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Risk Management through Alternative Production Practices and Management Strategies: Discussion

John R.C. Robinson

“What distinguishes the thousands of years of history from what we think of as modern times? The answer goes way beyond the progress of science, technology.... The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk.... The transformation in attitudes toward risk management... has channeled the human passion for games and wagering into economic growth, improved quality of life, and technological progress.”
Peter Bernstein, p.1.

The quote above highlights the importance of risk management in, among other things, improving technological progress. Today’s session looks at the continued interaction of technological progress and risk management. Specifically, these papers show the importance of production practices and technology in managing various types of risk faced by agricultural producers. My remarks about these papers will be woven around two main points: (1) the need for comprehensive treatment of risk faced by producers and (2) the role of technology as a two-edged sword in terms of risk.

Comprehensive Management of Risk

Agricultural economists have tended to treat risk issues in isolation. Production studies such as the three presented today apply methods such as stochastic dominance or risk programming to identify risk-efficient technologies. While these methods are certainly relevant, my suspicion is

that the risk content of such analyses is seldom delivered to agricultural decision makers. Unfortunately, the typical extension economics programs for farmers have segregated “risk management” into programs on marketing or crop insurance.

There is a current emphasis on holistic treatment of risk. The Risk Management Education initiatives by the USDA, the land grant universities, and others have explicitly focused on managing multiple sources of risks. Moreover, recent survey evidence shows that agricultural producers are aware and concerned about a wider array of risks than just price and yield (Knutson *et al.*).

Using production/technology strategies is helpful in managing multiple sources of risk. The Dillon paper dealt directly with both yield and resource (i.e., available field time) risk. The optimal prescription from this study varied whether the two risks were treated independently or jointly. The paper by Mapp showed that society’s policy makers have reason to be concerned with the risk outcomes in pollution variables following alternative production practices. (The Mapp paper indirectly highlights the income risk faced by producers from the various policy outcomes that could be imposed by regulators.) While none of the three papers explicitly dealt with price variability, the latter could readily be incorporated into their approaches. These studies show that a number of important sources of risk can be managed by selecting activities represented by combinations of crops, varieties, chemical, and technological inputs, etc.

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Technological Tools as a Two-Edged Sword

The three papers highlight the advantages and disadvantages of a production/technology approach to managing risk. The discussion above suggests that production/technology approaches are efficient in handling multiple sources of risk. Another advantage is that production/technology approaches may be more readily adopted by producers. The Dillon and Mapp papers considered different alternatives that are relatively easy to implement with a variety of choices, planting dates, and input decisions. To the extent that human and technical capital is not limiting, production approaches like these are a low-cost way to implement risk management.

Supporting the cost advantage is the orientation and attitude of growers. My casual observation is that agricultural producers have an obvious affinity with technological solutions. They will more readily attend and listen to educational programs about new technology. I suspect that when faced with a choice of attending extension meetings on a new transgenic crop (with a give \$X/acre premium and uncertain level of coverage) or a new revenue insurance product (with the same \$X/acre premium and explicit coverage), more producers would choose the former. The Knutson *et al.* survey results indicated that growers did not view production practices as significant risk management tools *per se*, but this could reflect (1) a dearth of cropping alternatives in the study area and (2) a lack of understanding on how production/technology solutions influence risk, i.e., they are focused only on the profit potential of new technology.

The discussion above highlights a second major advantage of production/technology approaches for extension programming: they are a good opportunity to "sneak in" education about risk concepts and management. Presentations on the risk efficiency of new technology are a perfect time to compare and contrast the costs and coverage of contractual risk management tools such as insurance products and commodity futures and options.

A final advantage of demonstrating the

risk-efficiency of new technology is the potential for beneficial interaction with contractual-type risk management tools. Lowenberg-DeBoer presented theoretical and empirical evidence of risk-reducing soil fertility strategies. Such demonstrable evidence creates an incentive for development of new insurable practices which could further enhance adoption of such practices. Such a situation represents the ongoing historical interaction between technological developments and risk management concepts reflected in the opening quote by Bernstein.

On the other hand, there are some disadvantages to production/technology approaches to manage risk. First, the adoption of some practices can increase yield variability while growers develop the necessary management skills to apply them. For example, variable crop yields are commonly associated with initial adoption of reduced tillage systems.

Following Lowenberg-DeBoer's approach, it is important to identify and evaluate studies that are likely to be risk-reducing. Such evidence is important to prevent modeling and decision making on the basis of conventional wisdom which may be wrong. For example, pesticides have commonly been thought of as risk-reducing inputs. More recent analytical and empirical evidence suggests that pesticides can be either risk reducing or risk increasing (Pannell).

Finally, the adoption of capital-intensive production alternatives can expose producers to more financial risk. The Lowenberg-DeBoer paper listed a number of relevant risks posed by adopting advanced spatial technology. The Mapp paper discussed alternatives which implied possible investment in new irrigation equipment, and the Dillon paper has underlying implications for machinery investment to manage the uncertainty in available field days. The potential interaction of price variability may be particularly significant in evaluating the financial risk associated with investing in new technology.

Summary

There are pros and cons to managing multiple risks with production/technology approaches.

Given the rapid pace of technological development and the increasing emphasis on holistic management education, there is a continued need for area-specific, interdisciplinary studies such as the ones presented in this session.

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