Introduction

We know a great deal about the roles of risk and uncertainty in agriculture in the West and other regions. Knowledge about perceptions of risk and its importance and causes of various farm risks in the U.S. Patric et al. (1985) indicated that perceptions of sources of risk and responses varied across geographic regions and by farm type. Boggs et al. (1985) and Wilson et al. (1994) found that perceptions varied somewhat across many individuals: that a risk classification based on socioeconomic variables was not possible. This pattern and Masser (1987) concluded that, besides geographic location, farm type, institutional structures and other factors affecting the environment and responses to risk. However, if studies were for producers of a specific agricultural crop or livestock. Therefore, results derived from these studies neither can be generalized nor are applicable to all agricultural operations. Moreover, it is small farms that are increasingly at greater risks due to new markets, internationalization of agriculture, tremendous demographic shifts, vertical integration, and increasing competition for farm land for non-agricultural use. The farmer viability of small farms is questionable to the homesteaders of rural people and places as these farms account for a significant percentage of all farms in the United States. Within this context there is a need to understand the importance and determinants of the various farm risks perceived by small producers in the West. Such knowledge is an important precondition for designing risk reducing strategies and education.

Objective

In this project, we address the following questions: How do smallholders in the rural Western perceive risks of? Are there different perceptions and risk management strategies among social groups in the rural West? Which risks are most prominent in different social groups? How are the determinants of perceived farm risks (production, financial, marketing, legal, institutional) and human) in the rural West? Which risks are most prominent in different social groups in the rural West? What are the most effective mediums for delivering Extension education to targeted audiences in the rural West? How will meal decisions be influenced by risk perceptions and risk management strategies in the rural West?

Data

We use Household Survey Data of 2,645 farm operators (with annual sales of less than $500,000) from 41 counties of the U.S. (Arizona, Colorado, and Wyoming). A total of 4,659 survey instruments were mailed to small farm operators in these states. In order to ensure a representative sample from each state, the number of survey instruments mailed to states were allocated based on the proportion of small farms in each state. The total response rate was 53.6%. A total of 2,645 surveys were completed, which constitutes a 94.5% response rate. Descriptive statistics were collected on small operators: demographics, reasons for involvement in the rural farming, sources of risk, vulnerabilities factors, information sources and preferences, resource management, and income status, and thus enabling us to empirically examine the role of social and other variables in perceived farm risks in the West.

Method

The dependent variables of interest are measures of perceived farm risks. The exploratory variables include demographic variables, income status, reasons for involvement in farm operation, information sources and preferences, resource management, and many others. The USDA has identified five primary sources of risk for agricultural operations: production, financial, marketing, legal/institutional, and human. To measure perceived farm risks of producers, using a Likert scale of 1 to 5, the survey respondents were asked to evaluate each of the five risks in terms of its importance to their operation, with 1 being the most important or critical to the operation and 5 being the least important. The nature of the perceived risk rating variables of the rural producer type, and it takes ordered discrete values from 1 to 5. For “Ordered discrete data,” the variable probability models is an ordered probit model. Since there are five types of risks, the empirical model is essentially a multinomial (five-variate) ordered probit model, estimated by using a simulated maximum likelihood procedure.

Results

Table 1 presents the estimated results for the determinants of perceived farm risks. Each column contains the results for the determinants of production, financial, marketing, human, and legal risk respectively. The following results can be inferred from Table 1:

- Production risk is determined by factors such as the source of information for production risk management, Extension education, schools, and rural water system as the source of water on the land, total acres of land managed, enrollment in Conseration Reserve Program (CRP), income from agricultural operation, and if property is managed by an off-farm operator.
- Financial risk is determined by factors such as perceived income as the motive for farming, internet as the source of information, CRP enrollment, and total acres of land managed.
- Marketing risk is determined by factors such as diversification of income source as measured by family income supplementing, income coming from agricultural operation, if operation is financed by off-farm income, and internet as the source of information.
- Legal risk is determined by factors such as profit and family income supplementing, income coming from agricultural operation, if operation is financed by off-farm income, diversification of income source as measured by family income supplementing, and CRP enrollment.

- Marketing risk is determined by factors such as profit and supplementing of family income, diversification of income source as measured by family income supplementing, if the business type is sole proprietorship, income from agricultural operation, and if property is managed by an off-farm operator.

- Legal risk is determined by factors such as income from agricultural operation, if operation is financed by off-farm income, diversification of income source as measured by family income supplementing, and CRP enrollment.

Conclusions

1. **Introduction**

   - Relevant importance of various factors in determining alternative farm risks varies significantly.
   - Different farmers perceive the same information differently.
   - The most effective mediums for delivering Extension education to targeted audiences are through Trade Magazines, which is contrary to current emphasis of outreach education on web-based tools.
   - Diversification of income sources for small farmers in the rural West holds the key to their long-run sustainability.
   - One way of promoting risk diversification could be through improving the skill base of households and development of the rural non-farm sector.

2. **Acknowledgments**

   We thank the Western Center for Risk Management Education for providing us with financial support to carry out this project. The survey data for this research was originally collected as a part of a multi-state Extension project in collaboration with John F. Hevel and Randolph R. Wagel (University of Wyoming) and Jeff Tread (Colorado State University). We have benefited from working with them. Finally, thanks are due to Ms. Pinar Gunes for excellent research assistance.

3. **Tables 1 and 2**

   Table 1 presents the marginal effects of explanatory variables on perceived production, financial, marketing, human, and legal risk respectively. The following results can be inferred from Table 1:

   - Production risk is determined by factors such as the source of information for production risk management, Extension education, schools, and rural water system as the source of water on the land, total acres of land managed, enrollment in Conseration Reserve Program (CRP), income from agricultural operation, and if property is managed by an off-farm operator.
   - Financial risk is determined by factors such as perceived income as the motive for farming, internet as the source of information, CRP enrollment, and total acres of land managed.
   - Marketing risk is determined by factors such as diversification of income source as measured by family income supplementing, income coming from agricultural operation, if operation is financed by off-farm income, and internet as the source of information.
   - Legal risk is determined by factors such as income from agricultural operation, if operation is financed by off-farm income, diversification of income source as measured by family income supplementing, and CRP enrollment.

   Table 2 shows the marginal effects of explanatory variables on perceived production, financial, marketing, human, and legal risk respectively. The results from these tables confirm the findings we noted from Table 1:

   - Marketing risk is determined by factors such as profit and supplementing of family income, diversification of income source as measured by family income supplementing, if the business type is sole proprietorship, income from agricultural operation, and if property is managed by an off-farm operator.
   - Legal risk is determined by factors such as income from agricultural operation, if operation is financed by off-farm income, diversification of income source as measured by family income supplementing, and CRP enrollment.

4. **Tables 3 and 4**

   Table 3 presents the marginal effects of explanatory variables on perceived production, financial, marketing, human, and legal risk respectively. The following results can be inferred from Table 3:

   - Production risk is determined by factors such as the source of information for production risk management, Extension education, schools, and rural water system as the source of water on the land, total acres of land managed, enrollment in Conseration Reserve Program (CRP), income from agricultural operation, and if property is managed by an off-farm operator.
   - Financial risk is determined by factors such as perceived income as the motive for farming, internet as the source of information, CRP enrollment, and total acres of land managed.
   - Marketing risk is determined by factors such as diversification of income source as measured by family income supplementing, income coming from agricultural operation, if operation is financed by off-farm income, and internet as the source of information.
   - Legal risk is determined by factors such as income from agricultural operation, if operation is financed by off-farm income, diversification of income source as measured by family income supplementing, and CRP enrollment.

   Table 4 shows the marginal effects of explanatory variables on perceived production, financial, marketing, human, and legal risk respectively. The results from these tables confirm the findings we noted from Table 1:

   - Marketing risk is determined by factors such as profit and supplementing of family income, diversification of income source as measured by family income supplementing, if the business type is sole proprietorship, income from agricultural operation, and if property is managed by an off-farm operator.
   - Legal risk is determined by factors such as income from agricultural operation, if operation is financed by off-farm income, diversification of income source as measured by family income supplementing, and CRP enrollment.