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# BRIEF EXPLANATION AND WORKSHEET TO EVALUATE CORN PRODUCERS PARTICIPATION DECISION IN THE 1986 USDA FEED GRAIN PROGRAM ${ }^{1}$ 

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## I. Introduction and Purpose of the Paper

Corn producers have several production/marketing alternatives for the 1986 crop year. The 1986 Feed Grains Program provides two distinct production/inarketing alternatives for corn producers. One alternative is to participate by retiring the required $20 \%$ corn base acreage and growing corn on the remaining $80 \%$ of base acreage. The second alternative is to produce corn on at least $40 \%$ of the base acreage, but grow a nonprogram crop on the acreage remaining after corn and the required retired acreage are allocated. The third obvious alternative is to not participate in the Feed Grains Program. It is the purpose of this paper to briefly explain the program and evaluate participating in the program versus non-participation.

The program is administered by the local Agricultural Stabilization and Conservation Service (ASCS) Office. The sign-up period is March 3 through April 11, 1986.

## II. General Purposes of the Feed Grain Program

- To reduce production and surplus stocks.
- To encourage exportation of U.S. feed grains.
- To provide support for net farm income.
- To provide a 'floor' below which corn prices are unlikely to fall.


## III. Structure of Program for Corn

A. Eligibility

- To be eligible for the program benefits including the deficiency payments, diversion payments and loans, you must limit your 1986 corn acreage to no more than 80 percent of the farm corn base.
- The remaining $20 \%$ must be put under conservation practices; $17.5 \%$ is labeled unpaid acreage reduction program (ARP) and the remaining $2.5 \%$ is a paid land diversion.

[^0]- You remain eligible for the program benefits as long as you plant at least $50 \%$ of your "eligible" acreage. "Eligible" acres are your base acres minus the unpaid ARP and the paid diverted acres. Another way of saying the same thing is that $40 \%$ of your corn base must be planted to corn (i.e., $40 \%=(50 \% * 80 \%)$ ). Up to the other $41.4 \%$ can be planted to a non-program crop. Additional details on this provision are presented in Sections III.D. 3 and V.C of this paper.


## B. Restrictions

- Offsetting and cross-compliance will not apply to the 1986 Program crops.
- Contracts signed by farmers are considered legally binding for required participation.
- Haying will not be permitted on the retired acreage. However, the acreage may be grazed, except during the five principal growing months as designated by county USDA officials.
- Corn must first go into regular loan for nine months before it will be eligible for reserve loan and the storage payments of $26.5 \zeta$ per bushel per year made by the Commodity Credit Corporation (CCC). There can be a cap put on the Farmer Owned Reserve.
- A $\$ 50,000$ payment limitation per farm. However, the portion of the deficiency payment due to the price being below $\$ 2.40 /$ bu is not subject to this limit.
C. BASE Acreage and Yield Determination
- Your 1986 farm corn base will be the average of 1981-1985 acreage planted and considered planted to corn. Considered planted land is land that was diverted to conservation uses due to participation in the Feed Grains Program for corn.
- The program base yield will be an Olympic average of the last 5 years' program yields (not proven yields) i.e., dropping the high and low and dividing by 3.
- If you have not certified your base acres or yield I or more of the past 5 years, there will be an opportunity to do so. It will not be easy and perhaps frustrating. However, the payoff could be very high.
D. Income RISK Protection
- Target price is $\$ 3.03$ per bushel.
- Loan rate is $\$ 1.92$ per bushel.
- Deficiency Payment Considerations

1) The deficiency payment per bushel equals the target price ( $\$ 3.03$ ) minus the average farm price or the loan rate ( $\$ 1.92$ ), whichever is greater. The maximum deficiency payment is $\$ 1.11$.
2) The deficiency payment is based on the national average farm corn price for the first five months of the corn marketing year if above $\$ 2.40 / \mathrm{bu}$ or on the entire crop marketing year if less than $\$ 2.40 / \mathrm{bu}$.
3) If you plant less than the full $80 \%$ eligible to corn, you are still eligible for $92 \%$ of the deficiency payment provided $18.6 \%$ of your corn base acreage is retired and at least $40 \%$ of corn base is planted to corn. The $18.6 \%$ retired acreage is derived from the $2.5 \%$ paid land diversion plus $92 \%$ of the $17.5 \%$ ARP; i.e. $(18.6 \%=2.5 \%+.92(17.5 \%)) /$
4) You may request $40 \%$ of the USDA projected 1986 deficiency payments ( $\$ 1.03$ ) when you sign up for the program. The deficiency payment cash advance will be reduced as $25 \%$ of the advance deficiency payment (or $10 \%$ of the total deficiency payment) is to be PIK. The cash deficiency payment may also be reduced because of the impact of the Gramm-Rudman bill. With an expected impact of the Gramm-Rudman at $4.3 \%$ reduction combined with the 10\% PIK deficiency, the cash deficiency payment per bushel of base is approximately $\$ .887 .88 .7$ c/bu $=\$ 1.03 / \mathrm{bu} \times(1-.043) \times(1-.10)$. The $40 \%$ cash advance is approximately $35.5 \mathrm{C} / \mathrm{bu}$.
5) The $25 \%$ PIK deficiency payment will be received as generic in-kind certificate with specific monetary amounts. Producers with commodities under loan must use these commodities as PIK payment.
6) The generic in-kind certificates may be sold to other producers to replace loan, commercial firms or producers who are Co-op members.

- Diversion Payment Considerations

1) The payment rate for the $2.5 \%$ paid land diversion was set at $73 \% / b u s h e l$. Total land diversion payment is $2.5 \%$ of (base yield x corn acres planted) times $73 \zeta /$ bushel. The land diversion payment will be made in generic in-kind certificates, i.e., the value of the payment divided by the value of corn gives you the number of bushels.
2) The generic in-kind certificates will be available by county after May 1 . Producers will have until September 30 or the maturity date of their loan whichever is earlier to redeem this certificate. CCC will value corn each day.

## IV. Farm Variables Critical to Participation Decision

A. Data that are unique to your farm and are critical to your decision on participation in the 1986 Feed Grains Program are:

- Farm Program Base Historical Yield as compared to expected 1986 yield on total acreage and on reduced acreage.
- Farm Program Base Acreage as compared to desired acreage for production purposes.
- Expected market price for corn as compared to calculated break-even price given your farm's expected yield and associated variable cost of production and storage.


## V. General Impressions of Three Alternatives

## A. No Participation in Program

- Highest risk as all price and yield risk are carried by farmer.
- May be attractive to those who:

1. Have low program base acreage relative to actual land available for corn production.
2. Have low base yield relative to expectations of 1986 yields--not participating becomes relatively more attractive as the difference becomes greater between program yield versus expected yield.
3. Have expectations of strong upward trend in corn prices to near $\$ 3.00$ neighborhood levels.
4. Have a high risk preference and are "betting" on high yields and/or high corn prices.
B. Participation in Program by retiring $20 \%$ of corn base acreage and planting $80 \%$ of corn base acreage to corn.
5. Corn minimum price guarantee on all corn produced in the form of the loan provisions.
6. Income support from deficiency payments.
7. Cash flow benefits from advanced payments of $40 \%$ projected deficiency payment and the value of having that money in hand plus PIK Paid Land diversion.
8. Cash flow expenditures for variable cost are decreased because of the $20 \%$ reduction in acreage planted.
9. Established floor on price, but still retain the possible gains from price increase on bushels produced.
10. The question is: "Will the benefits gained from the guaranteed loan rate on the reduced bushels produced, the diversion payment and the deficiency payments exceed the profits foregone from the acreage removed from production."
C. Participation in Prograrn at Reduced Corn Production Level.
11. If at least $40 \%$ of base acres are planted to corn and $18.6 \%$ are retired, up to the remaining $41.4 \%$ can be planted to a non-program crop. Non-proyrarn crops exclude barley, corn, cotton, oats, rice, sor ghum, soybeans, and wheat.
12. Participants receive $92 \%$ of deficiency payment that could be received with maximum corn acreage ( $80 \%$ of base acres).
13. PIK Paid Land diversion payment is not changed.
14. Corn base acreage will not be reduced using this alternative.
15. The loan provides price risk production.
16. Cash flow expenditures for corn production are reduced.
17. Remember there is an $8 \%$ penalty in the deficiency payment for this alternative. The fewer acres of non-program crop planted, the fewer acres to split the penalty.
18. The question in addition to that raised in item B. 6 above, is whether some non-program crops, e.g., vegetables, dry beans, alfalfa, can be produced that will yield a higher profit per acre as compared to corn with and without participation in the government program. Remember that without a pricing contract for these non-program crops, you must bear the downside price risk that could occur with increased production of these crops. Corn producers participating in the program have a price floor or risk protection. Nonprogram crop producers on the open market have no protection from prices that could possibly go to zero.

## VI. Other Considerations

- Participation in the acreage reduction program would also result in lower use (employment) of own farm resources as labor and equity capital. Is there a positive opportunity cost for these resources, i.e., can the resources be profitably employed either on the farm or off the farm?
- "Use" of idled land--are there land improvement projects that can be accomplished during the time period of idleness, e.g., tile drainage, fencerow clearance, establishment of forage seeding, etc.?
- Crop rotation--"Will participation result in severe disturbance to agronomic crop rotation program OR, will participation result in crop yield benefits in subsequent years due to soil improvement, etc?"
- Pest control on idled acreages--does idle acreage permit a "free" opportunity to enhance control of problem pests, be it weeds, insects or diseases?
- There are long-run benefits to the corn production sector from high participation.


## VII. Purpose of Worksheet and Example

- Attached is a blank worksheet plus one example to illustrate evaluation of three farm options: (1) No Participation; (2) Participation; (3) Participation with less than $80 \%$ of corn base planted to corn and producing non-program crops on remaining acreage.
- The method on the attached worksheet shows the gross margin (return to land, labor and equipment) of being in the program versus non-participation at an expected price. The example uses our expected prices and variable costs. For your evaluation, use your own expectations on yields, prices and variable costs as applied on your own base acreage and base yields.
- A critical question is: At what "expected" price should you sign up versus not signing up? This is called the "break-even" (B.E.) price. B.E. = (gross margin from being in the program + production expense if not in the program) divided by expected bushels to be produced (base acres times expected yield). If you expect a price less than the B.E. price, participate. If you expect a higher price, you may not choose to participate. (See B.E. of \$2.78 in Example.)


## VI I I. Worksheet Guidelines

A. Lines 1 through 9 of the worksheet present known data for the ' 86 program. These are the program numbers announced by the USDA and are needed to help calculate the expected returns of participating in the program. As can be seen each entry is numbered by line, these numbers are used in the worksheet to identify when the information on that line is used in the calculations.
B. Lines 10 through 20 are the inputs to be entered by the individual farmer. Since each individual farm will have different figures for this section, it is important that you put in your numbers in order to have an accurate scenario. Again, each item has a line number to call for it when needed in the calculations.
C. Lines 20 through 31 are used to calculate the revenue from each of three scenarios, non-participation, participation, and participation at lower corn acreage and having a non-program crop.

Sorne of the lines call for the entering of more data and other lines are used to make the necessary calculations given the inputted information. For example line 23 reads: ("23. Acres planted (line $10 *$ line $22 / 100^{\prime \prime}$ ). This line is used to calculate the number of acres actually planted to corn. To do this it calls for line 10 , which is the program base acres, and multiplies it times line 22, which is the \% of acres planted to corn, divided by 100 . The division by 100 is needed to change the $\%$ to a decimal in order to do the calculation. The calculation needs to be done for each scenario as shown below:

Not in acreage planted $=100 * 100 / 100=100$ acres planted
Participation acreage planted $=100 * 80 / 100=80$ acres planted
Participation Alt. acres corn $=100 * 40 / 100=40$ corn acres planted
Note 1. In the example $40 \%$ of base acres is planted to corn and $41.4 \%$ to nonprogram crops. You can plant $40 \%$ to $80 \%$ corn and $0 \%$ to $41.4 \%$ non-program crops.

Note 2. Expected yields are requested on Line 21. You may desire to recognize that expected yield on the reduced acreage could be higher than expected yield on entire acreage. For example, you normally expected 100 bu/acre on your entire acreage. But the $20 \%$ you set aside only yields 80 bu/acre, what would be your expected yield on the remaining $80 \%$ ? The calculation is below, but remember it is only as accurate as the numbers you put in.

```
\(\frac{\text { normal yield }-(\text { yield on diverted acres } * \% \text { diverted })}{\% \text { of base planted }}=\begin{gathered}\text { yield on actual } \\ \text { planted }\end{gathered}\)
\(\frac{100 \mathrm{bu} / \mathrm{ac}-(80 \mathrm{bu} / \mathrm{ac} * .20)}{.80}=105 \mathrm{bu} / \mathrm{ac}\)
```

Note 3. Line 29 asks for revenue from an alternative crop, here you must do the calculation of expected revenue per acre separately and enter it onto the worksheet, e.g., 13/cwt navybeans per acre times $\$ 13 /$ cwt equals $\$ 169 /$ acre.
D. Lines 32 through 41 calculate the variable expenses. Here we are only interested in the expenses that change due to the planting of a particular crop. Ignore such costs as property taxes and machinery depreciation which do not change. Again, the expenses vary from farm to farm and you should use your own farm cost data. On line 38 of the example, the $\$ 103$ is our variable expense per acre for Navybeans.
E. Line 42 gives you returns over variable costs. Here you subtract the variable expenses for each alternative, from its respective gross revenue. The result is the expected return to land, equipment, and management from each alternative. This is the critical line to be used in a farmers decision of whether or not to participate.
F. The last section of the worksheet is designed to calculate your breakeven price. This should give you some sense regarding the possibility that your decision is not the most profitable choice.

## WORKSHEET FOR EV.ALUATING THE 1986 CORN PROGRAM

## PROGRAM KNOWNS:

$\begin{array}{llll}\text { 1. } & \text { Target Price } & (\$ / \mathrm{Bu}) & \$ 3.03 \\ \text { 2. } & \text { U.S. Loan Rate } & (\$ / \mathrm{Bu}) & \$ 1.92\end{array}$
3. Formula Loan Rate $(\$ / \mathrm{Bu}) \quad \$ 2.40$
4. \% Acreage Reduction Program $17.5 \%$
5. \% Paid PIK Diversion $2.5 \%$
6. \% Advance Deficiency Payment $\quad 40.0 \%$
7. \% Advance Diversion Payment $0.0 \%$
8. \% Deficiency Payment as PIK $10.0 \%$ (is $25 \%$ of the $40 \%$ Advance Deficiency)
9. If Months, Advance Deficiency

Payment Use
12.0

## FARM INPUTS:

10. Program Base Acres
11. Program Base Yield
12. County Loan Rate

13. Annual Interest Rate
14. Expected U.S. Corn Price at Farm (Oct 86-Feb 87)
15. Expected U.S. Corn Price at Farm (Oct 86-Sept 87)
 \%
16. Expected Corn Price at your Farm(Oct 86-Sept 87)
17. USDA Expected Deficiency Payment per bushel

18. Paid Land Diversion Payment rate per bushel
19. Months Corn Storage to Obtain Expected Price

20. Expected Budget cuts due to Gramm-Rudmann Bill
$4.3 \%$

## REVENUE:

21. Expected Yield (Bu/Acre)
22. \% Planted in Corn ( $>40 \%$ and $<80 \%$ )

(for non-program alternative crop option)
23. Acres Planted (line $10 *$ line $22 / 100$ )
24. Gross From Corn (line $16 * 21 * 23$ )
25. Deficiency Payment/Bu. (DP)

If line $15>\$ 3.03, \mathrm{DP}=0$
If line $15<\$ 1.92, \mathrm{DP}=\$ 1.11$
If $\$ 3.03>$ line $15>\$ 1.92, \mathrm{DP}=\$ 3.03$-line 15
26. Deficiency Payment for Farm (\$Cash+ PIK)
(line $11 * 23 * 25) *(1-$ line $8 / 100) *(1$-line 20/100)
$+($ line $11 * 23 * 25) *($ line $8 / 100)$ and times .92 for Alt. Crop Option
27. PIK Diversion Payment (line $10 * 11 * 18 *$.025)
28. Interest Earned on Advanced Deficiency
(line $17 * 6 * 23 * 11$ )*(1-line 20/100)
(line $13 / 12$ mos. * line 9 )
and times .92 for Alt. Crop Option
29. Revenue Alternative Crop(s) (\$/Acre)
30. Gross Revenue Alternative Crop(s) (line 29 *(line 10 - line 23 - (line $10 *$.186))
31. Gross Revenue from Corn Base Acreage $\$ 2000.00 \quad \$ 24+33.9 i \quad \$ 2.243 i .94$ (line $24+26+27+28+30$ )
$\$ 0.00$

$\$ 0.00$
$\$ 0.00$.

$\$ 0.00$
$\$ 0.00$
$\$ 16900$
$\$ 0.00$
$\$ 6.996 .60^{9}$

EXPENSES:
32. Variable Costs/acre
33. Variable Costs for Corn (line $23 * 32$ )
34. Storage Costs/Bu/Month
35. Storage Costs (Line * $21 * 23 * 34$ )

* Line 19 or 9 months if in program and farm price loan rate

36. Cover Crop Costs/acre
37. Costs of Conserving Acres (line $36 * 10$ ) *. 20 or if Alt., then
$($ Line $36 * 10) * .186$

NOT IN
PROGRAM PROGRAM
IN PROGRAM +ALT CROP

IN
$\$ 160.00$
$\$ 16000.00$
$\$ 1.02$
$\$ 1000.00$
$\$ 0.00$
$\$ 0.00$
$\$ 10.00$
$\$ 200.00$
$\$ 160.00$
$\$ 6400.00$
$\$ 420.00$
$\$ 10.00$
$\$ 186.00$
$\$ 103.00$
38. Variable Costs Alt. Crop(s)/acre
39. Variable costs Alternative Crop (s)
$\$ 0.00$
$\$ 0.00$
$\$ 4264.20$
(line $38 *($ Line 10 - Line 23 - (Line $10 * .186)$ )
40. Interest on Expenses
$\$ 960.00$
$\$ 780.00$
$\$ 651.85$
(line $33+37+39$ )*
(line $13 / 12$ mos.) $* 6$ mos.
41. Total Variable Expenses (line $33+35+37+39+40$ )

## NET REVENUE:

42. Gross Margin (line 31 - line 41)
$\$ 2040$.
$\$ 9813.91$
$\$ / 0510.89$
BREAK-EVEN CORN PRICE

$\$ 17960.00$ $\qquad$ $\$ 11922.05^{-}$

## WORKSHEET FOR EVALUATING THE 1986 CORN PROGRAM

## PROGRAM KNOWNS:

1. Target Price ..... (\$/Bu) ..... \$3.03
2. U.S. Loan Rate (\$/Bu) ..... $\$ 1.92$
3. Formula Loan Rate (\$/Bu) ..... \$2.40
4. \% Acreage Reduction Program $17.5 \%$
5. \% Paid PIK Diversion ..... $2.5 \%$
6. \% Advance Deficiency Payment ..... $40.0 \%$
7. \% Advance Diversion Payment ..... $0.0 \%$
8. \% Deficiency Payment as PIK ..... 10.0 \%
(is $25 \%$ of the $40 \%$ Advance Deficiency)
9. \# Months, Advance Deficiency
Payment Use12.0

## FARM INPUTS:

10. Program Base Acres
11. Program Base Yield
12. County Loan Rate

13. Annual Interest Rate
14. Expected U.S. Corn Price at Farm (Oct 86-Feb 87)
15. Expected U.S. Corn Price at Farm (Oct 86-Sept 87)

16. Expected Corn Price at your Farm(Oct 86 - Sept 87 )
17. USDA Expected Deficiency Payment per bushel
18. Paid Land Diversion Payment rate per bushel
\$ . 73 /bu
19. Months Corn Storage to Obtain Expected Price $\qquad$ /mo
20. Expected Budget cuts due to Gramm-Rudmann Bill

## REVENUE:

21. Expected Yield
(Bu/Acre)
22. \% Planted in Corn ( $>40 \%$ and $<80 \%$ ) (for non-program alternative crop option)
23. Acres Planted (line $10 *$ line $22 / 100$ )
24. Gross From Corn (line $16 * 21 * 23$ )
25. Deficiency Payment/Bu. (DP) If line $15>\$ 3.03, \mathrm{DP}=0$
If line $15<\$ 1.92, \mathrm{DP}=\$ 1.11$ If $\$ 3.03>$ line $15>\$ 1.92, \mathrm{DP}=\$ 3.03$-line 15
26. Deficiency Payment for Farm (\$Cash+ PIK) $\$ 0.00$ (line $11 * 23 * 25) *(1$-line $8 / 100) *(1$-line 20/100) $+($ line $11 * 23 * 25) *($ line $8 / 100)$ and times .92 for Alt. Crop Option
27. PIK Diversion Payment (line $10 * 11 * 18 *$.025)
28. Interest Earned on Advanced Deficiency (line $17 * 6 * 23 * 11) *(1-$ line 20/100) (line $13 / 12$ mos. * line 9 ) and times .92 for Alt. Crop Option
29. Revenue Alternative Crop(s) (\$/Acre)
30. Gross Revenue Alternative Crop(s) (line 29 *(line 10 - line 23 - (line $10 * .186$ ))

NOT IN
PROGRAM PROGRAM PROGRAM $100 \%$

4.3 \%

## EXPENSES:

32. Variable Costs/acre
33. Variable Costs for Corn (line $23 * 32$ )
34. Storage Costs/Bu/Month
35. Storage Costs (Line * $21 * 23 * 34$ )

* line 19 or 9 months if in program and farm price loan rate

36. Cover Crop Costs/acre
37. Costs of Conserving Acres
(line $36 * 10$ ) *. 20 or if Alt., then
(Line 36*10) * . 186
38. Variable Costs Alt. Crop(s)/acre
39. Variable costs Alternative Crop(s)
(line 38*(Line 10-Line 23-(Line 10*.186))
40. Interest on Expenses
(line $33+37+39$ )*
(line 13/12 mos.) $* 6$ mos.
41. Total Variable Expenses
(line $33+35+37+39+40$ )

## NET REVENUE:

42. Gross Margin (line 31 - line 41)
\$ $\qquad$ \$ $\qquad$ \$
$\qquad$
$\qquad$ \$ $\qquad$ \$
$\qquad$
$\$ 0.00$
$\$ 0.00$
$\$ 0.00$
$\$ 0.00$
\$
$\qquad$
$\$ 0.00$
$\$ 0.00$
\$

\$
$\qquad$
\$
$\qquad$
\$ $\qquad$
$\qquad$
IN PROGRAM +ALT CROP
NOT IN
PROGRAM PROGRAM
\$ $\qquad$



[^0]:    1 Paper includes program provisions known as of February 17, 1986.
    2
    2 All authors are faculty members in the ${ }_{\mathrm{N}}^{60}$ Agricultural Economicsj, Department, Michigan State
    University.

