# Realizing Your Potential as an Agricultural Economist in Extension

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Chapter 4

# The Utilization of Applied Risk Management Tools in Extension Workshops

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The topic of risk management in extension workshops has traditionally been difficult to teach because it has been theoretical in approach, and required a knowledge of statistics. Early extension educational efforts on risk managements were developed by Nelson, et al., and Harris and Nelson. Those efforts, using slides and printed materials, provided a very good approach to teaching risk management.

One objective of this National Extension Workshop was to review statistical methods for extension faculty. One must thoroughly understand a subject before one might effectively teach it. Many people currently on extension facilities have been out of their graduate programs for several years, and have not had a reason to use their training in statistical procedures.

Skees utilized three approaches in developing prior probabilities for prices and yields. Those included elicitation of subjective probabilities, use of historical data, and use of forecast data. In Skees' review of the literature, he suggests that individual decision makers are not good at assessing probabilities. Skees also makes the point that the use of a carefully developed elicitation procedure will improve the ability of the decision maker to assess probabilities, but when historical data and/or forecast data is available, it should be fully exploited.

The use of historical and forecast data on crop prices is more easily applied to large groups or producers. In general, producers in a given region of a state will receive the same prices. Price differences received by producers, in general, are due to differences in timing of sales. Thus, in large extension groups, price analysis will apply to all producers in the workshop.

However, yield data will vary widely among producers, due to local rainfall amounts, soil types being farmed, management practices, etc. Preferred risk analysis would require that individual farm production data be used. The longer the data series the farmer has, the more confidence one might place in the analysis.

The problem in most general extension workshops is that most farmers have not kept those detailed type records. For those

producers who have not kept detailed records, how do they evaluate their production risk exposure?

One alternative is to use county average data. Developing cumulative distribution functions using yield data from county average yield data does not account for all of the variability in that data. Using individual farm yield wheat data, the average was 43.4 bushels per acre in southwestern Kansas for 1983, with a standard deviation of 9.13 bushels. The range was from 14.01 bushels per acre to 66.18 bushels per acre (Table 1). There is a considerable difference in an individual yield as compared to the average yield for the measured group.

Individual farm production data may only be available through the use of an elicitation procedure. If this approach is used, the elicitation of production data from the producer should be carefully done. If one plans to use an elicitation procedure, then one should probably allocate some time in the workshop to discuss the need for keeping good records.

## Teaching Risk Management in Extension Workshops.

The underlying random variable of yield and prices are the major random variables that influence the net income, cash flow, and other financial performance measures on a farm business. King's budgeting approach has real possibilities in teaching applied risk management to extension groups.

There are several problems that must be addressed by the person conducting the extension workshop. Those include:

1. Availability of yield and price data
2. Availability of cost of production data
3. Availability of alternative pricing
4. Use of crop diversification
5. The producer's understanding of statistical analysis...

I have already discussed the use of yield and price data in farm level risk analysis. But, in addition, there is the problem that, even with very small data sets (less than 10 years), the number of calculations becomes very large. Computer technology offers a potential solution to this problem, but it probably creates others. One approach would be to create a case farm on a main frame computer system and then discuss the results with a group of producers. That approach has several advantages. First, it is strictly educational, and the producers must apply those principles to their farms or hire a consultant to do it for him. Some producers would prefer the use of a case farm because they are not comfortable sharing their farm data with an extension worker. There is also the problem in extension workshops of keeping that data confidential so that a neighbor

TABLE 1. AVERAGE BUSHELS OF WHEAT PRODUCED IN SOUTHWESTERN KANSAS*

| Year | Average Wheat Yield | Standard Deviation | Minimum Value | Maximum Value |
|---|---|---|---|---|
| 1973 | 32.20 | 7.87 | 15.95 | 49.88 |
| 1974 | 29.80 | 7.01 | 11.48 | 46.00 |
| 1975 | 28.50 | 9.57 | 6.65 | 46.50 |
| 1976 | 26.60 | 10.68 | 2.74 | 51.61 |
| 1977 | 28.40 | 8.83 | 0.00 | 42.20 |
| 1978 | 27.21 | 7.33 | 8.38 | 46.57 |
| 1979 | 38.70 | 9.00 | 11.80 | 55.85 |
| 1980 | 32.50 | 8.28 | 5.00 | 46.45 |
| 1981 | 18.60 | 7.70 | 0.00 | 35.51 |
| 1982 | 34.40 | 8.72 | 6.99 | 52.64 |
| 1983 | 43.40 | 9.13 | 14.01 | 66.18 |

*Source: K-MAR 105 Data Base

does not overhear or see the financial data being discussed by an extension employee and the producer.

Providing individualized farm analysis will not be practical without the use of a micro computer. Micro computers are very useful tools, but they still require time for the extension worker to key in the data, and time for the micro computer to solve the problem and print out the solution. In a workshop, one will lose the participants if they are forced to sit and wait while this is being done.

The availability of cash cost on an enterprise basis is not readily available in many producers' accounting records. We have used an allocation procedure to allocate total cost back to an individual enterprise, but there is no good substitute for accurate enterprise records (Barnaby and Langemeier). If a procedure is used to allocate a producer's total cost figures back to individual enterprises, this will require additional time in the workshop.

Pricing alternatives may be limited in some areas and on some crops. Using King's approach on pricing using forward contracts, there is no basis risk to the producer. But, in the case of grain sorghum, the elevator may not be willing to accept the additional risk of a cross-hedge using the corn future contractt in order to offer a forward contract to the producer on grain sorghum.

Crop diversification may offer risk reduction on production, a useful function that is build into King's approach. However, diversification may be limited in the Great Plains, where wheat may be the only option.

The last consideration in teaching risk management to a producer group is their level of understanding in statistics. This is becoming less of a problem because many producers are college educated, but for some, a very elementary introduction to statistics will be necessary.

## A Possible Solution.

Many extension services are faced with reduced personnel, which limits their ability to provide individual farm analyses. One possible approach is the use of a case farm and a micro computer to do the analysis. Extension workshops would include the teaching of risk management principles and interpretation of the output from the software program.

Many producers currently have micro computers, and with the prices on computers declining, it is expected that more producers will purchase them in the near future. At the end of the workshop, the risk management software could be provided to the producer, who would take it home and analyze his own farm. One of the best products of this approach may be convincing the producer of the need for keeping better records. Nothing is more

frustrating than trying to run a sophisticated software package, only to discover that one does not have good data to key into the model.

## Conclusion.

Risk management and the ability to handle it may be the keyto farm survival during the rest of the '80s. King's approach and his software for doing the analysis is a major improvement in applied risk management. A major concern is that extension continues to stress the need for accurate data to base such analyses on.

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