Market Window Analysis for Selected Vegetables for Southern New Mexico[1]

Research Report 775

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ABSTRACT

The purpose of this research was to analyze regional wholesale market window opportunities for southern New Mexico-grown lettuce, carrots, broccoli, and spinach. A market window opportunity was identified as the period when average prices exceed production, marketing, and transportation costs. Market windows can be used as a screening tool to analyze which vegetables are possible alternatives for diversification. Wholesale markets examined for the market window analysis included Dallas, Atlanta, and Chicago.

The best opportunities for potential markets found were carrots in the Dallas and Atlanta markets, followed by spinach in the Dallas market and leaf and romaine lettuce in the Dallas and Atlanta markets. Price variability was the lowest for carrots and highest for head lettuce. Vegetables with the best market opportunities should undergo further financial feasibility analyses, including farm-level and packing house costs and returns, analysis of price volatility based on supply and demand, evaluation of competitor supply, and planting schedule trials (possibly using row covers) to extend the harvest.

INTRODUCTION

Most commercial vegetable production in New Mexico is concentrated in the southern counties where agronomic and weather characteristics are favorable for vegetable production. Southern NM has moderate temperatures, providing new crop opportunities for growers (Falk et al., 2010). Although NM has good prospects for agricultural diversification, urban expansion reduces agricultural resources. New Mexico's population increased 20.1% between 1990 and 2000 (U.S. Census Bureau, 2000). Farmers increasingly must compete with urban and industrial demands for water and land resources.

New Mexico's total cash receipts from the sale of farm and ranch production were an estimated $2.175 billion in 2007, 25% of which was generated by crop sales, although cropland represented only 5.4% of all land in farms (USDA-NASS, 2007a). The top commodity categories in terms of sales were milk and dairy products, cattle and calves, other crops and hay, grains, oilseeds, dry beans, and dry peas (USDA-NASS, 2007a). Total statewide acres of vegetables harvested in 2007 were 35,926, a slight increase from the 2002 census of 33,848 acres of vegetables harvested (USDA-NASS, 2007b).

The USDA tracks vegetable acres produced, irrigated, and harvested separately, since not all acres irrigated or in production are harvested. Nevertheless, Doña Ana County was the top vegetable-producing county in the state in 2007, with 10,118 acres, or 27% of the 36,933 acres of vegetable production statewide, followed by 9,555 acres in San Juan County, 6,449 acres in Luna County, and 2,878 acres in Curry County (USDA-NASS, 2007c). In Doña Ana County, the number of farms producing vegetables increased from 107 to 118 from 2002 to 2007, although the acreage fell slightly from 10,446 acres in 2002 (USDA-NASS, 2007c).

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Table 1. Vegetable Production in Doña Ana County, 2007

Vegetable	Size (acres)	Size (# farms)	Mean size (acres/farm)
Onions	5,175	50	103.50
Chile peppers	3,607	69	52.28
Lettuce, all	567	13	42.62
Head cabbage	336	7	48.00
Watermelons	165	16	10.31
Sweet corn	41	11	3.73
Tomatoes (field)	16	18	0.89
Squash (winter and summer)	15	9	1.67
Cantaloupe	13	12	1.08
Snap beans	3	12	0.25
Garlic	3	4	0.75
Cucumbers/pickles	2	11	0.18
Honeydew melons	1	4	0.25
Okra	1	6	0.17
Bell peppers	1	3	0.33
Potatoes	1	3	0.33

Source: USDA-NASS, 2007c.

Vegetables that were grown on more than 100 acres in Doña Ana were onions, chile peppers, lettuce, head cabbage, and watermelons (Table 1). The county produced 70% of dry onions grown in the state and 35% of chile peppers. Doña Ana County produced nearly all of the lettuce in the state, and most of that lettuce was head lettuce since the total acres of head lettuce in NM in 2007 were 582, and total acres statewide of all lettuces were 607 (USDA-NASS, 2007c). Besides the vegetables listed in Table 1, asparagus, green and Chinese peas, pumpkins, radishes, spinach, and turnips were grown in Doña Ana County in 2007, but on so few acres that only the number of farms were recorded, which were 1 to 3 farms for each of these minor vegetables.

Diversification is an important component of increased farm sustainability and risk management. In southern NM, farmers can take advantage of the favorable growing seasons and exploit new market opportunities. National trends to increase local and regional food production also lend support to vegetable diversification strategies. Though many vegetables can be grown in NM, and particularly in southern NM, growers may be reluctant to explore new options due to perceived risks.

Market window analysis can be used to determine which new crop opportunities are most promising (O'Rourke, 1984; Mook, 1985; Adrian et al., 1987; Mizelle, 1983; Collette and Wall, 1978; Dillard et al., 2006). Market windows are periods in which the expected wholesale price of a commodity exceeds the supplier's expected variable and fixed costs associated with production, packaging, and marketing. The length of the window most often used is at least two months; however, it is subject to the profitability per unit, number of units, and equipment that can be used for the new product (O'Rourke, 1985).

METHODOLOGY

Four crops were selected for this analysis: broccoli, carrots, spinach, and lettuce (head, leaf, and Romaine). All of these crops can be successfully grown in southern NM (Falk et al., 2010) and have greater demand than other vegetables that might be considered, such as cauliflower, beets, or turnips. Of the crops studied here, only head lettuce is currently commercially grown in southern NM. Broccoli and carrots would require specialized post-harvest handling facilities not available in the region.

Market Window Technique

Target markets were selected based on their distance from southern NM to provide transportation advantages over competitors. California and Arizona are the predominant wholesalers in Atlanta, Chicago, and Dallas. In this research, these three markets were selected as target markets for southern NM producers.

A market opportunity was identified as the period when average prices exceed production, marketing, and transportation costs. This research follows similar methodology for market window technique as previous studies (Runyan, 1986; Zwingli et al., 1987; Mook, 1985).

The following equation was used for the market window technique.

$$P - 15\%(P) > PC + TC$$

Where:

P	= Wholesale terminal prices/unit
15%(P)	= Markup/unit
PC	= Production cost/unit
TC	= Transportation cost/unit

P: Wholesale terminal prices are the prices received by wholesalers for less than a truckload of a product (USDA-AMS, n.d.). High and low averages from 2000 to 2006 were calculated, and seven years of prices were adjusted for inflation using the U.S. GDP implicit price deflator, where 2000 = 100. Wholesale terminal prices collected for the four vegetables correspond to specific types of containers and units.

15%(P): An average markup of 15% was assumed and subtracted from terminal wholesale prices to account for the wholesale margins and estimate the prices producers would receive at the terminal market. This 15% markup was used in previous studies (Runyan, 1986; Zwingli et al., 1987; Mook, 1985).

PC: Production cost estimates in NM were not available for most of the crops under study since they are new. Thus, production costs were estimated based on information available for different locations, prepared by university Extension specialists.

TC: Transportation costs were estimated in different ways. Transportation costs from California to the terminal markets were obtained from the weekly truck rate report for fruit and vegetables from California to terminal markets from April to May and October to November (USDA-AMS, n.d.). Transportation costs from southern NM to terminal markets were estimated using data from a New Mexico trucking company; a surcharge based on diesel prices was added to the cost per mile. Surcharges were available from the Owner-Operator Independent Drivers Association (OOIDA, 2006).

Transportation costs per unit were calculated using the following equation.

TC = [BC*(T/W) + S*(T/W)]*D

Where:

TC = Transportation cost per unit, i.e., carton.
BC = Base cost per mile, the cost charged by a New Mexico trucking company in high season.
T = Truckload, equivalent to 40,000 lb.
W = Weight/unit, e.g., head lettuce carton weighing 50 lb.
S = Surcharge cost per mile, based on diesel prices.
D = Distance in miles from southern NM to the terminal market.

Study Evaluation Criteria

Price variability. In order to evaluate price variability, the following criteria were used based on observations made in this study.

High = Coefficient of variation ≥ 0.30

Medium = Coefficient of variation between 0.15 and 0.29

Low = Coefficient of variation ≤ 0.15

In this study, criteria used to consider the market window possibilities for the various vegetables were as follows.

High possibility = Production costs + transportation < lower price, for all weeks during southern NM harvest season.

Medium possibility = Production costs + transportation < lower price, except for 1 or 2 weeks during southern NM harvest season.

Low possibility = Production costs + transportation < lower price, for only a few weeks during southern NM harvest season.

RESULTS

Growers selling lettuce wholesale during the spring and fall should expect high price variability. However, market windows were found during the NM harvest season. The length of the windows was always bigger if high average weekly wholesale prices were assumed. Thus, in order to identify possible windows, a conservative approach was used where low average wholesale prices were expected and high production costs were assumed. Using this approach, romaine and leaf lettuces had the greatest possibility of successful penetration in the wholesale markets (Table 2).

Market windows for fresh carrots had the lowest price variability compared to other vegetables

under analysis. Market windows were found for the full length of southern NM's harvest season for the Dallas and Atlanta markets. However, the Chicago market did not show any market window possibility. Spinach had high window possibility for the Dallas market; however, good opportunities for broccoli and spinach in the rest of the markets were not found when the conservative approach was used to identify windows (Table 3).

Transportation Cost Advantage

Transportation costs provided an advantage for southern NM compared to California; this advantage was also achieved by the Dallas market for all vegetables. In some cases, southern NM transportation costs were lower than California transportation costs in just one season (spring or fall), but not both (Table 4). Transportation costs from California to Chicago and Atlanta were low, probably because they considered backhaul truckloads.

CONCLUSIONS AND RECOMMENDATIONS

Market windows were used as a screening tool to analyze which vegetables are possible alternatives for diversification in southern NM. Market windows depend on price levels at the target market, production and transportation cost advantages, and harvest season at the shipping point. The best market windows for southern NM recommended for further investigation in this project were:

- Carrots in the Dallas and Atlanta markets, which have the lowest price risk.
- Spinach in the Dallas market, although it had higher price variability than carrots.
- Leaf and romaine lettuce in the Dallas and Atlanta markets, which had higher price variability than spinach.

Opportunities in the fresh spinach Dallas market exist year-round. The fresh spinach harvest season in Doña Ana County in spring lasts from early April to mid-May, and in the fall from late September to late November or possibly later (Falk et al., 2010). How far the fall harvest season can be extended is not well known, but a project examining spinach and lettuce season extension using row covers has investigated this issue in a companion research project.

Head lettuce did not have a good market window opportunity during the spring, nor during the fall from late September to middle November. Market windows might exist for head lettuce from late November to December, but the possibility of harvesting head lettuce in November and into the winter is not known.

Based on transportation cost advantages, the Dallas market represents a target market to be exploited by southern NM producers. In this research, the Dallas market showed that all vegetables in this study have lower transportation costs compared to California. The Atlanta market provided advantages for head lettuce and carrots.

Recommendations

Vegetables with the best opportunities should undergo further analyses, such as:

- Financial feasibility analyses, including farm-level and packing house costs and returns.
- Analysis of price volatility based on supply and demand, considering other regions supplying the market.
- Planting schedule trials, possibly using row covers, to alter the timing of harvest.
- Primary data collection from produce buyers regarding volumes of products desired, prices offered, and contractual arrangements. For example, there might be a minimum number of weeks that southern NM needs to supply the market to be attractive.
- Competitive analysis.

Small-scale growers who want to diversify and sell fresh vegetables to local markets should consider cooperative business planning. Market channels such as local community farmers' markets, food service, and educational institutions should be evaluated. From these market channels, potential products desired, prices offered, and volumes and delivery information can be gathered to build a business model for local growers of various farm sizes.

Table 2. Market Windows for Lettuce and NM Costs of Production and Transportation

Lettuce Type	Market	* Length of window in weeks, during spring		* Length of window in weeks, during fall		Price Variability	Window possibility across harvest season	
		Low price	High price	Low price	High price		Spring	Fall
Head	Dallas	7	8	7	10	High (0.46)	Medium	Low
Head	Atlanta	0	7	0	4	High (0.44)	Low	Low
Head	Chicago	0	5	0	3	High (0.49)	Low	Low
Romaine	Dallas	8	8	10	10	High (0.41)	High	High
Romaine	Atlanta	8	8	10	10	High (0.37)	High	High
Romaine	Chicago	8	8	9	10	High (0.33)	High	Medium
Leaf	Dallas	8	8	10	10	High (0.42)	High	High
Leaf	Atlanta	8	8	10	10	High (0.39)	High	High
Leaf	Chicago	8	8	6	10	High (0.44)	High	Low

* Length of window is the number of weeks prices exceed costs of production, transportation, and marketing under average low and high prices.

Table 3. Market Windows for Fresh Vegetables and NM Costs of Production and Transportation

Vegetable	Market	* Length of window in weeks, during spring		* Length of window in weeks, during fall		Price Variability	Window possibility across harvest season	
		Low price	High price	Low price	High price		Spring	Fall
Carrot	Dallas	6	6	5	5	Low (0.14)	High	High
Carrot	Atlanta	6	6	5	5	Low (0.08)	High	High
Carrot	Chicago	0	0	0	0	Low (0.09)	Low	Low
Broccoli	Dallas	0	5	7	9	High (0.33)	Low	Medium
Broccoli	Atlanta	0	6	6	9	High (0.31)	Low	Low
Broccoli	Chicago	0	0	0	6	High (0.33)	Low	Low
Spinach	Dallas	6	6	10	10	Medium (0.21)	High	High
Spinach	Atlanta	4	6	3	10	Medium (0.22)	Medium	Low
Spinach	Chicago	4	6	0	6	Medium (0.23)	Medium	Low

* Length of window is the number of weeks prices exceed costs of production, transportation, and marketing under average low and high prices.

Table 4. Transportation Cost Advantages from Southern NM Compared to California

Vegetable	Market	NM cost advantage compared to California	
		Spring	Fall
Head lettuce	Dallas	X	X
Head lettuce	Atlanta	X	X
Head lettuce	Chicago	X	X
Romaine lettuce	Dallas	X	X
Romaine lettuce	Atlanta		X
Romaine lettuce	Chicago		
Leaf lettuce	Dallas	X	X
Leaf lettuce	Atlanta		X
Leaf lettuce	Chicago		
Carrot	Dallas	X	X
Carrot	Atlanta	X	X
Carrot	Chicago	X	
Broccoli	Dallas	X	X
Broccoli	Atlanta		
Broccoli	Chicago		
Spinach	Dallas	X	X
Spinach	Atlanta		X
Spinach	Chicago		

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