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Florida Citrus Risk Management Survey¹

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Introduction

In an increasingly competitive world, risk management is becoming more important to business success. Citrus production, like all agricultural enterprises, has many risks. Risk is the possibility that an outcome or event will not meet expectations. Highly variable income from year to year is one indication of risk. Examples of specific risks include fruit yield less than expected, price not meeting expectations, and tree loss from insect or disease injury (Stricker et al., 1999). Most growers are aware of risks but are unaware of the concept of risk management as a part of overall business management. On the positive side, risk involves the chance of gain as well as loss. Negative consequences are referred to as downside risk; positive consequences as upside risk (Patrick, 1992; Fleisher, 1990). A number of risk management strategies and tools are available to help minimize the adverse consequences of an unanticipated negative event.

Risk Management Survey

To determine Florida citrus grower's risk awareness and knowledge of risk management tools, a survey was planned and conducted during February and March 1999. The objective was to use survey results to develop educational materials and activities to help growers to better deal with risks associated with growing citrus in Florida.

The scientific survey (designed so responses are representative of all citrus managers) was planned and implemented by mail. According to the 1997 Census of Agriculture, there were 7,676 citrus operations in Florida (U.S. Department of Agriculture, 1999). An alphabetized list of citrus growers was secured and a sample of about 600 participants was selected at random to represent all 7,676 operations. Four mailings were sent out. The first mailing (February 5, 1999) was a postcard informing recipients that their name had been selected for the survey and that they would receive a questionnaire in about a week. The second mailing (February 12, 1999) included a cover letter, four-page questionnaire, and business reply envelope. Two additional mailings were sent—a reminder letter and a final mailing—which included a

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second copy of the questionnaire. Data from questionnaires were entered into a spreadsheet program, summarized, and statistically analyzed using the Statistical Products for Social Sciences (SPSS) program to perform an analysis of variance and the Games-Howell Multiple Comparison Test (SPSS Inc., 1998).

Managers were asked to respond to specific statements by circling yes, no, or don't know; or by indicating on a scale of one to five, where one is not important and five is very important, how important specific practices are to the business. The survey form specifically asked that the decision maker of the business complete the form. Responses were stratified by age of manager, education of manager, amount of off-farm income, and size of operation. Percentages reported were rounded to the nearest whole number. One hundred and twenty-eight usable questionnaires were returned, for a response rate of 20%. Based on the population size and response rate, the precision level of the study was $\pm 9\%$ with a confidence level of 95% and $P=.05$ (Israel, 1992).

Results from Survey

In response to the statement "the citrus business has greater risks today than 10 years ago," 84% of managers marked yes. The greatest source of risk reported was unstable fruit prices (90%), followed by loss of trees/reduced yield from insect or disease damage (85%). Eighty-four percent (84%) rated loss of fruit from adverse weather as a very important risk factor, followed by increasing costs of inputs such as fertilizer, pesticides, machinery, and labor (80%). Foreign competition was rated as very important by 78% of managers, while 70% rated property loss (trees, buildings, etc.) from adverse weather as a very important risk factor. On the other hand, managers were not particularly concerned about loss of management because of personal sickness or injury (40%), equipment/production methods becoming obsolete (33%), or ability to get adequate credit (31%).

In terms of risk management concepts, only 19% of managers felt that they could shift some of their risk to others and only 26% felt that there is greater potential return when there is greater risk.

This is interesting because shifting risk to others is an important part of risk management. Further, it is generally true that increasingly risky enterprises create higher income potential. Sixty percent (60%) of managers agreed that there is less risk when they grow more than one variety of fruit, 88% of managers agreed that locking in a reasonable profit is more important than shooting for the top price, and 90% of managers agreed that some businesses are better able to sustain risks than others. Eighty percent (80%) of managers said that they use financial records to determine the break-even price for fruit and 85% said that they use financial records as a guide to making management decisions. Only 36% of managers reported selling fruit by forward contract, 17% used options, and 13% reported hedging on the futures market.

Some of the survey results appear to be contradictory. Only 24% of managers said that production management skills were more important than business management skills, while only 12% have written goals (business plans). Managers rarely use risk management tools such as cash flow projections, nor do they use credit to any great extent. Managers failed to recognize the relationship between risk and reward but appear to take greater risks associated with self-insuring, most likely to maximize return. This may suggest that managers have developed a business paradigm over time that has been beneficial. The survey found that 70% of operations had a strong balance sheet, and there is little need for borrowing money. Cash flow projections are probably not used because managers feel that they have sufficient cash for most contingencies. This situation will likely persist until a crisis occurs, resulting in a paradigm shift and increased need for risk management.

When asked to rate the importance of how they learn about new citrus production or management information, 78% of managers said other growers. Other sources included county/area Extension newsletters (61%); grower associations (55%); research centers (53%); farm magazines (48%); county/area Extension meetings, tours, etc. (44%); farm supply representatives (39%); government agencies (Water Management Districts, EPA, etc.) (34%); and trade shows (26%). Only 17% of

growers said that the Internet & World Wide Web was an important source of information.

Individuals vary greatly in their tolerance for risk. They may be classified into four categories: "risk avoiders", "risk takers", "adventurers", and "calculators" (Patrick, 1992). Risk tolerance is an important aspect of risk management for an individual manager. The vast majority (89%) of citrus managers classified themselves as calculators. A calculator is defined as a person who understands that he/she must take some risk to get ahead, but recognizes that there is a degree of risk in every situation. Before making a decision or taking action, the calculator gathers information and analyzes the odds. The second group (5%) was risk avoiders; the most cautious risk-takers. The risk avoider expects the worse to happen and will not take any risk that can be avoided. Four percent (4%) of managers classified themselves as risk takers; the opposite of risk avoider. The risk taker tends to plunge in and close his/her eyes to risk, ignore facts, and go ahead. Only 2% of citrus managers classified themselves as adventurers. Adventurers enjoy taking risks. They often look for the chance to take risks and even may enjoy the excitement of risk taking.

Results by Age of Manager

For comparison with size of operation (Table 1), managers were grouped into four age categories: <30, 31-50, 51-65, and >65. In addition, size of operation was grouped into ≤50 acres, 51-500 acres, and >500 acres. For other comparisons, managers were grouped into three age categories: ≤50, 51-65, and >65. Significant differences ($P < .05$) were found when age of manager was compared with size of operation. Data showed that larger groves were managed by younger managers. Managers aged 31-50 made up 28% of all managers and managed 50% of operations with >500 acres and 30% of operations of 51-500 acres. Managers between the ages of 51 and 65 were 34% of all managers and managed 37% of both 51-500 acres operations and >500 acre operations. Managers aged >65 were 37% of all managers and managed 54% of operations with ≤50 acres. Managers <30 years of age made up only 1% of managers and managed 2% of groves with ≤50 acres. No groves with >50 acres were reported to be managed by managers <30 years of age.

Although 76% of all respondents reported having goals for their citrus operation, only 12% had their goals in writing. No significant differences ($P < .05$) were found among different age groups for these questions. Significant differences were found among age groups for those who shared their goals with others in the business. Managers ≤50 years of age shared their goals more than the 51-65 age group but not significantly more than the >65 age group (Table 2). In addition, significantly more age ≤50 and 51-65 managers agreed that having groves in different geographic locations reduced risk. Also, significantly more ≤50 managers were aware of and followed environmental requirements compared with the >65 age group. Younger (≤50) and 51-65 age managers agreed that there is less risk when more than one variety of fruit is grown compared with the >65 age group. While only 10% of all managers felt that it was important to borrow operating money each year, 22% of those in the ≤50 group felt that it was important.

As a risk management tool, managers >65 were less likely to caretake groves for others (Table 2). It is likely that older managers are either retired or approaching retirement and are not interested in caretaking other groves. In general, ≤50 and 51-65 aged managers were more likely to purchase crop insurance for fruit and market both fresh and processed fruit. Younger (≤50) managers were more likely to maintain property insurance than 51-65 and >65 managers. In addition, ≤50 and >65 aged managers were more likely to spread their fruit sales over time than 51-65 aged managers. The inability to meet cash flow needs was considered to be an important risk factor by more of the ≤50 and 51-65 age groups than the >65 group. Concern about adequate credit appeared to decline with age.

Results by Size of Operation

Statistical tests indicated that differences among respondents, when filtered by size of operation, were substantial. In general, large operations (>500 acres) appeared to be more progressive in their risk management than operations of 51-500 acres or ≤50-acres. A higher percentage of managers of operations of >500-acres responded positively to most statements (Table 3). Managers of 80% of the

operations of ≤ 50 and 51-500 acres said that they used financial records as a guide to management decisions compared to 100% of managers of operations >500 acre. More managers of operations of >500 acres prepared cash flow projections, were aware of and followed environmental requirements, and felt that it was important to borrow operating money each year. Fifty three percent (53%), 78%, and 97% of managers of operations of ≤ 50 , 51-500 and >500 acres, respectively, reviewed property and liability insurance each year.

A higher percent of managers of operations of >500 and 51-500 acres said that they used individual risk management tools than managers of operations of ≤ 50 acres. Ninety six percent (96%) of managers of operations of ≤ 50 acres reported off-farm income, so they were not likely to depend on income from citrus for their livelihood. Having off-farm income was, not surprisingly, inversely related to size of operation. Also, an equal percentage (90%) of managers of operations of 51-500 and >500 acres reported that they maintain property insurance compared with 65% of operations of ≤ 50 acres. Loss of valued employee(s), as an important risk factor, was directly related to size of operation, as was the inability to get adequate credit.

Significant differences in sources of production or management information were found among managers. Managers of operations of >500 and 51-500 acres felt farm supply representatives and the Internet and World Wide Web were more important sources of information than managers of operations of ≤ 50 acres. Trade shows were more important sources of information for managers of operations of >500 acres than managers of operations of ≤ 50 and 51-500 acres.

Results by Educational Level of Manager

Managers were grouped into five categories based on their highest level of education: high school or less, some college, college degree, postgraduate degree, and professional degree. More citrus managers had college degrees (33%) than any other educational category, followed by managers with some college (26%) (Table 4). Together these two

groups managed 67% of operations with >500 acres, 63% of operations with 51-500 acres, and 59% of operations with ≤ 50 acres. Managers with professional degrees made up 15% of all managers but managed 20% of operations with >500 acres and 18% of operations with ≤ 50 acres. Managers with \leq high school were 14% of managers and managed 19% of ≤ 50 acre, 15% of operations with 51-500 acres, and no operations with more than >500 acres.

When evaluating attitude toward risk, managers with a college degree and those with a postgraduate degree were more likely to have reviewed property and liability insurance during the past year (Table 5). On the question of being subject to criminal prosecution for violating labor laws, an inverse relationship was observed with education level. Seventy-eight percent (78%) of managers with less than a college degree felt that they would be subject to criminal prosecution compared with only 36% of those with a professional degree.

Fewer managers with college degrees agreed with the statement that locking in a reasonable profit is more important than shooting for the top price compared with the other educational groups. Only 26% of all managers agreed with the statement that the greater the risk, the greater the income potential. However, more managers with college and postgraduate degrees agreed with the statement (39% & 40%) than the other three groups. Using farm records for management decisions was reported by 100% of managers with a college degree compared with 79% for managers with a professional degree.

Managers with \leq high school education appeared to be more concerned about risks than managers with more education. There appeared to be an almost linear negative correlation with concern about risk and level of education. One-hundred percent (100%) of managers with high school or less felt that foreign competition was an important risk compared with 50% of managers with a postgraduate degree. Ninety-four percent (94%) of managers with \leq high school and 88% of managers with some college thought that increasing costs of inputs was an important risk compared with 57% of managers with a postgraduate degree. Inability to meet cash flow needs was of greatest concern to managers with high

school or less (83%) compared to managers with postgraduate and professional degrees (36%).

Results by Percent of Manager's Off-Farm Income

The amount of family income from other than farm sources was grouped into three categories: $\leq 25\%$, 25-75%, and $>75\%$. There were few significant differences ($P < .05$) among managers based on percent of income from off-farm sources. There is likely to be two subgroups in this category with different characteristics. The first group might include small grove managers employed off the farm or with a spouse employed off the farm. The second group might include grove managers with substantial investment income.

Overall, 40% of managers had $\leq 25\%$ of income from off-farm sources, 28% fell into the 26-75% range, while 31% had $>75\%$ of income from off-farm sources. Two interesting results were observed when the data were stratified by off-farm income. The first dealt with forward pricing of inputs and the second dealt with inability to get adequate credit. While only 17% of all citrus managers said that they forward priced inputs, 29% of managers with $\leq 25\%$ off-farm income forward priced their production inputs. Inability to get adequate credit was recognized as an important risk by 48% of managers, with $\leq 25\%$ off-farm income compared with 30% of all managers and 22% and 21% of managers with 26-75% and $>75\%$ off-farm income. There were no significant relationships found between amount of off-farm income and where managers learn about citrus production or management information.

Conclusion

Risk management is applying management policies, procedures, and practices in a systematic way to the tasks of identifying, analyzing, assessing, treating, and monitoring risks (Hardaker et al., 1997). The issue for the manager is to understand the relationship between risk and potential return. Reducing risk or shifting risk to others has a cost associated either in the form of higher production costs or cash costs such as insurance premiums. Although assuming greater risks has the potential for

greater returns in the long run, unanticipated catastrophic events in the short run could lead to business failure.

Survey results indicate that citrus managers are using a number of risk management tools. However, the fact that only one out of five managers agrees that they can shift some of their risk to others indicates that they do not have a good understanding of risk management as an integral part of overall business management. Nine out of ten managers agreed that some citrus businesses are better able to sustain risk than others. Larger, more diversified businesses are usually better able to sustain risk than smaller businesses. Many risk management strategies are inherent in a >500 -acre operation such as growing more than one variety of fruit, locating groves in more than one geographical area, marketing both fresh and processed fruit, and spreading fruit sales over time. However, it also appears that the >500 -acre citrus businesses are using more of the other risk management tools than smaller operations. Managers of operations of >500 and 51-500 acres were more likely to purchase crop insurance for fruit than the managers of ≤ 50 -acre operations. Significantly more of the >500 -acre operations reported keeping informed of new regulations than either groups of ≤ 50 or 51-500 acres. This is likely enhanced by the ability of many >500 -acre operations to hire people specifically to deal with regulation issues. Operations of 50 and 51-500 acres are at risk of running into trouble with regulations if they are unaware of environmental requirements.

Of all managers, only about one in eight reported having written goals for their citrus business. By comparison, about one out of three managers of the >500 -acre operations had written goals. Goals are important because they act as a guide to decision making. To be meaningful, goals should be in writing and they should be shared with others involved in the business.

Another surprising result was the lack of understanding between risk and potential income. Of all managers, only about one in four agreed with the statement "the greater the risk, the greater the income potential." As one would expect, more managers with a college degree, about four out of ten, agreed with the statement compared with less than one out

of ten managers with \leq high school. It is a management principle that, over time, higher-risk enterprises will yield a greater return. Citrus may be a good example. Because of the risk of freezes, tree loss due to insects and diseases, and other risk factors, many people shy away from the citrus business. This results in less citrus produced in the long run and, hence, higher price potential.

There were no significant differences based on age, education, or off-farm income when it came to use of marketing tools including options, hedging, or forward contracting. Slightly more than one out of three managers reported using forward contracts, while only about two out of ten reported using options. Use of hedging as a marketing tool was reported by 13% of all managers, with operations of >500 and $51-500$ acres using hedging more than ≤ 50 -acre operations. It appears that managers could benefit from wider use of tools such as options and hedging to reduce price risk when marketing citrus. With unstable fruit prices considered to be an important risk by nine out of ten managers, wider use of the above marketing tools could help stabilize prices for individual managers. A better understanding of the operation of futures markets would likely help.

Loss of fruit from adverse weather was considered to be a very important risk by a large percentage of all managers, while only about half reported purchasing crop insurance for fruit. This varied significantly by size of operation and age of manager. Eight out of ten managers of the >500 -acre operations and two thirds of managers ≤ 50 years of age reported purchasing insurance for fruit. Loss of property, including trees and buildings, from adverse weather was considered an important risk by more than two thirds of the managers, while a little more than half of the managers said that they would purchase tree insurance if it were available and reasonable. (When the survey was conducted tree insurance was only available on a pilot basis in a few counties.)

It appears that ≤ 50 -year-old managers and managers of >500 -acre operations use risk management tools to a greater extent than >65 -year-old managers and managers of ≤ 50 -acre

operations. This appears to be logical since >65 -year-old managers are likely to be more financially secure and they manage a larger proportion of ≤ 50 -acre operations. In addition, managers of ≤ 50 -acre operations are less likely to depend on income from the citrus business for a major part of their livelihood and, therefore, are in a position to assume more risk. A better understanding of risk management as an integral part of overall management, along with an understanding of the relationship between risk and potential returns, would likely be beneficial to all citrus operations.

Growers differ greatly in the level of risk they can tolerate, depending on overall debt-to-equity situation and degree of diversification. One large loss or two or three successive smaller losses could bankrupt a highly specialized grower with a high ratio of debts to equity. A grower in this situation would want to make full use of risk management tools such as forward sales, option contracts, crop insurance, hazard insurance, irrigation, etc. to assure some minimum level of return. On the other hand, a grower with substantial financial reserves, or other sources of income, may choose to carry greater risks in hopes of achieving higher income over time. However, even the more financially secure grower may want to use some risk management tools such as growing different varieties of fruit, maintaining property insurance, and using forward contracts or options to expand profit opportunities while controlling risks.

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Table 1. Age of citrus managers compared with grove size.*

Age	Size of Operation (Acres)			
	All	<50	51-500	>500
<i>Percentage of Respondents</i>				
<30	1	2 a**	0 a	0 a
31 to 50	28	15 a	30 a	50 b
51 to 65	34	29 a	37 a	37 a
>66	37	54 a	33 b	13 c

* Data reported as a percent of people responding in each category.
** Means in each row with the same letter not different (P<.05) analysis of variance and Games-Howell Multiple Comparison Test.

Table 2. Responses stratified by age of manager.

	Age (Years)			
	All	<50	51-65	>65
<i>% of Respondents Marking "Yes"</i>				
Attitude toward risk				
I've shared my goals with others in the business	57	75 a	42 b	56 ab
Having groves in different locations reduces risk	74	89 a	77 ab	57 b
I'm aware of and follow environmental requirements	74	86 a	77 ab	57 b
Less risk when I grow different varieties of fruit	60	73 a	54 ab	54 b
It's important to borrow operating money each year	10	22 a	7 ab	4 b
Risk management tools				
Caretake groves for others in addition to own	18	26 a	27 a	2 b
Purchase crop insurance for fruit	47	67 a	43 ab	33 b
Market both fresh and processed fruit	55	71 a	55 ab	42 b
Spread fruit sales over time	53	68 a	44 b	49 ab
Maintain property insurance	79	94 a	73 b	71 b
<i>% Rating as "Important" and "Very Important"</i>				
Important risks				
Inability to meet cash flow needs	62	69 ab	74 b	46 a
Inability to get adequate credit	30	47 a	29 ab	18 b

* Means in each row with the same letter are not different (P<.05) analysis of variance and Games-Howell Multiple Comparison Test.

Table 3. Responses stratified by size of operation.

	All	Size of Operation (Acres)		
		<50 A	51-500	>500
Attitude toward risk		<i>% of Respondents Marking "Yes"</i>		
My goals are in writing	12	2 a*	11 ab	31 b
I've shared my goals with others in the business	57	38 a	62 ab	83 b
Use records to determine break-even fruit price	80	71 a	84 ab	93 b
Use records to track financial progress in business	91	85 a	91 ab	100 b
Use financial records as guide for management decisions	85	81 a	80 a	100 b
Having groves in different locations reduces risk	74	55 a	82 b	89 b
Reviewed property and liability insurance in past year	73	53 a	78 b	97 c
Prepare cash flow projections for business	48	32 a	47 a	76 b
I'm aware of and follow environmental requirements	74	60 a	73 a	97 b
Less risk when I grow a number of fruit varieties	60	46 a	67 b	76 b
Important to borrow operating money each year	10	2 a	2 a	38 b
Risk management tools				
Grow more than one variety of fruit	81	58 a	93 b	100 b
Have off-farm income	86	96 a	85 ab	69 b
Groves located in different geographical areas	43	10 a	59 b	83 b
Caretake groves for others as well as own groves	18	2 a	22 b	41 b
Purchase crop insurance for fruit	47	27 a	49 ab	79 b
Market both fresh and processed fruit	55	42 a	48 a	90 b
Hedge on the futures market	13	2 a	13 b	31 b
Spread fruit sales over time	53	24 a	61 b	90 c
Maintain property insurance	79	65 a	90 b	90 b
Maintain liability insurance	87	69 a	98 b	100 b
Maintain liability insurance for pollution risk	27	8 a	31 b	56 b
Use farm records for management decisions	91	84 a	95 ab	100 b
Keep informed of new regulations	85	78 a	84 a	100 b
Plan for backup management	40	17 a	46 b	69 b
Maintain health insurance program	67	62 a	56 a	90 b
Important risks		<i>% Rating as "Important" and "Very Important"</i>		
Loss of valued employee(s)	47	37 a	42 a	71 b
Inability to get adequate credit	30	13 a	32 b	55 b
Important sources of production or management info				
Farm supply sales representatives	40	32 a	35 ab	55 b
Trade shows	26	20 a	24 a	38 b
Internet and World Wide Web (www)	17	10 a	20 b	24 b
* Means in each row with the same letter are not different (P<.05) analysis of variance and Games-Howell Multiple Comparison Test.				

Table 4. Educational level of citrus managers compared with grove size.

Education	Size of Operation (Acres)			
	All	<50	51-500	>500
<i>% of People Responding</i>				
< High School	14	19 a*	15 ab	0 b
Some College	26	27 a	30 a	17 b
College Degree	33	29 a	33 a	50 a
Postgraduate Degree	12	7 a	15 a	10 a
Professional Degree	15	18 a	7 a	20 a

* Means in each row with the same letter are not different (P<.05) analysis of variance and Games-Howell Multiple Comparison Test.

Table 5. Responses stratified by education of manager.

	Education				
	High School or Less	Some College	College Degree	Postgraduate Degree	Professional Degree
<i>% of Respondents Marking "Yes"</i>					
Attitude toward risk					
Reviewed property and liability insurance	53 ac*	69 abc	83 b	85 b	64 ac
Subject to criminal prosecution for violating labor laws	78 a	78 a	58 b	60 ab	36 c
Locking in a reasonable profit is more important than shooting for top price	83 ab	94 ab	79 a	93 ab	100 b
Greater risk equals greater income potential	6 a	13 a	39 b	40 b	21 a
Risk management tools					
Use farm records for management decisions	94 a	85 a	100 a	87 a	79 b
Plan for backup management	47 a	17 b	49 a	60 a	29 b
<i>% Rating as "Important" and "Very Important"</i>					
Equipment/methods becoming obsolete	65 a	37 bc	21 c	25 c	23 c
Injury to employee(s)	81 a	69 ab	51 b	21 c	23 bc
Loss of management because of personal sickness or injury	62 a	52 a	34 b	7 b	36 ab
Inability to meet cash flow needs	83 a	69 a	68 a	36 b	36 b
Increasing cost of inputs	94 a	88 b	79 bc	57 c	77 bc
Foreign competition	100 a	73 b	83 b	50 c	71 bc

* Means in each row with the same letter are not different (P<.05) analysis of variance and Games-Howell Multiple Comparison Test