Food System Review: Fruit and Vegetable

South Dakota Grocers Survey Data Summary

A SURVEY OF GROCERY STORES IN SOUTH DAKOTA

SOUTH DAKOTA STATE UNIVERSITY EXTENSION &

SOUTH DAKOTA DEPARTMENT OF HEALTH

FULL REPORT MARCH 2013

Preface:

This report of local grocers in South Dakota is a part of the project entitled “Food Systems Review: Fruit and Vegetables in South Dakota”. The purpose of this study was to examine key factors that affect the consumption, distribution, and production of fruits and vegetables in South Dakota. The survey was used to collect South Dakota grocers’ information regarding the sale of fresh, frozen, and canned fruit and vegetable items, as grocers provide valuable insight into local food systems and consumer’s food buying practices.

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1. Introduction

This Grocery Store survey was a collaborative effort between the South Dakota Department of Health and South Dakota State University Extension as part of a Food System Review of Fruit and Vegetables in South Dakota. The purpose of the Grocery Store survey was to gain insightful information of fresh, canned and frozen fruit and vegetable availability and sales, as well as the grocer's perceptions regarding product availability and their perceptions of customer's attitudes and practices. The survey also sought to gather grocers' opinions of methods to increase South Dakotan's fruit and vegetable consumption. This study was funded by the Centers for Disease Control through the South Dakota Department of Health.

The survey study was conducted between May-July 2012. A total of 319 survey questionnaires were distributed through mail to owners or managers of grocery stores located in South Dakota. The mailing list was originally obtained from Manta.com (an e-commerce web site for business professionals searching) and later edited by SDSU Extension Field Specialists and administrative assistants. Recipients were provided with a cover letter stating the purpose of the study and a self-addressed stamped return envelope. The first 40 recipients to return a completed survey were provided a $40 gift card to Amazon. After discarding the incomplete or ineligible responses, a total of 45 usable surveys (14.4%) were included in the final report and analysis.

This report provided detailed information and the summary of the retailer survey. By assuming the respondents had some role in the management of the grocery stores, this report referred sample respondents as "grocers" or "respondents" throughout the content.

The report also divided the full sample into two sub-groups, based on the fact whether the areas of the sample grocers were in food desert areas or not. The "food deserts areas" were defined as areas with limited access to healthy and affordable food as developed by the USDA Economic Research Service (http://www.ers.usda.gov/data-products/food-desert-locator.aspx). Accordingly, 17 of the total 45 sample grocers were located in food desert areas and 28 stores were in non-food desert areas. Readers can find detailed information of statistics collected from the full sample and as well as data from those stores located in identified food deserts and non-food deserts. The last section of the report also included policy suggestions based on the study's findings.

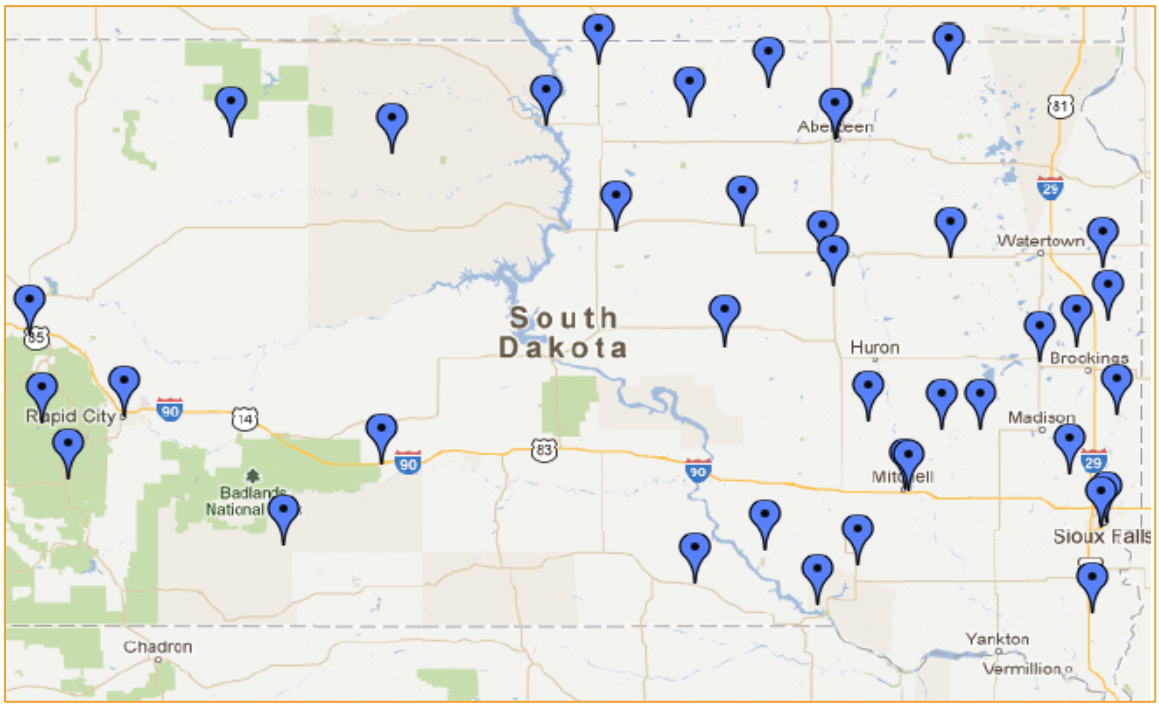
The following report is organized as follows:

- Section 2— **Characteristics of Sample**: Demographics and characteristics of sample grocers.
- Section 3—**Strategies to Increase Fruit & Vegetable Consumption:** Summarizes the accumulated points and rank rated by the sample respondents for the 10 possible marketing strategies to encourage more fruit and vegetables.
- Section 4—**Sales and Profitability:** Demonstrates detailed information of sales for frozen, fresh, and canned fruit and vegetables. Readers can also find sample grocers' self-report fruit and vegetables sales and delivery frequency statistics.
- Section 5—**Store Owners/Managers Self-Rated Satisfaction:** Summary of the store owners/managers' self-rated satisfaction regarding the variety, turn-over, and quality of the fruit and vegetables sold in the sample grocers.
- Section 6—**Perceptions of Consumer Preference and Determinants:** Sample grocers' perceptions of consumer preference and determinants to affect consumers' food choice, including food/nutrition knowledge, fruit and vegetables purchasing decisions, and possible reasons consumers do not eat enough fruit and vegetables.
- Section 7 - **Grocers' Previous Experience/Attitude:** Grocers' previous experience/attitude of selling locally-produced fruit and vegetables.
- Section 8 - **Conclusion and Recommendations.**

2. Characteristics of Sample

Figure 1 shows that our sample of 45 grocers closely represents the population distribution of the state of South Dakota. Among the total 45 sample grocers, 17 were located in food-desert areas and 25 were in non-food desert areas (see detail area at https://maps.google.com/maps/ms?msid=207407480735619029375.0004c4a854302a52da356&msa=0).

Figure 1: Areas of the Sample Grocers respondents.



Purchasing and Stocking Decisions

Tables 1-3 show the respondent's roles in the decisions of purchasing and stocking for fresh, canned and frozen produce. Table 1 and Figure 2 suggest approximately 48.9% of the respondents were sole decision makers for fresh produce. Data indicate that non-food desert areas had a higher percentage of sole decision makers (57.1%) for fresh produce, compared to food desert areas (35.3%). In food desert areas, 17.6% of the sample respondents reported no role in fresh produce purchasing and stocking.

Table 2 and Figure 3 show that the majority of grocers, regardless of the locations, were split between sole decision makers and joint decision makers for the canned produce. Table 2 also indicates a higher percentage of the respondents in food desert areas made either sole or joint decisions for the purchase of canned products (47.1%), compared to the stores in non-food desert areas (39.3%).

Table 3 and Figure 4 suggest the grocers in non-food desert areas had a relatively smaller role in the decision of purchasing and stocking the frozen produce, as compared to the stores in food desert areas. About 10.7% of the stores in non-food desert areas reported no role in the decision-making process, while only one store (5.9%) in food desert areas reported so.

Table 1: Role in the decisions regarding the purchasing/stocking of fruit and vegetables (Fresh Produce)

	Fresh Produce					
		Full Sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Sole Decision	22	(48.89%)	6	(35.29%)	16	(57.14%)
Joint Decision	19	(42.22%)	8	(47.06%)	11	(39.29%)
No Role	3	(6.67%)	3	(17.65%)	0	(0.00%)
No Response	1	(2.22%)	0	(0.00%)	1	(3.57%)

Figure 2: Role in the decisions regarding the purchasing/stocking of fruit and vegetables (Fresh Produce)

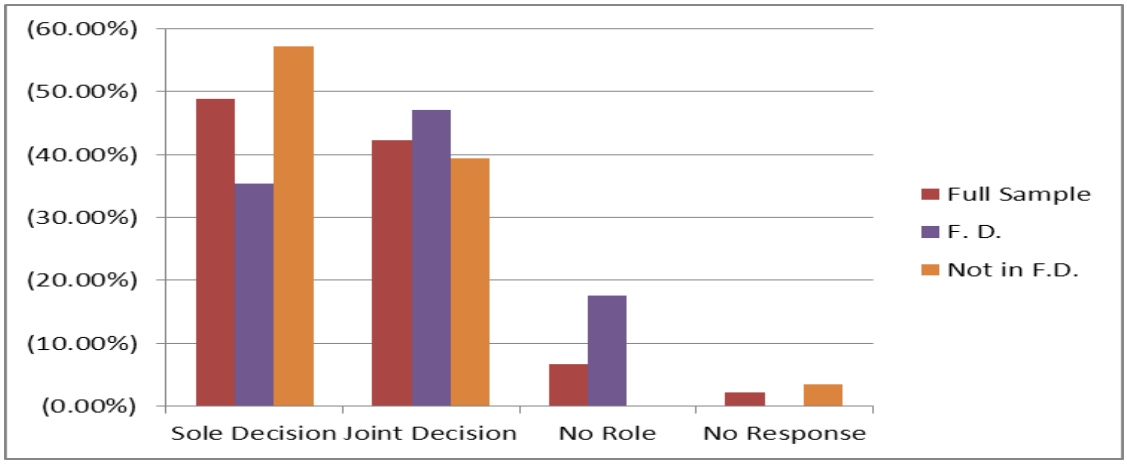


Table 2: Role in the decisions regarding the purchasing/stocking of fruit and vegetables (Canned)

	Canned Produce					
		Full Sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Sole Decision	19	(42.22%)	8	(47.06%)	11	(39.29%)
Joint Decision	19	(42.22%)	8	(47.06%)	11	(39.29%)
No Role	5	(11.11%)	1	(5.88%)	4	(14.29%)
No Response	2	(4.44%)	0	(0.00%)	2	(7.14%)

Figure 3: Role in the decisions regarding the purchasing/stocking of fruit and vegetables (Canned)

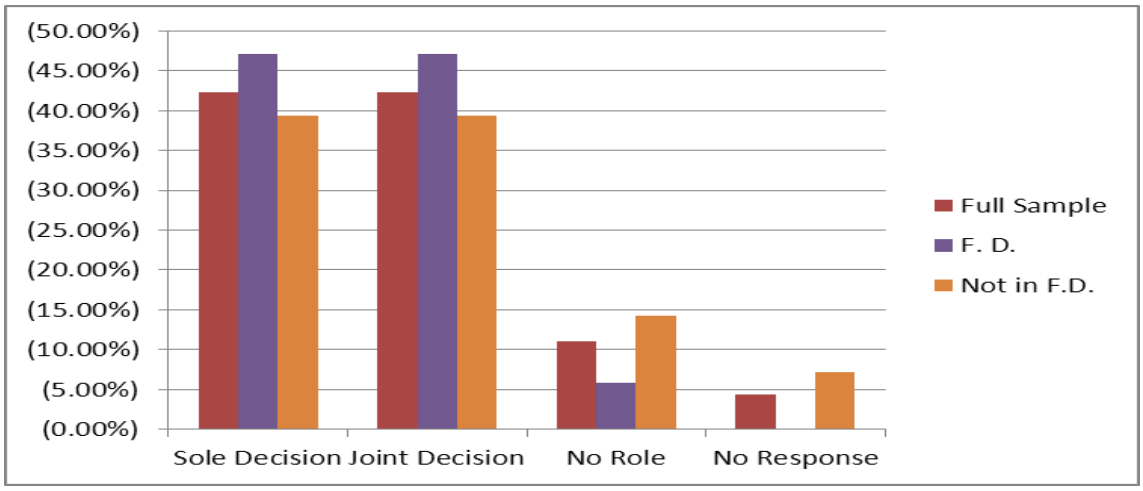
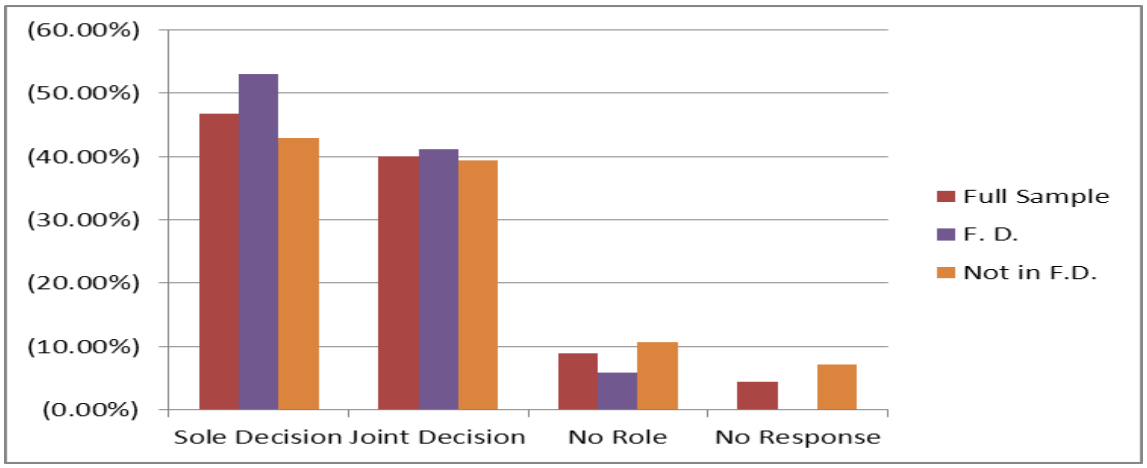


Table 3: Role in the decisions regarding the purchasing/stocking of fruit and vegetables (frozen produce)

	Frozen Produce					
		Full Sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Sole Decision	21	(46.67%)	9	(52.94%)	12	(42.86%)
Joint Decision	18	(40.00%)	7	(41.18%)	11	(39.29%)
No Role	4	(8.89%)	1	(5.88%)	3	(10.71%)
No Response	2	(4.44%)	0	(0.00%)	2	(7.14%)

Figure 4: Role in the decisions regarding the purchasing/stocking of fruit and vegetables (frozen produce)



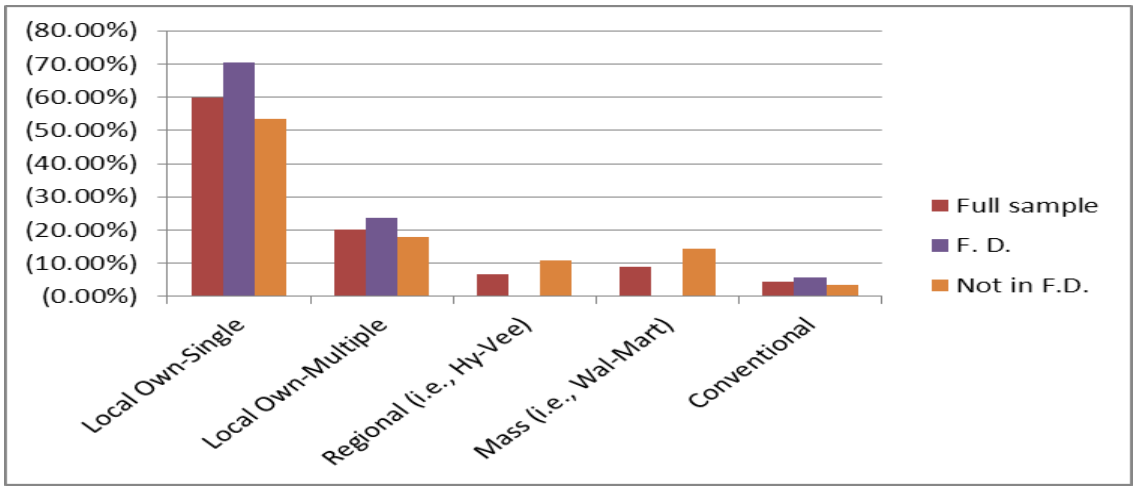
Types of Ownership

Table 4 and Figure 5 show 60.0% of sample respondents were locally owned, single businesses and 20.0% were locally owned, multiple stores. Data indicate that food desert areas had more local, single ownership grocers (70.6%) as compared to non-food deserts areas (53.6%). Table 4 suggests the regional and mass grocers only exist in our samples for non-food desert areas. Data indicate 10.7% of the sample grocers in non-food desert areas were regional stores (i.e. Hy-Vee) and 14.3% were mass stores (i.e. Wal-Mart).

Table 4: Types of ownerships

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Local Own-Single	27	(60.00%)	12	(70.59%)	15	(53.57%)
Local Own-Multiple	9	(20.00%)	4	(23.53%)	5	(17.86%)
Regional (i.e., Hy-Vee)	3	(6.67%)	0	(0.00%)	3	(10.71%)
Mass (i.e., Wal-Mart)	4	(8.89%)	0	(0.00%)	4	(14.29%)
Conventional	2	(4.44%)	1	(5.88%)	1	(3.57%)

Figure 5: Types of ownerships



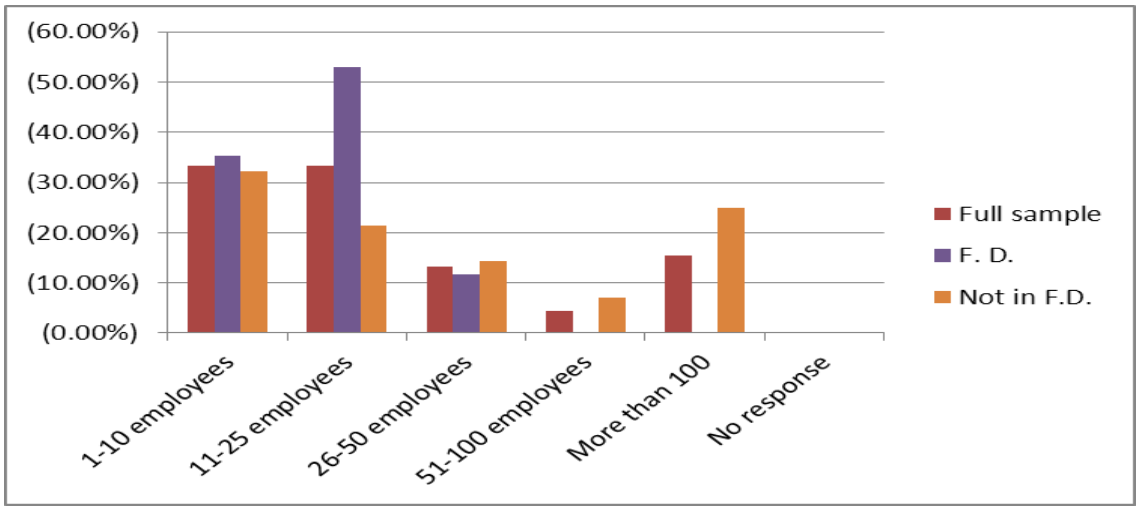
Business Scale

Table 5 and Figure 6 show the majority of the sample grocers (66.7%) had 25 or fewer employees. Data suggests non-food desert areas had more large-scaled retailer stores: 32.1% of the sample employing more than 50 employees and 25% of these stores with more than 100 employees. On the contrary, Figure 6 suggests none of sample grocers in food desert areas had more than 50 employees and 88.2% of them had 25 or fewer employees.

Table 5: Numbers of Employees

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1-10 employees	15	(33.33%)	6	(35.29%)	9	(32.14%)
11-25 employees	15	(33.33%)	9	(52.94%)	6	(21.43%)
26-50 employees	6	(13.33%)	2	(11.76%)	4	(14.29%)
51-100 employees	2	(4.44%)	0	(0.00%)	2	(7.14%)
More than 100	7	(15.56%)	0	(0.00%)	7	(25.00%)
No response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 6: Numbers of Employees



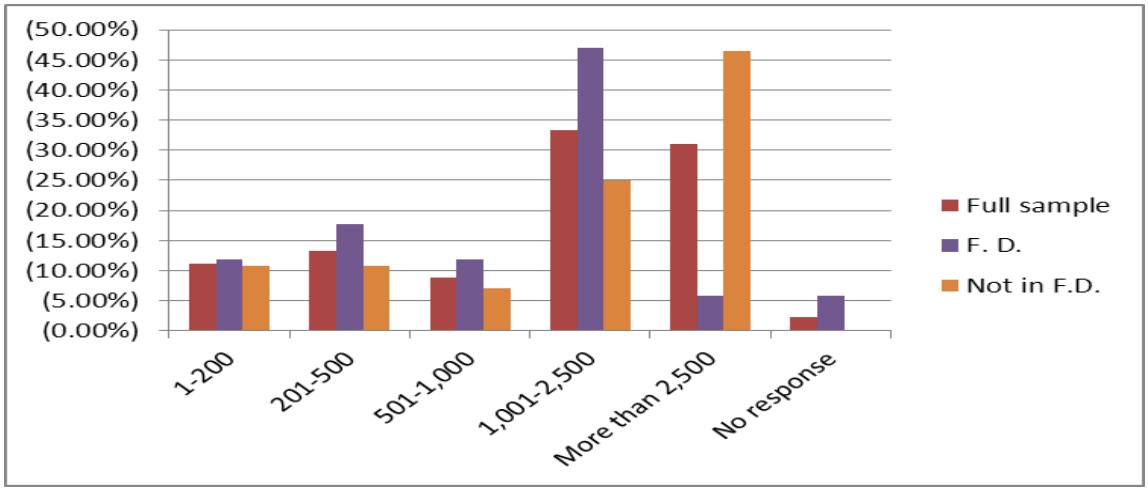
Number of Customers

Table 6 and Figure 7 show grocers in non-food desert areas generally had more customers, compared to the stores in food desert areas. About 71.4% of the sample grocers in non-food desert areas had 1,000 customers per week, whereas only 53.9% of the stores in food desert areas had similar numbers of customers. Furthermore, Table 6 shows 46.4% of the sample grocers in non-food desert areas had customer numbers larger than 2,500 per week, while only 5.6% (1 store) in the food desert area had 2,500 customers or more per week.

Table 6: Numbers of customers per week

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1-200	5	(11.11%)	2	(11.76%)	3	(10.71%)
201-500	6	(13.33%)	3	(17.65%)	3	(10.71%)
501-1,000	4	(8.89%)	2	(11.76%)	2	(7.14%)
1,001-2,500	15	(33.33%)	8	(47.06%)	7	(25.00%)
More than 2,500	14	(31.11%)	1	(5.88%)	13	(46.43%)
No response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 7: Numbers of customers per week



Food/Grocery Sold in the Store

Table 7 shows that all grocers provide a wide variety of food and grocery to their customers. There is no substantial difference in the products sold in stores between food desert and non-food desert areas.

Table 7: Types of food/grocery are sold

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Fruits, Vegetables, and Herbs	43	(95.56%)	16	(94.12%)	27	(96.43%)
Meat, Fish, and game	45	(100.00%)	17	(100.00%)	28	(100.00%)
Dairy Products	44	(97.78%)	16	(94.12%)	28	(100.00%)
Bread, flour, and baked goods	45	(100.00%)	17	(100.00%)	28	(100.00%)
Jams, preserves, honey, and sauces	43	(95.56%)	16	(94.12%)	27	(96.43%)
Tinned, packaged, or pre-prepared goods	42	(93.33%)	17	(100.00%)	25	(89.29%)
Beverage (alcoholic and soft)	44	(97.78%)	16	(94.12%)	28	(100.00%)
Others	2	(4.44%)	1	(5.88%)	1	(3.57%)

Gender, Ethnic, and Education Background

Table 8 and Figure 8 show the gender distribution of the sample grocers. Data shows 55.6% of the respondents were male and 44.4% of the respondents were female. Table 8 also indicates that non-food desert areas had higher percentage of male respondents (60.7% vs. 47.1%).

Table 9 shows most of respondents were Caucasian, regardless of the store locations. Table 10 and Figure 10 suggest 26.7% of the grocers had high school diplomas, 31.1% had some college and 35.6% had four-year college degrees (Table 10). However, Table 10 suggests that respondents in non-food desert areas in general had higher education backgrounds than those in food desert areas. For example, while 50.0% of the respondents in non-food desert areas had four-year college or higher degree of education, data indicate only 23.5% of the grocers in food desert obtained similar levels of education.

Table 8: Gender of sample grocery store owners/managers

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Male	25	(55.56%)	8	(47.06%)	17	(60.71%)
Female	20	(44.44%)	9	(52.94%)	11	(39.29%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 8: Gender of sample grocery store owners/managers

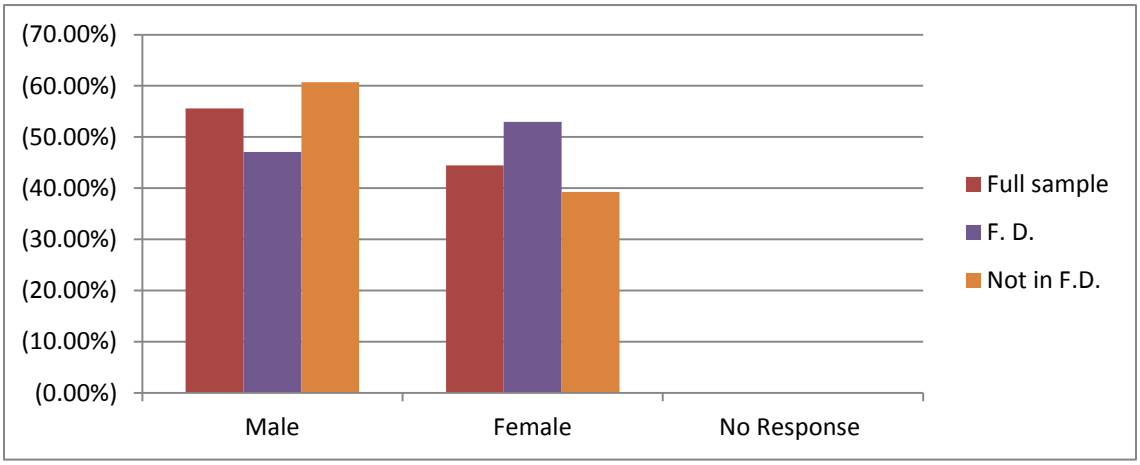


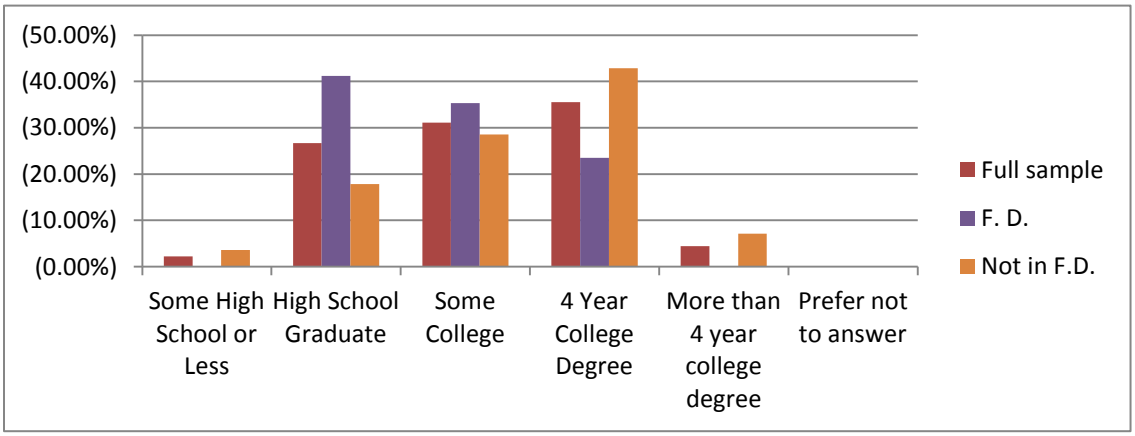
Table 9: Ethnic background

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
White	43	(95.56%)	16	(94.12%)	27	(96.43%)
African American	1	(2.22%)	0	(0.00%)	1	(3.57%)
Native American	0	(0.00%)	0	(0.00%)	0	(0.00%)
Asian	0	(0.00%)	0	(0.00%)	0	(0.00%)
Pacific Islander	0	(0.00%)	0	(0.00%)	0	(0.00%)
Hispanic	1	(2.22%)	1	(5.88%)	0	(0.00%)
Mixed Race	0	(0.00%)	0	(0.00%)	0	(0.00%)
Others	0	(0.00%)	0	(0.00%)	0	(0.00%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Table 10: Education Level

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Some High School or Less	1	(2.22%)	0	(0.00%)	1	(3.57%)
High School Graduate	12	(26.67%)	7	(41.18%)	5	(17.86%)
Some College	14	(31.11%)	6	(35.29%)	8	(28.57%)
4 Year College Degree	16	(35.56%)	4	(23.53%)	12	(42.86%)
More than 4 year college degree	2	(4.44%)	0	(0.00%)	2	(7.14%)
Prefer not to answer	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 10: Education Level



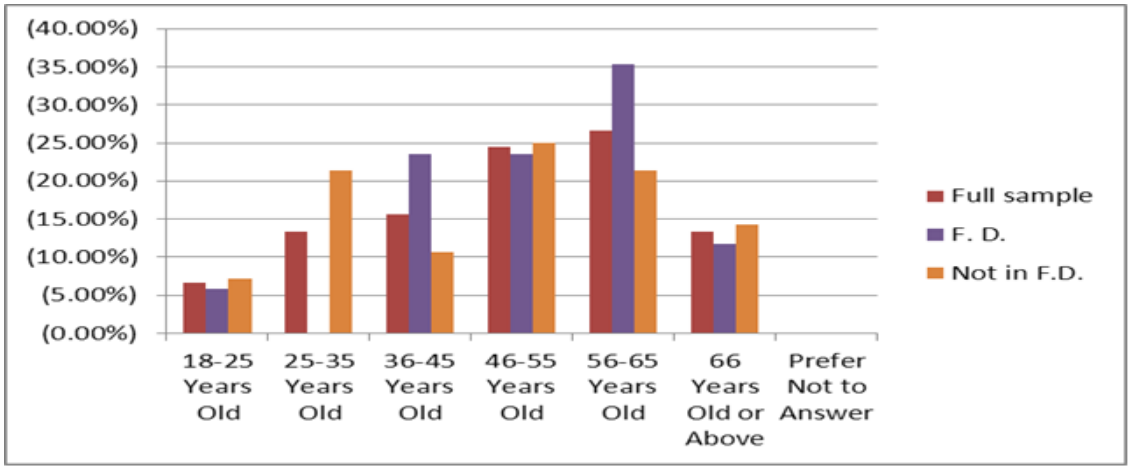
Age of Sample Grocers

Table 11 and Figure 11 show a majority of the respondents (64.4%) were 46 years old or older. The age of the grocers in non-food desert was noticeably younger, with 28.57% of the 35 years old or younger and 35.7% of the respondents 56 years old or older. On the other hand, the overall age of the respondents in food desert areas was relatively older: only one grocer (5.9%) in food desert areas was less 35 years old and 47.0% of the respondents were 56 years or older.

Table 11: Age Distribution of Sample Respondents

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
18-25 Years Old	3	(6.67%)	1	(5.88%)	2	(7.14%)
25-35 Years Old	6	(13.33%)	0	(0.00%)	6	(21.43%)
36-45 Years Old	7	(15.56%)	4	(23.53%)	3	(10.71%)
46-55 Years Old	11	(24.44%)	4	(23.53%)	7	(25.00%)
56-65 Years Old	12	(26.67%)	6	(35.29%)	6	(21.43%)
66 Years Old or Above	6	(13.33%)	2	(11.76%)	4	(14.29%)
Prefer Not to Answer	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 11: Age Distribution of Sample Respondents



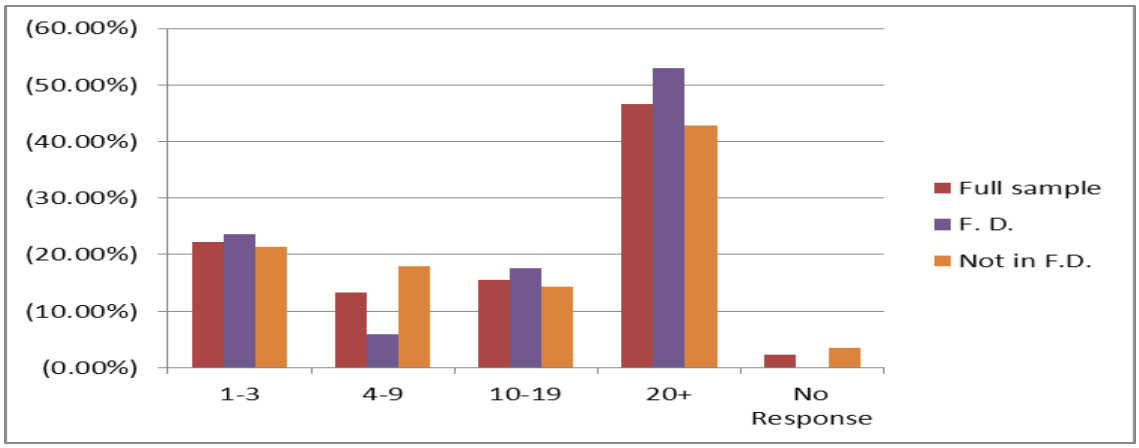
Years in the Current Role/Position

Table 12 and Figure 12 show 28 respondents (62.2%) had worked for the same role/position for more than 10 years. Data suggests a higher percentage of grocers in food desert had worked for the same role for more than 10 years (70.6%), compared to those in non-food desert areas (60.7%).

Table 12: Years in the current role

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1-3	10	(22.22%)	4	(23.53%)	6	(21.43%)
4-9	6	(13.33%)	1	(5.88%)	5	(17.86%)
10-19	7	(15.56%)	3	(17.65%)	4	(14.29%)
20+	21	(46.67%)	9	(52.94%)	12	(42.86%)
No Response	1	(2.22%)	0	(0.00%)	1	(3.57%)

Figure 12: Years in the current role



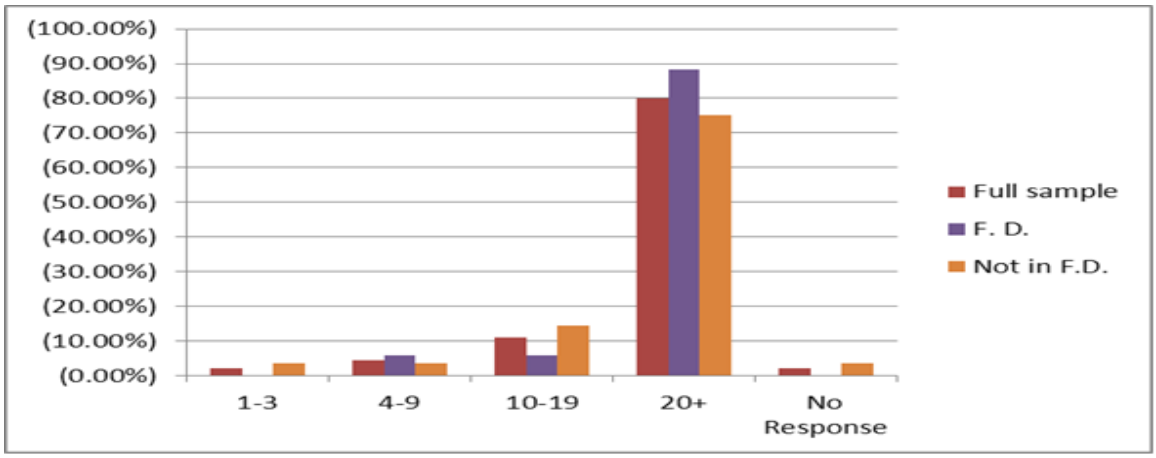
Years in the Business

Table 13 and Figure 13 show that 41 of the grocers (91.1%) had been in the business for more than 10 years. Only one store in food desert area (5.9%) and two stores in non-food desert area (7.1%) were in business for less than 10 years. Compared to the stores in non-food desert areas, Table 13 also suggests food desert areas have a higher percentage of grocers who had been in business for more than 20 years (88.2% vs. 75.0%).

Table 13: Years in the business

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1-3	1	(2.22%)	0	(0.00%)	1	(3.57%)
4-9	2	(4.44%)	1	(5.88%)	1	(3.57%)
10-19	5	(11.11%)	1	(5.88%)	4	(14.29%)
20+	36	(80.00%)	15	(88.24%)	21	(75.00%)
No Response	1	(2.22%)	0	(0.00%)	1	(3.57%)

Figure 13: Years in the business



Overall, the sample grocers included in this report had closely represented the geographical and business nature of the retailers in South Dakota. About 60% of these grocers were locally, single-

owned/operated and 20% were locally-owned, chain stores. Seventeen of the grocers in food desert areas were smaller both in scale and sales as compared to the grocers in non-food desert areas. The majority of the grocers had stayed in the business for more than 20 years, especially for those in food desert areas. The grocers in non-food desert areas were generally larger and the ownership types were more diverse. Data also suggest non-food desert areas had more newly-established stores.

Almost one-half of the grocers made the purchasing/stocking decisions for fruit and vegetables solely, while the other one-half of the stores made the decisions jointly. Furthermore, food desert areas had a smaller percent of sole decision makers for the fresh produce, but the areas also obtained a higher percent of sole decision makers for frozen produce, compared to non-food desert areas. The grocers in non-food desert areas, on the other hand, had a higher percent of sole decision makers for the fresh produce and less percentage of sole decision makers for the frozen produce.

The sample grocers were mostly white and had worked for the same or similar positions for more than 10 years.

3. Strategies to Increase Fruit & Vegetable Consumption

Based on the information generated from two previous studies by South Dakota Department of Health (i.e., "*BRFSS Analyses of Fruit and Vegetable Consumption in South Dakota 2005*, *2007, 2009"* and "*South Dakota Health Survey*"), this survey selected ten marketing strategies and asked respondents to rate their potential effectiveness in increasing fruit and vegetable consumption. Respondents were directed to use a Likert scale to rank the strategies: "1" was for the perceivably most effective strategy and "10" was for the least effective strategy. Table 14 provides the summary statistics for the full sample as well as grocers in identified food deserts and non-food desert areas.

Table 14: Strategies to increase fruit and vegetable consumption: accumulated Points and Rates

Strategy	Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)	
	Points	Rate	Points	Rate	Points	Rates
Offering only coupons for fruit and vegetable products	172	3	79	3	93	3
Offering only point of purchase "quick and easy" recipes displayed at the sale site of fresh, canned and frozen items	226	4	98	5	125	5
In-store displays which offer coupons and "quick and easy" recipes	161	2	76	2	85	2
Offering samples with locally sold produce.	149	1	67	1	82	1
Offering on-site cooking classes utilizing fresh, canned and frozen items	254	6	96	4	158	7
Offering off-site cooking classes utilizing fresh, canned and frozen items	315	10	113	6	202	10
Providing point of purchase "tip" sheets for consumers	234	5	115	7	119	4
Providing point of purchase video, i.e. demonstrating "quick and easy" preparation/cooking technique	286	8	120	8	166	8
Providing state wide distributed tips via social media such as Facebook, Twitter, etc.	294	9	125	9	169	9
Statewide distribution of recipes and incentive items for the purchase of frozen and/or canned products	259	7	115	7	144	6

The accumulated points for each strategy were calculated by adding all the points given by the respondents. Therefore, this report uses the accumulated points as un-weighted index of effectiveness evaluated by the sample grocers. Accordingly, the strategy that shows the smallest accumulated points should be interpreted as the most effective strategy rated by the respondents.

Table 14 shows all participants, regardless the store locations, selected the same top 3 strategies that they felt would increase fruit and vegetable consumption, respectively. Those top three strategies are:

#1. Offering samples with locally sold produce.

#2. In-store displays which offer coupons and "quick and easy" recipes.

#3. Offering coupons only for fruit and vegetable products.

Survey data indicate that simply offering point of purchase quick and easy recipes, tip sheets and on-site cooking classes could be somewhat effective. On the other hand, respondents considered statewide distribution of recipes and incentive items, point of purchase videos, and statewide distribution cooking tips through social media (such as twitter and Facebook) to be much less effective than other options. Offering off-site cooking classes was rated as the least effective strategy among all grocers.

4. Sales & Profitability: Frozen, Fresh, and Canned

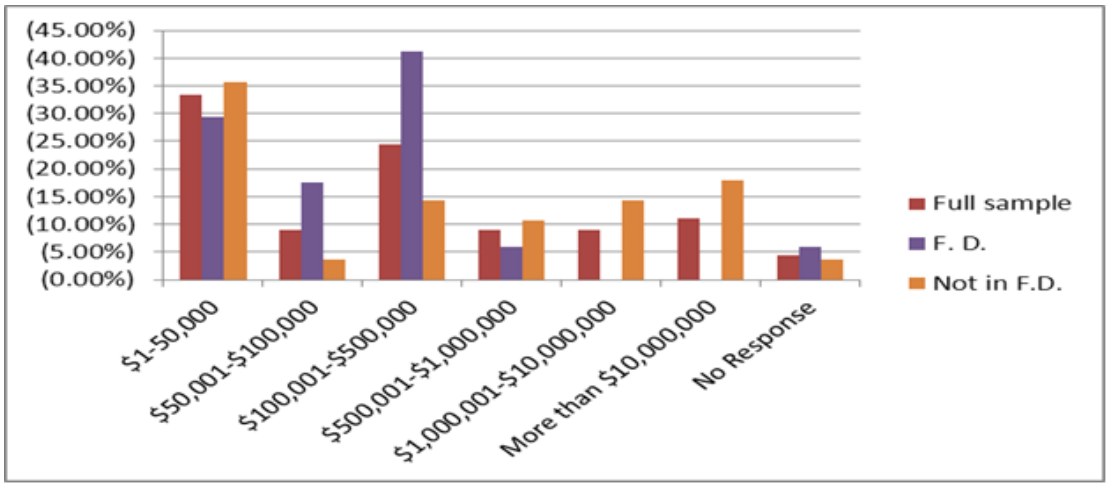
Annual Sales of Fruit & Vegetables

Table 15 and Figure 15 show growers' self-reported fruit and vegetable sales. Approximately 29.4% of the sample grocers in food desert areas reportedly had annual sales between $1- $50,000; 17.7% of grocers had sales between $50,001 -$ 100,000; 41.2% had sales between $100,001 -$500,000; and 5.9%% had sales between $500,000 -$ 1,000,000. Grocers in non-food desert areas commonly had higher sales record: 35.7% of the grocers reportedly had annual sales between $1 -$50,000; 3.57% of grocers had sales between $50,001 -$ 100,000; 14.3% had sales between $100,001 -$500,000; 10.7% had sales between $500,000 -$ 1,000,000; and 14.3% of the grocers had sales between $1,000,001-$10,000,000. Moreover, Table 15 shows 17.9% of the grocers in non-food desert areas had annual sales of fruit and vegetables more than 1 million dollars, while none of the grocers in food desert areas had sales more than $1,000,000.

Table 15: Annual Sales of fruit and vegetables

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
$1-50,000	15	(33.33%)	5	(29.41%)	10	(35.71%)
$50,001-$100,000	4	(8.89%)	3	(17.65%)	1	(3.57%)
$100,001-$500,000	11	(24.44%)	7	(41.18%)	4	(14.29%)
$500,001-$1,000,000	4	(8.89%)	1	(5.88%)	3	(10.71%)
$1,000,001-$10,000,000	4	(8.89%)	0	(0.00%)	4	(14.29%)
More than $10,000,000	5	(11.11%)	0	(0.00%)	5	(17.86%)
No Response	2	(4.44%)	1	(5.88%)	1	(3.57%)

Figure 15: Annual Sales of fruit and vegetables



Percentage of Sales for Frozen, Canned, and Fresh Fruit & Vegetables

The survey requested participants to report the percentage sales of frozen, fresh, and canned fruit and vegetables. The questions in the original survey questionnaire were presented in a table to direct the grocers to list the percentage of fruit and vegetable sales (in different columns). A "Total: 100%" sign was added in the end of each column to remind the grocers the summation of the percentages they filled frozen, fresh, and canned produce should not be equal to 100% (i.e., fruit and vegetables separately).

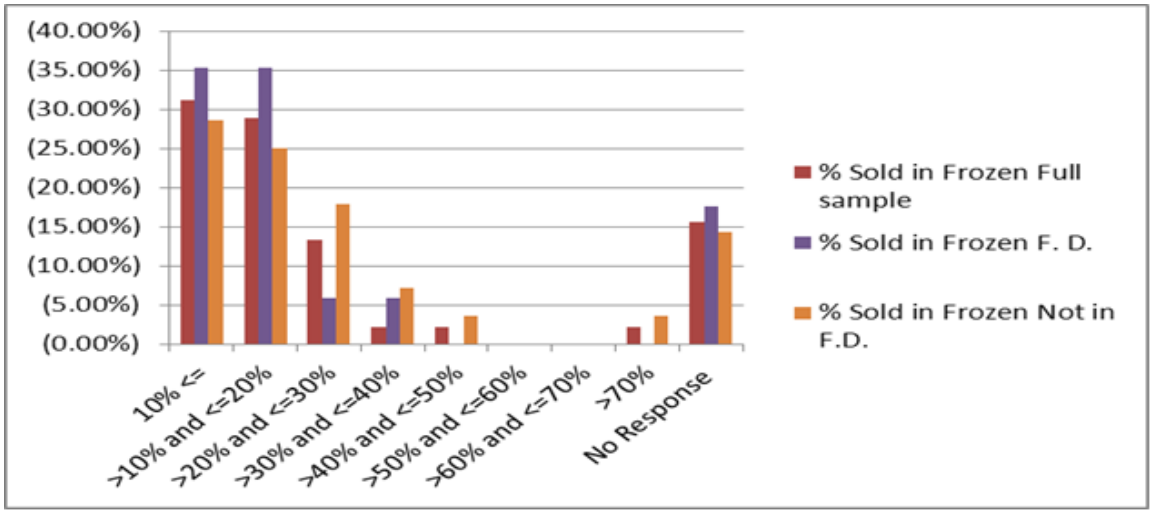
Percentages Sales of Frozen Vegetables

Table 16 and Figure 16 show the ratio of frozen vegetables sales to the total vegetables sales: 27 of 45 grocers (60.0%) indicated that the sales of frozen vegetables were 20% or less of their total vegetable sales. Among them, 14 of the grocers had less than 10% of the total sales from frozen vegetables (31.1%), and 13 the grocers (28.9%) had frozen vegetable sales between 10%-20% of the total vegetable sales. Table 16 suggests a larger percentage of the grocers in non-food desert areas sold more frozen vegetables. While only two stores (11.8%) in food desert areas sold more than 20% of frozen vegetables, data indicate that nine grocers (32.1%) in non-food desert areas sold more than 20% of their vegetables in frozen form. On the other hand, 12 (70.6%) grocers in food desert areas and 15 grocers (53.6%) in non-food desert areas sold less than 20% of the frozen vegetables.

Table 16: Percentage of sales: Vegetables-Frozen

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
10% <=	14	(31.11%)	6	(35.29%)	8	(28.57%)
>10% and <=20%	13	(28.89%)	6	(35.29%)	7	(25.00%)
>20% and <=30%	6	(13.33%)	1	(5.88%)	5	(17.86%)
>30% and <=40%	1	(2.22%)	1	(5.88%)	2	(7.14%)
>40% and <=50%	1	(2.22%)	0	(0.00%)	1	(3.57%)
>50% and <=60%	0	(0.00%)	0	(0.00%)	0	(0.00%)
>60% and <=70%	0	(0.00%)	0	(0.00%)	0	(0.00%)
>70%	1	(2.22%)	0	(0.00%)	1	(3.57%)
No Response	7	(15.56%)	3	(17.65%)	4	(14.29%)

Figure 16: Percentage of sales: Vegetables-Frozen



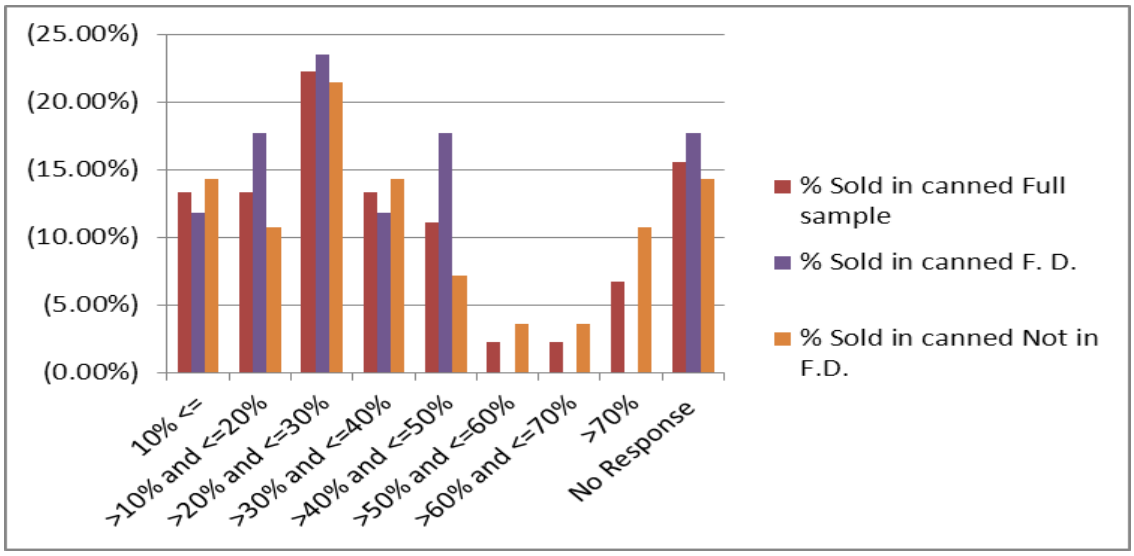
Percentages Sales of Canned Vegetables

Table 17 and Figure 17 show 35.3% of the grocers in food desert areas had more than 40% of the total vegetables sales in cans. In non-food desert areas, 39.3% of the stores had 40% or more of vegetable sales in cans, compared to 21% in the frozen vegetables sales at the same level. Data suggests that canned vegetable products comprised a larger portion of sales than frozen vegetable products for both food desert and non-food desert areas.

Table 17: Percentage of sales: Vegetables-canned

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
10% <=	6	(13.33%)	2	(11.76%)	4	(14.29%)
>10% and <=20%	6	(13.33%)	3	(17.65%)	3	(10.71%)
>20% and <=30%	10	(22.22%)	4	(23.53%)	6	(21.43%)
>30% and <=40%	6	(13.33%)	2	(11.76%)	4	(14.29%)
>40% and <=50%	5	(11.11%)	3	(17.65%)	2	(7.14%)
>50% and <=60%	1	(2.22%)	0	(0.00%)	1	(3.57%)
>60% and <=70%	1	(2.22%)	0	(0.00%)	1	(3.57%)
>70%	3	(6.67%)	0	(0.00%)	3	(10.71%)
No Response	7	(15.56%)	3	(17.65%)	4	(14.29%)

Figure 17: Percentage of sales: Vegetables-canned



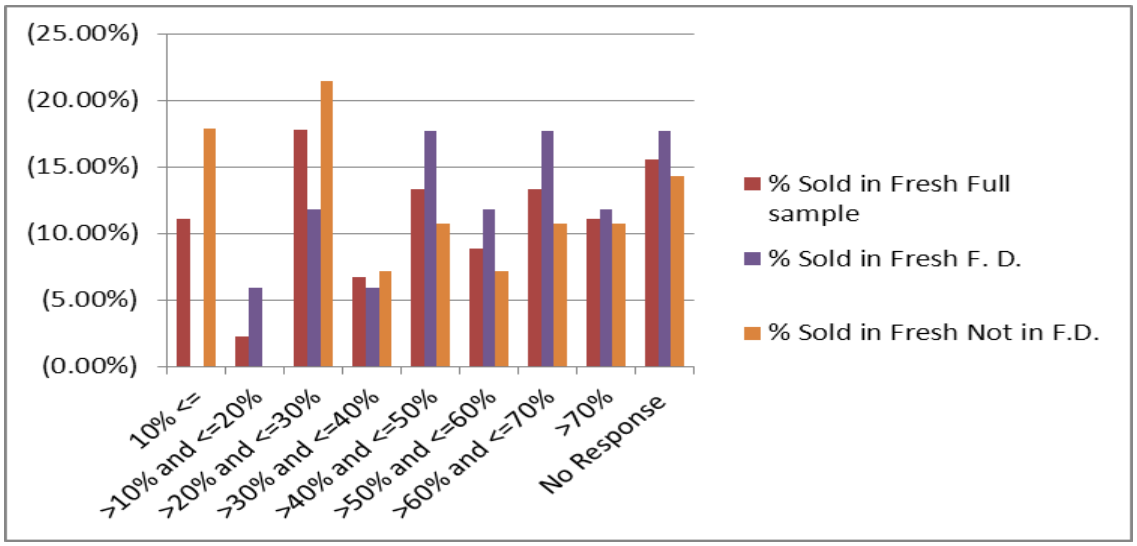
Percentages Sales of Fresh Vegetables

Table 18 and Figure 18 depict self-reported sales of fresh produce as a percent of total vegetable sales. In contrast to the sale records for the frozen and canned produce, food desert areas had noticeably more grocers reporting a higher percentage of fresh vegetables sales. For example, 64.7% of the grocers in food desert areas had 40% or more of fresh vegetable product sold, in contrast to 39.5% of grocers in non-food desert areas reported had the same percentage (40%) of fresh vegetable sales. Table 18 also shows that 11 grocers in non-food desert (39.3%) sold equal or less than 30% of fresh vegetables in fresh, compared to 17.6% in food desert areas.

Table 18: Percentage of sales: Vegetables-Fresh

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
10% <=	5	(11.11%)	0	(0.00%)	5	(17.86%)
>10% and <=20%	1	(2.22%)	1	(5.88%)	0	(0.00%)
>20% and <=30%	8	(17.78%)	2	(11.76%)	6	(21.43%)
>30% and <=40%	3	(6.67%)	1	(5.88%)	2	(7.14%)
>40% and <=50%	6	(13.33%)	3	(17.65%)	3	(10.71%)
>50% and <=60%	4	(8.89%)	2	(11.76%)	2	(7.14%)
>60% and <=70%	6	(13.33%)	3	(17.65%)	3	(10.71%)
>70%	5	(11.11%)	2	(11.76%)	3	(10.71%)
No Response	7	(15.56%)	3	(17.65%)	4	(14.29%)

Figure 18: Percentage of sales: Vegetables-Fresh



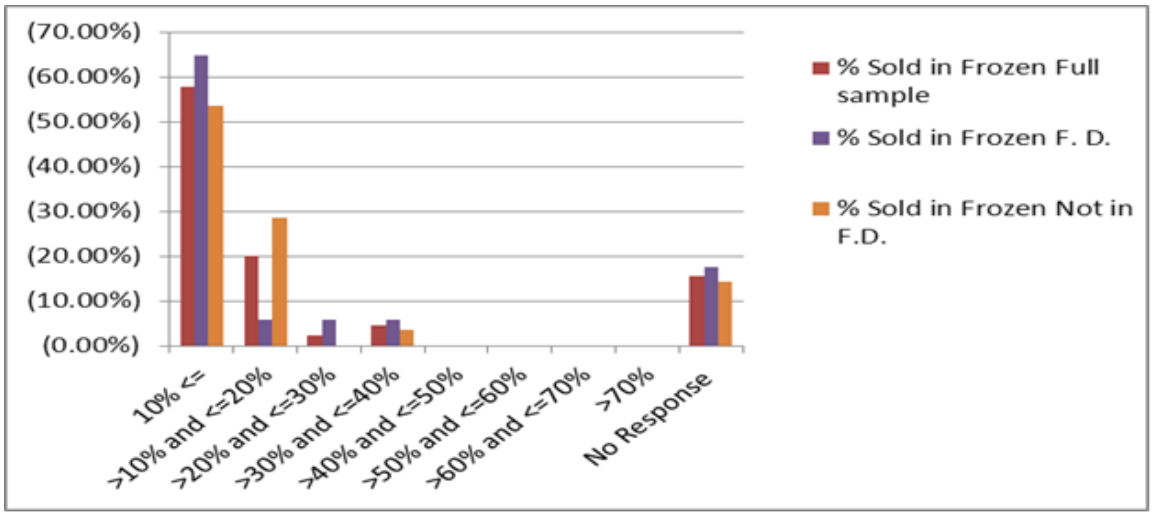
Percentages Sales of Frozen Fruit

Table 19 and Figure 19 depict the percentage of the frozen fruit sales as compared to total fruit sales. Thirty-five of the total 45 grocers (77.8%) reported sales of frozen fruit equal to or less 20% of the total fruit sales. Grocers in non-food desert areas reported somewhat larger percentage of total sales than those in food desert areas. Table 19 indicates that frozen fruit had a smaller market share for fruit sales as compared to fresh or canned fruit, both in food desert and non-food desert areas.

Table 19: Percentage of sales: fruit-Frozen

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
10% <=	26	(57.78%)	11	(64.71%)	15	(53.57%)
>10% and <=20%	9	(20.00%)	1	(5.88%)	8	(28.57%)
>20% and <=30%	1	(2.22%)	1	(5.88%)	0	(0.00%)
>30% and <=40%	2	(4.44%)	1	(5.88%)	1	(3.57%)
>40% and <=50%	0	(0.00%)	0	(0.00%)	0	(0.00%)
>50% and <=60%	0	(0.00%)	0	(0.00%)	0	(0.00%)
>60% and <=70%	0	(0.00%)	0	(0.00%)	0	(0.00%)
>70%	0	(0.00%)	0	(0.00%)	0	(0.00%)
No Response	7	(15.56%)	3	(17.65%)	4	(14.29%)

Figure 19: Percentage of sales: Fruit-Frozen



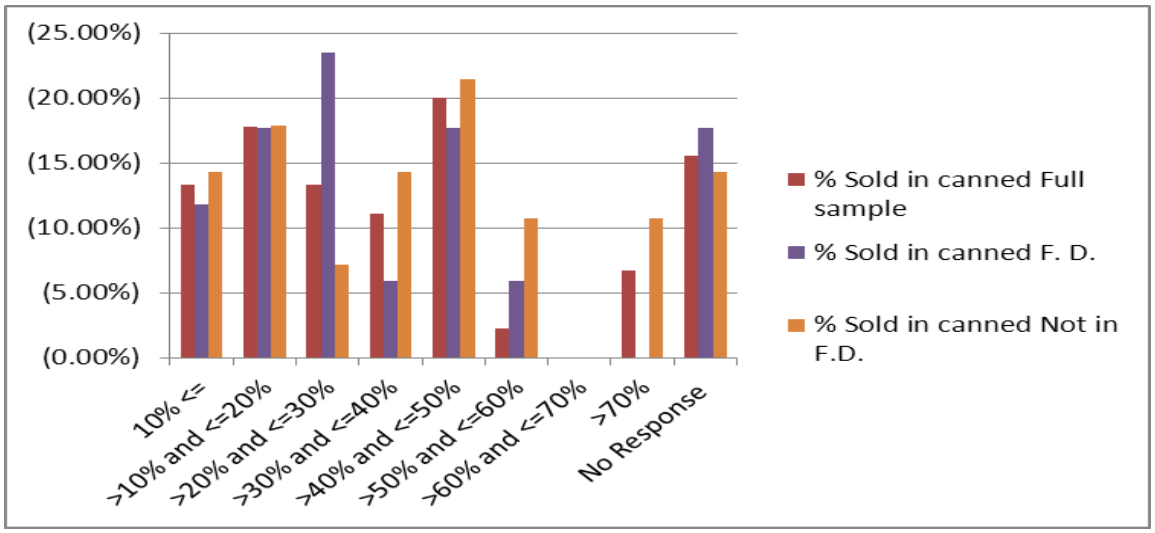
Percentages Sales of Canned Fruit

Compared to frozen fruit, canned fruit has a larger market share. Table 20 and Figure 20 show that 13 of the 45 grocers (28.9%) had canned fruit sales equal or larger than 40% of their total fruit sales. Non-food desert areas had 12 grocers (42.8%) reported having canned fruit sales of more than 40% of their total fruit sales. In contrast, only four grocers in food desert areas (23.5%) had the same percentage of fruit sales in cans.

Table 20: Percentage of sales: Fruit-Canned

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
10% <=	6	(13.33%)	2	(11.76%)	4	(14.29%)
>10% and <=20%	8	(17.78%)	3	(17.65%)	5	(17.86%)
>20% and <=30%	6	(13.33%)	4	(23.53%)	2	(7.14%)
>30% and <=40%	5	(11.11%)	1	(5.88%)	4	(14.29%)
>40% and <=50%	9	(20.00%)	3	(17.65%)	6	(21.43%)
>50% and <=60%	1	(2.22%)	1	(5.88%)	3	(10.71%)
>60% and <=70%	0	(0.00%)	0	(0.00%)	0	(0.00%)
>70%	3	(6.67%)	0	(0.00%)	3	(10.71%)
No Response	7	(15.56%)	3	(17.65%)	4	(14.29%)

Figure 20: Percentage of sales: Fruit-Canned



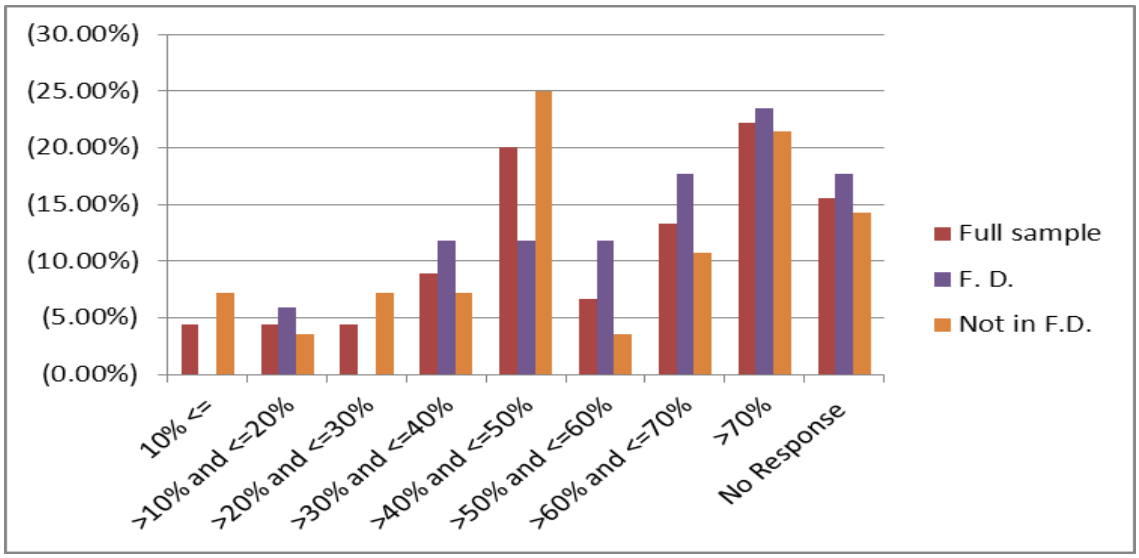
Percentages Sales of Fresh Fruit

Table 21 and Figure 21 indicate fresh fruit was the most important part of the total fruit market in South Dakota, regardless of the store locations: 19 (42.2%) of the total 45 grocers had fresh fruit sales over 50% of their total fruit sales. Table 21 also shows grocers in food desert areas reported a larger percentage of fresh fruit sold, as compared to grocers in non-food desert areas.

Table 21: Percentage of sales: Fruit-Fresh

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
10% <=	2	(4.44%)	0	(0.00%)	2	(7.14%)
>10% and <=20%	2	(4.44%)	1	(5.88%)	1	(3.57%)
>20% and <=30%	2	(4.44%)	0	(0.00%)	2	(7.14%)
>30% and <=40%	4	(8.89%)	2	(11.76%)	2	(7.14%)
>40% and <=50%	9	(20.00%)	2	(11.76%)	7	(25.00%)
>50% and <=60%	3	(6.67%)	2	(11.76%)	1	(3.57%)
>60% and <=70%	6	(13.33%)	3	(17.65%)	3	(10.71%)
>70%	10	(22.22%)	4	(23.53%)	6	(21.43%)
No Response	7	(15.56%)	3	(17.65%)	4	(14.29%)

Figure 21: Percentage of sales: Fruit-Fresh



Changes of Fruit and Vegetable Sales in the Past Three Years

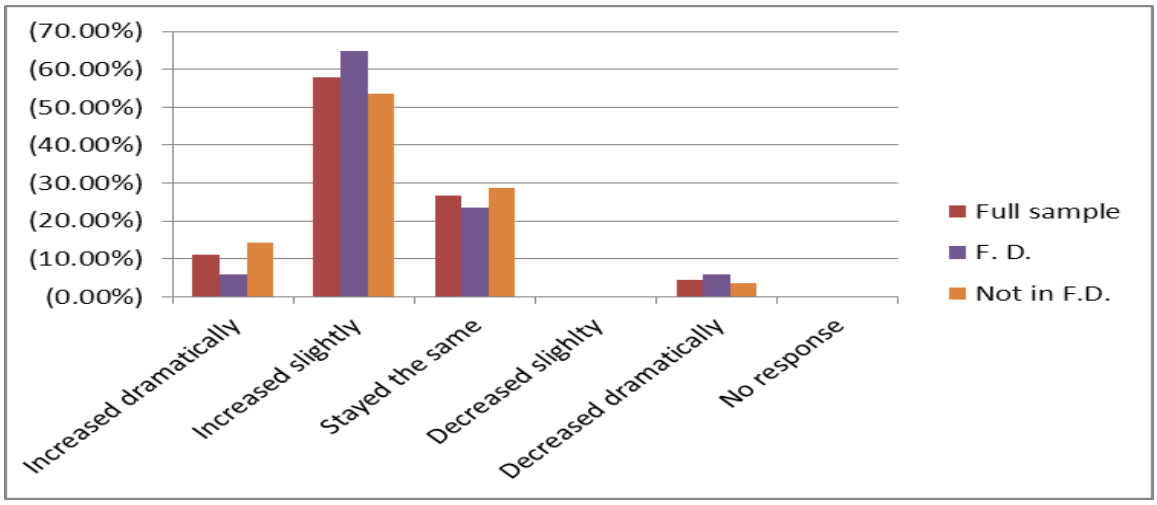
When asked to report the changes of fruit and vegetable sales in the past three years, 11.1% grocers reported dramatic increases in sales and 57.8% reported slightly increase in sales. Table 22 shows 4 grocers in non-food desert areas (14.3%) reportedly saw significant increases in sales and 15 grocers (53.6%) noted a slight increase in sales. In food desert areas, 5.9% of the grocers experienced significant increases and 64.7% had slightly increases in sales.

Table 22 also shows one store in a food desert area and one store in a non-food desert area reported significant decreases in their fruit and vegetable sales in the past three years. The survey record indicates that both of these two stores were small and single ownership grocers with 10 or fewer employees. One of the two grocers had less than 200 customers per week and the other less than 500 customers per week.

Table 22: Changes of Fruit and Vegetable Sales in the past three years

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Increased dramatically	5	(11.11%)	1	(5.88%)	4	(14.29%)
Increased slightly	26	(57.78%)	11	(64.71%)	15	(53.57%)
Stayed the same	12	(26.67%)	4	(23.53%)	8	(28.57%)
Decreased slighlty	0	(0.00%)	0	(0.00%)	0	(0.00%)
Decreased dramatically	2	(4.44%)	1	(5.88%)	1	(3.57%)
No response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 22: Changes of Fruit and Vegetable Sales in the past three years



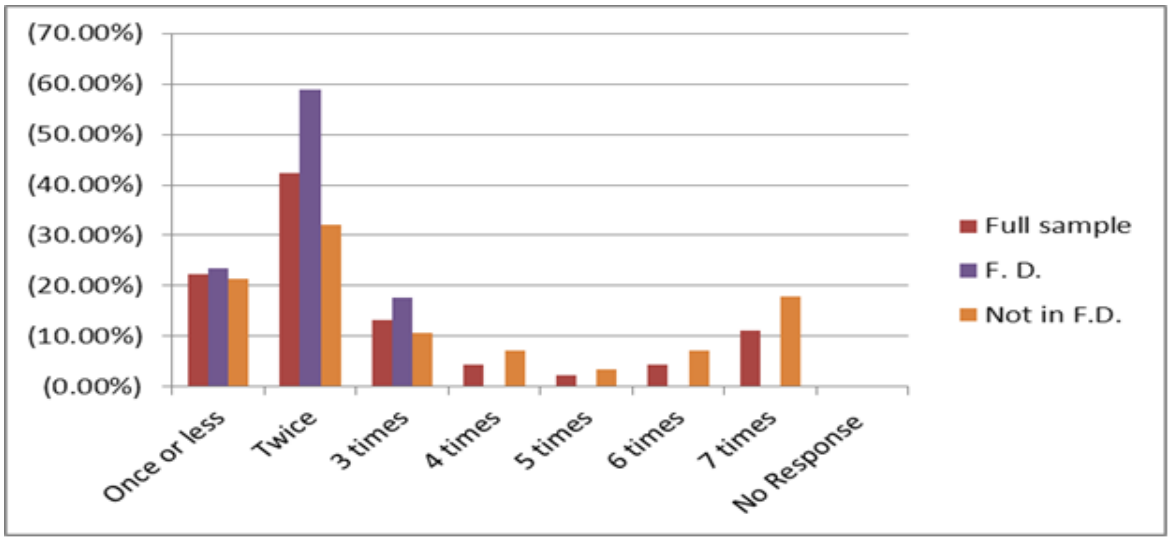
Frequency of the Fresh Produce Delivered to Stores per Week

The grocers in food desert areas had noticeably smaller frequency of the fresh produce delivery per week. Table 23 and Figure 23 show 14 of 17 grocers (82.3%) in food desert areas had two or less weekly deliveries, compared to 13 of 28 stores (46.4%) in non-food desert areas. Data suggests 10 grocers in non-food desert areas had 4-7 deliveries for fresh produce in a regular week, while none of the grocers in food desert areas had such frequency of weekly deliveries. Moreover, Table 23 also shows five grocers (17.9%) in non-food desert areas had daily delivery of fresh produce.

Table 23: Frequency of fresh produce delivered to stores per week

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Once or less	10	(22.22%)	4	(23.53%)	6	(21.43%)
Twice	19	(42.22%)	10	(58.82%)	9	(32.14%)
3 times	6	(13.33%)	3	(17.65%)	3	(10.71%)
4 times	2	(4.44%)	0	(0.00%)	2	(7.14%)
5 times	1	(2.22%)	0	(0.00%)	1	(3.57%)
6 times	2	(4.44%)	0	(0.00%)	2	(7.14%)
7 times	5	(11.11%)	0	(0.00%)	5	(17.86%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 23: Frequency of fresh produce delivered to stores per week



Overall, data indicates grocers in food desert areas had less annual fruit and vegetable sales than those in non-food desert areas. For example, while 88.2% of the grocers in food desert had the annual sales less than $500,001; data shows only 53.6% of the grocers in non-food desert areas had the same sales records. On the other hand, 17.9% of the grocers in non-food desert areas reported sales of more than $10,000,000, while none of the stores in food desert areas had sales more than $1,000,000. However, the majority of the stores, regardless of the store area, had experienced an increase in the sales of fruit and vegetables in the past three years.

In terms of the percentages of sales, we found all the grocers sold the majority of their fruit and vegetables as fresh produce. Grocers in food desert areas, compared to those in non-food desert areas, had a higher percentage of sales in fresh produce. Data indicated that canned produce had a relatively higher percentage of sales in non-food desert areas than it did in food desert areas. Frozen products had a similarly smaller market share, both in food desert and non-food desert areas.

5. Self-Rated Satisfaction & Factors that Affect Fruit & Vegetable Sales

The survey asked grocers to use a Likert scale system to rate their level of satisfaction with the variety and quality of fresh produces sold in their stores: “1” was for “very unsatisfied”; “3” was for “satisfied”; and “5” was for “very satisfied”. Table 24/Figure 24 and Table 25/Figure 25 report respondents’ level of satisfaction in summer/fall and in winter/spring, respectively.

Satisfaction of the Variety of Fresh Fruit and Vegetables in the Summer/Fall

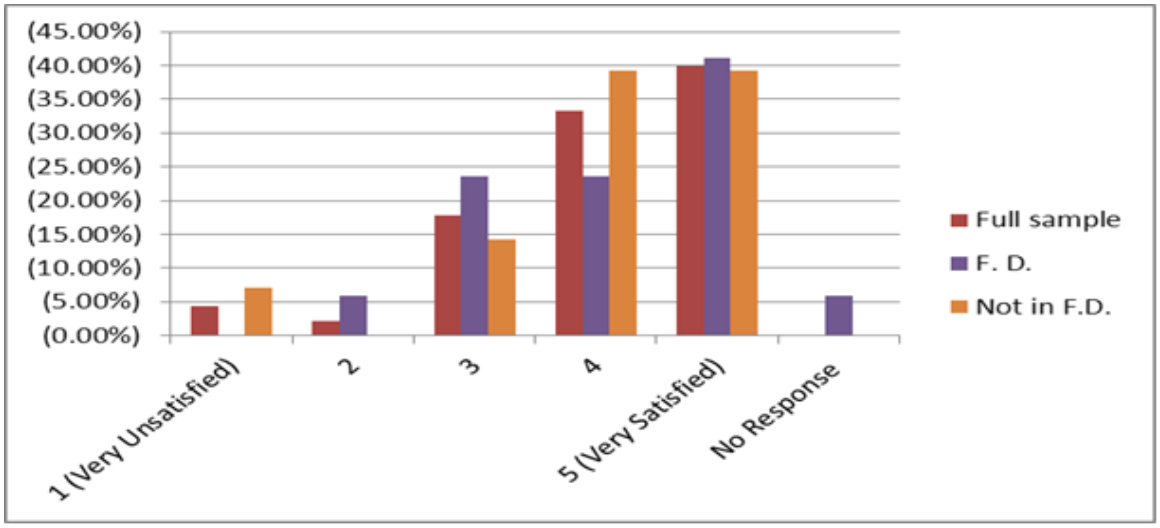
Table 24 and Figure 24 indicate that 15 grocers (33.3%) were very satisfied and 18 grocers (40.0%) were satisfied regarding the variety of fresh fruit and vegetables for the summer/fall. Only two grocers; both located in non-food desert areas, indicated they were “very unsatisfied” with their variety of fresh produce in the summer/fall. Table 24 also shows that grocers in food deserts had a relatively diverse

opinion about their satisfaction of the variety as compared to those in non-food desert areas. For food desert areas, 23.5% of the grocers rated 4 (satisfied) and 41.2% of the grocers rated 5 (very satisfied) with the variety of fresh fruit in summer/fall. The grocers in non-food desert areas, on the other hand, were generally more satisfied with the variety of fresh fruit and vegetables in the summer/fall. Except for those two grocers who indicated they were very unsatisfied, Table 24 shows 39.3% of grocers in the non-food desert areas rated 4 (satisfied) and 39.3% of grocers rated 5 (very satisfied) for the variety of produce in summer/fall.

Tables 24: Satisfaction of the variety of fresh fruit and vegetables in the summer/fall

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unsatisfied)	2	(4.44%)	0	(0.00%)	2	(7.14%)
2	1	(2.22%)	1	(5.88%)	0	(0.00%)
3	8	(17.78%)	4	(23.53%)	4	(14.29%)
4	15	(33.33%)	4	(23.53%)	11	(39.29%)
5 (Very Satisfied)	18	(40.00%)	7	(41.18%)	11	(39.29%)
No Response	0	(0.00%)	1	(5.88%)	0	(0.00%)

Figure 24: Satisfaction of the variety of fresh fruit and vegetables in the summer/fall



Satisfaction of the Variety of Fresh Fruit and Vegetables in the Winter/Spring

Table 25 and Figure 25 show the majority of the respondents were satisfied with variety of fresh fruit and vegetables in the winter/spring, although the number and percentage of grocers who rated "5" ("very satisfied") for this question was noticeably smaller than those in the previous question (for summer and fall). Data indicate respondents in non-food desert areas were more satisfied with the variety: 64.3% of the grocers rated "4" and "5" in the non-food desert areas as compared to 35.5% in the food desert areas. Moreover, 52.9% of grocers in food desert areas rated "3" for the variety of fresh produce in the winter/spring, while only 21.4% of grocers gave the same rate in non-food desert areas.

Table 25: Satisfaction of the variety of fresh fruit and vegetables in the winter/spring

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unsatisfied)	1	(2.22%)	0	(0.00%)	1	(3.57%)
2	4	(8.89%)	1	(5.88%)	3	(10.71%)
3	15	(33.33%)	9	(52.94%)	6	(21.43%)
4	19	(42.22%)	4	(23.53%)	15	(53.57%)
5 (Very Satisfied)	5	(11.11%)	2	(11.76%)	3	(10.71%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 25: Satisfaction of the variety of fresh fruit and vegetables in the winter/spring

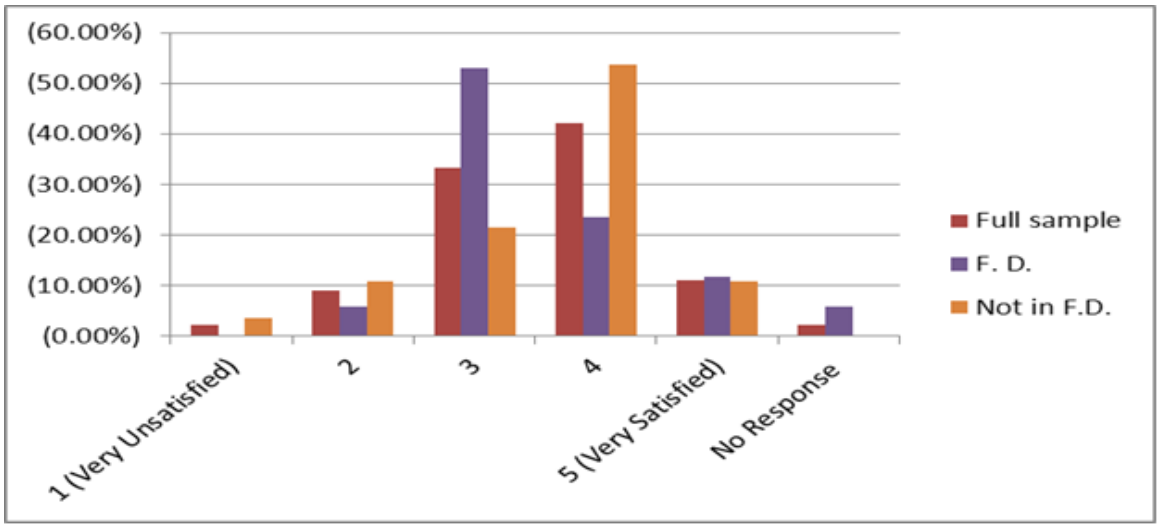


Table 26/Figure 26 and Table 27/Figure 27 show sample grocers' levels of satisfaction with the freshness of fresh fruit and vegetables in the summer/fall and in the winter/spring, respectively. Data suggests a very similar level of satisfaction and rating pattern by the grocers as shown in the previous questions (Table 25 and Table 26). In general, the majority of the respondents were satisfied with the freshness and the overall level of satisfaction was higher in the summer/fall. Moreover, grocers in food desert areas showed less satisfaction with the freshness for all seasons.

Satisfaction of the Freshness of Fresh Fruit and Vegetables in the Summer/Fall

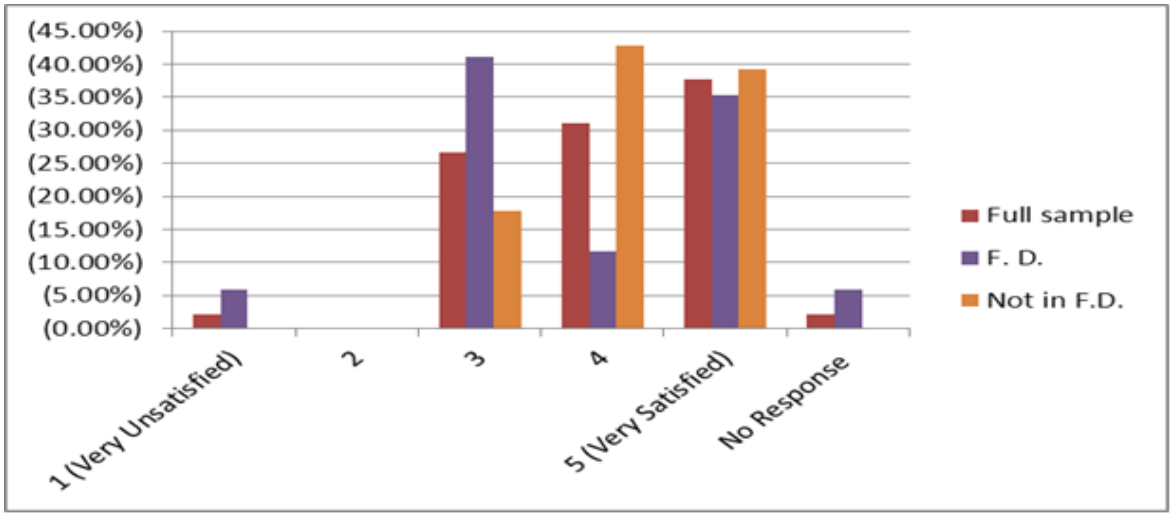
Table 26 and Figure 26 suggest the majority of the grocers were satisfied or somewhat satisfied regarding freshness of their produces in the summer[1]. In food desert areas, 41.2%, 11.8%, and 35.3% of the respondents rated their satisfaction with freshness in the summer/fall as "3", "4", and "5" respectively. In non-food desert areas, 17.9%, 42.9%, and 39.3% of the respondents rated "3", "4", and "5" for the satisfaction for the freshness. Table 26 shows that although grocers' overall satisfaction levels were very similar (between food desert and non-food desert areas), grocers in non-food desert areas were slightly more satisfied with the freshness of fruit and vegetables in the summer/fall.

[1] The only respondent who selected "1" in this question had also rated "1" for the rest of the questions discussed later in this section. The record indicates this sample grocer was located in the food desert area with a small scale of business and showed no interest in promoting vegetables and fruit sales. Therefore, readers should be aware of the possible bias (i.e., positive skews of the percentage distribution for food desert areas) created by including this grocer in the report.

Table 26: Satisfaction of the freshness of fresh fruit and vegetables in the summer/fall

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unsatisfied)	1	(2.22%)	1	(5.88%)	0	(0.00%)
2	0	(0.00%)	0	(0.00%)	0	(0.00%)
3	12	(26.67%)	7	(41.18%)	5	(17.86%)
4	14	(31.11%)	2	(11.76%)	12	(42.86%)
5 (Very Satisfied)	17	(37.78%)	6	(35.29%)	11	(39.29%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 26: Satisfaction of the freshness of fresh fruit and vegetables in the summer/fall



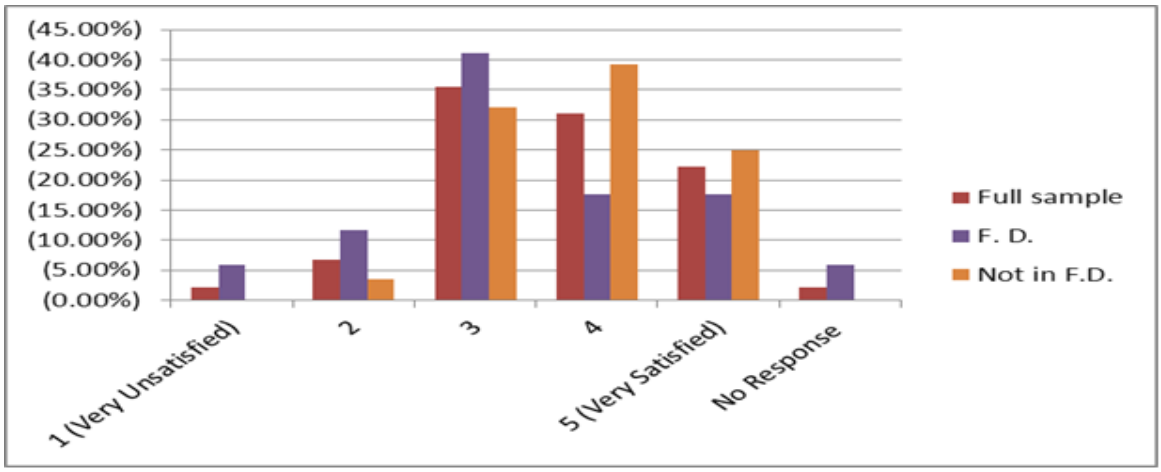
Satisfaction of the Freshness of Fresh Fruit and Vegetables in the Winter/Spring

Table 27 and Figure 27 show that more grocers were satisfied with the freshness of the produce in the summer/fall as compared to the winter/spring, especially for grocers in non-food desert areas. Table 27 also suggests grocers in non-food desert areas were noticeably more satisfied with the freshness in the winter/spring. For the non-food desert areas, data shows 39.3% of grocers rated “4” and 25.0% of grocers rated “5”. For the food desert areas, 17.7% of grocers rated “4” and 17.7% of grocers rated “5” for the freshness in the winter/spring.

Table 27: Satisfaction of the freshness of fresh fruit and vegetables in the winter/spring

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unsatisfied)	1	(2.22%)	1	(5.88%)	0	(0.00%)
2	3	(6.67%)	2	(11.76%)	1	(3.57%)
3	16	(35.56%)	7	(41.18%)	9	(32.14%)
4	14	(31.11%)	3	(17.65%)	11	(39.29%)
5 (Very Satisfied)	10	(22.22%)	3	(17.65%)	7	(25.00%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 27: Satisfaction of the freshness of fresh fruit and vegetables in the winter/spring



The survey also asked grocers' satisfaction levels of the variety of canned and frozen products. Data shows grocers in non-food desert areas had a noticeably higher level of satisfaction for both products. Grocers in non-food desert areas gave relatively higher rates for the canned products as compared to the frozen products (Table 28/Figure 28 and Table 29/Figures 29).

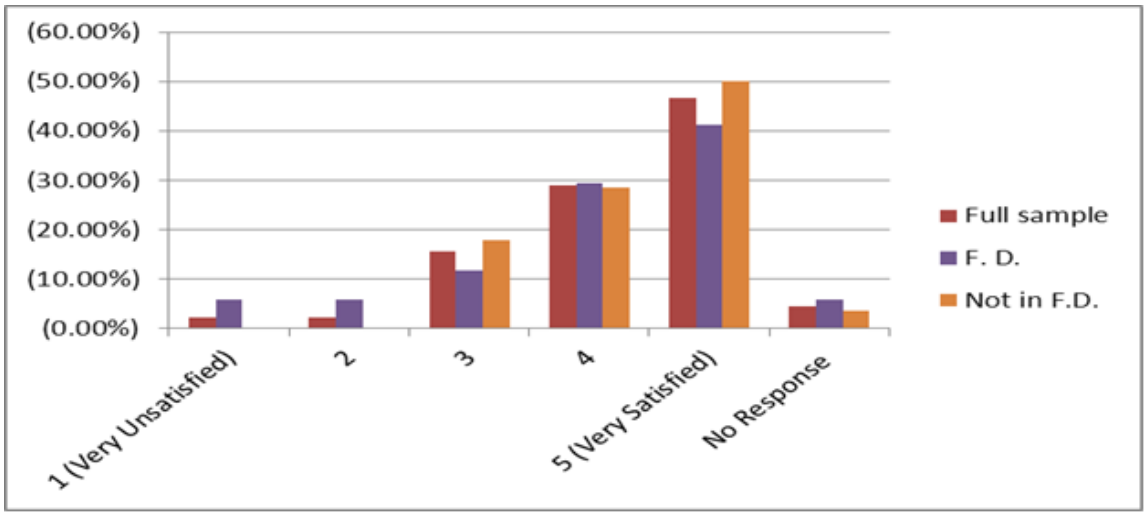
Satisfaction of the Variety for Canned Fruit and vegetable

Table 28 and Figure 28 show similar levels of satisfaction of the variety for canned products between food desert and non-food desert areas, with grocers in the non-food desert obtained a slightly higher level of satisfaction. About 50.0% of the respondents in non-food desert rated "5" (very satisfied) and no grocer in the same areas rated lower than "3" for the variety of canned products. Grocers in food desert areas showed slightly lower satisfaction for the variety of canned fruit and vegetables: in addition to smaller percentage of grocers rated "4" and "5", Table 28 shows 2 grocers in the food desert areas rated '1" and "2" for the variety of the canned products.

Table 28: Satisfaction of the variety for canned fruits and vegetables

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unsatisfied)	1	(2.22%)	1	(5.88%)	0	(0.00%)
2	1	(2.22%)	1	(5.88%)	0	(0.00%)
3	7	(15.56%)	2	(11.76%)	5	(17.86%)
4	13	(28.89%)	5	(29.41%)	8	(28.57%)
5 (Very Satisfied)	21	(46.67%)	7	(41.18%)	14	(50.00%)
No Response	2	(4.44%)	1	(5.88%)	1	(3.57%)

Figure 28: Satisfaction of the variety for canned fruits and vegetables



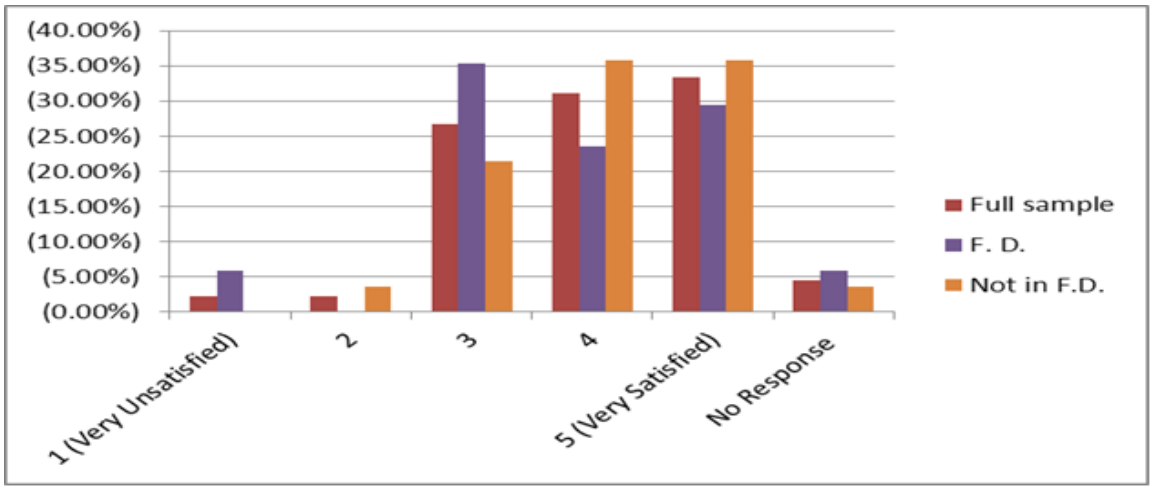
Satisfaction of the Variety for Frozen Fruits and vegetables

Although the majority of the grocers still rated "3" or higher for their satisfaction, Table 29 and Figure 29 show their overall satisfaction for the variety of frozen products was slight lower than what they rated for the canned fruits and vegetables. Compared to the satisfaction level of the variety for fresh (Table 24) and canned fruits and vegetables (Table 28), the percentages of grocers rated "3" for this question (26.7% - full sample, 35.3% -food desert areas, and 21.43% - non-food desert areas) were noticeably larger. In contrast, the percentages of respondents who rated "5" for their satisfaction for the variety of frozen products (33.3% - full sample, 29.4% - food desert areas, and 35.7% - non-food desert areas) were smaller than their rating for the fresh and canned fruits and vegetables.

Table 29: Satisfaction of the variety for frozen fruits and vegetables

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unsatisfied)	1	(2.22%)	1	(5.88%)	0	(0.00%)
2	1	(2.22%)	0	(0.00%)	1	(3.57%)
3	12	(26.67%)	6	(35.29%)	6	(21.43%)
4	14	(31.11%)	4	(23.53%)	10	(35.71%)
5 (Very Satisfied)	15	(33.33%)	5	(29.41%)	10	(35.71%)
No Response	2	(4.44%)	1	(5.88%)	1	(3.57%)

Figure 29: Satisfaction of the variety for frozen fruits and vegetables



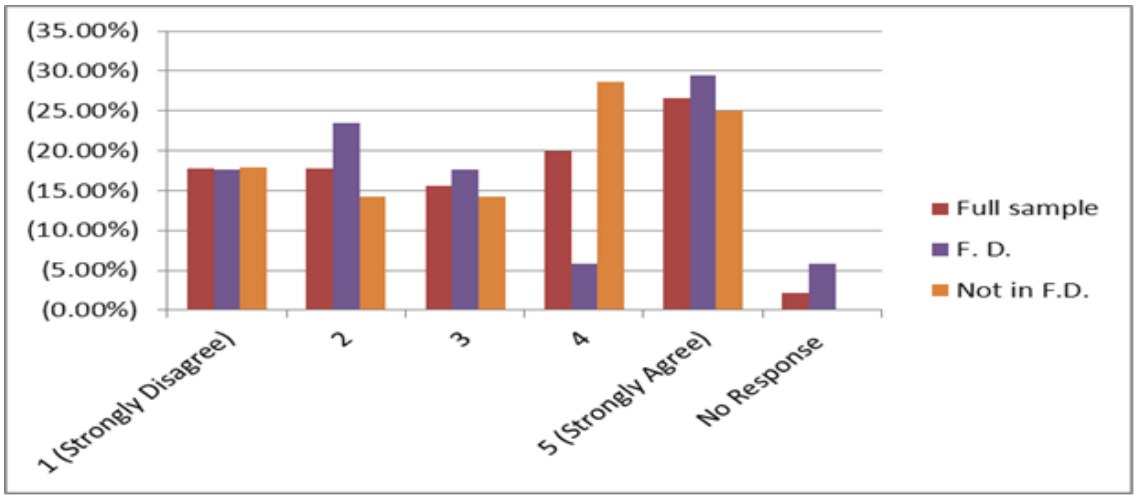
Turn-Over Rate and the limits to provide a Good Variety of Fruits and Vegetables

Respondents were asked to rate the question "Does the turn-over rate of your fresh produce limit your ability to provide a good variety of fruit and vegetables?" by a Likert scale rating system (i.e., "1" for "strongly disagree", "3" for "agree", and "5" for "strongly agree"). Table 30 and Figure 30 show that 28 of the 45 participants (62.1%) rated 3 (agreed) to 5 (strongly agreed) for this question, which indicates the turn-over rate was a significant factor to determine grocers' capability and willingness to carry fruit and vegetables in South Dakota. On the other hand, data also show 16 (35.5%) of the grocers strongly disagreed (1) or somewhat disagreed (2) to this statement. Table 30 suggests grocers in non-food desert areas revealed a higher concern about the turn-over rate than those in food desert area. While 67.6% of the respondents in non-food desert areas rated this statement as "3" (agree) or higher, the percentage of respondents who gave the similar rates in food desert areas was obviously smaller (52.9%). A possible explanation for the less concern of turn-over rate in food desert areas may lie in the fact that grocers in these areas often faced a smaller but consistent demand for fruit and vegetables, as compare to those in non-food desert areas.

Table 30: The turn-over rate limits the ability to provide a good variety of fruit and vegetables

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Strongly Disagree)	8	(17.78%)	3	(17.65%)	5	(17.86%)
2	8	(17.78%)	4	(23.53%)	4	(14.29%)
3	7	(15.56%)	3	(17.65%)	4	(14.29%)
4	9	(20.00%)	1	(5.88%)	8	(28.57%)
5 (Strongly Agree)	12	(26.67%)	5	(29.41%)	7	(25.00%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 30: The turn-over rate limits the ability to provide a good variety of fruit and vegetables



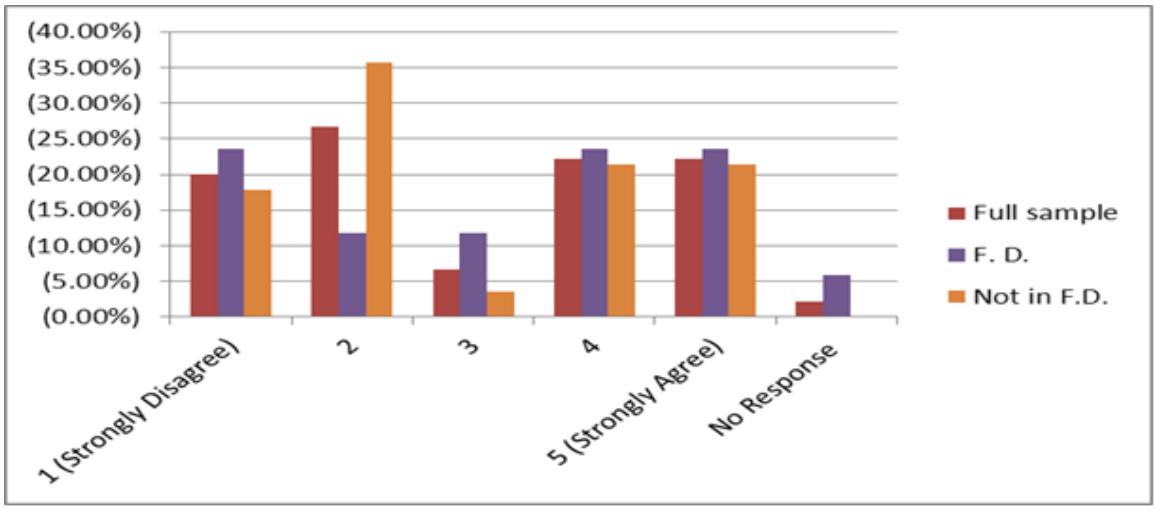
Turn-Over Rate and the limits to Charge Reasonable Prices for Fruit and Vegetables

Table 31 and Figure 31 show an opposite rating pattern, as compared to the rating shown in Table 30, for the statement "the turn-over rate of the fresh produce limits the ability to sell produce at reasonable prices." Between food desert and non-food desert areas, data suggests a similar rating pattern for strongly agree (23.5% vs. 21.4%) and agree (23.5% vs. 21.4%). However, less grocers in food desert areas rated 1 (strongly disagree) and 2 (disagree) for this question: 23.5% of grocers gave 1 and 11.8% gave 2 for this question, as compared to 17.9% and 35.7% in the non-food desert areas. Table 31 suggests grocers in the non-food desert areas were less concerned about the influence of turn-over rates on their prices for fresh produce.

Table 31: The turn-over rate of the fresh produce limits the ability to sell produce at reasonable prices

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Strongly Disagree)	9	(20.00%)	4	(23.53%)	5	(17.86%)
2	12	(26.67%)	2	(11.76%)	10	(35.71%)
3	3	(6.67%)	2	(11.76%)	1	(3.57%)
4	10	(22.22%)	4	(23.53%)	6	(21.43%)
5 (Strongly Agree)	10	(22.22%)	4	(23.53%)	6	(21.43%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 31: The turn-over rate of the fresh produce limits the ability to sell produce at reasonable prices



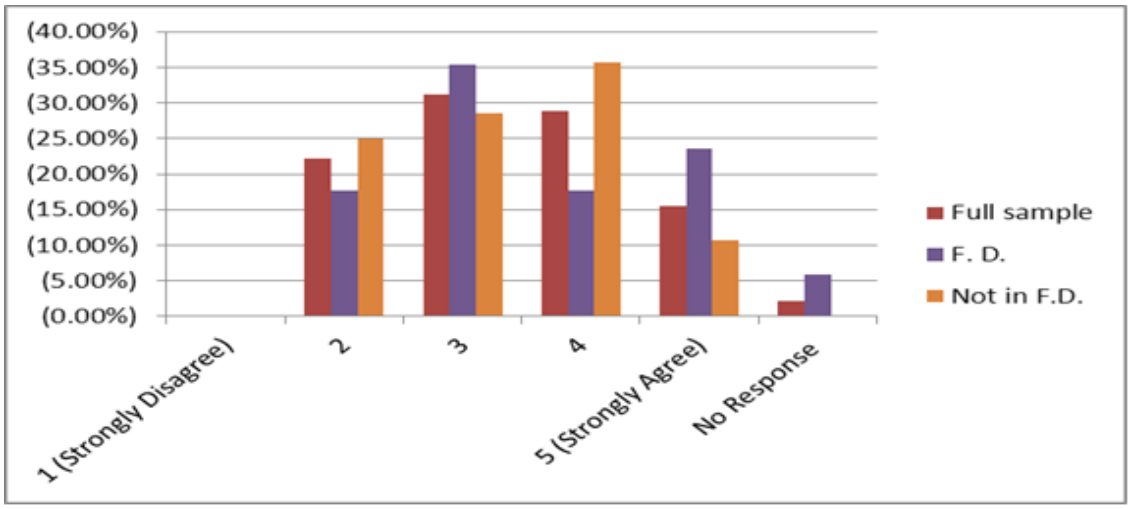
Home Garden Affect and the Sales of Fruit and Vegetables

When asked whether consumers' home grown gardens would reduce the sale of fruit and vegetables in the summer months, the majority of the grocers somewhat (3) to strongly agreed (5) with this statement (75.6% -full sample, 76.5% -food desert areas, and 75.0% -non-food desert areas) (Table 32 and Figure 32). This result indicates that grocers commonly felt that consumers' home gardens had negative impacts on their summer fruit and vegetable sales. Table 32 and Figure 32 also suggest more grocers in the food desert areas felt home garden had impacts on their sales: 23.5% of respondents in the food desert areas strongly agreed with the statement, as compared to 10.7% in non-food desert areas. Furthermore a larger share of non-food desert areas (25.0%) somewhat disagreed with the statement as compared to food desert areas (17.6%).

Table 32: Home grown garden produce would reduce the sales of fruit and vegetables

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Strongly Disagree)	0	(0.00%)	0	(0.00%)	0	(0.00%)
2	10	(22.22%)	3	(17.65%)	7	(25.00%)
3	14	(31.11%)	6	(35.29%)	8	(28.57%)
4	13	(28.89%)	3	(17.65%)	10	(35.71%)
5 (Strongly Agree)	7	(15.56%)	4	(23.53%)	3	(10.71%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 32: Home grown garden produce would reduce the sales of fruit and vegetables



Cost Charged to the Customers and the Fruit and Vegetables Purchasing

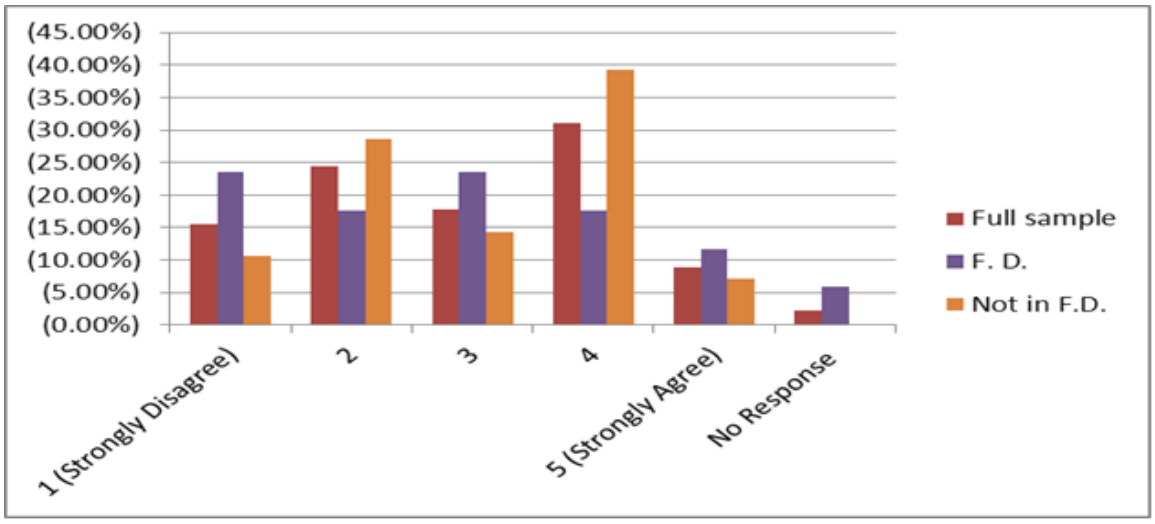
Table 33 and Figure 33 show the sample respondents' rating for the statement "the cost you need to charge customers inhibits their purchase fruit and vegetables". Too often consumers state that they do not eat vegetables because they are too costly to purchase. Table 33 suggests 40.0% of grocers either strongly disagreed or disagreed with this statement, which indicates the cost charged to customers was considered by grocers as a less important factor (compared to quality and variety) in determining fruit and vegetable sales. In general, grocers' opinion for this question in food desert areas was relatively neutral, Table 33 shows a relatively similar rating from "1" ("strongly Disagree") to "4" ("somewhat agree"). On the other hand, grocers in non-food desert areas had a relatively stronger concern of the cost on their sales of fruit and vegetables: 60.1% of the respondents in non-food desert areas rated 3 (agree) or higher for this factor, as compared to 52.5% in the food desert areas.

This result suggests the transportation cost i.e. shipping, handling & preparation, etc., although was less a concern compared to turn-over rate and home gardens for all sample grocers in determining fruit and vegetables sales, apparently had a larger impact on grocers in non-food desert areas as compared to those in food desert areas.

Table 33: Cost charged to the customers and fruit and vegetables sales

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Strongly Disagree)	7	(15.56%)	4	(23.53%)	3	(10.71%)
2	11	(24.44%)	3	(17.65%)	8	(28.57%)
3	8	(17.78%)	4	(23.53%)	4	(14.29%)
4	14	(31.11%)	3	(17.65%)	11	(39.29%)
5 (Strongly Agree)	4	(8.89%)	2	(11.76%)	2	(7.14%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 33: Cost charged to the customers and fruit and vegetable sales



This section demonstrated the results of grocers' self-rated satisfaction of quality and variety of the fruit and vegetables they carried and their fruit and vegetables sales. Data suggests the respondents were content with the variety and freshness of the fruit and vegetables they carried. Grocers in non-food desert areas had a higher level of satisfaction as compared to those in food desert areas for their fresh fruit and vegetable produce. They were also more satisfied with the variety of canned and frozen products. On the other hand, while grocers in non-food desert areas perceived the turn-over rate could be a problem to limit their ability to provide a good variety of fruit and vegetables, these grocers seemed to concern less about the influence of turnover rate on their pricing strategy as compared to the respondents in food desert areas.

Survey data also shows the majority of the grocers felt home gardens reduced their sales of fruit and vegetables. Grocers also felt that the cost they charged to their customers had a larger impact on the decrease in fruit and vegetable sales in non-food desert areas than food desert areas.

6. Grocers' Perception of Consumers' Preference/Food Choices

This section discusses the information generated from questions regarding grocers' perception of consumers' preference and purchasing decisions for fruit and vegetables.

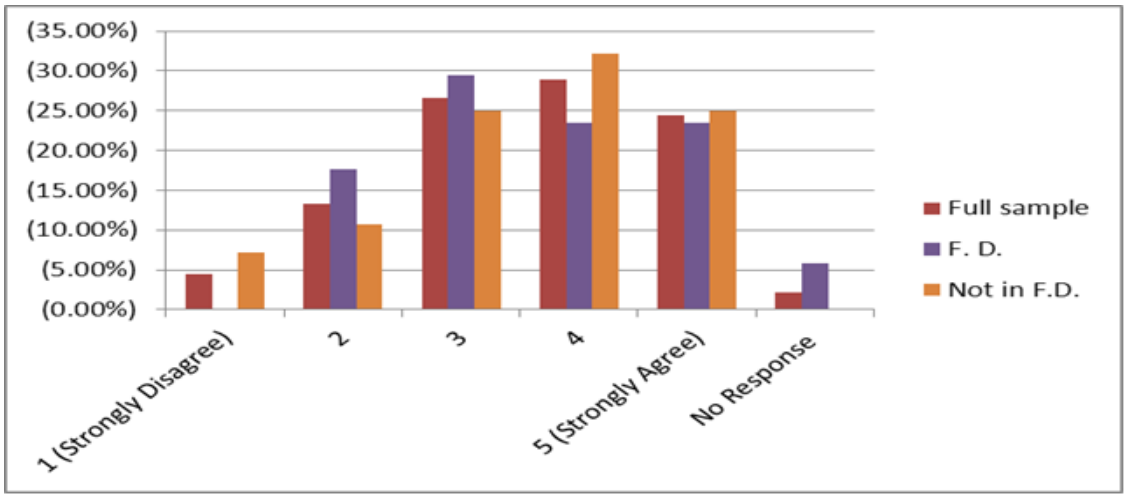
Consumers are Easily Swayed and Purchase Lower Cost Convenience Foods with Little Nutritional Value?

Table 34 and Figure 34 show 36 of 45 respondents (80%) selected from "agreed" to "strongly agreed" for the statement saying "consumers are easily swayed and purchase lower cost convenience foods with little nutritional value, i.e. hotdogs, pop tarts, TV dinners, etc." This result indicates the majority of our grocers believed consumers in the South Dakota are inclined to make unhealthy food choices.

Table 34: Consumers are easily swayed and purchase lower cost convenience foods with little nutritional value?

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Strongly Disagree)	2	(4.44%)	0	(0.00%)	2	(7.14%)
2	6	(13.33%)	3	(17.65%)	3	(10.71%)
3	12	(26.67%)	5	(29.41%)	7	(25.00%)
4	13	(28.89%)	4	(23.53%)	9	(32.14%)
5 (Strongly Agree)	11	(24.44%)	4	(23.53%)	7	(25.00%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 34: Consumers are easily swayed and purchase lower cost convenience foods with little nutritional value?



The Importance of the Amount of Time to Prepare the Food on Customers' Decisions to Consume Fruit and Vegetables

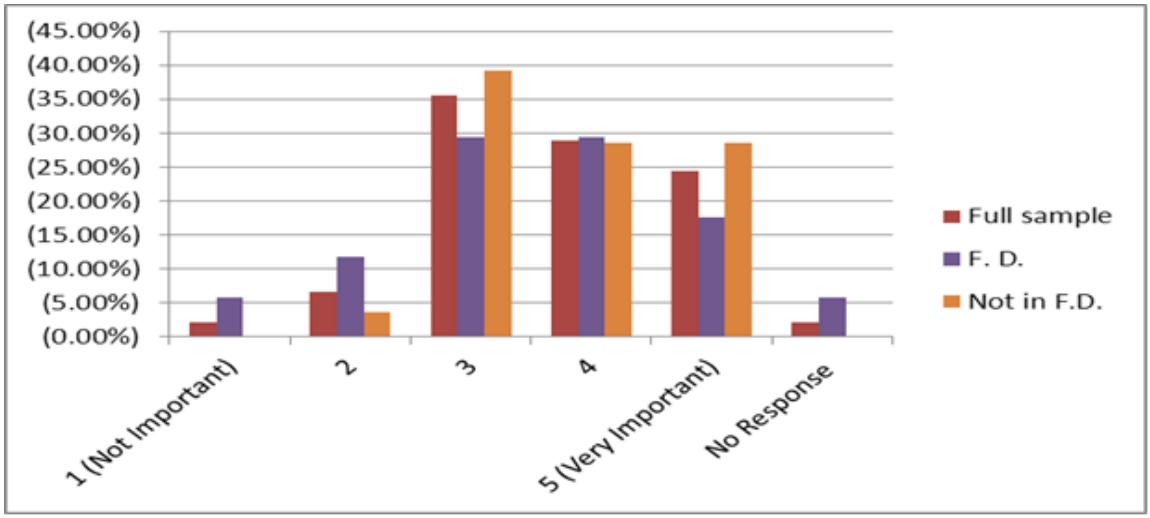
Table 35 and Figure 35 show the grocers' perception of the importance of time to prepare a product from the consumers perspective (1: not important; 3: somewhat important, 5: very important). Data indicate the time required to prepare the food was considered an important factor by the majority of sample grocers: 88.9% of grocers rated this statement from 3 (important) to 5 (very important) (5). Table 35 shows a higher percentage of respondents in non-food desert areas rated time as a more important factor (as compared to food desert areas).[2]

[2] The same respondent who rated "1" for most questions discussed in the previous section also rated "1" for most of the questions discussed in this section. Therefore, readers should be cautious about the potential bias of the statistics in this section.

Table 35: The amount of time to prepare the food on consumers' purchasing decision of fruit and vegetables

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Not Important)	1	(2.22%)	1	(5.88%)	0	(0.00%)
2	3	(6.67%)	2	(11.76%)	1	(3.57%)
3	16	(35.56%)	5	(29.41%)	11	(39.29%)
4	13	(28.89%)	5	(29.41%)	8	(28.57%)
5 (Very Important)	11	(24.44%)	3	(17.65%)	8	(28.57%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 35: The amount of time to prepare the food on consumers' purchasing decision of fruit and vegetables



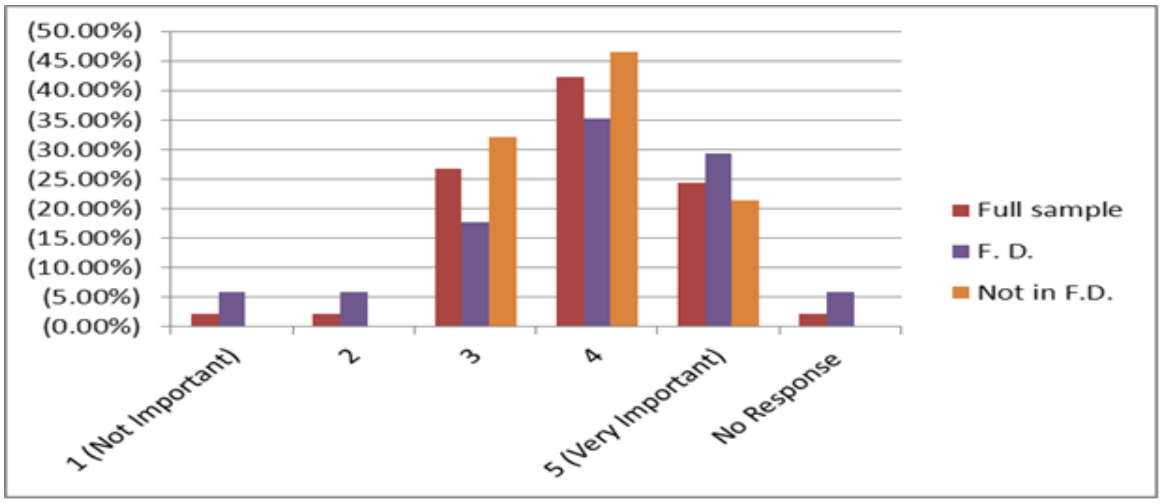
Cost of Fruit and vegetables on Consumers' Purchasing Decisions

Based on the data shows in Table 36 and Figure 36, almost all respondents agreed cost was an important factor for consumers when they make fruit and vegetables purchasing decisions. We found 12 grocers (26.7%) considered this factor as important (3), 19 grocers (42.2%) considered it somewhat important (4), and 11 grocers (24.4%) noted it was very important (5).

Table 36: Cost of fruit and vegetables on consumers purchasing decisions

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Not Important)	1	(2.22%)	1	(5.88%)	0	(0.00%)
2	1	(2.22%)	1	(5.88%)	0	(0.00%)
3	12	(26.67%)	3	(17.65%)	9	(32.14%)
4	19	(42.22%)	6	(35.29%)	13	(46.43%)
5 (Very Important)	11	(24.44%)	5	(29.41%)	6	(21.43%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 36: Cost of fruit and vegetables on consumers purchasing decisions



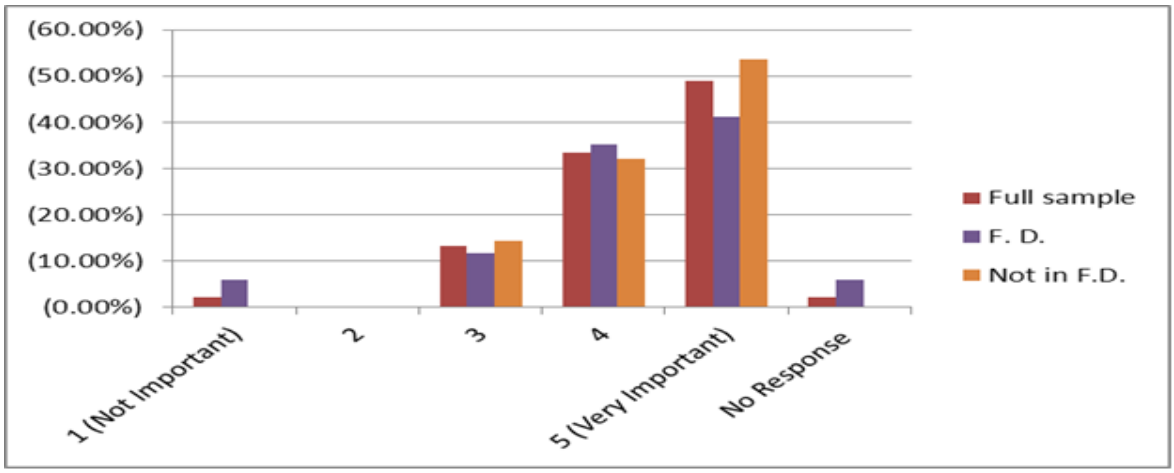
Freshness of Fruit and Vegetables on Consumers' Purchasing Decisions

Table 37 and Figure 37 show the sample grocers' perceived importance of freshness of fruit and vegetables on consumers' purchasing decisions. Data suggests freshness was considered as an important factor for an overwhelming majority of the grocers (95.6%). About 13.3% of grocers felt it was important, 33.3% of grocers felt it was somewhat important, and 49.0% of grocers felt it was very important. Table 37 also indicates that there were similar responses between grocers in food desert and non-food desert areas.

Table 37: Freshness of product on consumers purchasing decision

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Not Important)	1	(2.22%)	1	(5.88%)	0	(0.00%)
2	0	(0.00%)	0	(0.00%)	0	(0.00%)
3	6	(13.33%)	2	(11.76%)	4	(14.29%)
4	15	(33.33%)	6	(35.29%)	9	(32.14%)
5 (Very Important)	22	(48.89%)	7	(41.18%)	15	(53.57%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 37: Freshness of product on consumers purchasing decision



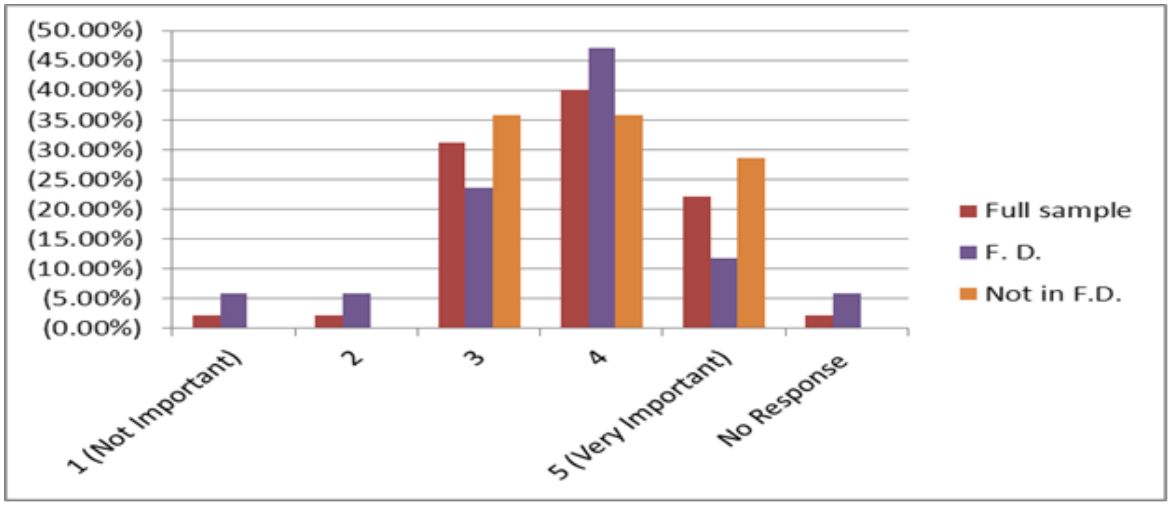
Knowledge of How to Prepare the Product and Customers' Fruit and Vegetable Consumption Decision

Table 38 and Figure 39 show 14 respondents (31.1%) rated it was important, 40.0% rated it as somewhat important and 22.2% rated it as very important for consumers to know how to prepare fruit and vegetable products. Compared to the results from previous questions, data shows a noticeably smaller percentage of grocers who rated this question as "5". Although our grocers still considered the knowing to prepare food as an important factor, Table 38 suggest they seem to believe other factors such as time to prepare (not how to prepare), cost, and freshness were more important in determining consumers' purchasing decisions of fruit and vegetables.

Table 38: Knowledge of how to prepare the product

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Not Important)	1	(2.22%)	1	(5.88%)	0	(0.00%)
2	1	(2.22%)	1	(5.88%)	0	(0.00%)
3	14	(31.11%)	4	(23.53%)	10	(35.71%)
4	18	(40.00%)	8	(47.06%)	10	(35.71%)
5 (Very Important)	10	(22.22%)	2	(11.76%)	8	(28.57%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 38: Knowledge of how to prepare the product



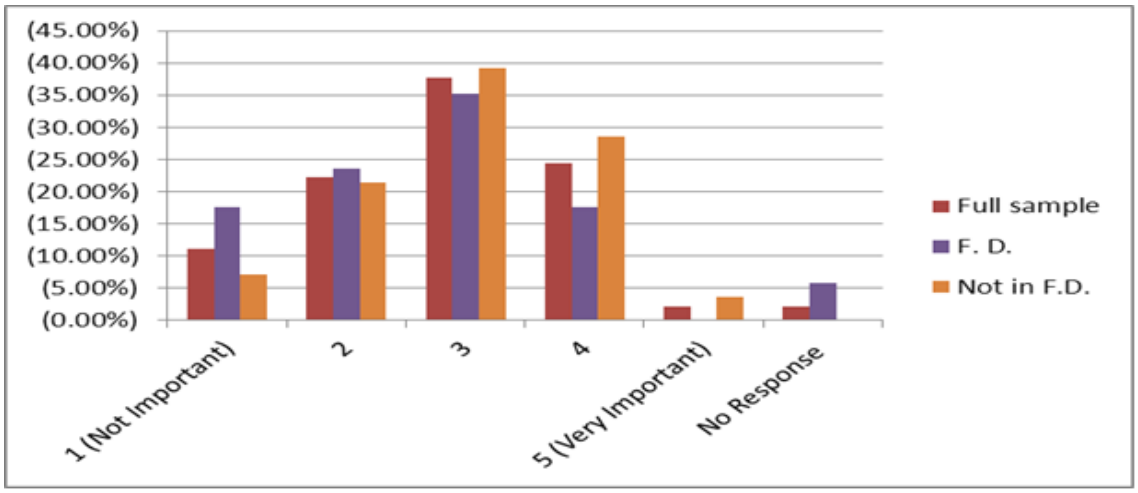
Tips or Recipes Available on Consumer's Fruit and vegetables Purchasing Decisions

In contrast to the responses from previous questions, Table 39 and Figure 39 suggest grocers did not consider giving tips or recipes to cook fruit and vegetables as an important strategy to encourage more fruit and vegetable consumption. About 33.3% of grocers rated 1 and 2 for this factor and 37.8% of grocers rated 3. On the other hand, only 1 grocer (2.2%) rated 5 (very important) for the importance of this factor. This result was consistent with the previous information discussed regarding marketing strategies. Table 14 suggests grocers believed it was ineffective by simply giving out recipes or offering on-site/off-site cooking lessons in terms of encouraging more fruit and vegetable consumption. However, Table 14 also suggests the strategy combining coupons and cooking tips/recipes was considered an effective marketing strategy.

Table 39: Tips or recipes available on consumer's fruit and vegetables purchasing decisions

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Not Important)	5	(11.11%)	3	(17.65%)	2	(7.14%)
2	10	(22.22%)	4	(23.53%)	6	(21.43%)
3	17	(37.78%)	6	(35.29%)	11	(39.29%)
4	11	(24.44%)	3	(17.65%)	8	(28.57%)
5 (Very Important)	1	(2.22%)	0	(0.00%)	1	(3.57%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 39: Tips or recipes available on consumer's fruit and vegetables purchasing decisions



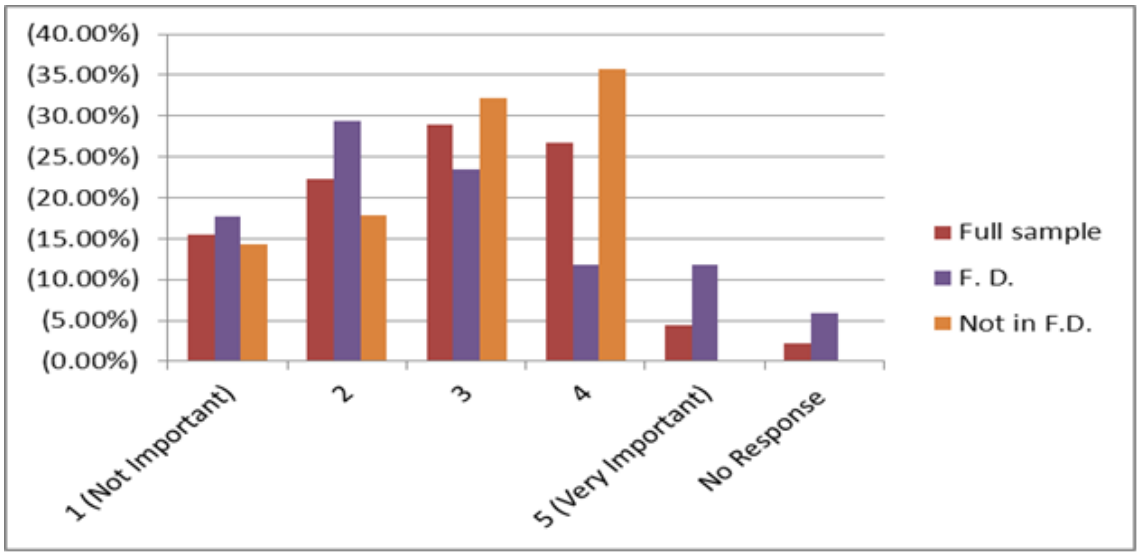
Giving Out Coupons on Consumers' Fruit and Vegetables Purchasing Decision

Although grocers considered offering coupons was one to the top three marketing strategies, Table 40 and Figure 40 show respondents were less enthusiastic about the affect to increase the purchases of fruit and vegetables by solely giving out coupons. While the results shown in Table 36 suggest that grocers believed consumers were price sensitive, they also believed giving coupons had a limited influence on their purchase of fruit and vegetables. Grocer's responses may indicate that the "everyday low prices" strategy would be a better marketing strategy than giving out coupons. It is recognized that the survey did not investigate into the logistics of providing coupons for fresh produce in itself has many influencing factors such as seasonality, distributorship, etc.

Table 40: Coupons on consumers' fruit and vegetables purchasing decision

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Not Important)	7	(15.56%)	3	(17.65%)	4	(14.29%)
2	10	(22.22%)	5	(29.41%)	5	(17.86%)
3	13	(28.89%)	4	(23.53%)	9	(32.14%)
4	12	(26.67%)	2	(11.76%)	10	(35.71%)
5 (Very Important)	2	(4.44%)	2	(11.76%)	0	(0.00%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 40: Coupons on consumers' fruit and vegetables purchasing decision



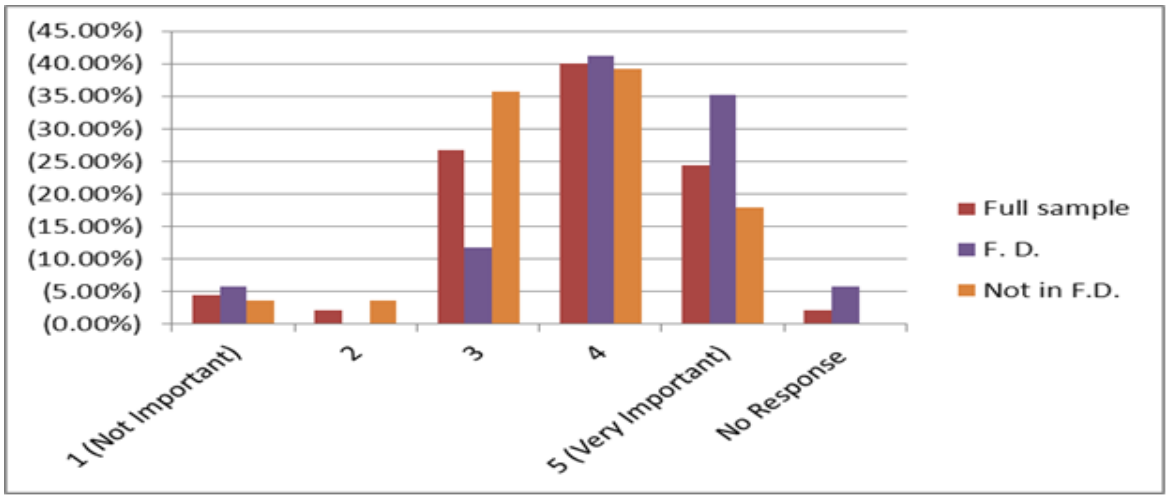
Family preference on consumers' fruit and vegetable purchasing decisions

Table 41 and Figure 41 suggest the majority of the grocers believed family preferences influence consumers' fruit and vegetable consumption. Data shows 95.1% (41) grocers rated family preferences as important (3) or higher. When comparing food desert to non-food desert areas, Table 41 indicates a higher percentage of grocers in food desert areas considered family preference as an important factor to affecting their customers' fruit and vegetable consumption. For example, while 76.4% of the sample grocers in food desert areas felt it was somewhat or very important, while only 57.1% of the grocers in non-food desert areas gave the same reply.

Table 41: Family preference on consumers' fruit and vegetable purchasing decisions

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Not Important)	2	(4.44%)	1	(5.88%)	1	(3.57%)
2	1	(2.22%)	0	(0.00%)	1	(3.57%)
3	12	(26.67%)	2	(11.76%)	10	(35.71%)
4	18	(40.00%)	7	(41.18%)	11	(39.29%)
5 (Very Important)	11	(24.44%)	6	(35.29%)	5	(17.86%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Figure 41: Family preference on consumers' fruit and vegetable purchasing decisions



After completing the questions related to consumers' purchasing decision, the sample grocers were requested to rate the following questions/statements regarding their perception of consumers' knowledge in the nutrition, health, and their ability to prepare fruit and vegetables (1: very unknowledgeable; 3: knowledge; 5: very knowledgeable).

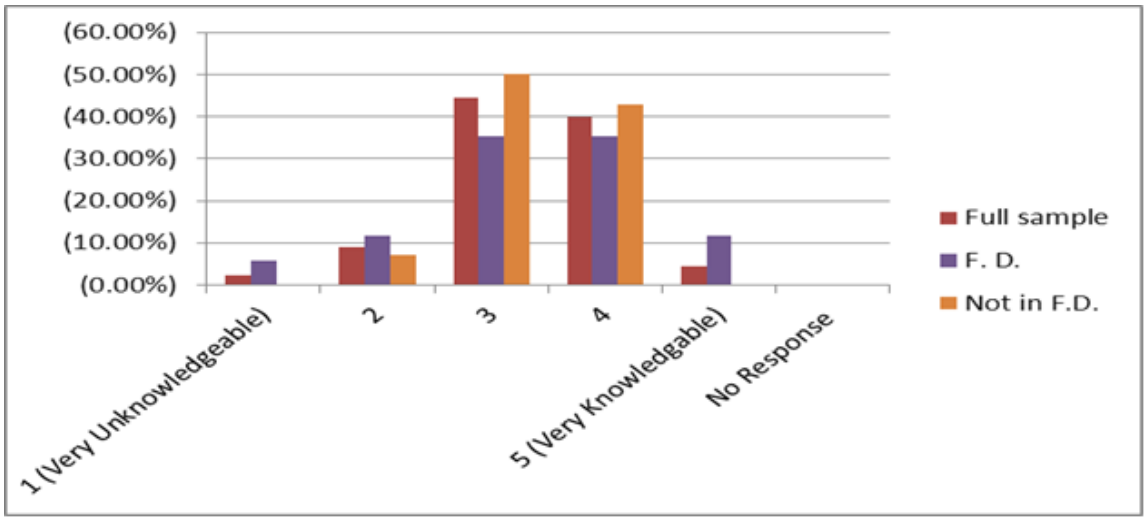
Consumers' Understanding of Fruit and Vegetables in a Healthy Diet

Table 42 and Figure 42 show grocers' perception of consumers' understanding of fruit and vegetables' contribution to a healthy diet. Data shows the majority of the grocers (84.4%) rated this factor important "3"or somewhat more important"4", which indicates that grocers believed consumers had a good, but not excellent, understanding for the subject matters. Table 42 also shows that although the majority of the grocers in non-food desert areas rated "3" or "4" for this question, rates given by the grocers in food desert areas were normally distributed between "2" and "5". This result suggests that sample grocers in non-food desert areas had a higher confidence in consumers' knowledge of fruit and vegetables' contribution in a healthy diet.

Table 42: Consumers' understanding of fruit and vegetables' contribution in a healthy diet

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unknowledgeable)	1	(2.22%)	1	(5.88%)	0	(0.00%)
2	4	(8.89%)	2	(11.76%)	2	(7.14%)
3	20	(44.44%)	6	(35.29%)	14	(50.00%)
4	18	(40.00%)	6	(35.29%)	12	(42.86%)
5 (Very Knowledgable)	2	(4.44%)	2	(11.76%)	0	(0.00%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 42: Consumers' understanding of fruit and vegetables' contribution in a healthy diet



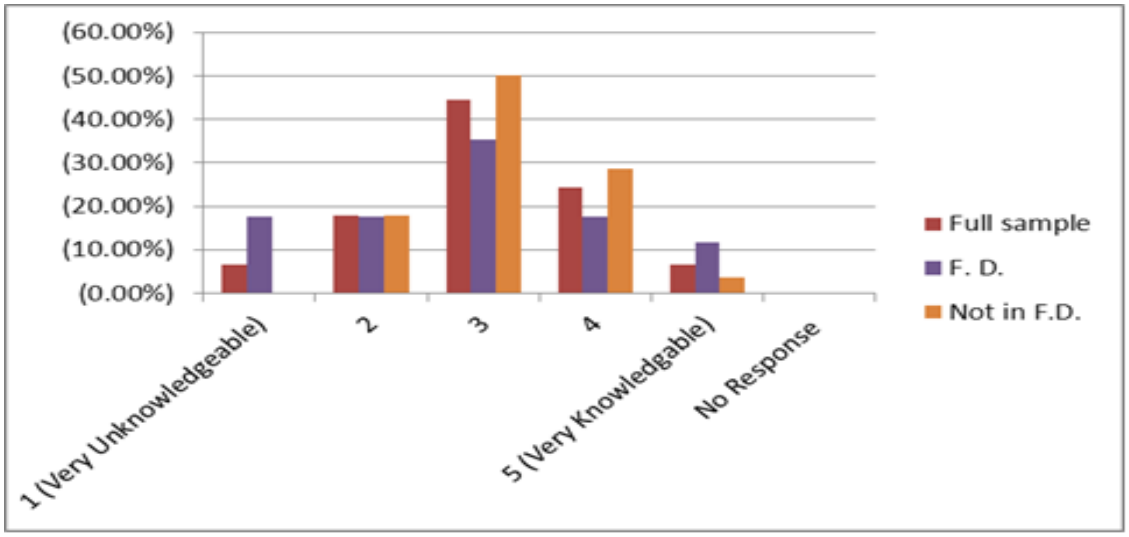
Consumers' Understanding of Fruit and Vegetable Contribution in Preventing Chronic Diseases

From the same perspective of the previous question, the survey asked respondents to rate consumers' understanding of fruit and vegetables' contribution in preventing chronic disease. Table 43 and Figure 43 show the majority of the respondents rated consumers knowledge as knowledgeable (44.4%) or somewhat more knowledgeable (24.4%). As compared to the previous question, there was an opposite pattern of rating between grocers in food desert and non-food desert areas. In contrast to the higher rating they gave for the previous question, about 70% of the grocers in food desert areas rated this question as average or less than average. This result indicates that grocers in food desert areas believed their consumers had a general/basic understanding of the benefits in eating fruit and vegetables. However, these grocers did not perceive their consumers had an advanced understanding (ex. health benefits and nutrition knowledge) of fruit and vegetables' contribution to health. On the other hand, respondents in non-food desert areas gave a relatively consistent rating for this question (78.6% of the respondents gave score "3" or "4"), compared to their rating for the previous question.

Table 43: Consumers' understanding of fruit and vegetables' contribution in preventing chronic diseases

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unknowledgeable)	3	(6.67%)	3	(17.65%)	0	(0.00%)
2	8	(17.78%)	3	(17.65%)	5	(17.86%)
3	20	(44.44%)	6	(35.29%)	14	(50.00%)
4	11	(24.44%)	3	(17.65%)	8	(28.57%)
5 (Very Knowledgable)	3	(6.67%)	2	(11.76%)	1	(3.57%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 43: Consumers' understanding of fruit and vegetables' contribution in preventing chronic diseases



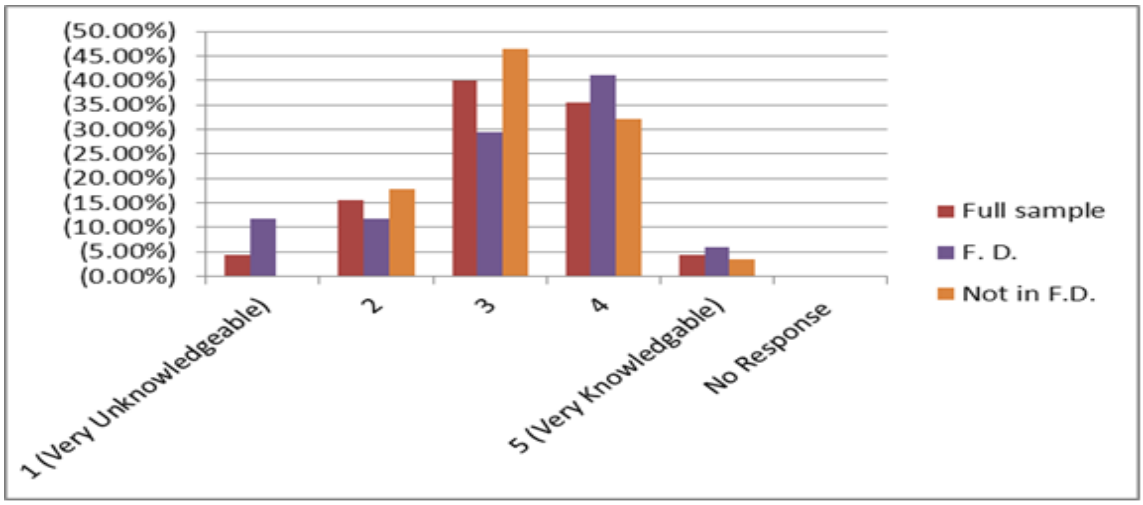
Consumers Ability to Prepare Fresh Fruit and vegetables

Table 44 and Figure 44 show 36 of 45 (80.0%) respondents rated the consumers' ability to prepare fresh fruit and vegetables as knowledgeable or above. For the most part, survey respondents felt that consumers were somewhat knowledgeable to somewhat unknowledgeable about their skills of preparing fruit and vegetables. Table 44 shows food desert areas had a higher percentage of grocers rated 4 and 5 for their consumer's ability to prepare fresh produces as compare to non-food desert areas (47.0% vs. 35.7%).

Table 44: ability to prepare fresh fruit and vegetables

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unknowledgeable)	2	(4.44%)	2	(11.76%)	0	(0.00%)
2	7	(15.56%)	2	(11.76%)	5	(17.86%)
3	18	(40.00%)	5	(29.41%)	13	(46.43%)
4	16	(35.56%)	7	(41.18%)	9	(32.14%)
5 (Very Knowledgable)	2	(4.44%)	1	(5.88%)	1	(3.57%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 44: ability to prepare fresh fruit and vegetables



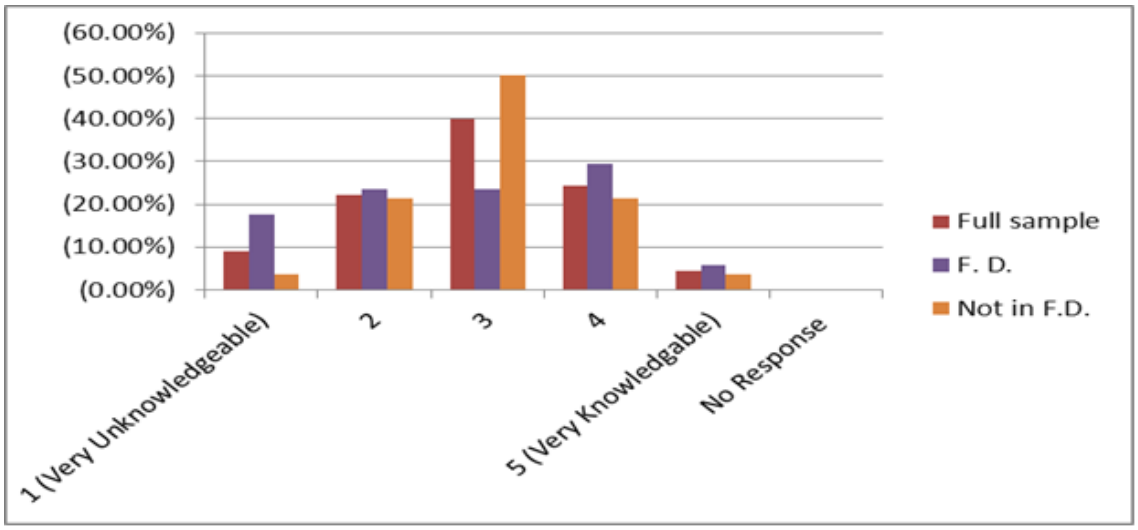
Knowledge of Cost Saving by Purchasing Fresh Produces vs. Ready to Eat Products

Table 45 and Figure 45 depict grocers' perception of consumers' knowledge of cost saving in purchasing fruit and vegetable produce/products. Compared to their rating of the previous three questions, Table 45 shows a noticeable increase in the percentage (8.9%) of respondents who rated consumers as very unknowledgeable (1) or somewhat unknowledgeable (22.2%). The ratings to this question were more evenly distributed among all responses than they were in the three previous questions. Data indicates that grocers, especially those in food desert areas, held a more neutral attitude toward their consumers' understanding of the cost savings by purchasing fresh produce.

Table 45: Knowledge of cost saving by purchasing fresh produces vs. ready to eat products

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Very Unknowledgeable)	4	(8.89%)	3	(17.65%)	1	(3.57%)
2	10	(22.22%)	4	(23.53%)	6	(21.43%)
3	18	(40.00%)	4	(23.53%)	14	(50.00%)
4	11	(24.44%)	5	(29.41%)	6	(21.43%)
5 (Very Knowledgable)	2	(4.44%)	1	(5.88%)	1	(3.57%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Figure 45: Knowledge of cost saving by purchasing fresh produces vs. ready to eat products



In summary, we found grocers assumed their consumers had a basic understanding of the benefits in eating fruit and vegetables. However, they were less assured whether their customers had an advanced knowledge regarding the nutrition and health benefits of consuming fruit and vegetables. Specifically, grocers in food desert had less confidence in the consumer's knowledge of the benefits of fruit and vegetables in the prevention on chronic diseases. In contrast, grocers held a relatively neutral attitude towards consumers' knowledge of the cost-savings measures for purchasing fresh produce as compare to convenience products.

The following indicates the grocer's perception of factors in priority order which impact consumer's decisions to purchase fruit and vegetables: time to prepare food, knowledge to prepare fresh produce, cost/price, freshness, and family preference. Survey respondents felt separately giving out cooking tips/recipes and coupons were less important. The data also indicates that our grocers believed a lower price was more effective than giving out coupons in encouraging consumers to purchase more fruit and vegetables.

7. Grocers' Previous & Current Experience in Selling Locally-Grown Food

This section discusses the results from questions regarding grocers' previous experience and current status of carrying locally-grown produce. Grocers' opinions about the factors that might limit their willingness and capacity to carry locally-grown produce were also included in this section.

Do You Currently Sell Locally-Grown Fruit and vegetables?

Table 46 and Figure 46 indicate 32 grocers (71.1%) currently carry locally-grown produce. Data indicates non-food desert areas had a significantly higher percentage of grocers who carried the locally-grown produces (78.6%) compared to food desert areas (58.8%).

Table 46: Do you sell locally-grown fruit/vegetables?

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Yes	32	(71.11%)	10	(58.82%)	22	(78.57%)
No	13	(28.89%)	7	(41.18%)	6	(21.43%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Whether the "Locally Grown" Signage/Label Increased Sales in the Past

Table 47 and Figure 47 show 31 of 45 the grocers (68.9%) reportedly gained in sales by displaying the "locally grown" signage/label in the past. A larger percentage of grocers in non-food desert areas (71.4%) found "locally grown" signage to be of benefit than those in food desert areas (64.7%).

Table 47: Whether the "locally grown" signage/label increased sales in the past

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Yes	31	(68.89%)	11	(64.71%)	20	(71.43%)
No	13	(28.89%)	6	(35.29%)	7	(25.00%)
No Response	1	(2.22%)	0	(0.00%)	1	(3.57%)

Willingness to display the "locally grown" signage if provided

Table 48 shows a significant percentage of respondents (91.1%) would display the "locally grown" signage if provided.

Table 48: Willingness to display the "locally grown" signage if provided

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
Yes	41	(91.11%)	15	(88.24%)	26	(92.86%)
No	3	(6.67%)	1	(5.88%)	2	(7.14%)
No Response	1	(2.22%)	1	(5.88%)	0	(0.00%)

Numbers of Requests per Month Received by Customers for the Locally-grown Fruit and Vegetables

The survey further asked the grocers to disclose the numbers of monthly requests they received from their customers for the locally-grown vegetables and/or fruit. Table 49 shows (21) grocers did not receive requests for locally grown produce. Among these 21 grocers, 10 were in food desert areas (58.8%) and 11 were in non-food desert areas (39.3%). About 40% of the respondents received 1-10 requests per month and 8.9% of grocers received 11-24 requests per month. Data shows only one grocer received more than 24 requests per month. Table 49 suggests non-food desert areas received more requests for the locally-grown produce as compared to food desert areas.

Table 49: Numbers of requests per month received by customers for locally-grown fruit and vegetables

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
None	21	(46.67%)	10	(58.82%)	11	(39.29%)
1-10	18	(40.00%)	6	(35.29%)	12	(42.86%)
11-24	4	(8.89%)	1	(5.88%)	3	(10.71%)
25-49	1	(2.22%)	0	(0.00%)	1	(3.57%)
50+	0	(0.00%)	0	(0.00%)	0	(0.00%)
No Response	1	(2.22%)	0	(0.00%)	1	(3.57%)

Interest in Providing More Locally-Grown Produce

Grocers were asked to indicate their interest in providing more locally-grown fruit and vegetables to their customers by using a Likert scale system (1: low interest; 5: high interest) (Table 50). Though grocers in food desert areas often experienced a low demand; Table 50 shows 8 of 17 respondents (47.0%) indicated they were somewhat or very interested in selling locally-grown produce. In contrast, grocers in non-food desert areas received more requests from their customers but were less interested in providing more locally grown produce. Although 53.6% of the grocers in the food desert areas indicated they had somewhat high to a high interest in providing more locally grown food, Table 50 also indicates 25.0% of the grocers indicated somewhat low or low interest in carrying locally-grown produce (as compared to 17.7% of grocers in food desert areas).

Table 50: Interest in providing more locally-grown produce

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Low)	6	(13.33%)	3	(17.65%)	3	(10.71%)
2	4	(8.89%)	0	(0.00%)	4	(14.29%)
3	10	(22.22%)	5	(29.41%)	5	(17.86%)
4	10	(22.22%)	4	(23.53%)	6	(21.43%)
5 (High)	13	(28.89%)	4	(23.53%)	9	(32.14%)
No Response	2	(4.44%)	1	(5.88%)	1	(3.57%)

Locally-Grown Produce Requested by Customers

Table 51 lists the items and frequency of requests received by sample grocers for locally-grown vegetables. Data shows corn, melons, and tomatoes were the most commonly requested items from customers, regardless of the store locations. Table 51 also shows grocers also received noticeable requests for beans, pumpkins, squash, and cucumbers from the customers, but only in non-food desert areas. A very possible explanation for this finding is that grocers in food desert areas had a general low demand in fruit and vegetables, both in the quantity and the variety. Otherwise, the low demand for these produce in food desert areas may lie in the fact that rural families often exchange or share their home garden produces.

Table 51: Locally-grown produce requested by customers

	Full	F.D.	Not in F.D.
Corn	30	11	19
Onion	4	2	2
Squash	9	3	6
Melons	23	9	14
Beans	8	1	7
Pumpkins	7	0	7
Peppers	6	1	5
Tomatoes	15	4	11
Potatoes	5	2	3
Cucumbers	9	3	6
Others	3	1	2

The last part of the survey requested grocers to rate the following 8 factors that potentially might limit their willingness or capacity to carry locally-grown produce (1: low/no impact; 5: high impact).

Connecting with Producers

Table 52 shows that our grocers had a split opinion regarding this factor: 16 of the total respondents (35.6%) indicated low or somewhat low interest and the other 16 respondents (35.6%) indicated high or somewhat high for this factor. Table 52 also suggests the connection to the local producers was more likely to be a concern for the grocers in non-food desert areas: while 39.3% of the respondents in non-food desert areas rated this factor as 4 (somewhat high) and 5 (high), only 29.4% of respondents in food desert areas gave the same rates.

Table 52: The impact of the connection to local producers on sample grocers' capability/willingness to carry locally-grown produce

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Low)	9	(20.00%)	5	(29.41%)	4	(14.29%)
2	7	(15.56%)	2	(11.76%)	5	(17.86%)
3	13	(28.89%)	5	(29.41%)	8	(28.57%)
4	9	(20.00%)	2	(11.76%)	7	(25.00%)
5 (High)	7	(15.56%)	3	(17.65%)	4	(14.29%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Insufficient Supply to Meet Demand

Table 53 suggests 30 of 45 grocers (66.7%) had a somewhat low or low concern about insufficient quantity as a factor limiting their ability from caring local produce, which implies the insufficient supply may not be a serious problem for all grocers. Grocers in food desert areas indicated a lower concern for insufficient supply to meet demand as compared to those in non-food desert areas. A possible explanation for this result may be that grocers in food desert areas had usually faced small or even no demands for the locally-grown produce, and accordingly, less stress from the insufficient supply. In

contrast, larger scale grocers often face a relatively large demand for the fresh produce and the insufficient supply can be a challenging issue.

Table 53: The impact of insufficient supply on sample grocers' capability/willingness to carry locally-grown produce

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Low)	11	(24.44%)	5	(29.41%)	6	(21.43%)
2	8	(17.78%)	3	(17.65%)	5	(17.86%)
3	11	(24.44%)	6	(35.29%)	5	(17.86%)
4	11	(24.44%)	3	(17.65%)	8	(28.57%)
5 (High)	4	(8.89%)	0	(0.00%)	4	(14.29%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Inconsistent supply

When asked to rate the importance of the inconsistent supply on their capacity and willingness to carry locally-grown produce, Table 54 shows grocers gave a relatively high rating for this factor compared to their answer from the previous question regarding insufficient supply. Data indicates 33 of 45 grocers (73.3%) gave a somewhat to high concern regarding the inconsistent supply (3 – 5). Table 54 also suggests inconsistent supply was a more important factor for the grocers in non-food desert areas (75.0%), in contrast to eight grocers in food desert areas (47.0%) who rated this factor somewhat high to a high concern.

Table 54: The impact of inconsistent supply on sample grocers' capability/willingness to carry locally-grown produce

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Low)	7	(15.56%)	5	(29.41%)	2	(7.14%)
2	5	(11.11%)	0	(0.00%)	5	(17.86%)
3	8	(17.78%)	4	(23.53%)	4	(14.29%)
4	15	(33.33%)	6	(35.29%)	9	(32.14%)
5 (High)	10	(22.22%)	2	(11.76%)	8	(28.57%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Inferior Quality

Table 55 indicates grocers in food desert areas showed a relatively smaller concern of inferior quality than grocers did in non-food desert areas: 15 grocers in food desert areas (88.2%) rated 3 or lower for this factor, as compared to 22 grocers in non-food desert areas (78.6%). Table 55 also shows grocers who rated this factor as "4" or higher was obviously smaller than the previous two questions, which implied grocers, regardless of the locations, were less concerned about this factor than they did for previous two factors.

Table 55: The impact of inferior quality on sample grocers' capability/willingness to carry locally-grown produce

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Low)	11	(24.44%)	3	(17.65%)	8	(28.57%)
2	10	(22.22%)	5	(29.41%)	5	(17.86%)
3	16	(35.56%)	7	(41.18%)	9	(32.14%)
4	6	(13.33%)	2	(11.76%)	4	(14.29%)
5 (High)	2	(4.44%)	0	(0.00%)	2	(7.14%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Price

Table 56 shows the price factor received an evenly-split rating: the percentage of grocers who rated "1" and "2" (37.7%) was very similar to the percentage of grocers who rated as "4" and "5" (33.3%), which suggests while some grocers considered price is an important factor, a similar number of the sample grocers held an opposite opinion.

Table 56: The impact of price on sample grocers' capability/willingness to carry locally-grown produce

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Low)	11	(24.44%)	5	(29.41%)	6	(21.43%)
2	6	(13.33%)	0	(0.00%)	6	(21.43%)
3	13	(28.89%)	6	(35.29%)	7	(25.00%)
4	10	(22.22%)	4	(23.53%)	6	(21.43%)
5 (High)	5	(11.11%)	2	(11.76%)	3	(10.71%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

Seasonality

Table 57 shows how the sample grocers rated the importance of seasonality on their willingness and capability to carry locally-grown produce. Judged by the geographical nature of South Dakota, it is not unusual to find 39 grocers (86.7%) rated "3" or higher for this factor[3].

Table 57: The impact of seasonality on sample grocers' capability/willingness to carry locally-grown produce

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Low)	4	(8.89%)	4	(23.53%)	0	(0.00%)
2	2	(4.44%)	0	(0.00%)	2	(7.14%)
3	12	(26.67%)	5	(29.41%)	7	(25.00%)
4	16	(35.56%)	5	(29.41%)	11	(39.29%)
5 (High)	11	(24.44%)	3	(17.65%)	8	(28.57%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

[3] Readers should be aware of the bias created by the 4 respondents who rated "1" for this factor. Data shows 3 from these 4 respondents (all in food desert areas) had also showed low/no interest in providing locally-grown food (i.e., rate "1" in Table 50).

Transportation and Receiving Products

Table 58 indicates an inconsistent conclusion regarding the importance of transportation and receiving products on grocer's willingness and capability to carry locally-grown produce between food desert and non-food desert areas. For the grocers in food desert areas, transportation and receiving products was relatively not important: we found only five of the grocers (29.41%) indicated they were somewhat concerned and no store in food desert area had a high concern. On the other hand, transportation and receiving were an important factor for a noticeable number of the grocers in non-food desert areas; Table 58 shows for 12 grocers in non-food desert areas (42.8%), transportation and receiving products were rated as 4 (somewhat high) to 5 (high) in offering locally grown produce.

Table 58: The impact of transportation on sample grocers' capability/willingness to carry locally-grown produce

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Low)	9	(20.00%)	6	(35.29%)	3	(10.71%)
2	6	(13.33%)	1	(5.88%)	5	(17.86%)
3	13	(28.89%)	5	(29.41%)	8	(28.57%)
4	14	(31.11%)	5	(29.41%)	9	(32.14%)
5 (High)	3	(6.67%)	0	(0.00%)	3	(10.71%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

No/Low demand

The last question carries an important, if not inspiring, message for the local food marketers in South Dakota. Small demand has long been considered as a negative factor to explain the small market shares for the locally-produced produce. However, Table 59 strongly suggests that no/low demand was not an important factor for most grocers in determining their capability and willingness to carry locally-grown food: about 26 of 45 grocers indicated low/no demand for locally grown produce had a low or moderately low impact on their decision. For the grocers in food desert areas, we found 54.7% of the respondents felt that that low/no demand had little if any impact on their decision to offer locally grown produce. On the other hand, although we found 14.3% of the grocers in non-food desert areas felt that low/no demand for locally grown produce had a high impact on their decision to offer it. This indicates that grocers, regardless their store areas, did not consider no/low demand as an important reason to their decision to carry locally-grown produce.

Table 59: The impact of no/low demand on sample grocers' capability/willingness to carry locally-grown produce

		Full sample (N=45)		F. D. (N=17)		Not in F.D. (N=28)
1 (Low)	15	(33.33%)	8	(47.06%)	7	(25.00%)
2	11	(24.44%)	3	(17.65%)	8	(28.57%)
3	12	(26.67%)	4	(23.53%)	8	(28.57%)
4	2	(4.44%)	1	(5.88%)	1	(3.57%)
5 (High)	5	(11.11%)	1	(5.88%)	4	(14.29%)
No Response	0	(0.00%)	0	(0.00%)	0	(0.00%)

8. Conclusions and Recommendations

Grocers are in touch with consumers on a daily basis so it was felt that their perceptions of customer knowledge and buying practices, their current marketing strategies and perceptions of potential marketing strategies were of value. It is felt that the 45 respondents to the survey were representative of demographic nature of South Dakota. For a more in-depth analysis, the data was sorted into food desert and non-food desert areas. One highlight of the survey was that a majority of grocers felt that their fruit and vegetable sales have increased somewhat too significantly in the past 3 years.

It was found that over 47.0% of grocers in food desert areas are age 56 or older with only one respondent younger than age 35, they are more likely to own single stores, and over one-half have been in the business over 20 years. As these individuals age and retire, will there be some entity to take over that business in that community to offer local purchase of food, including fruit and vegetables, or will the scope of food deserts increase?

When looking to increase the sale of fruit and vegetables grocers seem to feel that offering samples with locally sold produce was the number one marketing strategy, followed by in-store displays with "quick and easy" recipe's, followed by offering coupons. They felt that only quick and easy recipes, tip sheets and on-site cooking classes could be somewhat effective. Statewide distribution of recipe's and incentive items received a mediocre reply while use of social media was not well received as compared to other options. It may be that social media can be a time consuming process and could be difficult to manage for many of the singly operated or smaller chain stores.

Grocers felt that consumer's time, knowledge of preparation methods for fruit and vegetables, the cost/price, freshness and family preferences strongly influenced their purchasing decisions. They felt that separately giving out coupons and quick tip sheets were not as much as an influence on purchasing decisions. These considerations can provide some guidance when developing marketing strategies and consumer messages. While family preferences for fruit and vegetables have a large influence in consumer decisions, targeting younger populations to increase their exposure to fruit and vegetables may help to encourage overall consumption.

Grocers assumed their consumers had an overall understanding of the benefits in eating fruit and vegetables. However, they were less assured whether their customers had an in-depth knowledge regarding the nutrition and health benefits of consuming fruit and vegetables. Those in food desert had less confidence in the consumer's knowledge of the benefits of fruit and vegetables in the prevention of chronic diseases. Too, a significant number of grocers felt that consumers are easily swayed by lower cost convenience foods with little nutritional value. Local and statewide educational programming may focus on these factors to encourage the increased consumption of fruit and vegetables as well as increase the nutritional status of South Dakotans.

Two-thirds of survey respondents indicated that they currently offer locally grown produce and that the signage they provide for it helps to increase sales. Results indicated that grocers in non-food desert areas had more of a concern with connecting with locally grown produce venders as well as a concern with sufficient supply to meet demand and concern for inferior quality. These factors may provide some

educational opportunities for locally grown market venders as well as grocers across the state. Testimonials from grocers who provide locally grown produce, and venders who supply the produce may help to relieve some of the anxieties of those do not reach out or expand to these markets.

If possible, policy makers may consider initiating a series of statewide studies regarding consumers' food choice and grocery budgets in different local communities in the near future. The information generated will enable grocers to identify consumers and business opportunities in promoting fruit and vegetable consumption.

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