant crops nationwide. It is the second of two written deliverables for this Solicitation.

The Contractor cautions that the estimates of PTY developed in this analysis may not be completely representative of values that would be obtained in practice. That is because the Contractor calculated a PTY using only the data submitted by the Approved Insurance Provider (AIP) for a particular crop year. The producer's files maintained by the AIP may contain records for additional units that were not planted to the crop for that crop year and hence were not transmitted to RMA. However, with the exception of policies for which only a few actual yields were transmitted (but additional records existed), the estimates are believed to be reasonably representative of the values that would be obtained in practice.

Category B and Category C crops are considered independently in the analysis. Results for all crops in the Category at the national level in aggregate are presented in this report, except when individual crops are considered. In that case, data for the crop is reported at the national level. Since the effects of alternative approaches are relatively small, greater discussion by crop or region within the main body of the report was not deemed crucial to an understanding of the alternative approaches. Disaggregated data have been provided to RMA digitally in Microsoft Excel format should the agency desire to examine a particular crop at a finer scale.

Small differences exist among values in the various tables included in this report which might be expected to remain constant (e.g., net insured acres). This is the result of summing the data by subcategories which ultimately return slightly different outcomes because of mathematical operations such as rounding. These minor differences do not affect the overall results that need to be considered when evaluating the impact of using a PTY for all relevant crops nationwide.

### II.A. Analysis of Category B Crop Data

The Contractor initially separated all units into two categories: those units that used a T-yield in some form (for a missing actual yield, yield floor, a yield substitution) and those that did not. Table 3 presents the data developed by this sorting process for crop years 2007 through 2009 combined. These years correspond to the same years the PTY was available and for which complete data were provided in North Dakota. Use of three years rather than a single year also protects against an anomaly that may affect any single year. The Contractor separated the units by examining each yield type within each Type 15 record and by the yield limitation flag (to identify floors and substitutions).

Unit counts are presented in Table 3; policy counts are not. This is because a crop policy might have units that used T-yields in some form and units that did not; hence, if policy counts were compiled, the policy would be counted twice in the sorting process. Some units may be counted more than once due to separate lines for practice/type/variety/t map area (P/T/V/TMA) within a unit. However, the number of such instances should not affect the overall unit count as much as the number of policies would have been affected by counting policies twice if they included both units using T-yields and units using only actual yields. Acres, liability, premium, and indemnity are unaffected by the sorting process.

Use of T-yields is relatively common among Category B crops, with more than twice as many units using a T-yield in some form than those that did not. Acres demonstrate a similar relationship. Premium and indemnity also are substantially greater in the group using T-yields, while liability is only about 30 percent greater for this group. In contrast to the data developed for North Dakota, the loss ratio for units nationwide using a T-yield is much larger (about 25 percent higher) than the loss ratio for units that did not use a T-yield.<sup>2</sup>

**Table 3. Category B Crops: Data Separated into Units Using T-yield in any Form and Units with No T-yield Usage, 2007 through 2009, All States**

Year	Use of T-yield	Units Earning Premium	Units Indemnified	Net Insured Acres	-- thousands --				Loss Cost Ratio	Loss Ratio
					Liability	Premium	Indemnity	Loss Cost Ratio		
2007	No T-yield	701,486	95,154	48,540	17,851,513	1,479,550	566,593	0.032	0.383	
2008	No T-yield	712,552	274,555	50,555	26,378,684	2,351,894	2,082,436	0.079	0.885	
2009	No T-yield	639,536	58,900	55,449	23,498,029	2,130,794	509,764	0.022	0.239	
Total	No T-yield	2,053,574	428,609	154,544	67,728,226	5,962,238	3,158,793	0.047	0.530	
2007	T-yield	1,645,352	367,506	102,013	23,181,500	3,127,938	1,922,334	0.083	0.615	
2008	T-yield	1,707,893	607,882	106,683	33,524,503	4,854,908	4,348,302	0.130	0.896	
2009	T-yield	1,590,395	298,558	112,848	31,194,903	4,729,937	2,220,393	0.071	0.469	
Total	T-yield	4,943,640	1,273,946	321,544	87,900,906	12,712,783	8,491,029	0.097	0.668	
Total	All Units	6,997,214	1,702,555	476,088	155,629,132	18,675,021	11,649,822	0.075	0.624	

Table 4 provides the normalized data for the units shown in Table 3, using a T-yield in some form. “Normalization” is a procedure developed by the Contractor whereby the liability, premium, and indemnity are calculated using the approved yield (APH, cup, floor, or substitution) from the Type 15 record without regard to any optional coverage, unit structure, and other considerations on a yield-based coverage basis. The premium calculated under this procedure is based on the APH premium calculation procedure. The indemnity calculated under this procedure does not include any losses due to price change for the revenue insurance plans. Thus, the loss cost ratios are consistent with the data used by RMA for ratemaking in the determination of base premium rates. In addition, the “normalized” loss ratios represent estimates of the loss ratios for loss of yield only and are unaffected by the price changes that may have occurred. This process had a small effect on liability, but removed about \$3.4 billion of premium and \$2.1 billion of indemnities from the full insured dataset. The loss cost ratios are reduced significantly due to elimination of indemnities (e.g., revenue-based losses), but retention of approximately the same liability. The loss ratios, with the exception of 2008, are higher in the normalized dataset than in the nominal data. These data, rather than the original data in Table 3, are the base for comparing alternatives in Tables 5, 6, and 7.

<sup>2</sup> For application in this report, loss ratio and loss cost ratios are reported in decimal form in all tables. To convert to percentage, simply multiply the reported decimal value by 100 and label it as a percentage (e.g. 0.562 becomes 56.2%).



**Table 4. Category B Crops: Normalized Data for Units Using T-yield in any Form, 2007 through 2009, All States**

Year	Units Earning Premium	Units Indemnified	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --								
2007	1,645,352	367,506	102,013	23,287,045	2,443,980	1,819,560	0.078	0.745
2008	1,707,893	607,882	106,683	33,780,220	3,420,034	2,817,940	0.083	0.824
2009	1,590,395	298,558	112,848	31,489,845	3,436,826	1,759,577	0.056	0.512
Total	4,943,640	1,273,946	321,544	88,557,110	9,300,840	6,397,077	0.072	0.688

Tables 5, 6, and 7 provide estimates of the effects of replacing the T-yields with the simple average PTY, the production-weighted PTY, and the acreage-weighted PTY, respectively. The simple average PTY is the simple average of all yields in the PTY summary database for each P/T/V/PTY. The acreage-weighted PTY is the sum of all yields for each year in the database weighted by the acres in each year. The weighted sums are added and divided by the total of the acres. The production-weighted PTY is similar to the acreage-weighted approach, except the sum of the annual yields is weighted by the production for each year. The sum of the weighted yields is divided by the total of all the production across all relevant years. The data in Tables 5, 6, and 7 consist of the changes resulting from the substitution of PTY and retention of the original data whenever a policy did not have at least one actual yield to calculate a PTY. This is the form in which the data would have been observed in the absence of some form of T-yield procedure since a T-yield still is needed if a policy does not have at least one actual yield.

For units that used T-yields, substituting the simple average PTY based on normalized data increases liability and premium slightly and reduces indemnities, the loss cost ratio, and the loss ratio relative to the same attributes when T-yields are used. The production-weighted PTY increases the liability by a greater amount than the simple average PTY, and reduces the premium slightly, and increases indemnities, the loss cost ratio, and the loss ratio by relatively larger percentages. The acreage-weighted PTY reduces all variables by a small percentage relative to the same attributes when T-yields are used. Results for the simple average and the acreage-weighted PTY are similar.

These results are consistent with the data developed for North Dakota and presented in Deliverable 1. The production-weighted PTY causes a deterioration in performance when measured by either the loss cost ratio or the loss ratio relative to these ratios derived using the current T-yield calculations. Both the simple average and the acreage-weighted PTY slightly improve program performance when measured in terms of either ratio relative to the current T-yield approach.

**Table 5. Category B Crops: Effects of Substituting Simple Average PTY for T-yield for Units that Used T-yield in any Form, 2007 through 2009, All States**

Year	Restated Liability	Restated Premium	Restated Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --					
2007	23,283,401	2,482,732	1,778,994	0.076	0.717
2008	34,000,776	3,468,933	2,787,687	0.082	0.804
2009	31,807,107	3,508,521	1,728,435	0.054	0.493
Total	89,091,284	9,460,186	6,295,116	0.071	0.665
Change from Normalized Data (Table 4)	0.60%	1.68%	-1.62%	-2.23%	-3.36%

**Table 6. Category B Crops: Effects of Substituting Production-weighted PTY for T-yield for Units that Used T-yield in any Form, 2007 through 2009, All States**

Year	Restated Liability	Restated Premium	Restated Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --					
2007	23,630,703	2,418,117	1,894,213	0.080	0.783
2008	34,539,575	3,382,646	3,080,622	0.089	0.911
2009	32,335,461	3,426,210	1,882,174	0.058	0.549
Total	90,505,739	9,226,973	6,857,009	0.076	0.743
Change from Normalized Data (Table 4)	2.15%	-0.80%	6.71%	4.65%	7.45%

**Table 7. Category B Crops: Effects of Substituting Acreage-weighted PTY for T-yield for Units that Used T-yield in any Form, 2007 through 2009, All States**

Year	Restated Liability	Restated Premium	Restated Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --					
2007	22,909,920	2,418,117	1,750,840	0.076	0.724
2008	33,454,955	3,382,646	2,749,425	0.082	0.813
2009	31,242,532	3,426,210	1,697,543	0.054	0.495
Total	87,607,407	9,226,973	6,197,808	0.071	0.672
Change from Normalized Data (Table 4)	-1.08%	-0.80%	-3.22%	-2.11%	-2.40%

The Contractor further segregated the data into the categories defined by the yield limitation flag as shown in Table 8. These data represent normalization of both categories shown in Table 3 (units that did and did not use T-yields in the APH Databases). Cups and floors combined represent slightly less than five percent of the total acreage. About 25 percent of all net insured acres had a database with at least one yield substitution. About 70 percent were classified with a yield limitation flag representing APH.

**Table 8. Category B Crops: Normalized Data for all Units Sorted by Yield Limitation Flag, 2007 through 2009, All States**

Flag	Units Earning Premium	Units Indemnified	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --								
Actual yield	4,727,094	1,098,198	333,205	123,154,155	9,153,062	4,768,893	0.039	0.521
Cup	69,159	21,679	4,499	872,795	149,346	134,435	0.154	0.900
Floor	335,419	110,108	18,352	3,142,469	511,807	470,695	0.150	0.920
Substitution	1,844,142	473,289	119,825	29,299,945	3,509,694	2,587,660	0.088	0.737
Totals	6,975,814	1,703,274	475,881	156,469,364	13,323,909	7,961,683	0.051	0.598

Tables 9, 10, and 11 show the effect of substituting the simple average, the production-weighted PTY, and the acreage-weighted PTY respectively for the existing procedures. The percent changes differ slightly from those presented in Tables 5, 6, and 7 because all the data are included in the analysis leading to these tables whereas the former tables included only the units that used a T-yield. There is an opportunity for units in the group “no T-yield” to be affected by the PTY since the average yield could become subject to a floor or a yield may qualify for yield substitution. However, the results are the same: the production-weighted PTY worsens experience in terms of the loss cost and loss ratios whereas the simple average and the acreage-weighted PTY modestly improve experience relative to the existing procedures and do not differ materially from each other.

**Table 9. Category B Crops: Normalized Data for all Units Sorted by Yield Limitation Flag with Simple Average PTY Substituted for T-yield, 2007 through 2009, All States**

Flag	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --						
Actual Yield	270,398	105,166,597	7,565,598	3,905,540	0.037	0.516
Cup	6,418	1,315,172	203,807	151,839	0.115	0.745
Floor	112	31,276	2,974	1,310	0.042	0.440
Substitution	198,951	50,501,857	5,711,282	3,802,050	0.075	0.666
Totals	475,879	157,014,902	13,483,661	7,860,739	0.050	0.583
Change from Normalized Data (Table 8)		0.35%	1.18%	-1.28%	-1.64%	-2.50%

**Table 10. Category B Crops: Normalized Data for all Units Sorted by Yield Limitation Flag with Production-weighted PTY Substituted for T-yield, 2007 through 2009, All States**

Flag	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --						
Actual yield	261,432	102,231,934	7,126,524	4,016,290	0.039	0.564
Cup	9,145	1,661,536	295,153	237,821	0.143	0.806
Floor	181	53,355	5,070	2,145	0.040	0.423
Substitution	205,123	54,483,151	5,823,681	4,166,401	0.076	0.715
Totals	475,881	158,429,976	13,250,428	8,422,657	0.053	0.636
Change from Normalized Data (Table 8)		1.24%	-0.55%	5.47%	4.29%	5.99%

**Table 11. Category B Crops: Normalized Data for all Units Sorted by Yield Limitation Flag with Acreage-weighted PTY Substituted for T-yield, 2007 through 2009, All States**

Flag	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --						
Actual yield	271,564	103,785,860	7,394,633	3,827,629	0.037	0.518
Cup	12,278	2,262,492	393,167	306,692	0.136	0.780
Floor	104	31,977	2,913	1,173	0.037	0.403
Substitution	191,933	49,450,446	5,459,717	3,627,872	0.073	0.664
Totals	475,879	155,530,775	13,250,430	7,763,366	0.050	0.586
Change from Normalized Data (Table 8)		-0.60%	-0.55%	-2.55%	-1.94%	-1.99%

The Contractor notes yield substitution is elective on the part of the insured whereas cups and floors are not. Therefore, the Contractor was required to adopt a rule for managing the data when a potential substitution was indicated. The rule used by the contractor was: the producer will elect the substitution for all eligible substitutions unless a producer had previously indicated an eligible yield was not to be substituted. This rule may overstate the actual number that would be made in practice; however, the frequency of use of substitution (Table 8) indicates it is common, and therefore the rule was deemed reasonable.

Regardless of the type of PTY, replacing a T-yield with PTY reduced the number of acres with the APH flags and the floor limitation flags and increased the number of acres with the cup flags and substitution flags. The greatest absolute increase as a result of the modified procedures was in the yield limitation flag corresponding to yield substitution. This may in part be due to the assumption made by the Contractor. To better understand the changes that occurred, the Contractor tracked the changes in yield limitation flags, as shown in Tables 12 and 13. The only difference between these tables is the grouping of the data. Table 12 groups the data by destination yield limitation flag while Table 13 groups the data by the origin flag. About 80 percent of the acreage with the approved yield flag remained in that category, while nearly 100 percent of the acreage with the substitution flag remained in that category. Most of the acreage that moved from the actual yield flag went to substitution yield flag. This likely indicates the PTY was higher than the T-yield by an amount sufficient to trigger at least one substitution on

those acres, a condition demonstrated in Tables 15 and 16. This represented about one-eighth of the total acreage insured for the three years. Most of the acreage previously at the floor or that was copped also moved to substitution.

**Table 12. Movement of Records among Yield Limitation Flags when Simple Average PTY is Substituted for T-yield, 2007 through 2009, All States**

From	To	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --							
Actual Yield	Actual Yield	268,151	104,608,030	7,501,875	3,871,613	0.037	0.516
Cup	Actual Yield	102	29,963	3,396	2,417	0.081	0.712
Floor	Actual Yield	1,051	255,979	28,093	13,703	0.054	0.488
Substitution	Actual Yield	1,094	272,626	32,234	17,806	0.065	0.552
Actual Yield	Cup	4,526	953,074	143,152	106,053	0.111	0.741
Cup	Cup	450	105,745	16,704	11,811	0.112	0.707
Floor	Cup	541	101,263	15,751	11,568	0.114	0.734
Substitution	Cup	900	155,088	28,200	22,407	0.144	0.795
Actual Yield	Floor	90	25,388	2,301	1,119	0.044	0.487
Cup	Floor	0	34	5	2	0.066	0.455
Floor	Floor	22	5,798	661	185	0.032	0.281
Substitution	Floor	0	55	7	3	0.055	0.423
Actual Yield	Substitution	60,437	18,695,105	1,604,697	939,469	0.050	0.585
Cup	Substitution	3,946	695,836	132,762	103,415	0.149	0.779
Floor	Substitution	16,737	2,289,644	493,859	276,273	0.121	0.559
Substitution	Substitution	117,830	28,821,271	3,479,962	2,482,893	0.086	0.713
Totals		475,877	157,014,899	13,483,659	7,860,737	0.050	0.583

**Table 13. Movement of Records Among Yield Limitation Flags when Simple Average PTY is Substituted for T-yield, 2007 through 2009, All States**

From	To	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
		-- thousands --					
Actual Yield	Actual Yield	268,151	104,608,030	7,501,875	3,871,613	0.037	0.516
Actual Yield	Cup	4,526	953,074	143,152	106,053	0.111	0.741
Actual Yield	Floor	90	25,388	2,301	1,119	0.044	0.487
Actual Yield	Substitution	60,437	18,695,105	1,604,697	939,469	0.05	0.585
Cup	Actual Yield	102	29,963	3,396	2,417	0.081	0.712
Cup	Cup	450	105,745	16,704	11,811	0.112	0.707
Cup	Floor	0	34	5	2	0.066	0.455
Cup	Substitution	3,946	695,836	132,762	103,415	0.149	0.779
Floor	Actual Yield	1,051	255,979	28,093	13,703	0.054	0.488
Floor	Cup	541	101,263	15,751	11,568	0.114	0.734
Floor	Floor	22	5,798	661	185	0.032	0.281
Floor	Substitution	16,737	2,289,644	493,859	276,273	0.121	0.559
Substitution	Actual Yield	1,094	272,626	32,234	17,806	0.065	0.552
Substitution	Cup	900	155,088	28,200	22,407	0.144	0.795
Substitution	Floor	0	55	7	3	0.055	0.423
Substitution	Substitution	117,830	28,821,271	3,479,962	2,482,893	0.086	0.713
<b>Totals</b>		<b>475,877</b>	<b>157,014,899</b>	<b>13,483,659</b>	<b>7,860,737</b>	<b>0.050</b>	<b>0.583</b>

When examining the data, the Contractor noticed an increase in each year in the percentage of acreage that remained in the actual yield category and a reduction in the acreage that changed from the actual yield category to the substitution category (Table 14). The sum of these percentages remained constant at 98.6 percent. These data may indicate the PTY became less competitive with the T-yield in each succeeding year. There are insufficient data to determine the cause of this unusual pattern. During these same years, the same percentage of acreage that originated in the substitution category remained in that category. This may indicate the relationship of the PTY to T-yield remained about constant for the acreage that originated in the substitution category.

**Table 14. Movement among Selected Yield Limitation Flags by Year, 2007 through 2009**

Year	From	To	Original Net Insured Acres	New Net Insured Acres	Percent
2007	Actual Yield	Actual Yield	104,734	83,418	79.65
2008	Actual Yield	Actual Yield	109,945	88,420	80.42
2009	Actual Yield	Actual Yield	118,526	96,311	81.26
2007	Actual Yield	Substitution	104,734	19,890	18.99
2008	Actual Yield	Substitution	109,945	19,958	18.15
2009	Actual Yield	Substitution	118,526	20,589	17.37
2007	Cup	Cup	1,602	119	7.43
2008	Cup	Cup	1,488	122	8.20
2009	Cup	Cup	1,409	208	14.76
2007	Floor	Floor	6,370	7	0.11
2008	Floor	Floor	5,764	5	0.09
2009	Floor	Floor	6,218	9	0.14
2007	Substitution	Substitution	37,778	37,179	98.41
2008	Substitution	Substitution	39,981	39,357	98.44
2009	Substitution	Substitution	42,066	41,293	98.16

Distinct differences in the relationship of PTY to T-yield exist in the originating yield limitation flag categories. The Contractor compared the PTY to the T-yield for all data in the Type 15 database and determined the relationships as displayed in Table 15. All data in the Type 15 database are included because all available records must be used to establish the PTY even though acreage might not be reported for some units. Table 16 contains the relationships of PTY to T-yield for those acres actually reported for insurance. All data in the Type 15 database were used in the calculation of the PTY for this table; however, the comparisons relate only to the acreage actually reported.

**Table 15. Relationship of PTY to T-yield Considering all Data in the Type 15 Database**

Original Flag	PTY > t	PTY < t	PTY = T
	Percent		
APH	69.0	25.9	5.2
Cup	34.5	61.2	4.3
Floor	7.9	89.4	2.7
Substitution	43.8	50.5	5.7

**Table 16. Relationship of PTY to T-yield Considering Only Type 15 Records that Match Type 11 Records**

Original Flag	PTY > t	PTY < t	PTY = T
	Percent		
APH	75.7	20.3	4.0
Cup	36.0	60.0	3.9
Floor	5.9	92.8	1.3
Yield Substitution	48.9	46.6	4.5

The PTY for acreage for which the original flag is actual yield exceeds the T-yield in more than two-thirds of the instances in both tables. This is the reason a relatively large number of acres moved from this category to substitution: the higher PTY qualified at least one actual yield for substitution that previously did not qualify. In the case of acreage for which the original flag is floor, the PTY was less than the T-yield in nearly all instances. These acres changed category since the floor at the PTY was less than the floor at T-yield and the acreage no longer qualified for the floor. The relationships for substitution are more evenly split between higher and lower PTY. However, the overall amount of difference must not be large enough to eliminate substitutions as the appropriate adjustment in the majority of the records contained in the substitution category (Table 14).

The Contractor also examined the number of actual yields per policy for the units included in the category T-yield in Table 3. These units used at least one T-yield to derive the approved yield. The purpose of this review was to determine the number of policies behind those units that could support a PTY and the number of yields available to form the PTY.

These results are shown in Table 17 while Table 18 provides a percentage distribution of the results in Table 17. Of the approximately 322 million acres included in the Category “T-yield” in Table 3, about 308 million (over 95 percent) were associated with a policy that had at least one actual yield; thus, a PTY could be calculated with the rules for that procedure for the majority of the acreage. Over 85 percent of the acreage is associated with policies having four or more actual yields, meaning that a PTY could be calculated without recourse to use of any T-yields. About 60 percent of the acres had 10 or more actual yields at the policy level.

**Table 17. Number of Actual Yields for Calculating PTY for Category B Crops for Policies Containing at Least One Actual Yield, All States, 2007 through 2009\***

Number of Actual Yields	Policies Earning Premium	Policies Indemnified	Net Insured Acres	Liability	Premium	Indemnity	Loss Cost Ratio	Loss Ratio
1	118,220	31,984	11,788	2,875,203	440,102	337,499	0.117	0.767
2	102,469	28,482	10,798	2,813,306	413,063	309,187	0.110	0.749
3	101,916	28,923	11,235	3,096,044	431,153	319,301	0.103	0.741
4	81,450	24,897	9,644	2,450,228	376,777	285,549	0.117	0.758
5	79,233	23,385	9,385	2,396,987	371,713	264,037	0.110	0.710
6	76,262	22,852	8,987	2,305,600	363,692	259,628	0.113	0.714
7	76,756	23,576	9,201	2,364,137	368,140	274,538	0.116	0.746
8	79,171	23,834	9,767	2,542,570	393,447	278,234	0.109	0.707
9	86,909	25,653	11,266	2,932,076	443,429	302,578	0.103	0.682
10 or more	1,247,269	383,184	216,007	61,046,602	8,608,848	5,465,304	0.090	0.635
<b>Total</b>	<b>2,049,655</b>	<b>616,770</b>	<b>308,078</b>	<b>84,822,753</b>	<b>12,210,364</b>	<b>8,095,855</b>	<b>0.095</b>	<b>0.663</b>

\* From Table 3 Category “T-yield”.



**Table 18. Percentage Distribution of Actual Yields for Calculating PTY for Category B Crops for Policies Containing at Least One Actual Yield, All States, 2007 through 2009\***

Number of Actual Yields	Policies Earning Premium	Policies Indemnified	Net Insured Acres	Liability	Premium	Indemnity
-- Percent --						
1	5.77	5.19	3.83	3.39	3.60	4.17
2	5.00	4.62	3.50	3.32	3.38	3.82
3	4.97	4.69	3.65	3.65	3.53	3.94
4	3.97	4.04	3.13	2.89	3.09	3.53
5	3.87	3.79	3.05	2.83	3.04	3.26
6	3.72	3.71	2.92	2.72	2.98	3.21
7	3.74	3.82	2.99	2.79	3.01	3.39
8	3.86	3.86	3.17	3.00	3.22	3.44
9	4.24	4.16	3.66	3.46	3.63	3.74
10 or more	60.85	62.13	70.11	71.97	70.50	67.51
Total	100.00	100.00	100.00	100.00	100.00	100.00

\* From Table 3 Category "T-yield".

The Contractor also examined the number of actual yields per unit for the units included in the Category T-yield (units for which T-yields were used in some form) in Table 3. These results are shown in Tables 19 and 20. Nearly 40 percent of all net insured acres were associated with units on which ten actual yields were used. About 25 percent either had no actual or only 1 actual yield.

**Table 19. Number of Actual Yields Used to Determine the Approved Yield for Category B Crops, All States, 2007 through 2009\***

Number of Actual Yields	Net Insured Acres	Liability	Premium	Indemnity
-- thousands --				
0	46,400	12,527,153	1,795,245	1,369,052
1	33,925	9,585,668	1,329,374	913,734
2	27,696	8,280,142	1,114,432	742,380
3	24,625	7,657,270	1,011,829	670,084
4	10,369	2,247,369	441,944	283,684
5	10,590	2,414,434	440,925	292,924
6	10,628	2,517,392	436,303	293,348
7	10,886	2,643,333	436,537	293,146
8	11,410	2,866,259	452,956	307,273
9	12,886	3,301,976	502,458	328,172
10	122,127	33,859,995	4,750,797	2,997,228
Total	321,542	87,900,991	12,712,800	8,491,025

\* From Table 3 Category "T-yield".

**Table 20. Percentage Distribution of Actual Yields Used to Determine the Approved Yield for Category B Crops, All States, 2007 through 2009\***

Number of Actual Yields	Net Insured Acres	Liability	Premium	Indemnity
0	14.43	14.25	14.12	16.12
1	10.55	10.91	10.46	10.76
2	8.61	9.42	8.77	8.74
3	7.66	8.71	7.96	7.89
4	3.22	2.56	3.48	3.34
5	3.29	2.75	3.47	3.45
6	3.31	2.86	3.43	3.45
7	3.39	3.01	3.43	3.45
8	3.55	3.26	3.56	3.62
9	4.01	3.76	3.95	3.86
10	37.98	38.52	37.37	35.30
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

\* From Table 3 Category "T-yield".

The Contractor examined the data for any significant differences among crops with regard to the impact of using simple average PTY. These results are shown in Table 21. With only a few minor exceptions (Flax, Forage Production, Processing Beans, and Processing Tomatoes), the restated loss cost ratio and the loss ratio changed by small amounts relative to the original data.

**Table 21. Category B Crops: Change in Program Variables for Group T-yield when Simple Average PTY is Substituted for T-yield**

Crop	Units Earning Premium	Units Indemnified	Net Insured Acres thousands	Original Loss Cost Ratio	Restated Loss Cost Ratio	Original Loss Ratio	Restated Loss Ratio	New LCR / Old LCR	New LR / Old LR
Corn	1,546,410	344,147	96,865	0.046	0.045	0.547	0.519	0.969	0.948
Soybeans	1,388,182	356,282	82,650	0.049	0.050	0.504	0.521	1.026	1.034
Wheat	1,211,713	396,405	91,337	0.148	0.144	1.066	1.018	0.973	0.955
Cotton	252,380	73,186	15,699	0.156	0.153	0.989	0.974	0.982	0.985
Grain Sorghum	243,127	48,534	12,634	0.118	0.111	0.704	0.632	0.942	0.898
Sugar Beets	17,570	2,516	1,130	0.039	0.041	0.584	0.613	1.038	1.050
Rice	10,735	1,500	1,323	0.045	0.045	0.379	0.400	1.005	1.055
Potatoes	7,786	1,056	449	0.038	0.036	0.327	0.306	0.956	0.936
Forage Production	70,820	10,223	5,947	0.048	0.056	0.293	0.374	1.172	1.278
Sunflowers	24,881	6,729	2,322	0.104	0.089	0.592	0.503	0.855	0.849
Dry Beans	24,277	3,785	1,318	0.059	0.059	0.383	0.401	0.995	1.048
Barley	34,672	8,080	3,633	0.097	0.096	0.690	0.664	0.987	0.962
Burley Tobacco	18,984	4,286	147	0.137	0.120	1.040	0.915	0.872	0.880
Tomatoes, Processing	2,492	121	216	0.008	0.010	0.212	0.267	1.189	1.254
Onions	4,107	1,263	102	0.155	0.141	0.810	0.750	0.914	0.926
Sweet Corn, C&P	6,694	571	416	0.043	0.072	0.659	1.244	1.656	1.886
Green Peas	7,141	1,384	378	0.062	0.060	0.488	0.463	0.958	0.948
Dry Peas	10,292	2,629	1,082	0.118	0.114	0.894	0.841	0.963	0.940
Popcorn	3,650	364	253	0.028	0.030	0.217	0.239	1.077	1.105
Cotton Ex Long Staple	923	240	107	0.188	0.189	2.322	2.317	1.005	0.998
Sugarcane	4,309	235	199	0.015	0.014	0.218	0.181	0.896	0.831
Tomatoes, Fresh Market & GP	883	239	7	0.096	0.096	0.279	0.274	0.999	0.981
Beans, Processing	4,031	731	197	0.050	0.056	0.394	0.429	1.114	1.088
Oats	24,776	4,546	866	0.111	0.106	0.643	0.597	0.960	0.928
Millet	15,148	2,421	1,079	0.094	0.096	0.410	0.428	1.017	1.044
Cigar Binder Tobacco	1,298	493	5	0.335	0.316	1.906	1.684	0.944	0.884
Cultivated Wild Rice	223	20	57	0.029	0.025	0.460	0.401	0.882	0.872
Cigar Wrapper Tobacco	63	1	0	0.019	0.019	0.202	0.198	1.011	0.980
Canola	1,836	766	141	0.200	0.160	0.597	0.656	0.796	1.098
Cabbage	522	99	4	0.071	0.051	0.556	0.401	0.717	0.721
Alfalfa Seed	416	70	18	0.049	0.040	0.490	0.410	0.822	0.837
Mint	435	121	11	0.050	0.045	0.179	0.163	0.898	0.911
Safflower	1,275	242	131	0.095	0.099	0.449	0.430	1.043	0.957
Mustard	307	142	45	0.292	0.184	1.469	0.834	0.630	0.567
Flax	508	204	42	0.197	0.247	1.046	1.318	1.254	1.261
Rye	757	315	55	0.257	0.279	0.722	0.745	1.086	1.032
Cigar Filler Tobacco	16	0	0	0.000	0.000	0.000	0.000	0.000	0.000
Maryland Tobacco	1	0	0	0.000	0.000	0.000	0.000	0.000	0.000
<b>Total</b>	<b>4,943,640</b>	<b>1,273,946</b>	<b>320,865</b>	<b>0.072</b>	<b>0.071</b>	<b>0.688</b>	<b>0.665</b>	<b>0.978</b>	<b>0.967</b>

## II.B. Analysis of Category C Crop Data

The analysis for Category C crops was conducted in much the same manner as was done for the Category B crops. Differences included: 1) since there are no revenue plans associated with any of these crops, no adjustments to premium or indemnity were needed other than normalization to the yield from the Type 15 record, and 2) to accommodate the specialized yield types associated with certain Category C crops, the PTY value used to replace certain T-yields was  $PTY \times (T\text{-yield in Type 15 record} / \text{published T-yield})$ . This adjustment was necessary whenever a yield type such as EK<sup>3</sup> appeared (denotes 80 percent of T-yield adjusted for percent stand).

Table 22 contains the data separated into the two groups representing units that did not use T-yields for any purpose and those that did use T-yields as in Table 3 for Category B crops. In contrast to the Category B crops, there is much less use of T-yields among the Category C crops. This is to be expected since Category C represents perennial crops for which unit configuration within a crop policy changes little from year to year. Hence, use of a T-yield for calculating the approved yield should occur less frequently since many crops have long productive lives and build longer continuous APH histories than do many units of annual crops (rotations, planted acreage responsiveness to change in market prices, and other issues). A higher loss cost ratio and loss ratio for units having T-yield usage is the same characteristic as was observed for the Category B crops.

**Table 22. Category C Crops: Data Separated into Units Using T-yield in any Form and Units with No T-yield Usage, 2007 through 2009, All States**

Use of T-yield	Units Earning Premium	Units Indemnified	Net	Liability	Premium	Indemnity	Loss Cost Ratio	Loss Ratio
			Insured Acres					
-- thousands --								
No T-yield	71,477	10,011	2,395	5,367,418	407,542	288,521	0.054	0.708
T-yield	12,561	1,973	266	473,337	43,985	40,429	0.085	0.919
Total	84,038	11,984	2,661	5,840,755	451,527	328,950	0.056	0.729

Table 23 contains the normalized data for the Category C crops for those units classified as using a T-yield. Since revenue plans did not apply to any of these crops during 2007 through 2009, there is much less difference between the original and the normalized data. As was the case for the Category B crops, the normalized data provide the base against which alternatives are compared since the alternatives are calculated in the same manner as the normalized data.

<sup>3</sup> For Category C crops, used to identify if adjusted for percent stand prior to adjustment for 80 percent T-Yield.

**Table 23. Category C Crops: Normalized Data for Units Using T-yield in any Form, 2007 through 2009, All States**

Year	Units Earning Premium	Units Indemnified	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --								
2007	3,531	785	69	123,957	11,324	18,149	0.146	1.603
2008	4,074	651	80	142,980	13,607	11,914	0.083	0.876
2009	4,956	537	116	208,241	17,583	10,132	0.049	0.576
Total	12,561	1,973	265	475,178	42,514	40,195	0.085	0.945

Tables 24 through 26 present the effects of substituting the simple average PTY, the production-weighted PTY, and the acreage-weighted PTY, respectively. The T-yield data were retained whenever a PTY could not be calculated; hence, the loss cost ratio is representative of the group as it would appear in the experience data. This is because the T-yield is mandatory for units whenever a policy does not have at least one actual yield. A T-yield also is needed whenever there are fewer than four actual yields on a policy. As was observed with the Category B crops, the production-weighted PTY increases the loss cost ratio by the greatest amount among the three alternatives. The increase is nearly three times larger than the increase observed for the Category B crops, while the percentage increase in the loss ratio is about double that seen for Category B crops. The simple average PTY and the acreage-weighted PTY again developed substantially similar results, with a change in the loss cost ratio ranging from +0.34 percent (acreage-weighted) to +1.52 percent (simple average). These results, together with the results from the Category B crops, suggest the added complexity of acre weighting may not be offset by significantly improved program performance relative to simple average PTY.

**Table 24. Category C Crops: Effects of Substituting Simple Average PTY for T-yield for Units that Used T-yield in any Form, 2007 through 2009, All States**

Year	Restated Liability	Restated Premium	Restated Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --					
2007	132,712	11,978	21,238	0.160	1.773
2008	152,170	13,901	11,677	0.077	0.840
2009	217,138	17,984	10,204	0.047	0.567
Total	502,020	43,863	43,119	0.086	0.983
Change from Normalized Data (Table 23)	5.35%	3.08%	6.78%	1.52%	3.82%

**Table 25. Category C Crops: Effects of Substituting Production-weighted PTY for T-yield for Units that Used T-yield in any Form, 2007 through 2009, All States**

Year	Restated Liability	Restated Premium	Restated Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --					
2007	139,058	12,697	24,093	0.173	1.898
2008	162,090	14,995	14,325	0.088	0.955
2009	229,773	18,963	13,036	0.057	0.687
Total	530,921	46,655	51,454	0.097	1.103
Change from Normalized Data (Table 23)	10.50%	8.88%	21.88%	12.72%	14.27%

**Table 26. Category C Crops: Effects of Substituting Acreage-weighted PTY for T-yield for Units that Used T-yield in any Form, 2007 through 2009, All States**

Year	Restated Liability	Restated Premium	Restated Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --					
2007	133,988	12,115	21,425	0.160	1.768
2008	153,280	13,963	11,533	0.075	0.826
2009	219,251	17,919	10,033	0.046	0.560
Total	506,519	43,997	42,991	0.085	0.977
Change from Normalized Data (Table 23)	6.19%	3.37%	6.50%	0.34%	3.24%

Table 27 contains the normalized data for those policies for which a PTY could be calculated organized by yield limitation flag. Since the floor is not an allowable option for Category C crops, it is not included. As was the case with the Category B crops, most acreage is in the actual yield and the substitution category. Substitution was much less of a factor in establishing the approved yield than was observed for the Category B crops. Few acres were subject to a cup.

**Table 27. Category C Crops: Original Data for all Units Sorted by Yield Limitation Flag, 2007-2009, All States\***

Flag	Units Earning Premium	Units Indemnified	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --								
APH	56,456	6,393	1,954	4,569,888	294,047	187,373	0.041	0.637
Cup	3,642	846	83	186,837	18,544	23,583	0.126	1.272
Substitution	22,382	4,511	584	1,041,620	98,490	107,675	0.103	1.093
Totals	82,480	11,750	2,621	5,798,345	411,081	318,631	0.055	0.775

\* Excludes policies for which a PTY could not be calculated

Tables 28, 29, and 30 present the effects of substituting a simple average, a production-weighted, and an acreage-weighted PTY, respectively. Units in the original sorting category denoted as “no T-yield” can be affected because a PTY higher than the T-yield allows certain yields to qualify for substitution that previously did not qualify. Qualification for a cup also is affected by the size of the PTY relative to the T-yield since at least some of the units classified as APH would have used a T-yield to determine the actual yield. Again, the production-weighted PTY

causes the greatest increase in loss cost ratio and loss ratio. The percentages of change relative to the base data differ from Tables 24, 25, and 26 because the effects upon the units (collectively) in the original sorting category “no T-yield” are significantly lesser than upon the units (collectively) category “T-yield.” However, the overall indications again are that the production-weighted PTY will worsen program performance while there is little difference between the simple average and the acreage-weighted PTY. The production-weighted PTY also resulted in the greatest reduction in acres classified as actual yield.

**Table 28. Category C Crops: Normalized Data for all Units Sorted by Yield Limitation Flag with Simple Average PTY Substituted for T-yield, 2007 through 2009, All States**

Flag	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --						
APH	1,244	3,079,735	183,365	118,246	0.038	0.645
Cup	38	89,549	6,793	6,863	0.077	1.010
Substitution	1,340	2,692,713	225,658	201,528	0.075	0.893
Totals	2,622	5,861,997	415,816	326,637	0.056	0.786
Change from Normalized Data (Table 23)		1.09%	1.14%	2.45%	1.38%	1.33%

**Table 29. Category C Crops: Normalized Data for all Units Sorted by Yield Limitation Flag with Production-weighted PTY Substituted for T-yield, 2007 through 2009, All States**

Flag	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --						
APH	1,160	2,878,662	171,467	114,749	0.040	0.669
Cup	53	106,204	8,974	9,373	0.088	1.044
Substitution	1,409	2,974,348	245,546	226,229	0.076	0.921
Totals	2,622	5,959,214	425,987	350,351	0.059	0.822
Change from Normalized Data (Table 23)		2.70%	3.50%	9.05%	6.53%	5.76%

**Table 30. Category C Crops: Normalized Data for all Units Sorted by Yield Limitation Flag with Acreage-weighted PTY Substituted for T-yield, 2007 through 2009, All States**

Flag	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --						
APH	1,277	3,146,664	189,072	123,216	0.039	0.652
Cup	58	119,443	10,164	11,111	0.093	1.093
Substitution	1,286	2,599,905	216,525	191,641	0.074	0.885
Totals	2,621	5,866,012	415,761	325,968	0.056	0.784
Change from Normalized Data (Table 23)		1.15%	1.13%	2.25%	1.11%	1.14%

Tables 31 and 32 track movement of acreage among yield limitation flags that resulted in the data reported in Table 28 (simple average PTY substitution). The only difference between Tables 31 and 32 is the organization of the data. Table 31 is organized in a manner that groups

each category after substitution (approved yield, cup, etc.). Table 32 groups the data as it existed originally. The tables demonstrate the same outcomes as observed with the Category B crops. Most acres originally classified as actual yield and then as substitution after changing to PTY remained in that classification under the alternative PTY procedures. Most acres that transferred from actual yield went to substitution. Some of this transfer undoubtedly is due to the rule that substitution was performed for any yield that qualified for substitution. In actuality, producers most likely will not choose to substitute all yields, especially when there is only a minor effect on the guarantee.

**Table 31. Movement of Category C Records Among Yield Limitation Flags when Simple Average PTY is Substituted for T-yield, 2007 through 2009, All States**

From	To	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --							
APH	APH	1,222	3,033,404	180,188	115,648	0.038	0.642
Cup	APH	1	3,403	330	349	0.103	1.056
Substitution	APH	21	42,928	2,846	2,250	0.052	0.791
APH	Cup	13	30,964	2,147	2,063	0.067	0.961
Cup	Cup	20	49,713	3,865	3,675	0.074	0.951
Substitution	Cup	5	8,872	780	1,124	0.127	1.442
APH	Substitution	719	1,586,725	118,608	84,590	0.053	0.713
Cup	Substitution	62	129,052	13,803	18,250	0.141	1.322
Substitution	Substitution	559	976,937	93,247	98,688	0.101	1.058
Total		2,622	5,861,998	415,814	326,637	0.056	0.786

**Table 32. Movement of Category C Records Among Yield Limitation Flags when Simple Average PTY is Substituted for T-yield, 2007 through 2009, All States**

From	To	Net Insured Acres	Normalized Liability	Normalized Premium	Normalized Indemnity	Loss Cost Ratio	Loss Ratio
-- thousands --							
APH	APH	1,222	3,033,404	180,188	115,648	0.038	0.642
APH	Cup	13	30,964	2,147	2,063	0.067	0.961
APH	Substitution	719	1,586,725	118,608	84,590	0.053	0.713
Cup	APH	1	3,403	330	349	0.103	1.056
Cup	Cup	20	49,713	3,865	3,675	0.074	0.951
Cup	Substitution	62	129,052	13,803	18,250	0.141	1.322
Substitution	APH	21	42,928	2,846	2,250	0.052	0.791
Substitution	Cup	5	8,872	780	1,124	0.127	1.442
Substitution	Substitution	559	976,937	93,247	98,688	0.101	1.058
Total		2,622	5,861,998	415,814	326,637	0.056	0.786

The Contractor also examined the data for any changes by year in the transfers among classifications. As was the case with the Category B crops, there is an increase in the acreage remaining in the actual yield classification and a reduction in the acres transferring from actual yield to substitution by year. The changes are smaller than was observed with the Category B



crops. Again, the data are not adequate to determine if the shifts have any significance or are only an interesting artifact of the data analysis procedures.

**Table 33. Category C Crops: Movement Among Selected Yield Limitation Flags by Year, 2007 through 2009**

Year	From	To	Original Net Insured Acres	New Net Insured Acres	Percent
--thousands--					
2007	APH	APH	570	354	62.105
2008	APH	APH	648	403	62.191
2009	APH	APH	736	464	63.043
2007	APH	Substitution	570	211	37.018
2008	APH	Substitution	648	241	37.191
2009	APH	Substitution	736	266	36.141
2007	Cup	Cup	28	7	25.000
2008	Cup	Cup	29	7	24.138
2009	Cup	Cup	26	5	19.231
2007	Substitution	Substitution	135	128	94.815
2008	Substitution	Substitution	217	208	95.853
2009	Substitution	Substitution	232	223	96.121

Tables 34 and 35 demonstrate the relationships of the PTY relative to the T-yield among the yield limitation flags. The results are similar to those reported for the Category B crops. For acreage actually reported for insurance, the PTY exceeded the T-yield nearly 80 percent of the time for the APH yield limitation flag. In contrast, this condition existed in less than half the cases for the yield limitation flag substitution. Hence, as in the case of the Category B crops, the higher PTY on acreage with the APH flag qualified additional actual yields for substitution.

**Table 34. Category C Crops: Relationship of PTY to T-yield Considering all Data in the Type 15 Database**

Original Flag	PTY > t	PTY < t	PTY = T
	percent		
APH	77.6	21.8	0.6
Cup	55.4	44.1	0.5
Substitution	43.5	56.0	0.5

**Table 35. Category C Crops: Relationship of PTY to T-yield Considering Only Type 15 Records that Match Type 11 Records**

Original Flag	PTY > t	PTY < t	PTY = T
	percent		
APH	78.2	21.2	0.6
Cup	55.8	43.7	0.6
Yield Substitution	45.1	54.5	0.5

The Contractor also examined the potential of those units categorized as “using the T-yield” in Table 22 to be able to develop a PTY based solely on the data provided to RMA. The summary of the number of actual yields at the policy level is contained in Table 36, and the percentage distribution of the data is shown in Table 37. About two-thirds of all policies, representing over 95 percent of the acres, liability, premium, and indemnity, had the potential to include at least 1 actual yield for determining the PTY. Only about one-third of the policies, representing about one-half of the acres, etc., had four or more actual yields in the Type 15 database. In contrast, by definition, all the acres in the category “no T-yield”, which is the majority of the data, had at least four actual yields to form the PTY. Thus, most of the acreage of Category C crops could form a PTY without use of T-yields.

**Table 36. Number of Actual Yields for Calculating PTY for Category C Crops for Policies Containing at Least One Actual Yield, All States, 2007 through 2009\***

Number of Actual Yields	Policies Earning Premium	Policies Indemnified	Net Insured Acres	-- thousands --			Loss Cost Ratio	Loss Ratio
				Liability	Premium	Indemnity		
1	1,192	198	33	55,965	4,636	3,425	0.061	0.739
2	1,518	224	42	75,774	6,186	5,270	0.070	0.852
3	1,795	269	52	101,780	8,080	6,560	0.064	0.812
4	315	57	12	21,973	1,810	1,707	0.078	0.943
5	1,277	429	39	77,926	12,355	18,478	0.237	1.496
6	211	21	6	11,119	765	237	0.021	0.311
7	188	16	6	11,706	1,016	679	0.058	0.669
8	193	22	5	9,438	742	209	0.022	0.282
9	160	23	4	7,546	536	393	0.052	0.734
10 or more	1,445	164	54	89,263	6,835	2,201	0.025	0.322
<b>Total</b>	<b>8,294</b>	<b>1,423</b>	<b>253</b>	<b>462,490</b>	<b>42,961</b>	<b>39,159</b>	<b>0.085</b>	<b>0.912</b>

\* From Table 22 Category “T-yield”

**Table 37. Percentage Distribution of Actual Yields for Calculating PTY for Category C Crops for Policies Containing at Least One Actual Yield, All States, 2007 through 2009\***

Number of Actual Yields	Policies Earning Premium	Policies Indemnified	Net Insured Acres	Liability	Premium	Indemnity
-- percent --						
1	14.37	13.91	13.04	12.10	10.79	8.75
2	18.30	15.74	16.60	16.38	14.40	13.46
3	21.64	18.90	20.55	22.01	18.81	16.75
4	3.80	4.01	4.74	4.75	4.21	4.36
5	15.40	30.15	15.42	16.85	28.76	47.19
6	2.54	1.48	2.37	2.40	1.78	0.61
7	2.27	1.12	2.37	2.53	2.36	1.73
8	2.33	1.55	1.98	2.04	1.73	0.53
9	1.93	1.62	1.58	1.63	1.25	1.00
10 or more	17.42	11.52	21.34	19.30	15.91	5.62
Total	100.00	100.00	100.00	100.00	100.00	100.00

\* From Table 22 Category "T-yield"

The Contractor considered the effects of substituting the simple average PTY for the T-yield among Category C crops in the group T-yield. The general indications are the same as for the Category B crops in that changes were relatively small for most crops. However, due to the very limited acreage of some of the crops, more large divergences occurred in the Category C crops. This is believed to be the artifact of very limited data for some category C crops and states.

**Table 38. Category C Crops: Change in Program Variables for Group T-yield when Simple Average PTY is Substituted for T-yield**

Crop	Units Earning Premium	Units Indemnified	Net Insured Acres thousands	Original Loss Cost Ratio	Restated Loss Cost Ratio	Original Loss Ratio	Restated Loss Ratio	New LCR / Old LCR	New LR / Old LR
Grapes	2,919	263	50	0.034	0.031	0.440	0.410	0.924	0.931
Almonds	895	30	44	0.011	0.012	0.164	0.185	1.071	1.134
Peaches	1,314	631	19	0.472	0.460	1.901	2.162	0.975	1.138
Navel Oranges	637	75	18	0.043	0.038	0.616	0.545	0.880	0.885
Apples	1,412	302	16	0.082	0.078	1.477	1.397	0.948	0.946
Prunes	264	93	10	0.209	0.205	1.193	1.182	0.984	0.991
Table Grapes	388	55	7	0.056	0.042	0.677	0.517	0.755	0.764
Plum	787	157	7	0.061	0.059	0.464	0.453	0.974	0.978
Walnuts	205	17	6	0.029	0.027	0.520	0.487	0.944	0.937
Fresh Nectarines	652	55	5	0.029	0.028	0.344	0.338	0.980	0.980
Pumpkins	90	0	4	0.000	0.000	0.000	0.000	-	-
Valencia Oranges	209	14	4	0.032	0.031	0.366	0.354	0.966	0.966
Processing Cling Peaches	457	31	4	0.034	0.033	0.726	0.705	0.968	0.971
Fresh Freestone Peaches	537	51	3	0.025	0.018	0.431	0.317	0.721	0.736
Blueberries	377	79	2	0.092	0.095	1.042	1.084	1.034	1.040
Mandarins	105	8	1	0.040	0.032	0.339	0.274	0.811	0.807
Avocado	36	1	0	0.000	0.004	0.000	0.040	-	-
Macadamia Nuts	2	0	0	0.000	0.000	0.000	0.000	-	-
Cranberries	70	12	0	0.070	0.050	1.193	0.778	0.715	0.652
Figs	7	0	0	0.000	0.000	0.000	0.000	-	-
Pears	473	16	0	0.007	0.006	0.264	0.207	0.764	0.787
Grapefruit	42	3	0	0.029	0.028	0.426	0.426	0.980	1.000
Lemons	78	5	0	0.172	0.148	2.012	1.680	0.860	0.835
Mineola Tangelos	60	6	0	0.039	0.037	0.393	0.367	0.942	0.933
Sweet Oranges	12	1	0	0.088	0.079	1.333	1.167	0.895	0.875
Fresh Apricots	62	15	0	0.137	0.154	1.133	1.284	1.121	1.133
Processing Apricots	20	5	0	0.057	0.064	0.500	0.526	1.130	1.053
Processing Freestone Peaches	33	3	0	0.000	0.000	0.000	0.000	-	-
Early and Midseason Oranges	81	10	0	0.050	0.041	0.714	0.576	0.807	0.806
Late Oranges	38	6	0	0.027	0.025	0.162	0.152	0.922	0.934
All Other Grapefruit	1	0	0	-	-	-	-	-	-
Ruby Red Grapefruit	23	0	0	0.000	0.000	0.000	0.000	-	-
Rio Red & Star Ruby Grapefruit	114	22	0	0.087	0.076	0.440	0.387	0.883	0.879
<b>Grand Total</b>	<b>12,310</b>	<b>1,966</b>	<b>196</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

### SECTION III. SUMMARY OF FINDINGS

The Contract precludes presentation of any Contractor recommendations derived from this analysis. Consequently, the derived values must speak for themselves. To that end, this summary is presented in place of specific conclusions, which would include elements of judgment inherent in specific recommendations. The Contractor examined the impacts of replacing T-yields with three distinct approaches to calculating a PTY: simple average, acreage-weighted average, and production-weighted average. The impacts for each of these alternative transitional yield calculation approaches were separately estimated for Category B and Category C crops. Within each Category, estimates were made separately for all units that had used T-yields calculated using currently accepted approaches and for the total of all units included in each Category.

The results, measured in terms of change in the loss cost ratio, are summarized in Tables 1 and 2 (found in the executive summary). Use of the production-weighted PTY resulted in the greatest impact on both Categories B and C crops. Loss cost ratios increased 4.65 and 12.72 percent, for crops in Category B and crops in Category C respectively, for units where T-yields were already used in some form, and 7.29 and 6.53 percent for all units with Type 15 records. Both the simple average and the acreage-weighted PTY were associated with relatively small decreases in the loss cost ratio for the Category B crops but indicated a small increase for the Category C crops. Changes in loss ratios generally had the same sign as the changes in loss cost ratios and tended to be larger when measured as a percentage of the original value calculated using the currently accepted PTY procedures.

The results when simple average PTYs were substituted for T-yields were substantially the same for individual crops as for the aggregated crop data. Changes in the loss cost ratio and the loss ratio generally were small. Considering the relationship between the insurance attributes for simple average PTY and acreage-weighted PTY for the aggregated data, the same would be expected for substitution of the acreage-weighted PTY for T-yields. No one crop stands out as an extreme outlier when insurance attributes are evaluated by crop.

Finally, an interesting finding of this analysis relates to the relationship of PTY to T-yield among yield limitation flags. For units classified with the flag “APH”, the PTY was larger than the T-yield in a very high percentage of the cases. For units classified with the flag “floor”, the PTY was smaller than the T-yield in nearly all cases. For units classified with the flag “substitution”, the relationship was closer to 50/50, but the PTY was smaller than the T-yield in more cases than those where the T-yield was smaller. These results were observed for both crop categories.

RMA’s objectives for this report, as identified in the SOW (Combined Solicitation page 38), are:

*“to evaluate the North Dakota PTY Insurance Program and provide:*

- 1) An assessment of the impact of requiring use of the PTY within the pilot area, as opposed to allowing producers to elect it as an option;*
- 2) An assessment on [the effects of] an alternative PTY using a weighted average in the PTY summary database; and*
- 3) An assessment of the feasibility of expanding the program beyond North Dakota as a program requirement as either the existing Pilot PTY or Alternative PTY.”*

The SOW then continues, stating:

*“The feasibility assessment should be a clear and complete analysis of the impact associated with expanding the option as a program requirement, however, RMA does not want the contractor to provide a specific recommendation, but rather to lay out all the issues to consider and weigh regarding any decision to make the pilot program part of the program requirements.”*

Results for all crops in the Category (B or C) in aggregate at the national level are presented in this report, except when individual crops are considered. In that case, data for the crop is reported at the national level. The estimated impacts of requiring the use of the simple average PTYs on a national basis for the yield-based crops in RMA’s database is addressed by comparing Tables 4 and 5 (for Category B crops) and Tables 23 and 24 (for Category C crops). The estimated impacts of requiring the use of the weighted PTYs on a national basis for the yield-based crops in RMA’s database is addressed by comparing Tables 4, 6, and 7 (for Category B crops) and Tables 23, 25, and 26 and 24 (for Category C crops). Since the effects of alternative approaches are relatively small (even if the crop uses Master Yields and simple average T-yields for added land) greater discussion by crop or region within the main body of the report was not deemed crucial to an understanding of the effects associated with the alternative approaches. Disaggregated data by crop and region have been provided digitally should RMA desire to examine a particular crop at a finer scale.

For producers whose yields fall well below the county average, floors, cups, and yield substitutions are intended to mitigate the effects of particularly bad years on insurance guarantees going forward. The movement of yields among these database flags and the effects on insurance experience are addressed in Tables 20 through 29 of Deliverable 1 (for eligible crops in North Dakota) and Tables 9 through 14 (for Category B crops) and Tables 28 through 33 (for Category C crops) of this report. Inasmuch as use of 60 percent of PTY in yield substitutions maintained a very large percentage (>98 percent) of the T-yield substitutions in the yield limitation class “Substitution” and resulted in substantial movement from the class “Actual Yield” to the class “Substitution,” it is clear that using higher percentages of PTY in establishing values for substitution would accentuate these effects.

The Contractor found no evidence in North Dakota of program abuse. Although stakeholders indicated they were aware of the potential for yield building by farming limited acres in early years with exceptional attention to management, in fact, the learning curve for production of most crops requires such attention just to maintain a “normal” yield. Standard underwriting procedures should identify cases of fraud. Use of the Inconsistent Yield procedure<sup>4</sup> provides a mechanism to address unusual yield and acreage patterns in early years of production. The

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<sup>4</sup> The “Inconsistent Yield” procedure addresses both unusually high yields and the pattern of acreage planted from one year to the next. Each approved yield is compared to 1.15 times the simple average of all Databases or the applicable county T-yield if there is only one Database. Any Database that is greater than the 1.15 times the average is then subject to acreage limitations for the following year. If the acreage planted the following year on this Database is greater than 400 percent of the average acreage on this Database or if there are 2 or more APH crop years within the Database that are less than 10 percent of the insurable acreage planted the following year, then it is considered “inconsistent.” The producer must then submit an explanation as to why the acreage and yield patterns occurred and may also have to submit production records and acreage verification.

combination of production from different units in the PTY database should limit the administrative burden of this procedure to cases where attention is particularly required.

The simplest summary estimating the loss performance for North Dakota based on the alternative approaches in calculating PTY is found in Table 13 of Deliverable 1. Estimates of the effects of alternative PTY calculation procedures on the Loss Cost Ratio at the national level are found in Tables 1 and 2 of this report. Similarities in outcomes of using a simple average PTY and an acreage-weighted PTY are illustrated throughout both deliverables, including Table 12 of Deliverable 1 and in Tables 1, 2, 5 and 7, and Tables 24 and 26 of this report. The data in Tables 1 and 2 of this report illustrate substantial differences in using PTY for Category B and Category C crops. Effects of using simple average PTY by crop are evident in Table 4 of Deliverable 1 and Tables 21 and 38 of this report. This is not to say that data in other tables should not be considered as changes in procedure are contemplated. The wide range of comparisons that can be made in considering the effects of procedural changes is evident in the alternative analyses presented in the revised Deliverable 1 and the differential effects illustrated in this report.

In preparing these analyses, the Contractor did not incorporate the surcharge in establishing premium (and therefore in determining the Loss Ratio and Loss Cost Ratio). It is neither feasible, nor desirable to attempt to recreate all the elements of the DAS in comparing hypothetical situations. Doing so introduces elements that render the comparison invalid because each outcome is defined by its unique situation. No summary would be possible. Consequently, the Contractor used normalized data and standardized situations to provide a valid basis for comparison.

The best measure of the impact of using PTY on rating is a comparison of the Loss Cost Ratio for each transitional yield approach. Ultimately, the specific impact of requiring the use of PTY on rating will depend on whether a simple average or a weighted PTY is used. Regardless, the effects on rating will be small. However, as with all RMA products, the effects on rating will need to be evaluated at the crop and county level.

A more substantial, and less quantifiable, impact on rates will be if the PTY is retained as an option rather than as a program requirement. If choice is allowed, the selection of a transitional yield approach (T-yield or PTY) by producers to maximize their guarantees and minimize their premiums may need to be addressed by a rate surcharge for use of PTY. Currently in North Dakota, if a producer uses PTY, an option surcharge is assessed. The PTY option surcharge sometimes varies by county/crop/P/T/V. If the PTY program is offered as an option nationwide, assessment of an appropriate surcharge will depend on the specific manner in which the PTY is calculated and county/crop level experience. In addition, the PTY calculation approach will influence the rate yield, which in turn affects the yield ratio and ultimately the premium rate.

## SECTION IV. ADDENDUM

This addendum was prepared to address RMA comments following the submission of the initial report. These materials include analysis of Master Yields, Simple Average T-yield Procedures for added land, and a study on the distributional effects of Simple Average PTY substitution.

### IV.A. Master Yields

Normalized data and the PTY alternative calculations for master yield crops are included in Table 39. These data include all units of the eligible crops. In contrast to other crops, the crops eligible for master yield have two possible procedures to establish a unit guarantee. An approved yield can be based on standard APH procedures or, at the producer's option, the master yield procedures can be selected. If selected, the master yield applies to the entire contract. The calculation of the master yield is substantially similar to the procedures for a simple average PTY with the exception that at least four continuous crop years of production reports must be certified for master yields. In addition, both an operator and a landlord must select the master yield option. The other substantive difference is in use. When the master yield option is selected, the approved yield for a unit is the master yield regardless of the number of actual yields certified for that unit or the average of those actual yields. In contrast, the PTY functions in a manner similar to a T-yield. Only one actual yield for a practice/type/variety/T-Map area (P/T/V/TMA) at the policy level is required to establish the PTY.

**Table 39. Normalized Experience Data for Crops Eligible for Master Yield and Alternative PTY Computations, 2007-2009**

Year	Units Insured	Units Indemnified	Net Acres	Liability	Total Premium	Indemnity	Loss Cost Ratio	Loss Ratio
Normalized Data								
2007	42,801	7,261	2,856	1,624,600	118,309	44,798	0.028	0.379
2008	40,717	7,367	2,730	1,845,436	136,028	109,609	0.059	0.806
2009	43,205	4,727	3,003	2,214,608	156,770	67,372	0.030	0.430
Totals	126,723	19,355	8,589	5,684,644	411,107	221,779	0.039	0.539
Simple Average PTY								
2007				1,634,151	118,532	44,073	0.027	0.372
2008				1,859,276	136,633	108,710	0.058	0.796
2009				2,232,730	157,187	66,474	0.030	0.423
Totals				5,726,157	412,352	219,257	0.04	0.532
Percent Change Relative to Normalized Data				0.7	0.3	-1.1	-1.9	-1.4
Production Weighted PTY								
2007				1,603,101	114,716	44,480	0.028	0.388
2008				1,828,314	132,652	108,605	0.059	0.819
2009				2,195,281	152,670	66,407	0.030	0.435
Totals				5,626,696	400,038	219,492	0.0390	0.549
Percent Change Relative to Normalized Data				-1.0	-2.7	-1.0	0.0	1.7
Acre Weighted PTY								
2007				1,582,513	113,279	42,661	0.027	0.377
2008				1,804,038	130,844	104,314	0.058	0.797
2009				2,164,095	150,473	62,203	0.029	0.413
Totals				5,550,646	394,596	209,178	0.038	0.530
Percent Change Relative to Normalized Data				-2.4	-4.0	-5.7	-3.4	-1.7



In one respect, the impact of any of the PTY weighting options with respect to the crops eligible for master yields is similar to the impact for all Category B crops: the aggregate impact is relatively small. Two differences exist: first, the behavior of the acreage weighted PTY does not substantively resemble the simple average PTY. In the aggregated data, the outcomes of these alternatives were very similar. The Contractor did note that the relatively larger difference in the loss cost ratio for the acre weighted PTY (-3.4 percent) compared to the difference in the loss cost ratio for simple average PTY (-1.9 percent) is mostly a function of the low level of the actual loss cost. If taken to four decimal places, the data for loss cost ratio would show 3.90 percent (normalized data), 3.83 percent (simple average), and 3.77 percent (acre weighted). Second, the impact of the production weighted PTY is smaller than observed for the aggregated data. Regardless of the specific, but relatively minor differences in the aggregate results among the alternatives, the impact of PTY relative to the aggregate of master yield crops is not great.

Table 40 compares the impacts of alternative PTY approaches for units on policies that elected to follow standard APH procedures rather than select the master yield option. These units utilized T-yields, either to complete a database, to set a floor value, or to perform a yield substitution. These units represent over 40 percent of the total acres and slightly more than 30 percent of the liability of crops eligible for master yields. The changes mirror those for all units but have greater magnitude. The simple average has the greatest impact in terms of reducing the loss cost ratio and loss ratio.

**Table 40. Normalized Experience Data for Crops Eligible for Master Yield but that Used T-yields, and Alternative PTY Computations, 2007-2009**

Year	Units Insured	Units Indemnified	Net Acres	Liability	Total Premium	Indemnity	Loss Cost Ratio	Loss Ratio
Normalized Data								
2007	17,463	3,417	1,156	466,454	42,200	19,503	0.042	0.462
2008	16,241	3,513	1,101	567,973	51,219	46,795	0.082	0.914
2009	17,948	2,430	1,251	703,056	61,335	39,445	0.056	0.643
Totals	51,652	9,360	3,508	1,737,483	154,754	105,743	0.061	0.683
Simple Average PTY								
2007				475,046	42,363	18,718	0.039	0.442
2008				581,678	51,755	46,337	0.080	0.895
2009				719,411	61,640	38,741	0.054	0.629
Totals				1,776,135	155,758	103,796	0.058	0.666
Percent Change Relative to Normalized Data				2.2	0.6	-1.8	-4.0	-2.5
Production Weighted PTY								
2007				438,996	38,195	18,622	0.042	0.488
2008				544,853	47,369	45,225	0.083	0.955
2009				675,727	56,710	37,811	0.056	0.667
Totals				1,659,576	142,274	101,658	0.061	0.715
Percent Change Relative to Normalized Data				-4.5	-8.1	-3.9	0.6	4.6

**Table 40. Normalized Experience Data for Crops Eligible for Master Yield but that Used T-yields, and Alternative PTY Computations, 2007-2009 (continued)**

	Acre Weighted PTY				
2007	423,252	37,114	17,245	0.041	0.465
2008	526,033	45,980	41,941	0.080	0.912
2009	650,574	54,932	34,582	0.053	0.630
Totals	1,599,859	138,026	93,768	0.059	0.679
Percent Change Relative to Normalized Data	-7.9	-10.8	-11.3	-3.7	-0.6

Tables 41 and 42 contain data by crop which corresponds to Tables 39 and 40, respectively. Although only the simple average PTY results are displayed, a similar effect would result from the alternative PTY calculation methods. The amounts of change by crop are relatively small with outliers in percentage terms being due at least in part to the small magnitude of premium and indemnity for certain crops. Table 43 compares the total changes in liability, premium, and indemnity by crop to the changes in these variables on units that used the T-yield in lieu of electing the master yield for the policy. Virtually all of the change in these variables was due to replacing T-yields with a simple average PTY. Stated another way, the liability, premium, and indemnity for the crops eligible for master yield changed very little in the aggregate on the 60 percent of acres and 70 percent of liability that elected to use the master yield procedures or that had four or more actual yields and did not elect yield substitution or qualify for a floor.

**Table 41. Normalized Data and Impact of Simple Average PTY Substitution, Crops Eligible for Master Yields, 2007-2009**

Crop	Units Insured	Units Indemnified	Net Acres	Liability	Total Premium	Indemnity	Loss Cost Ratio	Loss Ratio
Normalized Data								
Onions	3,644	1,076	117	266,580	40,305	37,856	0.142	0.939
Canola	2,010	845	173	30,292	3,544	6,027	0.199	1.701
Sugar Beets	33,678	4,700	2,281	1,471,907	88,040	54,868	0.037	0.623
Sweet Corn, C&P	9,730	758	637	261,526	14,658	9,825	0.038	0.670
Beans, Processing	4,724	886	261	105,230	10,961	5,356	0.051	0.489
Beans, Dry	30,601	4,662	1,666	580,987	67,786	33,068	0.057	0.488
Peas, Green	8,138	1,580	454	180,320	21,267	10,393	0.058	0.489
Peas, Dry	11,986	2,947	1,260	179,422	20,963	19,325	0.108	0.922
Potatoes	13,954	1,517	1,076	1,595,406	113,805	34,573	0.022	0.304
Tomatoes, Fresh Market & GP	122	14	4	15,688	1,128	1,145	0.073	1.015
Tomatoes, Processing	8,136	370	646	997,270	28,639	9,326	0.009	0.326
<b>Grand Total</b>	<b>126,723</b>	<b>19,355</b>	<b>8,575</b>	<b>5,684,628</b>	<b>411,096</b>	<b>221,762</b>	<b>0.039</b>	<b>0.539</b>
Simple Average PTY								
Onions				268,620	40,240	35,812	0.133	0.890
Canola				30,145	3,588	5,878	0.195	1.638
Sugar Beets				1,483,233	88,397	55,039	0.037	0.623
Sweet Corn, C&P				266,423	14,792	10,050	0.038	0.679
Beans, Processing				108,923	11,303	5,434	0.050	0.481
Beans, Dry				590,799	67,904	34,221	0.058	0.504
Peas, Green				180,524	21,235	10,098	0.056	0.476
Peas, Dry				174,011	21,037	18,546	0.107	0.882
Potatoes				1,599,160	114,029	33,677	0.021	0.295
Tomatoes, Fresh Market & GP				15,085	1,148	1,028	0.068	0.895
Tomatoes, Processing				1,009,220	28,664	9,461	0.009	0.330
<b>Grand Total</b>				<b>5,726,143</b>	<b>412,337</b>	<b>219,244</b>	<b>0.038</b>	<b>0.532</b>
Percent Change								
Onions				0.8	-0.2	-5.4	-6.1	-5.2
Canola				-0.5	1.2	-2.5	-2.0	-3.7
Sugar Beets				0.8	0.4	0.3	-0.5	-0.1
Sweet Corn, C&P				1.9	0.9	2.3	0.4	1.4
Beans, Processing				3.5	3.1	1.5	-2.0	-1.6
Beans, Dry				1.7	0.2	3.5	1.8	3.3
Peas, Green				0.1	-0.2	-2.8	-2.9	-2.7
Peas, Dry				-3.0	0.4	-4.0	-1.0	-4.4
Potatoes				0.2	0.2	-2.6	-2.8	-2.8
Tomatoes, Fresh Market & GP				-3.8	1.8	-10.2	-6.6	-11.8
Tomatoes, Processing				1.2	0.1	1.4	0.2	1.4
<b>Grand Total</b>				<b>0.7</b>	<b>0.3</b>	<b>-1.1</b>	<b>-1.9</b>	<b>-1.4</b>

**Table 42. Normalized Data and Impact of Simple Average PTY Substitution, Crops Eligible for Master Yields that Used T-yields, 2007-2009**

Crop	Units Insured	Units Indemnified	Net Acres	Liability	Total Premium	Indemnity	Loss Cost Ratio	Loss Ratio	
									Normalized Data
Onions	2,226	787	61	138,307	22,599	26,873	0.194	1.189	
Canola	1,486	648	115	19,447	1,873	4,347	0.224	2.321	
Sugar Beets	6,904	1,168	436	254,802	17,368	13,189	0.052	0.759	
Sweet Corn, C&P	5,035	434	337	135,467	7,929	5,644	0.042	0.712	
Beans, Processing	2,865	488	157	60,625	6,247	2,837	0.047	0.454	
Beans, Dry	14,674	2,318	858	281,795	35,422	17,718	0.063	0.500	
Peas, Green	4,761	902	271	104,254	13,032	6,727	0.065	0.516	
Peas, Dry	7,498	1,964	834	103,854	14,270	13,908	0.134	0.975	
Potatoes	4,370	572	247	341,689	27,014	11,933	0.035	0.442	
Tomatoes, Fresh Market & GP	29	7	0	5,739	387	761	0.133	1.966	
Tomatoes, Processing	1,804	72	180	291,490	8,594	1,792	0.006	0.209	
<b>Grand Total</b>	<b>51,652</b>	<b>9,360</b>	<b>3,496</b>	<b>1,737,469</b>	<b>154,735</b>	<b>105,729</b>	<b>0.061</b>	<b>0.683</b>	
					<b>Simple Average PTY</b>				
Onions				140,242	22,611	25,144	0.179	1.112	
Canola				19,234	1,912	4,204	0.219	2.199	
Sugar Beets				265,008	17,474	13,465	0.051	0.771	
Sweet Corn, C&P				139,781	8,017	5,876	0.042	0.733	
Beans, Processing				63,587	6,518	2,939	0.046	0.451	
Beans, Dry				292,822	35,739	18,811	0.064	0.526	
Peas, Green				104,138	12,962	6,447	0.062	0.497	
Peas, Dry				100,233	14,438	13,149	0.131	0.911	
Potatoes				344,338	27,072	11,226	0.033	0.415	
Tomatoes, Fresh Market & GP				5,086	408	641	0.126	1.571	
Tomatoes, Processing				301,651	8,590	1,882	0.006	0.219	
<b>Grand Total</b>				<b>1,776,120</b>	<b>155,741</b>	<b>103,784</b>	<b>0.058</b>	<b>0.666</b>	
					<b>Percent Change</b>				
Onions				1.4	0.1	-6.4	-7.7	-6.5	
Canola				-1.1	2.1	-3.3	-2.2	-5.3	
Sugar Beets				4.0	0.6	2.1	-1.8	1.5	
Sweet Corn, C&P				3.2	1.1	4.1	0.9	3.0	
Beans, Processing				4.9	4.3	3.6	-1.2	-0.7	
Beans, Dry				3.9	0.9	6.2	2.2	5.2	
Peas, Green				-0.1	-0.5	-4.2	-4.1	-3.6	
Peas, Dry				-3.5	1.2	-5.5	-2.0	-6.6	
Potatoes				0.8	0.2	-5.9	-6.6	-6.1	
Tomatoes, Fresh Market & GP				-11.4	5.4	-15.8	-5.0	-20.1	
Tomatoes, Processing				3.5	0.0	5.0	1.5	5.1	
<b>Grand Total</b>				<b>2.2</b>	<b>0.7</b>	<b>-1.8</b>	<b>-4.0</b>	<b>-2.5</b>	

**Table 43. Source of Change in Liability, Premium, and Indemnity for Crops Eligible for Master Yield, 2007-2009**

Crop	All Units			T-yield Units			Difference		
	Liability	Premium	Indemnity	Liability	Premium	Indemnity	Liability	Premium	Indemnity
Onions	2,040	(65)	(2,044)	1,935	12	(1,729)	105	(77)	(315)
Canola	(147)	44	(149)	(213)	39	(143)	66	5	(6)
Sugar Beets	11,326	357	171	10,206	106	276	1,120	251	(105)
Sweet Corn, C&P	4,897	134	225	4,314	88	232	583	46	(7)
Beans, Processing	3,693	342	78	2,962	271	102	731	71	(24)
Beans, Dry	9,812	118	1,153	11,027	317	1,093	(1,215)	(199)	60
Peas, Green	204	(32)	(295)	(116)	(70)	(280)	320	38	(15)
Peas, Dry	(5,411)	74	(779)	(3,621)	168	(759)	(1,790)	(94)	(20)
Potatoes	3,754	224	(896)	2,649	58	(707)	1,105	166	(189)
Tomatoes, Fresh Market & GP	(603)	20	(117)	(653)	21	(120)	50	(1)	3
Tomatoes, Processing	11,950	25	135	10,161	(4)	90	1,789	29	45
<b>Grand Total</b>	<b>41,515</b>	<b>1,241</b>	<b>(2,518)</b>	<b>38,651</b>	<b>1,006</b>	<b>(1,945)</b>	<b>2,864</b>	<b>235</b>	<b>(573)</b>

Data regarding substitution of alternative PTY calculations by crop are not included in the written report since the results are similar to the information contained in Tables 41 and 42 relative to Tables 39 and 40 for the simple average PTY. The data for the alternative calculations are included on a data disk included with this report.

#### **IV.B. Simple Average T-yield (SA T-yield) Procedures for Added Land**

Normalized data and the impacts of simple average PTY substitution for SA T-yields are included in Table 44. The units included in this table represent about nine percent of units earning premium, eight percent of net insured acres, and nine percent of liability for category B crops. The results are substantially the same as those reported for all category B crops – increases in liability and premium with decreases in indemnity, loss cost ratio, and loss ratio. With the exception of liability, the percentage changes are smaller than category B crops considered as a whole. The data represent 36 crops, with corn (41.6 percent of acres), soybeans (32.0 percent), wheat (16.3 percent), cotton (3.8 percent), and grain sorghum (2.4 percent) accounting for the bulk of the acreage. SA T-yield Procedures for added land for no other crop accounted for more than 0.8 percent of the total acres. Detailed data are located on the data disk if more information is desired.

**Table 44. Normalized Experience Data for Units Using Simple Average T-yield for Added Land and Simple Average PTY Computation, 2007-2009**

Year	Units Insured	Units Indemnified	Net Acres	Liability	Total Premium	Indemnity	Loss Cost Ratio	Loss Ratio
Normalized Data								
2007	199,573	46,989	11,921	3,576,437	304,239	244,437	0.068	0.803
2008	222,976	91,551	13,269	5,470,170	449,998	366,243	0.067	0.814
2009	213,069	28,371	14,266	4,853,536	442,635	167,083	0.034	0.377
Total	635,618	166,911	39,456	13,900,143	1,196,872	777,763	0.056	0.650
Simple Average PTY								
2007				3,623,257	306,174	245,069	0.068	0.800
2008				5,542,649	453,255	365,024	0.066	0.805
2009				4,897,400	446,300	164,334	0.034	0.368
Total				14,063,306	1,205,729	774,427	0.055	0.642
Percent Change from Normalized Data				1.17	0.74	-0.43	-1.58	-1.16
Percent Change for all Category B crops				0.60	1.68	-1.62	-2.23	-3.36

SA T-yield usage occurred in 46 states, with Minnesota (12.5 percent), Iowa (12.2 percent), South Dakota (10.2 percent), Nebraska (10.1 percent), Kansas (8.7 percent), and Illinois (6.6 percent) accounting for over one-half of the acreage. All the remaining states had less than five percent of the acres included in this category. Detailed data are available on the data disk. The alternative weighted indices are not reported since no previous analysis demonstrated large differences when these alternatives were substituted.

#### IV.C. Distributional Effects of Simple Average PTY Substitution

The information in this section was presented at the second oral report on this contract. It is included herein for completeness of written results.<sup>5</sup>

The Contractor calculated a percentage change in the approved yield. These changes were ranked, and then divided into ten equal segments, or deciles. For example, if the range of changes was -60 percent to +40 percent, the size of each segment would have been 10 points. The associated change in liability, premium, and indemnity within each segment was summed. Table 45 reports these results.

<sup>5</sup> These data were included on the data disc provided with the second written deliverable. The information in Table 45 was prepared to respond to questions raised at the first oral report.

**Table 45. Distribution of Changes to Category B Crops with Simple Average PTY Substitution**

Group	Acres	Liability	Premium	Indemnity	Loss Ratio	Change in Liability
					Indication	\$/Acre
			1,000			
10	17,108	(706,530)	34,501	(207,181)	L	(41.30)
20	21,127	(282,961)	8,983	(54,109)	L	(13.39)
30	36,790	(75,295)	2,058	(20,729)	L	(2.05)
40	37,847	23,686	1,717	(6,714)	L	0.63
50	38,471	167,028	1,331	14,901	H	4.34
60	34,936	170,089	3,120	9,963	H	4.87
70	34,510	229,476	5,776	17,326	H	6.65
80	31,463	241,435	7,523	18,221	H	7.67
90	29,634	258,394	10,296	17,457	H	8.72
100	26,186	350,803	21,201	11,968	L	13.40
Total	308,072	376,125	96,506	(198,897)	L	1.22

Groupings 10 to 30, representing almost 25 percent of the net acres, had a reduction in liability as a result of the simple average PTY substitution to complete a database, for a yield substitution, or to establish a yield floor. This is consistent with the data reported in Table 16 of the second written deliverable, which shows that the PTY was less than the T-yield in 20.3 percent of the cases for the Type 11 records reported for insurance during 2007-2009 when those Type 11 records matched the Type 15 records. These three groups had significant decreases in indemnity. Since the indemnities decreased and premiums increased, the loss ratio necessarily would be lower for these groups under PTY. The last column of the table indicates the magnitude of the decreased liability in terms of a dollar amount per net insured acre included in the group.

All remaining groups, with the exception of group 40, had increases in liability, premium, and indemnity. Group 40 showed a decrease in indemnity. Loss ratios, with the exception of groups 40 and 100, are indicated to increase since the indemnity increases more than the premium in groups 50 through 90. The magnitude of the loss ratio changes in any category, with the possible exception of groups 10 and 20, is likely to be small since these changes generally are ten to twenty millions of dollars as compared to about six billion dollars of indemnity and nine billion dollars of premium.

These data demonstrate that, although the aggregate changes from introducing PTY are likely to be small, some units will incur larger impacts. This is particularly true of units that currently use T-yields that are substantially higher than the expected yields implied by their own history (or PTY).

## SECTION V. OVERALL ASSESSMENT OF THE FINDINGS

The Solicitation requires the Contractor to refrain from making recommendations regarding the implementation of PTY, whether on a discretionary basis as it is with the North Dakota pilot or on a mandatory basis to replace the routine use of the T-yield. Nonetheless, it is obvious that

some form of a proxy yield will be needed if PTY is introduced since some policies will not have even one actual or assigned yield for one or more P/T/V/TMA.

#### *Voluntary PTY Implications*

The most obvious implication of a voluntary PTY can be deduced from Table 45. Producers with units that would have the greatest reductions in liability and potential indemnities (groups 10 through 40) most likely would not elect PTY but instead would remain with the T-yield option. Thus, rather than a reduction of around \$300 million in indemnities, an increase up to \$100 million is more likely. The exact amount of increase cannot be estimated with certainty since all eligible policies that would receive a benefit may not elect to participate. It is more likely that the policies that would be adversely impacted will decline to participate in a voluntary PTY option.

A second implication is that under a voluntary PTY system, RMA must be constantly reviewing an appropriate loading of premiums. The effects are not evenly distributed, but will vary by P/T/V/TMA, by crop, by state, and by county. The surcharge will be affected by differences in participation in PTY among these variables. This adds to the workload for the rating processes.

A third implication is that agents would assess the option most advantageous to an individual producer and recommend that option. This creates additional workload for agents in particular. The Contractor notes that those agents who chose to participate in voluntary discussions about the PTY did not identify this matter as an issue. Since these responses were not from a random sample but instead represent a self-selected sample of persons with a specific interest, this position may not be universally acceptable among agents.

A fourth implication is that higher yielding producers will have an option to choose a proxy yield that may more accurately reflect their production capabilities. This potential depends upon recent weather and its impacts on crop production and the length of the producer's experience for a P/T/V/TMA. A short history and bad production conditions will result in a relatively low PTY. Some of the issues that led to creation of the pilot program then do not disappear but may be exacerbated.

#### *Mandatory PTY Implications*

The most obvious implication of a mandatory PTY also can be deduced from Table 45. Producers that presently are in the groups that would have the greatest negative change in approved yields would incur a significant reduction in insurance guarantees and higher premiums. Theoretically, this should be the natural outcome of the APH system – as experience accrues, it is incorporated into APH databases and approved yields change accordingly. In this sense, a mandatory PTY program may only accelerate the natural process. This presupposes unit management under the present system is not possible and the actual yields will be built into the APH database relatively rapidly.

A second implication of mandatory PTY is lesser need to impose surcharges. Experience across the yield ratios for crops with this system for determining a premium rate will become integrated into the base premium rates and exponents. This also would occur if a surcharge is imposed in the interim, but the question then becomes one of determining when it no longer is necessary.



For crops that do not use yield ratio to determine premium rates (crops that have a flat premium rate regardless of the unit's yield relative to a reference yield), experience also ultimately will be reflected in that flat rate and thereby render a surcharge unnecessary.

A third implication of mandatory PTY relative to a voluntary approach is reduced complexity in the program. A single method for establishing the approved yield when fewer than four actual yields are available for a unit does reduce complexity. The Congress has identified program complexity as a matter of some concern. For example, section 508(k)(5) directs the Corporation to "... alter program procedures and administrative requirements ..." to reduce costs to reflect reductions in administrative and operating expense reimbursement mandated by the Act. A mandatory PTY rather than a voluntary approach is consistent with that mandate.

A fourth implication mirrors the fourth implication related to a voluntary PTY, except that it no longer is an option. Higher yielding producers will have a yield history that may more accurately reflect their production capabilities. However, this potential depends upon recent weather and its impacts on crop production and the length of the producer's experience for a P/T/V/TMA. A short history and bad production conditions will result in a relatively low PTY. Some of the issues that led to creation of the pilot program then do not disappear but may be exacerbated.

A fifth implication of a mandatory PTY is that lower yielding producers no longer could depend on a relatively higher T-yield to provide an artificially higher guarantee or encourage them to seek ways to avoid full application of the APH procedures.

A sixth implication of a mandatory PTY, and to a lesser extent of a voluntary PTY, is the loss of relevance of the floor as a meaningful limitation to any erosion of yields that may occur. Since PTYs are the T-yields, a single unit at a P/T/V/TMA level on a policy can never qualify for the floor. The PTY is the average of all actual yields on that unit and cannot be both the approved yield and 60 percent of itself. Consideration of the continuing utility of a floor must be part of any decision. An alternative method to approach issues that require a floor may be necessary.

#### *No PTY Implications*

There most likely are enough defenders of the status quo that any attempt to introduce any change will be resisted. The relatively small aggregate gains from introducing PTY nationally may not convince some stakeholders in the crop insurance system that a change is needed. This is a problem arising from the results that demonstrate small aggregate changes. This could lead to an attitude that the system is not broken, so why is there a need to fix it?

A second implication is that PTY does not necessarily "fix" the issues that led to introduction of a pilot. A short production history for a P/T/V/TMA coupled with poor production conditions could result in a PTY lower than the T-yield (or whatever other proxy exists for situations where fewer than four actual or assigned yields are certified for a P/T/V/TMA). In this case, there could be dissatisfaction with the PTY with demands use of the T-yield be allowed. This situation could exist if either voluntary or mandatory PTY were to be implemented.

A third implication is that no change to the status quo means no training or other expenses associated with introduction of a new feature of the crop insurance program would be needed.

The Contractor, in the foregoing discussion, has attempted to identify issues that may arise with regard to a decision regarding the future of PTY. The comments hopefully comply with the directives of the Solicitation by not providing specific recommendations, but instead “*lay[ing] out all the issues to consider and weigh regarding any decision to make the pilot program part of the program requirements.*” This is a multi-faceted decision affecting a program feature that has been in place since the mid-1980s. There are pros and cons associated with any action taken by RMA.