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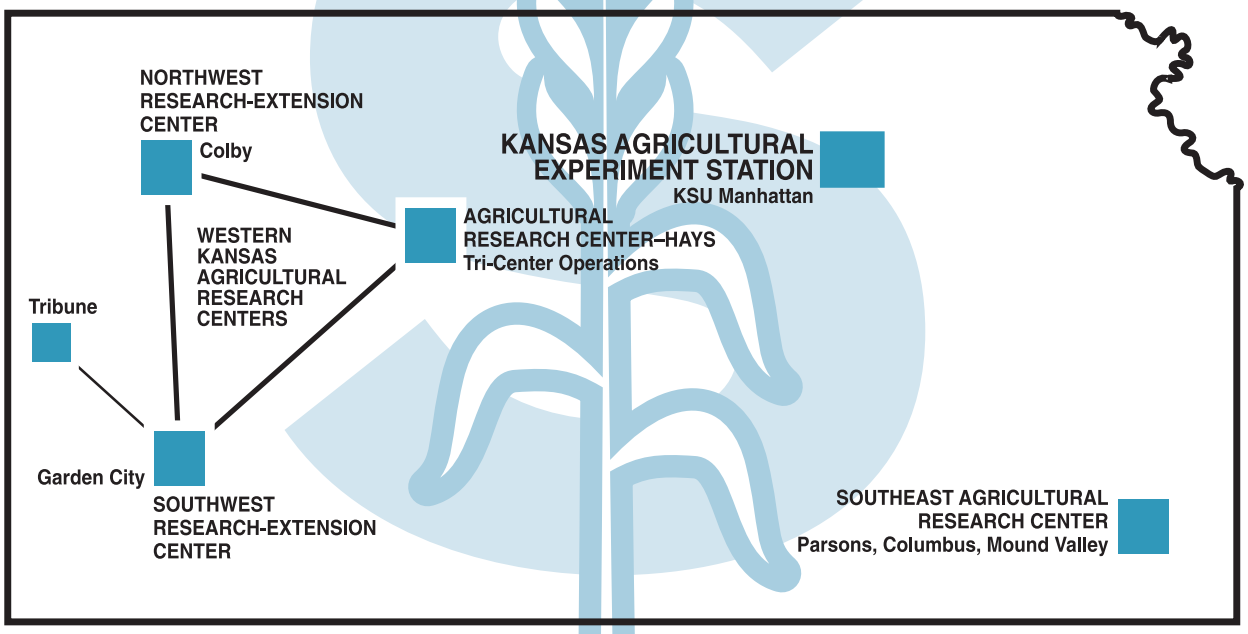
Economic Issues with Specialty Crops



Agricultural Industry Competitiveness

Enhance the value of Kansas Agricultural goods

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

Economic Issues with Specialty Crops

Kansas is known for its production of wheat, milo, corn, and soybeans. However, many specialty crops also thrive in the state's level, well-drained, sandy loam to silty soil. The three main categories of specialty crops are: 1) vegetables, sweet corn, and melons; 2) orchard crops; and 3) nursery and greenhouses.

The 1996 Federal Agriculture Improvement and Reform (FAIR) Act presents new management challenges for farmers, producers, and ranchers. Additional planting flexibility is provided, but the price support safety net, which provided a base income for farmers, has been replaced by direct payments until 2002.

The diversified nature of agriculture will likely force producers to search for risk management alternatives such as crop diversification, contractual arrangements, or crop insurance. The USDA Small Farm Commission suggested that a high priority for educators and extension personnel is to help producers understand and respond rationally to the risks inherent in their decisions. Uncertainty and risk cause decision making to be challenging and frustrating, although eliminating all risk would decrease potential profits. Crops that have more variability in production likely have greater income potential.

The objective of this publication is to provide an overview of the Kansas specialty crop industry. A broad overview of the economic traits that characterize this industry is provided using Census of Agriculture data. Then the drivers of change that will likely influence future trends in the industry are described. A study of factors that influence risk is summarized using data from a survey of Kansas growers.

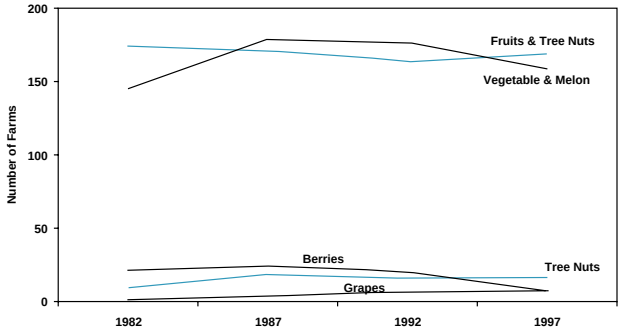


Figure 1. *Kansas Specialty Crop Farm Numbers*

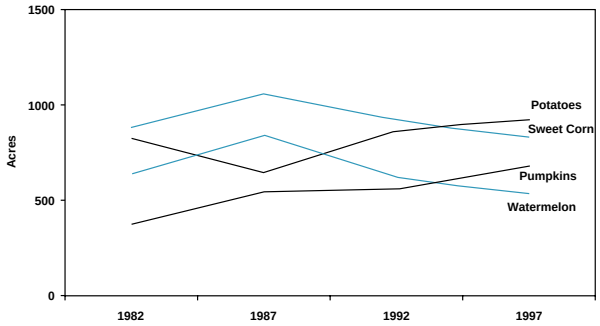


Figure 2. *Kansas Vegetable Production Acreage*

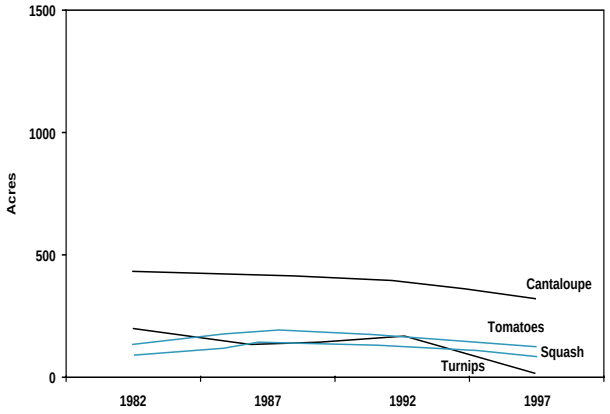


Figure 3. *Kansas Vegetable Production Acreage*

Economic Traits of the Specialty Crop Industry

Figure 1 provides the number of farms engaged in specialty crop production for the Census of Agriculture years 1982, 1987, 1992 and 1997. The graph shows a slight decrease in the number of vegetable and melon farms with a slight increase in fruits and tree nuts, which are categorized as orchard crops.

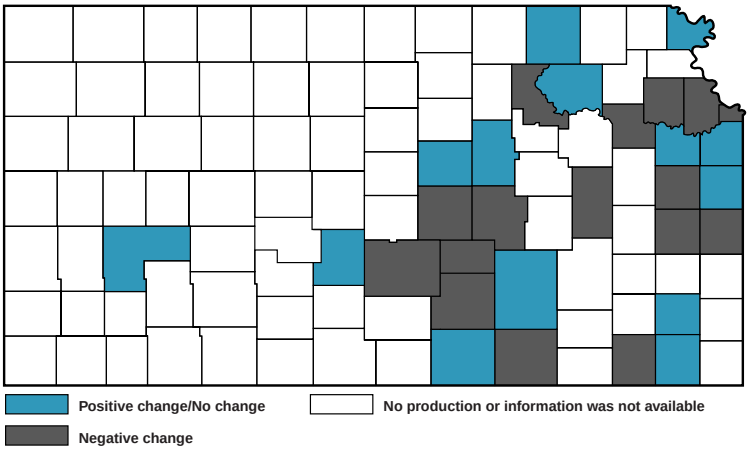


Chart 1. *Percentage Change in Vegetable Acreage from 1992-1997*

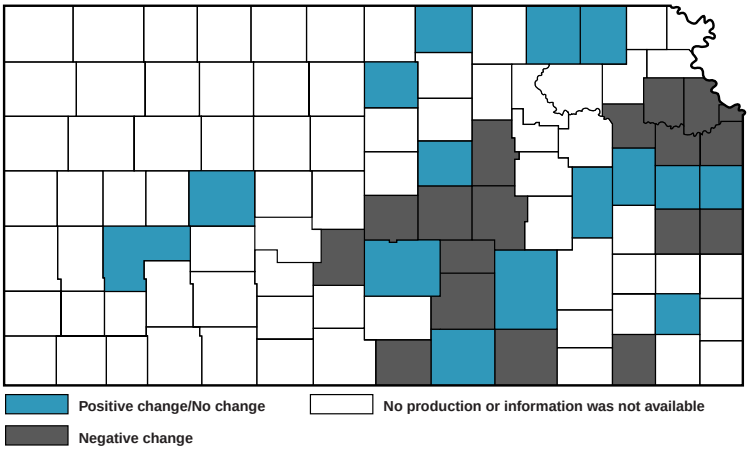


Chart 2. *Percentage Change in Vegetable Farms from 1992-1997*

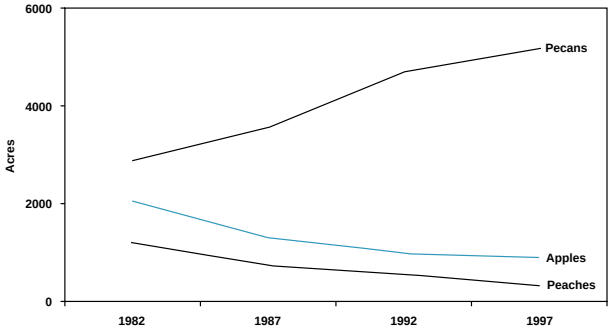


Figure 4. *Kansas Orchard Production Acreage*

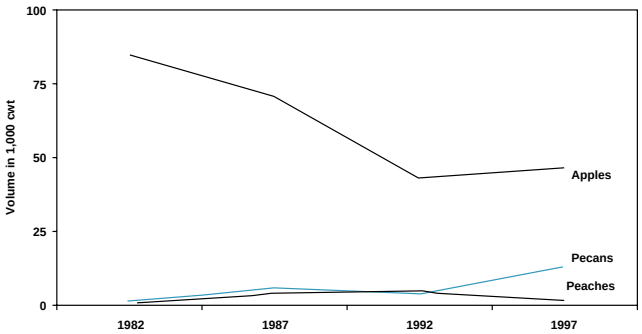


Figure 5. *Kansas Orchard Harvest Volume*

Vegetables, Melons and Sweet Corn Crops

Since 1987 there has been an increase in the acreage of potatoes and pumpkins harvested. However, all other vegetable production has decreased gradually over this time period as shown in figures 2 and 3. Potato production has almost doubled over the past 15 years. Melon and sweet corn production increased in 1987 but has trended downward since then.

Charts 1 and 2 indicate the changes in the number of farms and acres planted to specialty crops in the 1992 and 1997 Census of Agriculture surveys. In 1997, Douglas (23 farms) and Reno (26 farms) counties had the greatest number of farms. The greatest increase in number of farms occurred in Republic (83 percent) and Mitchell (75 percent) counties. Harvey County had the greatest decrease in number of farms with a 150 percent change (15 to 6 farms). The greatest positive changes in acreage were 306 percent in Sumner (17 to 69 acres) and 289 percent in Miami (28 to 109 acres) counties. The highest total acreage in vegetable production in 1997 was Douglas County (285 acres). The greatest decline in acreage was noted in Cowley County (59 to 12 acres) and Linn County (27 to 6 acres). Total state sales volume for vegetable, melon, and sweet corn crops fell from $4.2 million in 1992 to $3.5 million in 1997.

Orchard Crops

Orchard production has not only increased in number of farms, but as Figure 4 shows, pecan acreage has almost doubled since 1982. Orchard volume of apples and peaches has declined over time (Figure 5). Grape and strawberry production also has declined (Figure 6). Charts 3 and 4 indicate the percentage change in the number of orchard farms and orchard acreage over the 1992 to 1997 time period. Wabaunsee County had the greatest increase in the number of farms (1 farm in 1992 compared to 3 farms in 1997). The counties with the highest total number of

orchard farms are Sedgwick (27 farms) and Cherokee (25 farms). The greatest decline in the number of farms took place in Lyon County (7 to 3 farms). In orchard acreage, Neosho County was the highest with 1,992 acres. The greatest increase in orchard acreage was in Bourbon County (13 to 90 acres), while the greatest decrease was noted in Allen County (52 to 16 acres). Total state sales volume for orchard crops fell 6 percent from $1.7 million in 1992 to $1.6 million in 1997.

Nursery and Greenhouse Crops

Nursery and Greenhouse crops also are considered specialty crops in Kansas. Figure 7 indicates a decrease in acreage for sod and nursery crops, while nursery and greenhouse crop acreage has increased by 20 percent for the past 5 years. The two counties in Kansas with the highest number of nursery and greenhouse crop farms are Sedgwick (56 farms) and Johnson (50 farms). Johnson County is the top county in terms of sales volume at $5.2 million in 1997. Sedgwick County ranks second with 1997 sales of $3.6 million. Total sales of nursery crops was $49 million with a total of 528 farms in 1997.

Drivers of Change in Specialty Crop Industry

Drivers of change are variables that are likely to affect demand and supply in the future. There are two key factors determining the long-term changes in total food expenditures, income growth and population growth. As incomes rise, consumers are more selective than previous generations. However, prices still strongly affect the mix of foods purchased, the amount of unbranded foods, and low income household purchases. Population growth includes demographic and attitudinal changes such as age, dual-career families, ethnic composition, nutritional concerns, and beliefs about food-health relationships. For specialty crops, there are five principal drivers of change: locally grown foods, USDA food

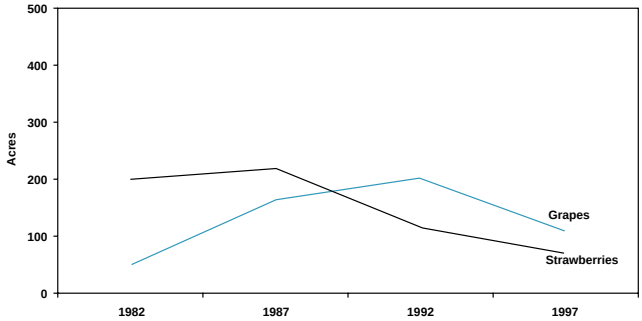


Figure 6. *Kansas Fruit Production Acreage*

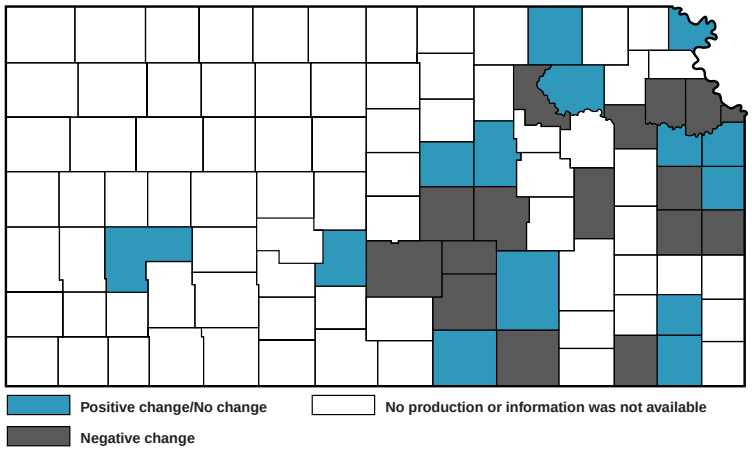


Chart 3. *Percentage Change in Orchard Acreage from 1992-1997*

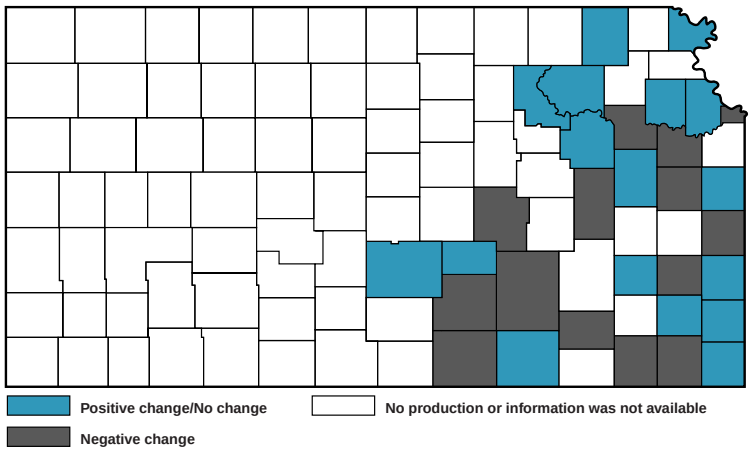


Chart 4. *Percentage Change in Orchard Farms from 1992-1997*

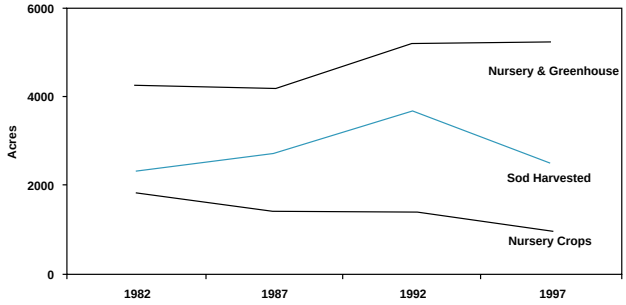


Figure 7. *Kansas Nursery and Greenhouse Acres*

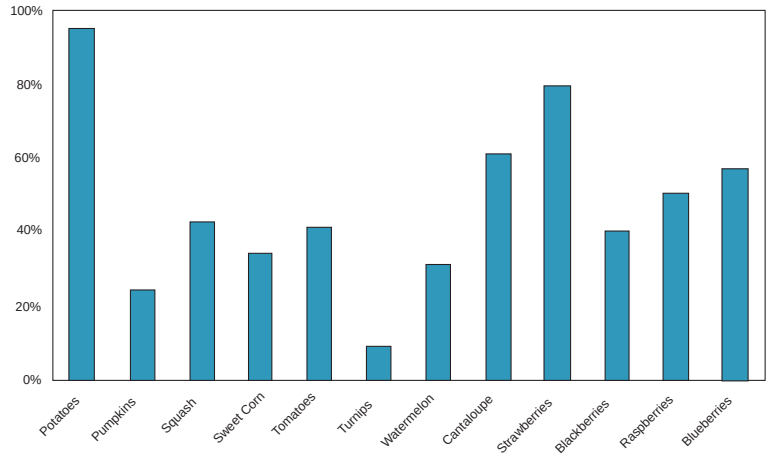


Figure 8. *Percentage of Total Kansas Acreage Irrigated in 1997*

pyramid, organic production, food service demand, and profitability.

Locally Grown Foods

Research has suggested that some consumers are willing to pay more for food products that incorporate value added features such as fresh-tasting, low-fat, low-sodium, ethnic-identity, and convenience foods. This results in an increase in the demand for vegetables and fruits that satisfy consumer preferences. But, locally produced fruits and vegetables may have higher prices due to higher production and marketing costs. USDA has begun a major initiative to promote farmers' markets with locally grown produce. Another trend is a growing demand for ethnic vegetables such as tomatillo, daikon, and other Oriental vegetables. Demand for these vegetables will depend on the ethnic composition of each region. Thus, demand may be higher for locally grown foods, which has positive implications for producers.

FDA-USDA Food Pyramid

The Food and Drug Administration and the U.S. Department of Agriculture have developed the Food Pyramid, which provides information on daily nutritional requirements. The USDA Food Guide Pyramid recommends 6 to 11 servings of the Bread, Cereal, Rice & Pasta Group, 3 to 5 servings of the Vegetable Group, and 2 to 4 servings of the Fruit Group per day. Studies show that consumers are buying more starch foods, fruits, and vegetables. Increased interest and promotion of healthy diets is a positive trend for specialty crop producers.

Organic Production

Public concern over a safe food supply may provide opportunities for organic producers of vegetables, fruits, and orchard crops. Some consumers are becoming interested in food that is certified organic. Information about nutrition, ingredient composition, and health linkages also has been well received by consumers. It must be noted that organic products have no nutritional differences from non-organic products. However, organic products do provide an alternative to consumers who have allergies with respect to various food additives or who are willing to pay more for crops which have been grown in organic production. Producers require more intensive management in order to manage specialty crops because production risk may be greater than conventional crops. Small organic producers have fewer acres and lower production yields, which will likely mean less potential revenue. Thus, it is unclear whether organic production is a positive or negative driver for Kansas specialty crop producers.

Food Service Demand

Another driver of change is the increase in food service demand. If the U.S. economy continues to grow, consumers will continue to spend more of their food dollar on food service. This will impact the market for vegetables and fruits, possibly shifting the major buyers from retail grocery stores to restaurants.

Profitability

It is evident from the preceding charts and figures that the number of specialty crop producers and acreage has declined in Kansas since 1982. The increase in the number of producers exiting the industry suggests low profitability or diseconomies of size. It is unclear whether this decline is due to increased costs, decreased

revenues, the flood in 1993, or older producers exiting through retirement without new entrants. Many variables effect the profitability of specialty crop production. Fruit, vegetable and tree nut production is very labor intensive. Producers must have access to an affordable, abundant labor supply. Local markets that will provide high returns (i.e., supermarkets, restaurants, and processors) may be hard to establish and transportation costs will be higher for perishable goods. Restaurants and processors must have a stable supply that small, local producers may not be able to guarantee.

Risk Factors in Specialty Crops

A recent study on specialty crop insurance by the U.S. Government Accounting Office (GAO) identified four key characteristics that distinguish specialty crop risk from non-specialty crop risk: 1) greater market price risk, 2) unique production risk, 3) strong relationship between crop prices and farm-level yields, and 4) the manner in which risk has traditionally been managed. These characteristics are driven by the perishable nature of most specialty crops.

Market price risk is most important for many specialty crop producers. Perishability is a major issue because most specialty crops cannot be stored. Price volatility is frequently higher than for non-perishable crops. Producers have greater difficulty in adjusting volume to short-term shifts in supply and demand, which leads to the price volatility. Seasonal production without storage ability is one example of a short-term shift in supply. Additionally, most specialty crops do not have a futures market and therefore, no opportunity to hedge price risk. Market price risk is likely to be great for many Kansas specialty crop producers.

Production risk may or may not be higher for specialty crops relative to non-specialty crops. Irrigation, special intensive production practices (i.e., drip irrigation, row covers, plasticulture, etc.) uses of greenhouses, crop diversification, longer growing periods with multiple croppings (i.e., strawberries, tomatoes, etc.), and use of perennials (orchard crops, vine crops, etc.) are examples of how specialty crop producers can manage production risk. Input costs are typically greater for specialty crops relative to non-specialty crops.

Irrigation and diversification are probably the most common risk management strategies used by Kansas specialty crop producers. There were 1,033 irrigated acres (down from 1,650 in 1992) of specialty crops in 1997. Approximately one-third of Kansas vegetable and melon crop producers use irrigation. In 1992, 42 percent of the total specialty crop acres in Kansas were irrigated relative to 33 percent in 1997. This varies by crop as seen in Figure 8. For example, more than 50 percent of the potatoes, strawberries, raspberries, blueberries, and cantaloupe were irrigated in 1997. Less than 15 percent of the orchards in Kansas use irrigation. However for many producers, production risk is likely to be great without access to irrigation.

The relationship between price and yield may be stronger for some specialty crops than non-specialty crops. This is particularly true for crops that are grown in certain geographical regions. A negative relationship between prices and yields may be found when production is geographically concentrated. However, this is not likely a major issue in Kansas because specialty crops grown in the state also are grown in many other areas of the United States.

In many areas, specialty crop producers manage risk through vertical coordination methods. One such method is closed-membership cooperatives whereby producers plant certain varieties and deliver on specified dates to a processor. Such an arrangement helps manage supply. Another example is the use of production contracts whereby producers market directly to a processor. These vertical coordination methods have not been widely used by Kansas producers.

Table 1. Means and Standard Deviations for Acres, Prices, and Gross Revenues, by Crop

	Acres		Price, $/pound		Revenue, $/acre	
Crop	**Mean**	**Std.**	**Mean**	**Std.**	**Mean**	**Std.**
Apples	22.75	22.88	0.40	0.07	1,266.53	1,093.81
Asparagus	0.60	0.42	0.85	0.10	1,169.95	559.41
Beets	0.03	0.01	0.32	0.05	5,239.85	4,058.66
Blackberries	1.04	1.71	1.80	0.41	3,651.20	3,241.33
Broccoli	0.25	0.51	0.50	0.13	4,687.65	3,416.34
Cabbage	1.08	1.59	0.14	0.01	1,482.39	1,229.12
Cantaloupe	2.40	2.71	0.24	0.02	2,479.79	1,676.69
Cauliflower	0.01	0.63	0.41	0.05	1,326.65	1,179.42
Cherries	1.50	0.01	1.20	0.21	3,275.93	1,531.52
Chili Peppers	0.09	0.01	1.00	0.10	6,430.71	4,326.79
Chinese Cabbage	0.01	0.01	0.50	0.14	12,963.21	7,173.711
Corn	503.85	293.58	0.04	0.01	124.40	116.56
Cucumber	0.06	0.04	0.32	0.03	3,121.71	3,195.87
Eggplant	0.03	0.01	0.37	0.04	3,456.08	4,076.93
Gourds	0.20	0.01	0.50	0.02	2,541.71	541.99
Grapes	1.82	0.88	0.80	0.14	973.58	950.52
Green Beans	0.12	0.10	0.72	0.15	3,398.63	2,462.55
Lettuce	0.04	0.01	0.40	0.09	4,061.25	1,370.64
Milo	243.04	173.38	0.04	0.01	115.00	84.08
Onions	0.07	0.01	0.50	0.04	4,927.71	1,671.81
Peaches	7.13	5.66	0.60	0.12	725.76	755.28
Peas	0.04	0.01	1.30	0.21	4,667.99	1,963.10
Peppers	0.16	0.08	0.50	0.08	5,367.39	4,776.05
Plums	1.20	0.01	0.80	0.09	395.77	190.92
Potatoes	0.22	0.19	0.28	0.04	2625.57	2,209.51
Pumpkins	10.23	10.87	0.12	0.01	1484.50	1,271.84
Radishes	0.15	0.01	0.71	0.04	2,185.18	522.94
Raspberries	3.00	0.51	3.60	0.52	933.92	1,003.49
Soybeans	342.17	384.70	0.10	0.02	160.15	75.60
Spinach	0.05	0.01	1.20	0.11	5,118.02	1878.23
Squash	0.16	0.18	0.45	0.04	1,304.61	909.64
Strawberries	1.62	0.99	1.80	0.34	2,583.99	1,943.55
Sweet Corn	9.08	10.32	2.58	0.23	1,095.41	988.43
Tomatoes	0.18	0.20	0.38	0.09	4,446.24	4,190.35
Watermelon	1.52	2.02	0.14	0.01	1,990.78	2,980.66
Wheat	132.84	149.81	0.06	0.02	96.01	61.19
Winter Squash	0.77	0.84	0.25	0.04	2,465.56	2,148.85
Zucchini	0.01	0.01	0.40	0.07	12,494.56	12,802.85

Source: Coltrain et al.

Measuring Risk Among Kansas Specialty Crop Producers

USDA's Small Farm Commission noted that risk management was needed for small producers. A survey was done to learn more about variability in Kansas specialty crops in order to better understand sources of risk. Producers in Kansas were randomly surveyed regarding information on production and revenues from 1992 to 1997 (Coltrain et al.). The survey had a response rate of 38 percent. The mean, standard deviation, and coefficient of variation for acres, prices, and revenue are reported in Table 1. The coefficient of variation (CV) is simply the standard deviation divided by the mean and can be interpreted as a measure of risk. A higher CV (due to a higher standard deviation or a lower mean) implies more risk while a lower CV suggests less risk.

The study aggregated producer specialty crop data into eight categories due to a desire to make the interpretation of the results easier. The **Melon** crops included watermelon, cantaloupe, and pumpkin. Zucchini, summer squash, winter squash, cucumber, and gourds were considered to be **Vine** crops. **Vegetables** were cabbage, broccoli, cauliflower, Chinese cabbage, green beans, peas, asparagus, spinach, lettuce, onions, radishes, and beets. **Sweet Corn** was a separate category while apples, peaches, plums, and cherries constituted **Tree Fruit**. **Vine Fruit** consisted of blackberries, strawberries, raspberries, and grapes. Finally, **Solanaceae** was used as a category for tomatoes, peppers, potatoes, eggplant, and chili peppers. **Conventional** crops included corn, soybeans, wheat, and milo. The selected statistics are reported in Table 2.

Volume

The number of conventional field crops (**Conventional**) had the highest number of acres planted, followed by **Tree Fruit** (apples, peaches, plums, and cherries), **Melons** (watermelons, pumpkins, and cantaloupe), **Sweet Corn**, and **Vine Fruit** (blackberries, strawberries, raspberries, and grapes). For harvested acres, the greatest variability, as measured by the CV, was observed in **Conventional** crops (150.52 percent) while the **Tree Fruit**, **Vine Fruit**, and **Solanaceae** crop categories had the least amount (approxi-

Table 2. *Means, Standard Deviations, and Coefficient of Variation for Prices, Yields, and Gross Revenues (per acre), by Eight Crop Categories*

	Acres			Price, $/pound			Yield, 1,000 pounds/acre		
Crop Category	**Mean**	**Std.**	**CV**	**Mean**	**Std.**	**CV**	**Mean**	**Std.**	**CV**
Melon	10.92	13.08	119.85	0.14	0.03	20.52	13.84	9.36	67.66
Vine	0.56	0.60	108.14	0.35	0.09	25.70	10.28	8.77	85.33
Vegetable	0.89	1.02	115.08	0.60	0.25	42.45	4.97	3.89	78.26
Conventional	483.25	727.41	150.52	0.07	0.02	28.92	1.79	0.87	48.67
Sweet Corn	8.57	10.23	119.27	0.22	0.07	31.82	5.45	17.82	83.52
Tree Fruit	19.92	20.22	101.46	0.45	0.13	28.53	2.48	2.28	92.04
Vine Fruit	1.88	1.95	103.44	1.39	0.49	35.10	1.18	1.02	86.37
Solanaceae	0.31	0.32	102.15	0.42	0.13	29.84	10.62	10.10	95.14

Source: Coltrain et al.

mately 105 percent). The magnitude of the CV for harvested acres was likely due to the wide range of producers in the survey sample. The difference in range between highest and lowest specialty crop category was 18.4 percent.

Production Risk

Obviously, yield variability is a source of risk in specialty crops. The CV for yield per acre also had a broad range. The range of CVs for the non-**Conventional** crop categories was 67.66 percent (**Melon**) to 95.14 percent (**Solanaceae**) compared to the **Conventional** crop category which was 48.67 percent. The difference in range between highest and lowest CV specialty crop category was 27.48 percent. The average producer in the survey planted 5.2 specialty crops per year, which indicates broad diversification among crops. Approximately half the producers planted **Conventional** crops, which suggests diversification into nonspecialty crops. In most cases, it appeared that the choice of crops planted was driven by different harvesting dates that would ease the labor burden on these farms.

Market Price Risk

Average prices received by producers represents another source of risk. Prices exhibited the smallest variability as measured by the CV. The range was 20.52 percent (**Melon**) to 42.45 percent (**Vegetable**). The difference in range for the non-**Conventional** crop categories was 21.93 percent. On average, the **Vegetable** and **Vine Fruit** crop categories exhibited the highest variability. Thus, specialty crop variability is greatest for production and lowest for prices. On average, specialty crop prices were higher than **Conventional** crop category, which likely reflect the increased costs due to labor. However, production risk is likely factored into these higher prices. The GAO report indicated that crop insurance pilot projects will begin in year 2000 or shortly thereafter for various specialty crops such as cucumbers, pumpkins, strawberries, blackberries, raspberries, asparagus, and carrots.

Major Conclusions

For these producers, **Melon**, **Tree Fruit**, **Sweet Corn**, and **Vine Fruit** are important crop categories for focusing risk management efforts. Any program for managing risk for specialty crop producers will require producers to evaluate this broad variability between crop categories. Production risk has the greatest variability in this study. Consequently, producers should focus on revenue, prices or yields.

In the future, any potential crop insurance program for specialty crops will require accurate records over time on production and prices. To that extent, the Kansas State University Farm Management Association recently incorporated specific specialty crop information for production and prices in the records and analysis programs. Producers who choose to participate have both manual and computer accounting programs to keep track of acres planted, production volume, prices, and other information. The data is then collected and producers are provided extensive information on their operation which can also be utilized for tax purposes. Benchmarks also are provided so producers can compare their operation against other similar producers. For more information contact Fred DeLano at (785) 532-1506 or electronic mail at fdelano@agecon.ksu.edu).

Hydroponic Tomatoes in Kansas?

Coltrain studied 12 information, negotiating, and monitoring transaction variables in the Kansas hydroponic tomato industry and found that brokers and retail supermarkets were the most common end-users for tomatoes. Tomatoes typically rank first in produce sales in many retail supermarkets and are regarded as the most important produce item with respect to visibility and promotion by produce managers. Lucier reports that United States (U.S.) per capita tomato consump-

tion has increased from 12 to more than 17 pounds since 1982. Many of these tomatoes are sold on-vine in clusters which is perceived as being tastier and more attractive to consumers. Imports of hydroponic tomatoes have grown considerably over the past several years. U.S. Department of Agriculture reports that the volume of Canadian hydroponic tomato imports increased by 65 percent in 1998 and imports from other countries (Israel, Netherlands, and Belgium) have also increased in recent years.

Hydroponic tomato producers who sell directly to retailers and brokers also were surveyed by Coltrain. Time spent determining price, uncertainty over price prior to sale, transportation costs, packaging costs, and grading after tomato delivery were significant variables for growers selling to brokers. More experienced producers were likely to spend greater time negotiating with brokers because they have greater bargaining leverage. Producers with larger volumes of tomatoes packaged for commercial sale with a UPC label had more production flexibility and were more apt to sell to retailers. These producers may have had higher costs but might also receive greater economic incentives to offset these costs. The U.S. Department of Agriculture suggests that hydroponic tomatoes sold to retailers: 1) have 20 percent higher margins relative to food service, 2) incur greater marketing expenses due to packaging and promotion, and 3) have higher labor costs relative to food service.

Implications

The number of farms, acres, and sales dollars in specialty crops has declined since the 1992 Census of Agriculture in Kansas. The success of the Kansas specialty crop industry will depend on the ability of producers to minimize average production costs such as labor, find profitable local markets, and manage risk associated with prices and production. Kansas producers may be able to respond to economic incentives of consumer preferences for fresh locally produced fruits and vegetables. Greenhouses may enable producers to reduce production risk. Diversification and irrigation are the most common forms of production risk management in Kansas.

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David Coltrain
Extension Assistant
Department of Agricultural Economics
Arthur Capper Cooperative Center

Liz Neufeld
Research Assistant
Department of Agricultural Economics

Michael Boland
Assistant Professor
Department of Agricultural Economics

Chuck Marr
Extension State Leader
Department of Horticulture, Forestry, and Recreation

State funds for this project were matched with federal funds under the Federal-State Marketing Improvement Program of the Agricultural Marketing Service of the United States Department of Agriculture

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF-2427 August 1999