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Utah Farm-Chef-Fork: Building Sustainable Local Food Connections

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Abstract

While research documenting the impacts of direct marketing locally produced foods find positive impacts across the food supply chain (i.e. producers, chefs, consumers, and the overall economy), significant barriers to efficient farm-to-chef connections remain. Lack of knowledge and communication regarding product availability and quality are primary barriers. This paper outlines the activities and impacts of the Utah Farm-Chef-Fork program, who's primary goal is to enhance community vitality and reduce food miles by connecting Utah producers and restaurants through workshops, mingles, farm and restaurant tours, and other locally-sourcing food events. In 2013-2014, the program conducted six farmer/chef workshops and six mingles statewide, with 172 farmers, 73 chefs, and 24 educators participating. Workshop materials specifically addressed common barriers and benefits experienced by farmers and chefs in local sourcing. Mingles provided producers and small food processors the opportunity to showcase their products to chefs and specialty store owners in attendance. Impact measures show significantly increased understanding and confidence among participants in establishing local-sourcing relationships, as well as plans for increased activity in the future.

Keywords: direct marketing, Extension programming, local foods, sourcing restaurants, specialty crops

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Introduction

According to the USDA's 2007 Census of Agriculture, 301,300 acres of agricultural land in Utah were developed between 1982 and 2007 (USDA-NASS 2009), a loss of over 50 aces a day. Research has shown, however, that when farmers direct market to local restaurants, it is an effective way to increase farmer income and decrease farmland loss in that it provides a greater proportion of the product's final price to the farmer (Adam, Balasubrahmanyam, and Born 1999, Govindasamy and Nayaga 1996). In addition, local food sourcing has been linked to enhanced economic development in local communities, fostering public health outcomes related to food security, addressing food safety problems linked to the spread of disease via large-scale agriculture by using shorter supply chains, fostering a better sense of community, and providing opportunities for both farmers and restaurants to advertise environmental sustainability that creates positive public perceptions and embracement (Jensen 2010). As mentioned in Martinez et al. (2010), local food sourcing not only helps sustain small-scale farms, but also supports more diverse products and a wider variety of seeds and crops as opposed to monoculture farming.

Regarding economic gain, Martinez et al. (2010) found that sourcing to restaurants provided direct benefits to farmers in allowing outlets for small-scale farmers. An enterprise also has a better probability of survival if it has a range of specialty or high-value crops to sell, grossing between $4,000 and $20,000 per acre (Adam, Balasubrahmanyam, and Born 1999). Farmers also have more control over production and processing methods, and learn added entrepreneurial skills (Feenstra et al. 2003, Martinez et al. 2010). This is associated with longer-term economic impacts for rural communities in that "a climate of entrepreneurship and risk-taking" is encouraged (Gale 1997, p.25).

Thus, the benefits associated with sourcing locally extend beyond the farmer to the community as a whole. This has been demonstrated through multiple studies where imported goods were replaced with locally grown goods, leading to job creation and improved local retail returns in industries throughout an entire state (Swenson 2009, 2010a, 2010b). Bachmann (2004) summarizes this well by stating "selling to local chefs is among the alternatives that will help to build a diverse, stable regional food economy and a more sustainable agriculture" (p.1). It also has been proven through weighted average source distance calculations to help the environment by reducing carbon emissions associated with grocery store food items, known as food miles (Pirog and Benjamin 2003).

Despite the documented benefits of direct marketing, including farm-to-chef connections, research has also shown that barriers exist in fostering the required relationships. For example, Curtis et al. (2008) discovered via focus groups with farmers in Nevada that nearly all agreed they would like to enter the restaurant market, but the lack of information was the biggest barrier in doing so. In a separate study with restaurants and farmers in New York, the top three barriers listed by restaurants in sourcing locally included: 1) no time to contact farmers, 2) lack of confidence regarding product consistency, 3) and a lack of confidence regarding product quality (Schmit, Lucke, and Hadcock 2010). As stated by Curtis et al. (2008) and Starr et al. (2003), restaurant chefs are not always aware of the high quality foods available locally and a need exists for farmers to actually show restaurants what they can provide, so that chefs may plan seasonal menus well in advance.

Restaurants typically rate product attributes such as taste or quality as most important in their purchasing decisions (Curtis and Cowee 2009, Schmit, Lucke, and Hadcock 2010, Thilmany 2004), which is why direct marketing to restaurants is a perfect match for small-scale growers. Dependability is typically ranked a close second, which includes receiving expected quantities, quality, and consistency. Restaurants, however, commonly voice frustration in the lack of information regarding product availability, inconvenient ordering, and poor communication skills when sourcing locally (Curtis and Cowee 2009, Feenstra et al. 2003).

Despite the barriers, sourcing locally is an effective marketing tool for restaurants. As found by Schmit, Lucke, and Hadcock (2010), patrons at restaurants in New York strongly support and view positively the sourcing of local food in restaurants. The demand for local foods is rapidly growing across the U.S. as shown in the following reports.

- The National Restaurant Association's 2013 "Restaurant Industry Forecast" reported that 7 of 10 consumers were more likely to visit a restaurant offering locally produced items.
- The National Restaurant Association's 2014 "Top Ten Trends across the Nation," included locally sourced meats and seafood and locally grown produce as the top 2 trends.
- The National Grocery Association 2012 Consumer Panel found that the availability of local foods were major influences on grocery shopping decisions as 87.8% of respondents rated local food availability as "very or somewhat important," with 45.9% indicating "very important."

Why would Utah farmers be interested in sourcing directly to restaurants? Key reasons from previous studies include increased farm sales (Schmit, Lucke, and Hadcock 2010), ability to develop a unique product brand and differentiate farm products (Curtis and Cowee 2009), securing sale of products that may otherwise be lost due to excess supply in peak production season (Thilmany 2004), and providing insight into current market trends and changing consumer demands (Pepinsky and Thilmany 2004). Farm-to-restaurant sourcing has proven successful in similar programs, including New York's Columbia County Bounty (Schmit, Lucke, and Hadcock 2010), Home Grown Wisconsin (Lawless 2000), Red Tomato in the Northeast U.S. (Stevenson 2013), Practical Farmers of Iowa (Practical Farmers of Iowa 2002), and Colorado Crop to Cuisine (Thilmany 2004).

Program Overview

The Utah Farm-Chef-Fork program was initiated in 2012 through a USDA Specialty Crop Block Grant. The three primary program objectives included: 1) Train restaurant owners/chefs on effective communication and web-based/social media marketing techniques when attempting to source from local farmers; 2) train farmers regarding best practices in direct marketing, opportunities to collaborate with local restaurants, and effective communication and web-based tools in searching for and promoting to local restaurants; and 3) host mingles across the state for farmers and chefs to learn about their respective businesses and establish partnerships.

In the first two years, the program conducted six one-day farmer/chef workshops and six mingles statewide, with 172 farmers, 73 chefs, and 24 educators participating. Workshops were held in

Kaysville, Lehi, and Salt Lake City, UT in 2013 and in Salt Lake City, Moab, and Hurricane, UT in 2014. Workshop materials were developed when needed, especially related to social media and web based promotional techniques, but primarily consisted of amended materials from the many "How To" guides currently in existence regarding direct marketing farm products to restaurants (Adam, Balasubrahmanyam, and Born 1999, Kelley 2006, Pepinksy and Thilmany 2004, Strohbehn et al. 2002, SARE 2008, Wright 2005).

Workshop materials, in 2013, specifically addressed common barriers and benefits experienced by farmers and chefs in direct marketing, strategies to overcome these barriers and maximize on the benefits, best practices in working with – and maintaining a relationship with – chefs, common questions asked by chefs when considering sourcing locally, creating a marketing plan, funding opportunities available, and social media marketing best practices. In 2014, workshop topics included marketing farm products to chefs, improving online visibility, making a sales pitch, maintaining relationships with chefs and other buyers, organizing and enhancing social media tools, pricing farm products for the restaurant market, food safety and good agricultural practices, winter growing techniques, as well as a chef panel discussing preferred products and preferences on communication, delivery and samples.

Mingles were held in Moab, Hurricane, Lehi, Park City, Logan, and Salt Lake City, UT in 2013. Mingles were jointly sponsored and promoted by Slow Food Utah groups across Utah and provided farmers, ranchers, and small food processors the opportunity to showcase their products to chefs and specialty store owners in attendance.

Program Results

The program impact assessment plan included pre and post-assessments, and nine-month follow-up assessments for each workshop, as well as retrospective and nine-month follow-up assessments for the mingles. Following the 2013 farmer/rancher workshops, paired-sample t-tests indicated that the overall posttest scores on participants' confidence in performing a series of marketing activities was significantly higher (M = 3.68, SE = 0.11) than the overall confidence score on the pretest (M = 2.50, SE = 0.18). Table 1 reports changes in farmers/rancher activity performance confidence levels.

Following the 2013 chef workshops, paired-sample t-tests indicated that the overall posttest scores on chefs' confidence in working with producers to locally source their restaurants was significantly higher (M = 3.77, SE = 0.20) than the overall confidence score on the pretest (M = 2.42, SE = 0.19). Table 2 reports score changes on chef activity confidence measures. Also, Table 3 indicates chefs' intentions to perform a variety of tasks, as a result of attending the 2013 workshops.

Table 1. Change in Confidence for Farmer/Rancher Activities

	Pretest		Posttest					
Activity	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*	Cohen's *d*
Knowing the best time of day to call on a new chef contact	2.55	1.35	4.21	0.70	7.71	32	0.00	1.57
Knowing which restaurants in my area want to source locally	2.29	1.19	3.76	0.99	7.94	33	0.00	1.36
Knowing what chefs need to know about my farm/business	2.35	1.23	4.03	0.72	8.72	33	0.00	1.69
Understanding the nature of restaurant business	2.79	1.32	3.76	0.70	5.35	33	0.00	1.99
Understanding the needs of restaurant business	2.73	1.26	3.73	0.80	5.93	32	0.00	1.80
Understanding the quantities chefs will purchase	2.33	1.11	3.18	0.95	6.13	32	0.00	1.28
Ability to meet the quantities chefs will require	2.12	1.14	3.03	1.10	5.51	32	0.00	0.84
Understanding the delivery methods preferred by chefs	2.28	1.22	3.28	1.09	5.25	31	0.00	0.91
Understanding the variety of produce required by chefs	2.58	1.18	3.45	1.09	5.07	30	0.00	0.76
Ability to meet consistency required by chefs	2.39	1.14	3.36	1.05	6.07	32	0.00	0.88
Understanding the level of commitment needed to supply chefs	2.69	1.18	4.03	0.97	6.60	31	0.00	1.29
Understanding how to price my products when selling to chefs	2.15	1.25	3.88	0.70	9.55	32	0.00	1.73
Understanding the billing process of restaurants	2.33	1.29	3.85	0.83	6.95	32	0.00	1.42
Understanding the best medium for communicating with chefs	2.24	1.15	3.88	0.70	2.04	32	0.00	1.75
Understanding the information chefs need on an on-going basis	2.33	1.19	3.88	0.74	8.35	32	0.00	1.59
Understanding of the specialty items chefs will require	2.31	1.28	3.28	1.02	5.16	31	0.00	0.85
Knowing the expectation of the restaurant's customers	2.44	1.29	3.47	0.98	5.66	31	0.00	0.91

Note. Confidence was measured on a Likert scale ranging from 1 to 5: 1 (*not at all confident*), 2 (*slightly confident*), 3 (*neutral*), 4 (*very confident*) and 5 (*completely confident*).

Table 2. Change in Confidence for Chef Activities

	Pretest		Posttest					
Activity	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*	Cohen's *d*
Contacting a local farm for the first time	2.64	0.93	4.00	0.68	6.82	13	0.00	1.73
Knowing the best time of day to make a new contact	2.47	0.99	3.53	1.06	4.00	13	.001	1.07
Knowing which farms in my area sell locally	2.43	1.15	3.71	0.91	5.83	13	.000	1.28
Understanding what farmers need to know about my restaurant/customers	2.27	0.80	3.80	0.78	7.12	14	0.00	2.00
Understanding the seasonal production capabilities/ growing condition in Utah	2.80	1.08	3.60	1.06	4.58	14	0.00	0.77
Understanding the needs of local farmers	2.13	0.74	3.60	0.63	8.88	14	0.00	2.21

Note. Confidence was measured on a Likert scale ranging from 1 to 5: 1 (*not at all confident*), 2 (*slightly confident*), 3 (*neutral*), 4 (*very confident*) and 5 (*completely confident*).

Table 3. Chef Intentions of Completing Activities in the Future

Activity	***n***	***M***	***SD***
Investigate competitors' local sourcing activities	16	3.81	1.11
Highlight locally sourced products and farmers on table tents of restaurant windows	16	3.75	1.18
Develop food safety, insurance, and/or production method (organic, grass-fed, etc.) requirements	16	3.75	1.13
Develop an instruction sheet for local farmers regarding contact needs (samples, prices, etc.)	16	3.56	1.15
Develop delivery procedures	16	3.56	1.03
Develop a payment plan	16	3.50	1.10
Develop chef/restaurant contact procedures (time, format (email, phone) etc.)	16	3.50	1.03
Develop local product ordering plan	16	3.50	0.97
Prepare a list of products you locally source now	16	3.44	1.37
Prepare listing of local farms you currently source from	16	3.44	1.03
Design a "for farmers/local sourcing" tab	15	3.40	1.12
Prepare a list of products and quantities you would like to source locally	16	3.38	1.20
Train service staff on locally sourced products	16	3.37	1.26
Provide and update menus on website	16	3.25	1.44
Incorporate sourcing of local foods into business plan	16	3.25	1.29
Develop "commitment to sourcing local" statement	16	3.25	1.13
Highlight locally sourced products and farmers on menus	16	3.19	1.17
Approach local farmers to initiate purchases	16	3.19	1.17
Research/visit farms I plan to approach	16	3.13	1.02
Develop a social media site	16	2.94	1.77
Develop a restaurant website	16	2.94	1.73
Make a list of farms I want to approach	15	2.87	1.19

Note. Intention was measured on a Likert scale ranging from 1 to 5: 1 (*already doing it*), 2 (*done in 3 months*), 3 (*done in 6 months*), 4 (*done in 12 months*) and 5 (*will not implement*).

The majority of the chef attendees indicated they performed these activities within six months of the training. Chefs indicated the percentage of restaurant ingredients they would source locally, ranging from 11-20% (16.7%), 21-40% (16.7%), 41-71% (33.3%), 61-80% (16.7%), or 81-100% (16.7%). To summarize, 71.4% indicated that they would increase the percentage of restaurant ingredients sourced locally as a result of the workshop, while 28.6% did not plan to make any significant changes. The overall impact of the Utah Farm-Chef-Fork program is perhaps best demonstrated by the following farmer and chef attendee quotes:

> *"The most critical hurdle to overcome in our effort towards building a sustainable infrastructure between local producers/artisans and chefs has, in my experience, been communication. As we at Heirloom Restaurant Group have labored to make those connections on our own is has become apparent to our team that we needed more help. Someone who has a vested interest in strengthening the fabric of our food community, but isn't directly involved with the day-to-day operations of running a farm or restaurant. How lucky we now are to have the Farm-Chef-Fork program and those at Utah State University who are concerned about the same issues we are and are willing to help find solutions to the problems we are facing. I was honored to represent Heirloom Restaurant Group this past week in sharing our experiences buying locally, supporting those in our community and the benefits that our company has seen as a result of this effort. I have no doubt that the Farm-Chef-Fork program can go on to play a crucial role in bringing our community together thereby allowing all of us to benefit from the shared efforts of each other. I look forward to Heirloom Restaurant Group's continued support of this program and the positive outcome I know it can bring."*
>
> –Heirloom Restaurant Group

> *"We were able to make connections and leads with Island Market that may lead to selling eggs through their store. Additionally it was great to meet other producers and make additional connections for our network."*
>
> –Appenzell Farms

> *"I thought it was a great experience overall. As for how it has changed my business, I feel like I have a better idea of how to approach restaurants in our area and what the restaurant owners/ chefs' expectations are."*
>
> –Living Traditions Farm

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Supply and Demand for Fresh Locally Produced Poultry Products in United Arab Emirates

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Abstract

Domestically produced poultry products in United Arab Emirates (UAE) are mostly marketed fresh. The objective of this research was to analyze the economic performance of the production supply chain and estimate consumers' Willingness to Pay (WTP) higher prices for fresh/chilled and locally-produced products such as fresh/chilled whole chicken and eggs. The authors conclude that increases in productivity are possible by adapting "best practices." Applying "best practices" is expected to increase market share for locally produced poultry products against fresh imported poultry products. Results of the cross-section survey data collected, analyzing the demand side, found that WTP is significantly affected by explanatory households' socio-economic characteristics variables such as income, nationality, head of household age and gender.

Keywords: locally produced poultry, production economic performance, Willingness to Pay, premium, United Arab Emirates.

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Background

Local poultry production in United Arab Emirates (hereafter UAE) includes the production of both poultry meat and eggs. Local poultry meat production is estimated to be about 40 thousand tons in 2011 or 12% of the total poultry meat available for consumption in the country, down from 20% in 2000. Poultry meat is mostly marked fresh. Meanwhile, UAE imported 298 thousand tons of poultry meat in 2011. Local eggs production is estimated to be 28.5 thousand tons (518 thousand eggs) in 2011 or 60% of the eggs available for consumption. Meanwhile, UAE imported about 32 thousand tons of eggs (581 thousand eggs). Domestic producers face significant challenges mainly due to strong competition from subsidized poultry production in neighboring countries Saudi Arabia and Sultanate of Oman. The number of poultry production plants in UAE has declined from 20 in 2006 to only 12 plants in 2011 (USDA, Foreign Agricultural Services, 2014). However, the total production for eggs has increased over the last three decades, from 1980 to the present. The Arab Organization for Agricultural Development (AOAD 2013) showed that UAE Self Sufficiency Ratios (SSRs) for poultry meat and eggs are 23%, and 50% respectively on average during the period 2000 to 2011. This research investigates factors that may increase locally produced meat and eggs market share on the supply side and highlights important socio-economic variables that impact the demand for fresh locally produced poultry products on the demand side.

Research Objectives

The objective of this research is twofold; to analyze the production's supply side economic performance for producers, on the one hand; and to estimate the consumers' Willingness to Pay (WTP) for fresh locally produced poultry products such as fresh whole chicken and eggs, on the other hand. Primary data was collected through interviews with the poultry plants' managers; whereas consumers' data was collected via surveying 500 householders in Al-Ain City, UAE. This research used poultry plants' gross margin (total revenue – variable costs) as an indicator for the supply side analysis; whilst Logit model was used for the demand side analysis to analyze the consumers' higher WTP (a premium) for locally fresh produced poultry products. Supply side challenges were investigated and issues such as high feed cost impacts on operational costs were found to be highly influential on the local production performance, using plants' gross margins as an economic efficiency indicator. The consumers' WTP a higher price, compared to imported fresh poultry products, for locally produced fresh poultry products was regressed against selected explanatory variables such as income, family size, head household's age and respondent's nationality and their impacts on the interpretation of consumers' WTP variability among the consumers interviewed were analyzed for the study area.

Supply Side Analysis

To analyze the locally produced poultry meat and eggs production in United Arab Emirates, the authors conducted a field survey of the nine largest poultry production firms in the country out of the twelve firms in the country, by conducting direct interviews with the poultry plant managers. Results of the survey showed that meat (broilers), eggs (layers), and (meat and eggs) producers represent 56%, 11%, and 33 % of the total plants, respectively. On average poultry farm's annual production of meat was found to be 2,880 tons. On average poultry farm's annual production of eggs was found to be 49 million eggs. Average output price per kg of poultry meat was found to be 15 Arab Emirates Dirham (AED). Where AED is Arab Emirates Dirham = $ 0.272. Average output price per dozen of eggs = AED 5.275. Feed costs represent 70-75% of total poultry farm's variable costs. About 60 % of broiler producers and 75% of layers producers indicated to having marketing challenges. Research results showed high feed price variability from one region to the other in UAE. However, differences among various producers in terms of the feed quality were found to be negligible (Hussein et al. 2014).

Table (1) below shows descriptive statistics of the UAE poultry production in 2012, as retrieved from the poultry producer's survey. The Coefficient of Variation (CV), which is calculated as percentage of the standard deviation divided by the average as well as the range of per plant production for the nine poultry farms interviewed, showed that both meat production as well as egg production, poultry meat, and the egg industry in UAE includes both large and very small scale operations. The small scale operations, especially due to the high feed cost and fierce competition from neighboring countries' producers, have declined in the last three decades, from 1980 to the present (as indicated by the poultry plant interviewed managers). This caused small firms to exit the poultry industry due to lack of production efficiency and due to fierce competition from poultry producers in the neighboring countries.

Table 1. Poultry Meat and Egg Production Descriptive Statistics in United Arab Emirates, 2012

Poultry Meat		**Poultry Eggs**	
Annual Average (Ton)	2,880	Average (Million Eggs)	49
Standard Deviation (Ton)	1,799	Standard Deviation (Million eggs)	28
Coefficient of Variation (%)	62%	Coefficient of Variation (%)	1
Maximum (Ton)	5,400	Maximum (Million Eggs)	65
Minimum (Ton)	1,200	Minimum (Million Eggs)	7
Range (Max. - Min)	4,200	Range (Max. - Min.)	58

The survey also investigated issues and technical barriers that face the poultry production industry in UAE including, birds healthcare issues, workers' healthcare training/practices, routine bird healthcare checkup on farm, healthcare records information, dead birds' disposal procedure, biosecurity management and practices, workers' hygiene practices, farm isolation and visitor guidelines, disease prevention practices, incoming new birds and feed handling and practices, biosecurity measurement in case of crises, assessment of the poultry farms' biosecurity benefits and costs. The survey concluded that the majority of the poultry production plants considered these issues and challenges of high importance, all of which impact productivity and, consequently, poultry farms' economic efficiency. All poultry production plant managers

interviewed agreed that such mentioned "best practices" are necessary to enhance productivity and would increase their production efficiency, leading to increased market shares in United Arab Emirates (UAE).

Figure (1) below shows the contribution of locally produced poultry meat to the total supply available for consumption declined in recent years to reach 12% in the year 2011, down from 20% in the year 2000. Meanwhile, Figure (2) shows that produced eggs' total supply available for consumption has increased recently form 42% in year 2000 to reach 60% in year 2011 (Arab Organization Agricultural Development (AOAD), 2013). This is due to increased imports of poultry meat in United Arab Emirates that competes with local production. However, increased local production of eggs may lead to lower overall eggs prices and so it increases both its competitiveness and market share position against imported meat and eggs. On the supply side of poultry meat and eggs in UAE, the authors conclude that increases in production efficiency is possible by adapting "best practices". Applying "best practices" such as feed rationing and safety standards would increase locally produced poultry products production efficiency and expected to lead to increasing competitiveness and possibility of increasing of local poultry producers' market share in UAE.

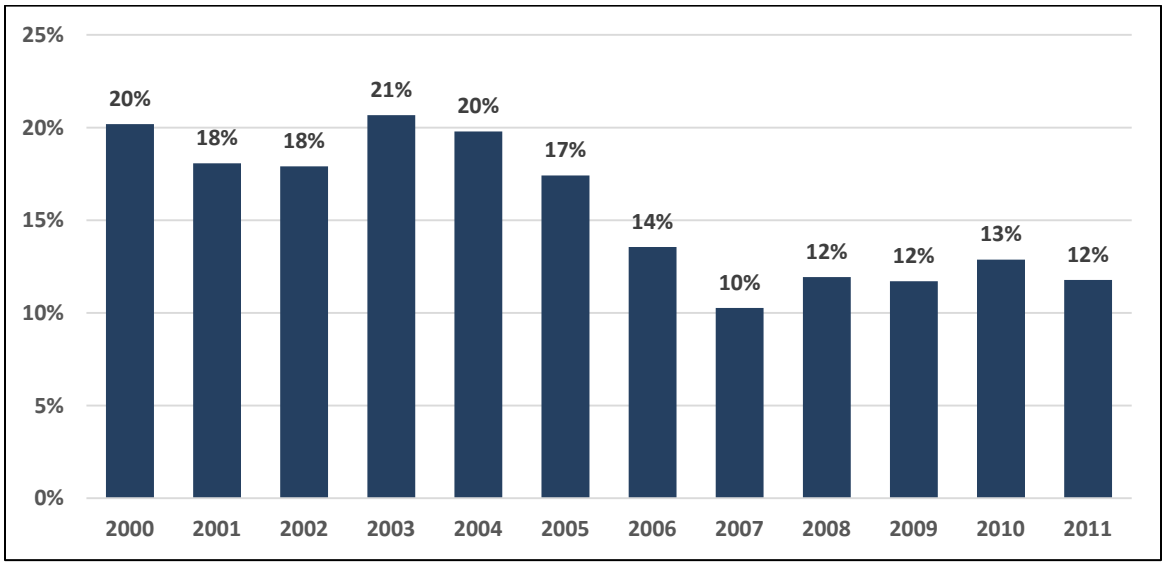

Figure 1. Share of Locally Produced Poultry Meat from Total Supply Available for Consumption in United Arab Emirates 2000-2011.

Source. Arab Organization Agricultural Development (AOAD). 2013. Arab Agricultural Statistics Yearbook. Volumes 26 - 33. http://www.aoad.org/AASYXX.htm.

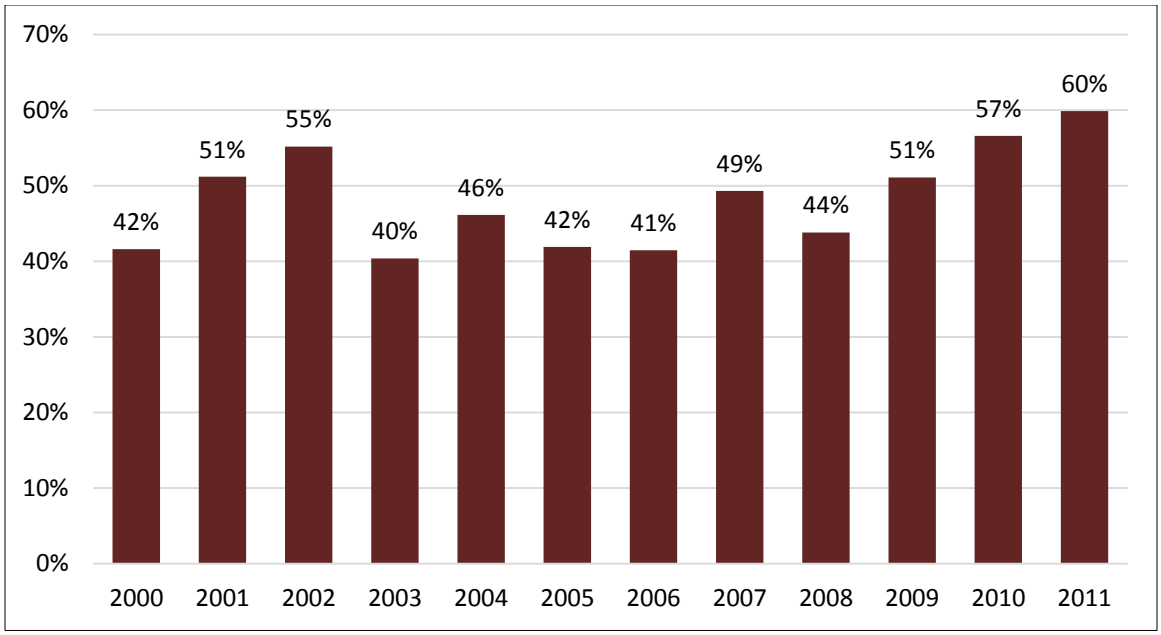

Figure 2. Locally Produced Eggs from Total Supply Available for Consumption in United Arab Emirates 2000-2011

Source. Arab Organization Agricultural Development (AOAD). 2013. Arab Agricultural Statistics Yearbook. Volumes 26 - 33. http://www.aoad.org/AASYXX.htm.

Demand Side Analysis

The model used in this study is the Logit model to study the relationship between the willingness to purchase fresh locally produced poultry meat and eggs as the dependent, regressed against selected households r's socio-economic characteristics. Al Ain City, United Arab Emirates was selected as the study area for this research. The Logit Model' regression can be algebraically represented as follow (Kennedy 2008):

$$(1) \qquad Y_i = \alpha + \beta X_i + e_i$$

Where

Y_i is 1 if the first option purchasing locally produced poultry and eggs is chosen and 0 if the imported products are chosen.

X_i = value of the respondents' socio-economic characteristics (e.g. income for ith individual).

The logit model is based on the cumulative logistic probability function and is specified as:

$$(2) \qquad P_i = \mathrm{F}(Z_i) = \mathrm{F}(\alpha + \beta X_i) = \frac{1}{1+e^{-Z_i}} = \frac{1}{1+e^{-(\alpha+\beta X_i)}}$$

In equation 2, e represents the base of natural logarithms, which is approximately equal to 2.718, P_i is the probability that an individual makes a certain choice.

A survey was carried out in January to May, 2014 in United Arab Emirates that covered a sample of 500 households. Data was obtained from direct face-to-face interviews with five hundred householders. Data obtained was tabulated and analyzed using Simetar © software. Survey results showed that Willingness to Pay (WTP) for locally produced poultry meat products that is less than 100 AED per month represents 17% of the sample. Meanwhile, consumers who showed WTP to pay more than 100 AED to 500 AED per month are 50% of the sample. A smaller percentage of households (33%) revealed that they are willing to pay more than 500 AED monthly. Survey results on WTP for fresh locally produced eggs varied between 40 AED per month up to more than 132 AED per month. About 18% of such consumers indicated that they are willing to pay between 40 AED to 88 AED per month. The percentage of those who said that they are willing to pay between 89 AED to 132 to buy locally produced eggs was found to be 55% of the sample. UAE consumers who showed a willingness to pay of more than 132 AED per month to buy eggs represent 27% of the sample. The respondents were asked to answer a question that reveal their willingness to pay some higher price (premium) to purchase locally produced poultry fresh products (as opposed to imported fresh poultry products including imports from neighboring countries). Specific locally fresh produce brands names were revealed as an example of locally produced fresh poultry products.

Table 2. Summarizes the Willingness to Pay for locally produced poultry meat and eggs regression analysis results. The table shows the results of the Logit Model. The dependent variable is a binary variable that takes the value 1 for those who are willing to pay higher price (a premium) for locally produced poultry products and zero value for the respondents who are not willing to pay higher price for locally produce poultry products. Results indicated a strong fitness of the model representing the survey's data of the Willingness to Pay for locally produced poultry meat and eggs in United Arab Emirates. Three out of the seven model's explanatory variables; namely, gender and nationality of the head households, as well as the household level of income were found to be highly significant showing large student's T statistic value and very small P-values. The Beta coefficients show the likelihood of change in the dependent variable (willingness to buy locally produced poultry meat and eggs) when the corresponding explanatory variable changes by 1%. For example, results indicated that when income changes by 1% it is likely that WTP to pay higher premium for locally produced meat and eggs will increase by 0.316 %.

Table 2. Willingness to Pay Regression against Head Household and Family Socio-Economic Characteristics

Variable	Intercept	Age	Gender	Nationality	Marital Status	Education	Household Income	Family Size
Beta Coefficient	0.662	-0.328	-0.517	1.255	-0.392	0.091	0.316	0.024
Standard Error	0.637	0.167	0.253	0.297	0.271	0.115	0.100	0.036
T-test	1.040	-1.961	-2.046	4.225	-1.445	0.790	3.146	0.658
P-Value	0.299	0.050	0.041	0.000	0.149	0.430	0.002	0.511

Conclusions

United Arab Emirates faces challenging questions in relation to food security in the country, including food quality. Local poultry fresh meat and eggs production faces a fierce competition

from subsidized industries in neighboring countries. This study used primary data that were collected by directly interviewing the poultry meat and eggs largest nine producers in the country. Supply side challenges were investigated in this research and issues such adaptation of production "best practices" were found to be highly influential on the local production's economic performance. This finding was reached using interviewed poultry firms' production economic indicators (i.e. gross margin = total revenue – variable operational cost). On the demand side, it was found, based on consumers survey, that Willingness to WTP for paying a higher premium to purchase locally produced poultry products is highly affected by explanatory variables such as household income, family size, and nationality. Market researchers and local poultry production in UAE would benefit from understanding the factors that influence both the supply and demand sides of their products in order to expand their market share in the country.

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Appendix

Table A1. Logit model socio-economic variables where the dependent variable is 1 if the respondent is willing to pay a higher price (premium) for locally fresh produced poultry products and 0 if not. Explanatory variables are as follows:

Explanatory Variables	**Respondent Categories**				
Age (years old)	19 or younger	20 to 29	30 to 40	41 to 50	More than 50
Gender	Male	Female			
Citizenship	Emirates	Expatriate			
Marital Status	Single	Married			
Education Level	Elementary or less	High school	Diploma or Associate degree	College degree	Graduate degree
Monthly Income (AED) - $1= 3.67 AED	> than 5,000	5,000 to 10,000	>10,000 to 15,000	>15,000	
Family Size	Open-ended question				

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Feasibility Study for Mixes of Different Sales Options for Rural Local Food Collaborators

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Abstract

Collaborative local food distribution and business enterprise combinations were studied for agriculture producers in remote, low-populated rural communities in Nevada. The research assessed the supply of agricultural products and compared the feasibility of enterprises for local sales and value adding and distribution to Las Vegas. Consumer interests and demand for local food indicated potential demand for a commercial kitchen, café and storefront, a local buying club, Las Vegas product distribution, or a combination of all. The agriculture producers have used the results to plan collaborative distribution into differing enterprise mixes to maximize profits and efficiency, and meet regional consumer demand.

Keywords: local food, collaborative distribution, food supply chain

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Introduction

A group of producers in Lincoln County Nevada recognized the need to collaborate to distribute and sell their local foods. High quality local food production has started in the region as a result of a series of producer to chef activities and the results of studies educating production techniques and a strong demand for local food in Las Vegas, Nevada (Cowee et.al. 2009). The producers recognize that the transportation costs are high since the Las Vegas market is 150 miles away and that local markets were limited due to the sparse population in their rural area (5300 people in 10,000 sq. miles). Producers working together are a means to remain viable but it was unclear what markets to target to make the best use of the required infrastructure for those markets.

Value added enterprises were added into the evaluation to determine the feasibility to prevent losses, extend shelf life and/or add value. Examination of local markets show that consumers pay nearly the same price for small packages of produce compared to large bulk volume sales (Gatzke 2012). A health certified commercial kitchen and process is required to gain the value from packaging in Nevada. During the peak growing season, product losses from 20% to 60% have been incurred by producers from not getting the ripe product to market in addition to losses incurred via products that do not meet the aesthetic properties necessary for premium pricing. Processing them into longer storage products prevents the losses but incurs costs for time and facilities. Value-added products can also be sold year-round, generating cash flow during the slower off-season months.

The enterprises under consideration were a value-added café and storefront in Lincoln County to sell locally produced food products; a commercial kitchen that could offer processing, co-packing, and/or a selection of educational classes; the potential for a Community Service Agriculture (CSA) program and/or regular sales of raw and further processed food products to residents of Lincoln County; and a CSA program and/or sales of further processed items at farmers markets to consumers in Las Vegas. The goal of the study is to provide farmers the initial data to make informed decisions on the demand and costs for differing distribution and marketing options to collaboratively sell their local foods. The study allows the group to select a combination of enterprises that is feasible for the remote rural community while fitting the group of producers that are willing to collaborate.

Methods

Supply and demand data were collected through producer and consumer surveys that assessed production capacity and the local food attitudes and desires of consumers in four small Lincoln County communities and the nearby metropolis of Las Vegas. Surveys were mailed to all producers and emailed to a local mailing list. Lincoln County resident survey data was collected through paper survey and a link to an online survey was sent to a random sampling of 853 households in Lincoln County in September 2012. A total of 224 surveys were returned and considered complete for analysis, a response rate of 26.2%. Logit regressions were used to examine likelihood of a binary response for an average person from the sample population on the Lincoln County survey data. Las Vegas surveys were conducted in-person at the Bet on The Farm Farmers Market in two different weeks in September 2012. This was the only market

serving high-end chefs and "foodies" at the time. The attendance of those markets was low in those weeks and so there were only 38 surveys completed. Cost estimates for different enterprises were estimated by collecting costs of startup equipment and building from available commercial packages.

Results

Supply

Producer responses indicated production potential of more than 30 different crops providing produce valued at $143,000 with plans for future expansion to over $273,000 in the next two years. There was a low response rate (10 of 108 farmers) which matched the low number of farms involved in local food. Local food production is new to the region with the introduction of production test plots in 2008. The production area has matched very close to the survey data projections collected.

Producer respondents indicated preference for the market that provide the best return (70%), and then 60% choosing farmers markets and Las Vegas Stores, 50% to a local café, marketing and promotion and collaborating on transportation. These results indicate an openness to targeting the market that will provide the greatest return. Fifty percent were interested in creating value added products.

Demand –Lincoln County Residents

The definition Local food in Lincoln County was considered by 38% of respondents as food grown in their region and 26% as grown by a farmer or rancher they know. Only 4% of the Nevada population defined local as being grown/raised by a farmer or rancher they knew.

The importance to purchase local foods was rated by 54% of respondents as a value of 6 or higher (1=not important, 10 =extremely important). These ratings are consistent with a recent statewide survey of Nevada residents. When selling in the rural area, the farm should be identified and build personal relationships when needing to gain more sales. When marketing to Las Vegas, identification of being grown in Nevada likely will achieve initial support.

The likelihood of any Lincoln County resident being familiar with a CSA is only 28.8%. The results show the average resident of Caliente or Alamo has a higher probability of being familiar with a CSA than residents from Pioche or Panaca. The only statistically significant demographic indicator is education. Income, gender, age were not significant indicators for knowledge of CSA (Table 1.). Initial support for a CSA likely would come from higher educated residents. Less than 21% of Lincoln County consumers indicated they would join a buying club (CSA).

Lincoln County survey respondents have low expenditures on produce (80% spent less than $120/ month) and groceries (52% between $201- $400; 28% $401- $600 per month). Respondents indicated interest in local produce (86.7%), a limited café featuring healthy options (55.7%), local processed foods (45%), and various educational classes. The low expenditures on

produce and low population will limit the potential sales in the county far below production potential and so outside sales are needed.

Table 1. Demographics and Location Indicators of Being Familiar with the Term CSA

Lincoln County Resident likelihood of being familiar with CSA = 0.288								
	Education	**Income**	**Gender**	**Age**	**Alamo**	**Caliente**	**Panaca**	**Pioche**
Change in Probability	0.096	-0.041	0.09	-0.005	0.272	0.18	-0.1	Omitted
Standard Errors	0.045	0.021	0.08	0.014	0.131	0.108	0.111	Omitted
Statistically Significant	YES	NO	NO	NO	YES	YES	NO	Omitted

Data showed the strongest support for local products and the importance of buying local products was in the City of Caliente. Caliente is centrally located for Lincoln County residents and serves as the central shopping location. Pioche would be a second location to consider based on strong interest in local products. Pioche appears to be a good candidate for farmers' market sales, particularly of value-added pre-packed produce or café items. Estimates of produce purchases were made based on population, produce spending ranges and differing percentage of the market for Caliente and Pioche to show potential customer support.

Demand - Las Vegas

A series of surveys have shown Las Vegas farmer market participants and chefs have high interest in purchasing local fresh produce and generally do not know produce can be supplied from Nevada farms (Cowee et al. 200, Curtis et al. 2010). The survey in this study had a low response but the data results matched these previous studies. This indicates a strong market potential in Las Vegas but a need for marketing about Nevada grown food.

Conclusions

The study provided agriculture producers initial data comparing costs and customer support to narrow and target planning for enterprises that improve returns in collaborative distribution. A CSA would have low startup costs but the consumers' lack of understanding indicates there will be limited support in Lincoln County for a CSA program. To gain a successful CSA an educational program would have to be launched before the enterprise. The enterprises that require a commercial kitchen (limited café, preparation of commercial products for onsite sales and/or some educational classes) would be supported locally and in combination may provide business income needed to pay for the cost of developing a commercial kitchen. This operation likely would receive the strongest support if located in Caliente. The low population and resulting limited business would require the facility to include several of the enterprises such as store front, limited café, commercial processing and possibly education classes to pay for infrastructure and staff costs. It was also determined that there may be too much produce to sell within the county and so additional distribution to Las Vegas would be needed or distribution could be focused solely to Las Vegas.

The information provided from this study changed the collaborative group‘s focus in discussions to more educated planning and acquiring more details in target areas. One producer dropped out of the group and changed his career path because the return and the location would not likely meet his needs. Another producer took the lead for the group by building and sharing a small on farm processing facility and a cooler truck to deliver to Las Vegas. He was the largest farmer and recognized he needed the simple processing to make his farm viable. The producers’ discussions continue to use the data as they plan how a more diverse facility can be built in a public location as the collaborating farms’ growth demands it.

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Self-Reported Consumption of Fast-Food Meals by University Students

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Abstract

Students' consumption of fast-food meals depends on perceptions of health status, label use, knowledge about sugars, household income levels, age, and marital status. Consumption is independent of weight status, knowledge of total fat and sodium, gender, household size, academic classification, and areas of residence. Perceptions of weight status statistically significantly differ from body mass indices. U.S. overweight and obesity rates have been steadily increasing in the 18 to 29 age group, and this group often includes university students. Thus, universities can play an active role in helping students to learn about the potential dangers of unhealthy diets and to develop better eating habits.

Keywords: university students; fast-food meals; consumption; body mass indices; perceptions of weight and health

Introduction

The United States has been battling an overweight and obesity epidemic for more than 20 years, and victory remains elusive. Currently, at least two-thirds of adults and about one-third of children and adolescents in the country are overweight or obese, and diet-related healthcare costs continue to trend toward unsustainable levels. Although there are some disagreements on whether genes, eating habits, areas of residence, lifestyles, attitudes, emotions, or household income levels are the main contributors to the epidemic, what is indisputable is that imbalances between energy intake and energy expended lead to weight gain.

Pereira and colleagues (2005) observe that because obesity has increased so rapidly in genetically stable populations, factors other than genes must be analyzed when trying to identify the root causes for the epidemic. To them the two most likely contributors to the obesity epidemic are environmental factors affecting diet, and levels of physical activity. On the dietary side, they suggest that the growth in fast-food establishments since the 1950s and larger portions loaded with sugar, salt, and fat often exceeding daily energy requirements are strong contenders in Americans excessive weight gains. The research findings also support their stated hypotheses of strong positive associations among fast-food consumption, weight gain, and the increased risks for obesity and type 2 diabetes (Pereira et al. 2005).

Recent statistics also indicate that although U.S. obesity rates have stabilized in the general population, the numbers have been rising among 18 to 29 year olds (Ogden, Carroll, Kit, and Flegal 2014). College students usually fall in the 18 to 29 age group and their dietary patterns often predispose them to weight gain and future health problems (Racette et al. 2005). Hamburgers, French fries, pizzas, and soft drinks are favorites of many college students compared to fruits, vegetables, and milk (Driskell, Meckna, and Scales 2006). Thus, excessive consumption of high-calorie fast-food meals and low physical activity levels are likely contributors to the upward trends in overweight and obesity rates among these young adults. Eating habits also are associated with students' demographic and psychographic characteristics, and their residence (Brevard and Ricketts 1996).

Morse and Driskell (2009) advance the view that the frequency with which college students eat fast foods depends on menu choices, cost, convenience, taste, advertisement, poor cooking skills, location, gender, and on the opportunity to socialize with friends. While there are positive benefits in socializing with friends, these benefits can erode very quickly if eating at fast-food restaurants leads to weight gain. Their findings indicate that male students who eat fast foods more frequently have statistically significantly higher body mass indices than their female counterpart. Heidal and colleagues (2012) found that the greater the monthly expenditures on fast foods by college students, the higher the amount of calories they consumed.

Deshpande, Basil, and Basil (2009) also note college students' tendencies to consume high-fat, high-caloric foods, and their low propensities to consume fresh fruits and vegetables, and suggest using aggressive public relations campaigns to promote healthy eating among university students. Recognizing the gender differences in food choices and views on health, the authors suggest that for these campaigns to be effective, they must be gender specific. Thus, campaigns for females should focus on the health consequences of poor diets, while those for males should

aim at increasing men's awareness that they are just as vulnerable to health-related diseases from poor diets as do women.

Overweight and obese individuals are at higher risks for developing type 2 diabetes, heart disease, high blood pressure, and some types of cancer, among others, and the costs for treating these diet-related illnesses have been growing at unsustainable levels. Consequently, the federal and state governments have tried several measures to address the problem (U.S. Department of Health and Human Services, 2014). At the federal level, the U.S. Department of Agriculture recently instituted new guidelines for food packages and the Special Supplemental Nutrition Program for Women, Infants and Children in an attempt to combat the overweight and obesity epidemic plaguing the country (Ogden, Carroll, Kit, and Flegal 2014). Despite these measures, 50 million Americans eat at fast-food establishments daily and almost 37 percent of their daily caloric intake comes from eating a fast-food meal. Thus, researchers must continue to study fast-food consumption given its links to overweight and obesity rates among young adults. Our study takes a small step in that direction by examining the frequency of consuming fast-food meals by a selected group of college students.

Objectives

The study's overall objective is to examine students' daily consumption of fast-food meals, and factors associated with consumption of these meals. The specific objectives are (a) to assess students' perceptions of their weight status compared to computed body mass indices; (b) to document self-reported daily consumption of fast-food meals; and (c) to determine whether fast-food consumption is associated with students' perceptions of their health and weight status; label use; knowledge of percent daily values for total fat and sodium; knowledge of the sugar content of foods; and their selected sociodemographic characteristics (age, gender, household size, household income, marital status, academic classification, and residence).

Data and Procedures

The study's data were compiled from a survey of 402 undergraduate students and generated information on knowledge of Nutrition Facts, label use, perceptions of health and weight status, consumption of fresh fruits and vegetables and fast foods, and sociodemographic characteristics. For the paper, variables are defined as follows: (1) students' assessments of their health (**Health**) and weight (**Weight**) status; (2) frequency of reading Nutrition Facts panels (**Label**); (3) knowledge of percent daily values for total fat (**Fat**) and sodium (**Sodium**); and basic knowledge about the sugar content of foods (**Sugars**); (4) age (**Age**); gender (**Gender**); household size (**Size**); household income (**Income**); marital status (**Status**); academic classification (**Class**); and residence (**Residence**).

Selected survey questions include the following. How often do you read food labels: often; sometimes; rarely; or never? Do you consider yourself overweight, underweight, or about right? Would you say that, in general, your health is poor, fair, good, very good, or excellent? Would you say that, in general, you eat fast-food meals: ____ times per day; ___ times per week; ___ times per month? Body mass indices were computed as [(weight in pounds) ÷ (height in inches) ^{2}] * 703. The chi-square tests for independence were used to analyze the data.

Empirical Results and Discussion

Descriptive Statistics

The average age of survey participants is 22 years old, while the median age is 20 years. Academic classifications are as follows: freshmen (33 percent); sophomores (29 percent); juniors (23 percent); seniors (14 percent). Thirty-seven percent of the students live on campus; sixty-five percent are females; and 90 percent are single. From the survey, 9 percent of the students perceive themselves as underweight, 48 percent feel their weights are about right, and 43 percent think they are overweight. Based on our estimates of students' body mass indices, 31 percent is overweight and about 30 percent is obese.

Chi-Square Results

Comparisons between perceptions of weight status and computed body mass indices suggest that students overestimate their healthy weight status, while underestimating their overweight status (Table 1). Within category comparisons also indicate that 48 percent of the students who are overweight and 23 percent of those who are obese perceive their weights are just right or falling into the healthy weight category. Perceptions of weight status are associated with actual body weight. Additionally, 36 percent of students eat fast-food meals more than three times per day, while 29 percent do not consume any fast-food meals on a daily basis (Table 2).

Table 1. Perceptions of Weight Status and Computed Body Mass Indices (BMI)

Variables	Under Weight	About Right	Over Weight	Chi-Square	P-Value
Total Weight	9.0a	48.0	43.0		
Total BMI	4.5	34.5	31.1		
BMI Categories					
Under weight	22.0	50.0	28.0		
Healthy weight	19.0	68.0	13.0		
Overweight	4.0	48.0	48.0		
Obese	2.0	23.0	75.0	111.96***	0.000

Note. (a) Numbers in table represent percentages. (***) implies statistical significance at the 1% level of probability.

Table 2. Self-Reported Daily Fast-Food Consumption

Times/Day	Percentage	Chi-Square	P-Value
None	29.4		
One	21.1		
Two	13.2		
Three or more	36.3	48.488***	0.000

Note. (***) implies statistical significance at the 1% level of probability.

Consumption is associated with perceptions of health status, label use, knowledge about sugar, age, income levels, and marital status. Forty-three percent of students who describe their health as fair or poor and 25 percent of those who read food labels indicate that they consume fast-food meals at least three times per day. Students who answer the question on sugar incorrectly, older students, those whose family's household income levels range from $50,000-$74,000, and married students are more likely to eat fast-food meals compared to their corresponding counterparts. The frequency of eating fast foods is invariant to perceptions of weight status,

knowledge of the percent daily values for total fat and sodium, gender, household size, academic classifications, and areas of residence (Table 3).

Table 3. Factors Associated with Fast-Food Consumption by Percentages

Variables	None	One	Two	Three	Chi-Square	P-Value
Total	**29.4**	**21.1**	**13.2**	**36.3**		
Health						
Fair/Poor	28.3	14.5	13.8	43.4		
Good/Very Good	30.4	26.4	12.3	30.8		
Excellent	26.1	13.0	17.4	43.5	11.933*	0.063
Weight						
Underweight	29.7	10.8	21.7	37.8		
About right	31.8	25.5	12.3	31.2		
Overweight	26.6	18.5	13.3	41.6	10.168	0.118
Label						
Never	27.2	21.2	13.6	38.0		
Often	44.9	20.4	10.2	24.5	7.134*	0.068
Fat						
Correct	25.4	23.7	20.4	30.5		
Incorrect	30.0	20.7	12.0	37.3	3.910	0.271
Sodium						
Correct	28.9	17.8	11.1	42.2		
Incorrect	29.4	21.6	13.4	35.6	0.927	0.819
Sugars						
Correct	32.8	22.6	13.6	30.9		
Incorrect	22.6	18.2	12.4	46.7	10.307**	0.016
Age						
<25	28.7	23.6	14.2	33.5		
≥25	32.4	9.9	8.5	49.3	10.929**	0.012
Gender						
Male	28.8	16.5	17.3	37.4		
Female	29.7	23.6	11.0	35.7	4.903	0.179
Size						
One	28.6	14.3	9.5	47.6		
Two	26.9	17.2	20.4	35.5		
Three or more	30.2	22.9	11.1	35.8	7.484	0.278
Income						
<$15K	31.4	28.6	14.3	25.7		
$15 - $24K	23.7	13.2	22.4	40.8		
$24 - $49K	36.4	13.6	12.1	37.9		
$50 - $74K	23.5	19.1	8.8	48.5		
≥ $75K	29.9	31.2	11.7	27.3	27.642**	0.024
Status						
Single	28.3	22.8	13.6	35.3		
Other	38.2	7.1	9.5	45.2	7.073*	0.070
Class						
Freshman	30.6	19.4	17.2	32.8		
Sophomore	29.1	17.9	13.7	39.3		
Junior	29.0	20.4	14.0	36.6		
Senior	27.6	32.8	1.7	37.9	12.852	0.169
Residence						
On-Campus	31.2	17.5	14.4	36.9		
Off-Campus	28.0	23.6	12.4	36.0	2.304	0.512

Note. (*) and (**) imply statistical significance at the 10% and 5% levels of probability, respectively.

Summary and Conclusions

The study's primary objectives were (a) to examine students' perceptions of their weight status as compared to their computed body mass indices; (b) to document self-reported daily consumption of fast-food meals; and (c) to determine whether fast-food consumption was associated with students' perceptions of their health and weight status, label use, knowledge of percent daily values for total fat and sodium, knowledge about the sugar content of foods, and their selected sociodemographic characteristics (age, gender, household size, household income, marital status, academic classification, and residence). The results suggested that 48 percent of the students who were overweight and 23 percent of those who were obese perceived themselves as being in the healthy weight category. Further, the most frequent (≥ 3/day) consumers of fast foods perceived themselves as being in excellent health (43.5%); had limited knowledge about sugars (47%); were non-label users (38%); were at least 25 years old (49.3%); reported family household income between $50,000 and $74,000 (48.5%); and were married (46%).

The United States has an overweight and obese epidemic and the healthcare costs for treating this epidemic keep rising. Excessive consumption of fast foods has been one of the factors driving the epidemic. College students are notorious for consuming fast foods and for thinking that they are invincible when it comes to their health. The study's findings suggest that there are discrepancies between perceptions of weight status and actual weight which can lead to greater consumption of fast foods. Given the budgetary challenges and rising healthcare costs at the national level, young adults must become more proactive in improving their eating habits. Universities can play a vital role in this endeavor by teaching students in the mandatory courses how to make healthier food choices.

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Determinants of Consumer Attitudes and Purchasing Behaviors on Genetically Modified Foods in Taiwan

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Abstract

Consumers have been concerned about the introduction of genetically modified (GM) foods into Taiwan. This study examines the public's attitude toward GM foods in Taiwan using data obtained in a nationwide telephone interview in January 2004. Logit regression was used to measure the relative importance of consumers' socio-demographic characteristics, personal beliefs, and awareness of genetically modified foods which may impact their purchasing behavior, as well as consumers' willingness to pay a premium for non-GM foods. Results show that the perceived risk of GM foods and technology, previous knowledge about genetic engineering, and higher education levels were significant determinants of consumers' willingness to purchase non-GM foods versus GM foods. Moreover, on average, Taiwanese consumers were willing to spend 19% more to avoid purchasing GM foods.

Keywords: Genetically Modified foods, Taiwanese consumers, willingness to pay.

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Introduction

The increased marketing of genetically modified (GM) foods raised considerable concerns about this new technology, which calls for a better understanding on the public's attitude toward GM foods in Taiwan. Consumers' attitudes toward risk, GM labeling, shopping frequency, knowledge about genetic engineering, religion, vegetarianism, and basic socio-demographic indicators shape their opinions about GM foods. The objective of this paper is two-fold: firstly to examine the significance of various factors that may influence consumers' attitudes and purchasing intentions about genetically modified vegetable oil, tofu, and salmon; secondly to estimate determinants of consumers' willingness-to-pay premium for non-GM foods. Finally, based on empirical results, recommendations will be made to come up with GM foods regulations better adjusted to the needs of Taiwanese consumers, as well as marketing strategies.

Data

Data used were drawn from a telephone survey administered by The Research Center for Humanities and Social Sciences (RCHSS) in Taiwan (Chiang 2012) during the period January 2 to 29, 2004. This survey was conducted by random sampling telephone interviews across Taiwan. In total, there are 1002 valid observations in the data set.

The telephone interview contained 337 questions that were divided into three sections. The first section focuses on consumers' purchasing behaviors, habits and attitudes toward GM products. The second section collects consumers' WTP on vegetable oil (made from non-GM soybeans vs. GM soybeans), tofu (made from non-GM soybeans vs. GM soybeans), and salmon (fed with non-GM soy powder vs. GM soy powder), which covers the main usages of GM soybeans and corn in Taiwan. Because many WTP questions have the same price range, we calculate the percentage difference between non-GM and GM foods to capture consumers' choice under different price scenarios. In the third section, basic household socio-demographic data were collected.

Overall, the data represent consumers who are mostly female, married, middle-aged, less educated, and with relatively low income. Thus, we weighted the dataset to keep it balanced. Notably, the data in Table 1 shows that more people think GM foods are risky (65.5%) and should be labeled (95.2%).

Table 1. Variable Definition and Sample Means of Taiwanese Consumer Characteristics

Variable	Definition and Coding	Mean	Std.
Female	= 1 if female; 0 otherwise	0.779	0.416
Married[1]	= 1 if married; 0 otherwise	0.916	0.278
Young age	= 1 if < 30 years old; 0 otherwise	0.254	0.436
Middle age	= 1 if 30 to 50 years old; 0 otherwise	0.652	0.477
Base group	= > 60 years old		
Medium education	= 1 if some college but no bachelor's degree; 0 otherwise	0.160	0.367
High education	= 1 if 4 years college degree and above; 0 otherwise	0.133	0.34
Base group	= high school diploma or less		

Table 1-*Continued*

Variable	Definition and Coding	Mean	Std.
Medium income	= 1 if income $30,000 to $50,000; 0 otherwise (in USD)	0.168	0.375
High income	= 1 if income more than $50,000; 0 otherwise (in USD)	0.072	0.259
Base group	= income less than $30,000		
Knowledge[2]	= 1 if very/somewhat knowledgeable about GM foods; 0 otherwise	0.292	0.455
Shopper	= 1 if shops more than once a week; 0 otherwise	0.928	0.259
Religion	= 1 if belongs to a religious group; 0 otherwise	0.505	0.5
Vegetarian	= 1 if is vegetarian; 0 otherwise	0.045	0.207
Label[3]	= 1 if GM food should be labeled; 0 otherwise	0.952	0.213
Risk	= 1 if associate GM foods with high/ moderate risk; 0 otherwise	0.655	0.476
Price	= price difference between GM and non- GM foods	0.593	0.291

Note. [1] married=1 if married or have at least one year of marriage. [2] The survey examined consumers' knowledge by the question "How do you perceive your knowledge about the GMO?" Answers are "Very knowledgeable", "Somewhat knowledgeable", "Heard of but do not know", "Unheard of and do not know", "No reply". The question design has subjective issues. [3] label =1 if consider GM labelling very important, or somewhat important

Methodology

This research applied a logit model to estimate the degrees of influence of identified factors on respondents' purchasing choice and willingness to pay for GM foods (vegetable oil, tofu or salmon). The response to the survey questions about WTP is a binary choice between yes and no, following Li, Zepeda, and Gould's methodology (2007).

$$(1) \qquad Y = \gamma + \alpha k + \beta p + \varepsilon$$

$$\text{Where } y = \begin{cases} 1 \text{ if the respondent chooses to buy GM foods} \\ 0 \text{ otherwise} \end{cases}$$

Also, k is a vector of the 14 explanatory variables listed in the Table 1, and p is a price vector defined as the price difference between GM and non-GM foods (base group) in the empirical model in order to capture the price effect; ε is the random error assuming logistic normality (Bukenya and Wright 2007). By maximum likelihood estimation of the logit model, we can determine which factors have a significant impact on consumers choosing GM foods.

With respect to the price variable, we assume non-GM foods to be the base group: GM food products were more expensive than their non-GM counterparts. Therefore, the prices of non-GM food products were specified as discounts to the prices of GM food products, using Chern and Rickertsen's methodology (2002). The discounts ranged from -50% to 100%, while responses to questions about WTP on vegetable oil clustered mainly between 0 – 30%, 0 – 100% for tofu, and 0 – 50% for salmon. So 30% price difference was assigned for vegetable oil-related questions, 100% for tofu questions, and 50% for salmon questions in the logit model in order to avoid the multicollinearity problem.

The WTP premium is calculated by definition as the expected premium for non-GM foods: how much more are consumers willing to pay for non-GM foods to avoid consuming GM foods (Wang et al. 2007).

Results and Discussion

Estimated Logit Regression Results

The results are presented in the Table 2, including the log-likelihood coefficient, the pseudo R^2, the model's prediction success, and the estimated WTP premium. Although the R^2 value is low, it is the norm with logistic regression (Hosmer Jr. and Lemeshow 2004). There is no multicollinearity problem of explanatory variables (the condition number is 23.55).

Table 2. Estimated Logit Regression Results of Taiwanese Consumers' Willingness to Purchase Three GM Foods.

Logit Model		Dependent Variable = Assessment of the willingness to purchase GM foods (vegetable oil, tofu or salmon)
Variable	**Coefficient**	**SE**
Female	0.058	0.040
Young age	-0.092	0.071
Middle age	-0.080	0.065
Married	0.008	0.070
Medium education	-0.018	0.048
High education	-0.157 **	0.063
Religion	0.000	0.033
Medium income	-0.004	0.048
High income	0.103	0.067
Shopper	0.006	0.066
Knowledge	-0.178 ***	0.040
Risk	-0.274 ***	0.036
Label	0.087	0.075
Vegetarian	-0.082	0.090
Price	-0.001	0.054
Constant	-0.488	0.619
Observations	736	
Pseudo R-squared	0.1145	
Model Prediction		
(dependent variable = 1)	67%	
(dependent variable = 0)	72%	
Log likelihood	-398.252	
WTP premium	23.78	
Sample size	736	

Notes. *** p<0.01, ** p<0.05, * p<0.1

Dependent variable for the logit model is purchasing GM foods that takes on a value of one if the participant opted to purchase, and zero otherwise. Logit estimates are partial derivatives computed at sample means or the discrete change of dummy variables from zero to one

The coefficient of high education is significant at the 5% level. It indicates the purchase of GM foods will be 15.7% less if one has a four-year college degree or above. The perceived risk levels

associated with GM foods and previous knowledge about genetic engineering both have negative effects on purchasing GM foods, which are both significant at the 1% level. It shows that consumers will decrease their purchase by 27.4% if they perceive GM foods as risky; similarly, consumers will decrease purchase by 17.8% if they are more knowledgeable about GM foods.

Since the WTP premium is affected by the price differences designed in the survey when calculated in terms of price, we calculate it in percentage terms: how much more in percentage terms are consumers willing to pay a premium for non-GM foods. The results shows the WTP are 19% for non-GM vegetable oil, 20% for non-GM tofu, and 18% for non-GM salmon, respectively. The average WTP premium is 19%.

Determinants of Differences in Willingness to Pay for Non-GM Foods

In this section, determinants of differences in WTP across individual consumer characteristics are examined. The dependent variable for this regression is the WTP premium, and the estimation results are presented in the Table 3.

Table 3. Determinants of WTP Premium for Non-GM Foods

WTP Premium	**Coefficient**		**SE**
Female	-0.026		0.043
Young age	0.121	*	0.066
Middle age	0.141	**	0.057
Married	0.000		0.051
Medium Education	0.072		0.049
High Education	0.065		0.049
Religion	0.067	*	0.037
Medium income	-0.113	**	0.047
High income	0.012		0.066
Shopper	0.073		0.053
Knowledge	0.016		0.035
Risk	0.185	***	0.028
Label	0.146	**	0.058
Vegetarian	0.029		0.068
Price	0.014		0.060
Constant	-0.200	**	0.095
Observations	430		
R-squared	0.117		
Sample size	430		

Note. *** p<0.01, ** p<0.05, * p<0.1

The results indicate that age plays an important role in the WTP premium for non-GM foods; younger age consumers are willing to pay premiums of 12.1% more for non-GM foods, and people of middle age are willing to pay premiums of 14.1% more for non-GM foods. Religion, risk, and labelling also play important roles in WTP premium decisions. On the contrary, medium- income consumers are not willing to pay premiums to purchase non-GM foods. Other coefficients are not significant; however, most coefficients present positive signs, indicating

consumers in the sample are more willing to pay premiums to purchase non-GM foods in avoidance of GM foods.

Although the explanatory variables are the same in both analyses (Tables 2 and 3), their significance level are different. It indicates that variables that significantly influence GM food purchasing decisions are not always the ones that lead to consumers' WTP premiums for non-GM foods in avoidance of GM foods; for example, the variables education and knowledge were not significant. This is very important because purchasing decisions are the first step in the consumers' food choices, and the next step is their WTP premiums to back up their purchasing decisions.

Implications

This research has important implications for policy makers, producers, and marketers of GM foods. Positive publicity of GM foods and their functions within a country's food chain should be reinforced (Xu and Wu 2010). Since the survey indicates that only 29.2% of the sampled consumers are somewhat or very knowledgeable about GM foods, most of the individuals are rather "uninformed" about GM technology, which may lead to GM avoidance behaviors.

Manufactures could refine their labeling strategy in order to capture market margins since consumers, on average, are willing to spend 19% more to purchase non-GM foods (Chern and Rickertsen 2002). Moreover, consumers' attitudes and purchasing behaviors relative to GM foods in Taiwan might have changed since the study period, and food manufactures need to keep update with consumers' tastes and preferences. Thus, more recent surveys should be conducted to keep the analyses up to date.

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Factors Affecting Consumers' Willingness to Pay for Certified Organic Food Products in United Arab Emirates

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Abstract

Organic food consumption is increasing among United Arab Emirates (UAE) consumers in the last few years. This increase is due to high per capita income, more awareness on healthy food and the diverse population. Consumers are willing to pay higher prices for the certified organic food products. The objective of this paper is to examine consumers' Willingness to Pay (WTP) for the organic food in UAE. Data was collected in UAE from 300 respondents. Regression model was used to identify major determinants of consumers WTP for the organic food. The results showed that majority of consumers responded positively when asked if they are willing to pay more for the organic food products. The age, nationality, education; household size and income were deciding factors for consumers to pay higher price for the organic food. These results will provide key information to organic food industry that will help to promote organic food markets in the UAE.

Keywords: organic food, willingness to pay, consumers' preferences, price premium

Introduction

According to the definition of the Codex Alimentarius (2007), "organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. The cost of organic farming is higher than traditional farming due to state and private certifiers' fees, pesticides residue testing and other services. Studies also show that lower yield and higher cost per acre indicate a need for higher break-even prices, organic price premium, and new markets for organic production compared to conventional production (Wyman and Diercks 2003, Klonsky and Livingston 1994; Batte et al. 1993; Assadian et al. 1999). Organic farming has been suggested by many as an alternative enterprise to enhance farm profitability and survivability.

According to Global Survey on Organic Agriculture (2008), the global market for organic products reached a value of $71 billion in 2008 ($38.6 billion in 2006), with the vast majority of products being consumed in North America and Europe. Using 1997 sales data and annual growth rates from the International Trade Center ITC (2002), and assuming a linear trend, projected market size in 2012 will be at least $46 billion in the European Union, $45 billion in the United States, and $11 billion in Japan. A survey in Europe, North America, and Japan indicated that 20 to 30 percent of consumers purchase organic foods regularly. Healthy annual growth rates of 15 to 30 percent are expected to continue in the coming years. It is suggested that the ever-growing demand for organic products offers attractive opportunities for producers especially those in developing countries (Lohr 1998).

Some of the benefits associated with organic farming are improved soil tillage and productivity along with lower energy use and reduced use of pesticides (USDA 1980; Smolik et al. 1993). Organic farming is also used by several states to capture environmental benefits by subsidizing conversion to organic farming systems (Greene and Kremen 2003). Some of the management-intensive practices for organic systems and environmental benefits justify financial or other assistance to farmers who adopt these practices. Specialized production practices, high price premiums and new markets for organic products pose different types and sources of risks than conventional production. A few studies that have examined the yield, costs and profits, managerial requirements and other economic characteristics of organic farming have reported mixed results when comparing most features. However, it is important to identify and analyze factors that affect adoption of organic farming. These factors include assessing demand and consumption trends, factors affecting consumption, marketing strategies, identifying sources of risk in organic production and educating consumers and producers on key issues.

The alternative to conventional farming, known as organic farming, is based on the idea of responsible environmental behavior and tries to minimize the social costs associated with the conventional farming. It is an agricultural production system based on respect for natural cycles that sustain the health of soils, ecosystems, and people (Koocheki 2004). Organic farming is defined as "a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. Organic production systems are based on specific and precise standards of production which aim at achieving optimal agro-ecosystems which are socially, ecologically and economically

sustainable (Haas 2006, FAO 1999)". Organic products, on the other hand, are the products that come from organic production processes or from organic farming (Alvares et al. 1999).

The practice of organic farming involves the maintenance of soil health, conservation of resources, and nature-driven management of weeds and disease. Techniques and concepts utilized to this end include crop rotation, cover crops, green manures, biological controls, and incorporation of biodiversity (Guthman 2000). It avoids the use of synthetic pesticides, herbicides, chemical fertilizers, growth hormones, antibiotics or gene manipulation. Instead, organic farmers use a range of techniques that help sustain ecosystems and reduce pollution. It dramatically reduces external inputs by refraining from the use of chemo-synthetic fertilizers, pesticides and pharmaceuticals. Instead, it allows the powerful laws of nature to increase both agricultural yields and disease resistance (Adeoye 2005).

As opposed to conventional farming, organic farming is known for its friendly environmental and human practices. A study carried out by FAO (1998) has shown that an adequate management of organic farming generates a positive impact on the environment (e.g., reduction of water "contamination", increased soil fertility due to crop rotation). On the demand side, consumers have positive attitudes towards organic products as they perceive them as healthier than conventional alternatives (Beharrel and MacFie 1991).

The natural question then arises that why not the farmers abandon the conventional farming techniques, known for so much of undesirable consequences, and adopt with the more environmental and human friendly organic farming. The answer, to a greater extent, is provided by the relative price differentials in the organic and conventionally produced products (Gil et al. 2001). There is abundance of research showing that the cost of producing organic products is higher than that of conventionally produced products (Barkley 2002, Belicka and Bleidere 2005). This is so because organic products must meet the criteria of being organic, must be distinguishable from the conventional products and must be certified by a recognized agency. All these activities are costly (Haghjou et al. 2013) and hence are reflected in the private cost and prices of the organic products. The certification process in particular is very troublesome for the farmer which requires farmers not to use any synthetic substances on their fields for a specified period, usually in years, before they are registered as organic producers. Note that the private cost benefit analysis is based on market valuation and if we include the indirect costs and benefits, which are not considered by the market, organic products might have net benefits as compared to conventionally produced products.

However, despite higher prices, consumer around the world are increasingly becoming aware of the negative consequences of the conventional farming and are consuming organic products (Aryal et al. 2009, Pinna et al. 2014, Van Elzakker et al. 2007, Ghorbani et al. 2007). It means that consumer would not compromise on their health and environment and would pay a price premium instead to protect the two. In this regard, we needs to understand the two inter-related terms, consumers' awareness and their Willingness to Pay (WTP hereafter), which governs whether or not the consumer will consume a particular product.

Willingness to Pay (WTP) is measured using either the stated preference methods or the revealed preference method (Sanchez et al. 2001, Umberger et al. 2002, Nakaweesa 2006). The revealed

preference method involves observing the actual expenditure made by the consumers in the market place to obtain goods. The stated preference methods, i.e. the conjoint analysis and contingent valuation among others (Kroes & Sheldon 1988), are based on asking the consumers about their WTP for a particular good (King et al. 2000). The stated preference methods are good in case where there are no established markets for the product under consideration but are subject to much criticism (Diamond and Hausman 1994, Nalley 2004, Lusk and Hudson 2004).

The WTP for organic food can be divided into two categories; i.e. product related factors and consumers related factors. The product related factors that influences consumers' WTP are product price (Bhatta et al. 2009, Aryal et al. 2009), product quality (Bhatta et al. 2009), product type (perishable or non-perishable) and origin of production (Gil et al. 2001), knowledge of the product (Piyasiri et al. 2002, Coulibaly et al. 2011, Haghjou et al. 2013), labeling (Pinna et al. 2014) and regularity in supply (Coulibaly et al. 2011). Consumer related factors are income, age, education, gender, occupation, family size and type of the consumers (Piyasiri et al. 2002, Pinna et al. 2014, Bhatta et al. 2009, Govindasamy & Italia 1998, haghjou et al. 2013). Additionally, consumers' WTP is also affected by peers opinion, awareness (i.e. awareness about the harmful effects of consuming traditionally produced food products), habits and socio-cultural factors (Straughan & Roberts 1999, Janssen & Jager 2002, Piyasiri et al. 2002, Govindasamy & Italia 1998; Haghjou et al. 2013). Note that the current study focus on only consumers related factors and their influence on WTP.

Data and Methodology

The study is based on a sample survey of 300 randomly selected respondents from United Arab Emirates. The data is collected through a questionnaire containing questions on awareness about organic food, WTP for organic food and on various socio-demographics of the respondents. The analytics, in order to know what determines consumers' WTP for organic food. The regression model could be specified as;

$$WTP_i = \alpha_0 + \alpha_1 AW_i + \alpha_2 AG_i + \alpha_3 GR_i + \alpha_4 NY_i + \alpha_5 ED_i + \alpha_6 MI_i + \alpha_7 ES_i + \alpha_8 HS_i + \epsilon_i$$

A consumer's willingness to pay (WTP) is best represented by his demand (and if we assume zero consumer surplus, then the two identities are actually the same because the only difference between the two is consumer surplus). Therefore, the dependent variable in the above specification, WTP, is represented by consumer's expenditure on organic food as a percentage of total food expenditure. The independent variables include Awareness, Age, Gender, Nationality, Education, Monthly Income, Employment Status, and Household Size.

Since the dependent variable in the regression model is a continuous variable, the appropriate estimation method is the ordinary least squares (OLS), provided that the basic Guass Markov properties are satisfied.

Results and Discussion

The regression results for WTP are presented in Table 1. The model is estimated using the OLS method and the model is tested against Multicollinearity (using Variance Inflating Factor criteria), Heteroskedasticity (using White's heteroskedasticty test) and misspecification errors (using Ramsey's RESET test).

Table 1. WTP for Organic Food

Variable	Coefficient		Std. Error	t-Statistics	p- Value
Awareness	2.075		4.749	0.437	0.663
Age	55.768	**	27.998	1.992	0.048
Gender	12.263		24.593	0.499	0.619
Nationality	55.090	***	32.504	1/695	0.092
Education	70.241	***	40.223	1.746	0.082
Monthly Income	64.218	**	28.181	2.279	0.024
Employment Status	-31.689		28.182	-1/124	0.262
Household Size	15.145	*	2.916	5.195	0.000
Constant	-138.050	**	65.684	-2.102	0.037

Note. *, **, *** represents significant at 99%, 95% and 90% level of confidence respectively.

The Table 1 reports the regression results of WTP of the consumers. Considering only variables that has statistical significance, consumers' WTP for organic food is influenced by their age, nationality, education, monthly income and household size. Age has a positive and significant influence on consumers' WTP for organic food, i.e. the result implies that WTP for organic food increases with the age. This finding is slightly different from the findings of other researchers who claim that WTP for organic food is the highest at the middle age (25-40) but our finding has more than one logical reason in its support. First, education and income usually increases with age which also has a positive and significant impact on consumers' WTP for organic food. Second, young people's health consciousness is a rare phenomenon but as the people gets older and the diseases of aging caught up their minds, they become more and more health conscious. Thus as their age increases, more threat is posed by various diseases and hence their WTP for healthier food also increases. The other reason could be a large young expat population working in the low paid jobs and older population represents different ethnic population (local origin) with high income, education and more resources.

Nationality, education and monthly income are the other important factors that influence consumer's WTP for organic food positively and significantly. Education and monthly income has often been sighted as the important factors to influence WTP but nationality, in our findings, is a new variable that turn out to influence consumers' WTP for organic food. As mentioned earlier, this implies that people from Emirates origin are more willing to pay for organic food than non-emirates and the reasons are clear; the immigrants are usually low paid workers and lack the necessary knowledge and resources to consume organic food.

Household size is usually reported as having negative influence on consumers' WTP for organic food, as feeding more people out of limited resources becomes increasingly difficult. But our findings reveals the polar opposite case, i.e. larger is the household size-the more is their WTP for organic food. The obvious reason for such finding is that majority of Emirates population

have traditionally a large household size and more resources compared to others. The results will help organic industry to identify and target certain population segments that are willing to pay for the organic food products. The finding will play a vital role in promoting organic food in UAE.

Conclusions and Recommendations

Conventional farming, to a greater degree, achieved the goals of providing food for the majority but at the cost of damaging the environment and human health. Organic farming, on the other hand, is environment and human friendly farming which avoids the use of synthetic chemicals and other residues considered harmful for the human planet. However, organic farming and organic food is a relatively new phenomenon and very few people around the world are aware of its beneficial impacts on the environment and human health. Besides, organic food is relatively expensive as compared to conventionally produced food and hence WTP for the two types of food differs amongst individuals. In order to encourage organic farming and the production of organic food, market for the organic food will have to be established so that organic farmers gets an outlet for their products. But the establishment of a market for organic food depends on knowing what factors influence consumers' awareness and their WTP for organic food. Once such factors are ascertained, then the farmers will be better equipped to market their organic products. The current study is an attempt to achieve these two objectives for those who want to market their organic food products in the United Arab Emirates.

The study utilizes sample data and contemporary econometric techniques to investigate factors that influence WTP for organic food. Our findings regarding consumers' WTP for organic food imply that aged people from emirates origin having more education and income are willing to pay a price premium for organic food products. The results will help organic food industry in UAE to understand and identify factors that are affecting consumers WTPs. These results will provide key information to organic food industry that will help to promote organic food markets in the UAE.

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A New World Industry Initiative in an Old World Market: The Economics of California Olive Oil Quality Standards

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Abstract

The United States is increasing its share in global production of olive oil along with other "New World" producers. Recently, the state of California, where most of the olive oil in the US is produced, approved new regulations governing the grades of olive oil, labeling, methods of testing and traceability standards. This research report evaluates the potential costs of compliance with the new regulations and analyzes their economic impact on marketing of olive oil. The results indicate that if the compliance costs are passed on to the consumer, it may result in the decline of olive oil sales by less than one percent.

Keywords: olive oil regulations, compliance costs, grades and standards

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Introduction

The global consumption of olive oil began to increase in the 1990s beyond the traditional European markets as consumers worldwide became more aware of the nutritional and health benefits of olive oil. Though the EU still produces 75 percent of the World's olive oil, an increasing share is accounted for by so-called "New World" producing countries, specifically the United States, Australia, Argentina, and Chile (see Table 1). On the consumption side, the EU is the largest consumer followed by the US, which is also the biggest importer of olive oil whose imports constitute about 37 percent of the world imports in 2013 (See Figure 1 and 2). The US domestic olive oil production meets less than 2 percent of the domestic demand. But, the production of olive oil has grown substantially in the United States over the past decade, and total olive plantings have risen as well, driven by new super high-density groves intended for production of olive oil (Warnert 2011). While olive trees can be grown in the warmer parts of the United States, and an estimated 99 percent of total U.S. olive oil production presently comes from California, mostly the state's Central Valley.

The California Department of Food and Agriculture (CDFA) has recently approved new standards on the labeling, grading and testing of olive oil in California (Pierson, 2014). For a long time, as there was no regulatory enforcement of grading standards in the U.S. market, there existed a financial incentive to misrepresent lower-priced, lower-grade olive oils as higher grade ones. Added to that, the lack of proper definitions for various grades of olive oils and lack of a list of acceptable testing methods and proper traceability guidelines led to the situation where consumers have difficulty making informed choices. The new regulations are designed to improve the competitiveness of olive oil produced in California by ensuring the quality of the olive oil produced locally. This study evaluates the potential costs of compliance with the new standards on growers and handlers along with the potential effects on sales of California olive oil of any associated retail price increase. The analysis presented is based on a preliminary assessment drawn from ongoing research at the Center for Agricultural Business, Fresno.

New Olive Oil Regulations Approved by California

The new olive oil standards only apply to California handlers of olives that are processed into olive oils, refined-olive oils and olive-pomace oils in the amount of 5,000 gallons or more during a given period (CDFA, 2014). Olive oils will be graded based a set of quality parameters and limits established for each parameter. Some of the standards like the benchmark for free fatty acidity in extra virgin olive oil are much stricter than the international standards. The stricter standards are supposed to provide advantages to olive oil produced in California as it is considered to be of superior quality than imported olive oils.

The new regulations also include a list of prohibited food additives that cannot be mixed with olive oils. Along with these, the new regulations specify the acceptable methods that can be used to determine the characteristics of olive oils, refined olive oils and olive pomace oils. The new regulations also prohibit the usage of terms like "Pure", "Lite", "Extra Lite", among other terms on the labels. A list of acceptable grade designations has been provided in the new regulations. The new labeling standards also include specifications about how producers may voluntarily provide additional information regarding the year of harvest, varietal names, shelf life, extraction

process, etc. The new labels will also have the lot number clearly specified which provides traceability related information to the handlers.

The new regulations and standards are put in place to ensure the quality of oil produced from olives in California, enhance the continued growth of olive oil production through greater consumer and trade confidence in the consistent, high quality of California olive oils, and provide the producers, handlers, buyers and consumers of California oil with reliable and trustworthy information concerning the quality and grade of the product (CDFA 2014).

Methodology

This study addresses the estimated costs to producers to comply with the new regulations and the potential effect of those costs on the marketing of California olive oil. The study also analyzes the potential effects on sales of California olive oil of any associated retail price increase. The analysis has been performed making some assumptions based upon the information provided by the University of California Cooperative Extension's report on sample costs for production of bottled olive oil in the north and central coasts of California for 2011 (Vossen et al. 2011). In this example we assume that a typical olive oil farm will produce on average about 1211 bottles (375 ml) per acre (based on a yield of 3 tons/acre of olives and 40 gallons of oil per ton of olives). Given a producer's price of $7.50 per bottle, the revenue per acre is calculated to be approximately $9082.

The impact of the associated cost of compliance is dependent on where in the value chain the additional cost is absorbed. If the increased costs are passed on to the producer in the form of a lower price for their olives the results are declining producer revenues per acre. If the increased costs were passed on to the consumer as increased prices, the impact would presumably be observed in the change in sales of California olive oil. In this study we use established estimates of price elasticity of demand to determine the potential impact of a cost of compliance transfer in the form of an increased retail price. Results of a previous study of the price transmission of regulatory costs increases suggest that some combination of producer and consumer price adjustment occurs (Yoram, Sunding and Berkman 2007). Any effects resulting from the cost to comply with the new standards would be likely be shared between the two sectors.

Results and Discussion

Industry sources indicate the compliance costs for new regulations will be 10-13 cents per 375 ml bottle of olive oil. Assuming average production and the midpoint of the industry estimated costs of compliance the additional costs would amount to $145 per acre (about 1.6% of the projected revenue per acre). Given a retail price of a bottle of 375 ml olive oil of $10, the cost of compliance would be equivalent to approximately 1.2% of the retail price.

Price elasticity of demand for olive oil is calculated as 0.257 (Xiong, Sumner and Matthews 2014), consistent with the assumption that olive oil consumption is less sensitive to price changes compared to general cooking oil in the US whose price elasticity of demand is about 0.5 (Yen, Kan and Su, 2002). Applying the price elasticity of demand for olive oil and the estimated

1.2 percent increase in retail price due to compliance costs, it is expected that the quantity of sales may decline by less than half a percent (0.31 percent).

As our analysis estimates that the impact of new regulations on olive oil sales is expected to be minimal, we will monitor sales of olive oil following the implementation of the new regulations to determine if the marketability of California produced olive oil improves, reflecting success in distinguishing itself from imported olive oils.

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Exploiting Economic Potential for Goat Production: A Case for Missouri and Arkansas

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Abstract

Goat production, is one of the fastest growing agricultural production systems in the U.S. This growth has created opportunities for producers, especially the small-scale farmers looking for a profitable alternative enterprise to integrate into their existing production systems, particularly in Missouri and Arkansas. Although the U.S. is not one of the primary producers of goat meat or goat products, it still stands to gain from exploring opportunities of this growing industry.

Keywords: Enterprise choice, production potential, meat goats, milk goats, enterprise choice

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Background

Unlike other livestock enterprises (dairy and beef cattle) with well-functioning production and marketing support, such functional structures are largely nonexistent for the goat industry. In the U.S., goat production ranges from a high to low input system. While a low input system in the dry, Southern and Western states, goat production can be a high input system in the Midwest, Southeast, and Northern states due to differences in weather, forages, and established fencing. Yet still, goat production has great potential to contribute to farmer income diversification as well as expand local food choices. Some attributes making goat production a viable start-up option for producers are relatively inexpensive animals when compared to cattle. In general, goats require less land than cattle, as six goats can be sustained by the same amount of area needed to sustain one cow. Goats can also be raised on land not suitable to cattle in that they can do well on browse and forbs that are generally not consumed by cattle. In the dry western areas of the country, they do not need expensive structures like barns to thrive (Okpebholo and Kahan 2007, Solaiman 2010).

With limited acreage, goats could be raised to produce a host of products including fiber, milk, or meat products (Stanton 2004). Goats are also valued for religious ceremonies, for companionship, and for use in controlling brush and other unwanted vegetation (Singh-Knights et al. 2005).

Goat production opportunity is boosted by the ever expanding market for goat meat, particularly among new immigrants, religious groups, and the rapidly expanding Hispanic population, who consume goat meat as a regular part of their diet. Additionally, American consumers are increasing their consumption of goat meat as a result of their exposure to ethnic foods and the low-fat health aspects of goat meat. Interestingly goat milk offers unique nutritional and biochemical properties that allow it to be consumed by those with cow milk allergies and gastrointestinal disorders (USDA, APHIS 2012). Goats do offer a variety of products; goat meat can be processed and sold, goat milk can be marketed, and milk by-products such as cheeses, lotions, and soaps can be also sold.

Study Objectives

There is a dearth of studies and data relating to goat production and marketing nationwide as well as at state levels including Missouri and Arkansas. The first and maybe the only comprehensive study of the U.S. goat industry was conducted by the USDA's National Animal Health Monitoring System in 2009. Study findings show that the majority of U.S. operations with 10 or more goats are raised goats for meat production with lower percentages raising goats for milk or fiber (USDA 2009). NASS data shows that the most recent inventory for 2013 and 2014 to be 82.36 (total=2,811,000 & meat goats=2,315,000) and 82.40 (2,761,000 & 2,275,000), respectively. A recent study by Qushim, Gillespie, and McMillin (2014) using a nationwide mail survey of U.S. meat goat producers basically focusing on cost and returns of goat farms. The study examined productivity and efficiency of U.S meat goat farms. Our study objective is to examine factors driving Missouri and Arkansas goat enterprise choices in an attempt to broaden the economic rationale for goat production premised on profit motivation. The study uses survey data from Missouri and Arkansas States collected in 2013.

Results

Study results show differential impacts of independent variables on the three enterprises (dairy, goat and mixed). For example, along state lines, it is more likely to find famers in Arkansas selecting dairy goat enterprise than those in Missouri. Dairy goat producers are likely to be young (under 40 years) and those in mid-age (40 to 50 age bracket). However, those more likely to prefer meat goat or mixed goat enterprises are predominantly in mid-age (40-50 years). For reasons not clear, the results also suggest that meat goat famers paid higher prices for stocking compared to dairy or mixed goat enterprises. Raising goats driven primarily for home consumption was a more relevant factor for dairy goat than meat goat producers. In contrast, the results suggest that meat goats are largely raised for market.

The results show that a successful dairy goat operation may require a herd size larger than 20 goats, whereas meat goat farming requires a smaller herd size. Experience was more important in dairy goat production than it was for meat or mixed goat enterprises. One needs to have more than five years of experience to do well with dairy goats. The results additionally suggest that meat goat farmers are more constrained by marketing and time. Preferably, meat goat farmers opt for natural breeding compared to other approaches.

Future Research Directions

Given the scope of the survey data used, not all economic aspects about goat production and competing enterprises are included in this study. Future studies should incorporate profitability indicators across enterprises, including major crops and other livestock to allow more powerful analysis.

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Consumer Testing for the Local Food Start-Up

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Abstract

Consumer tests are utilized by medium and large food companies to evaluate new products or test new product formulations on potential buyers. The typical objective is to examine various sensory attributes for liking and to examine whether adjustable product attributes such as saltiness, sweetness and texture are "Just About Right" or need reformulation, but packaging, message, and purchase intent questions can be incorporated or emphasized to evaluate the market. These pieces of information may help a company market its product to retailers or distributors by proof of liking or willingness to purchase. However, though this information is perhaps needed even more by those interested in starting-up a food company. A consumer test could help avoid serious losses in launching a product that consumers either don't like sufficiently or which will require a price which consumers aren't willing to pay. A consumer test can also help discover if small adjustments in formulation are needed. Properly executed such a study can also provide evidence to start marketing to retailers or look for financing. Unfortunately the costs of a professionally executed test can be prohibitive.

Conducting a professional consumer test starts at around $10,000 when panelist payments, facility rental, and the professional sensory staff time to prepare the survey, recruit the panelists, run the test, and analyze and report on the data collected are included. Large, well established companies don't have a problem paying for this type of research and many run consumer tests regularly for new products or reformulations, but generally entrepreneurs are unable to do so.

A self-executed consumer test protocol for food entrepreneurs has been designed and is undergoing testing in Portland, Oregon. The key elements of the protocol are a template and instructions for development and execution of a survey, and a spreadsheet which automatically produces useful tables and charts from the survey data. The protocol was developed to allow entrepreneurs to evaluate their product and its market potential on a small, local scale.

The survey template begins with standard consumer test questions assessing concept and liking and evaluating sensory attributes, how they would utilize the product (check all that apply and fill-in), and if desired, open-ended likes and dislikes. The second page begins with set of priced purchase intent questions. A price range (six prices) is listed and consumers are asked to indicate their willingness to pay for the product at each price. The results for these purchase intent questions can be used to produce a pseudo-demand curve of the proportion of the consumers surveyed willing-to-buy the product at each price. This question has been effective and fairly accurately answered. These are followed with a check all that apply question on production and ingredient preferences relevant to the product (for example attributes such as organic and gluten-free). The next question asks about the quantity they would buy per year at a specific price. This provides a means by which to project a total annual demand if combined with information on where the product would be offered. Finally, there are demographic questions (age, gender, income, education). Together these questions can provide entrepreneurs with crucial information about their product or their market niche.

The survey protocol has been beta-tested at a craft market and three farmers markets with four different products. These beta testers all have recently started their small, local business with limited funds. Three have sold their products in farmers markets and at a small number of local retailers. One was still in product formulation stage.

While entrepreneurs can discover a great deal of information from such tests, there are some lessons to be learned from the beta testing. One is that it is difficult for entrepreneurs not to market their products by providing consumers with information, beyond what was contained on the package. The goal is to replicate a point of purchase scenario, not a trade show display to buyers. Thus the entrepreneurial spirit may reduce the accuracy of the consumer test. One of the entrepreneurs (the only one who was selling the product at the same time) gave out samples without asking the consumer to fill out the survey first-which both reduced the consumers desire to take the consumer tests, and interfered somewhat with evaluation of the concept. On the other hand sometimes team members are not bold enough to ask people to take the survey. Finally, we find that the connection to a regional university seems to be important. This is particularly true in getting permission to conduct a test, and signs announcing the university's involvement in the consumer test helps in getting consumers to take the survey. These factors may indicate that the involvement of cooperative extension will be critical to the success of this protocol for the start-up that does not yet have a retail buyer or location already established. Further beta tests are expected to take place at a grocery store and at a restaurant. The protocol is expected to completed and available at the end of 2015.

Acknowledgement

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Keywords: consumer test, sensory, purchase intent, start-up, local food.

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Disentangling Teamwork Dynamics: All Work for One or One Teaches All

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Abstract

Teamwork is a key component of an active learning strategy. Peer collaboration through teams may enhance the formation of social support and social learning. Whereas the classic case of "freeriding" involves one team member doing the work for the others, the "ideal" group dynamic allows for the acquisition of knowledge via a so-called "ripple effect." This effect signifies that one group member may rise to the position of "team leader", who is in charge of the other group members' work. In particular, many agribusiness service-learning classes include a variety of students from different majors. Working in a team of non-major students, an agribusiness major may have a knowledge advantage and the opportunity for the technical subject matter to ripple-off and enhance the knowledge of other team members.

Our study determines the "ripple effect" of teamwork on an individual team member's knowledge in the context of food marketing and distribution. We constructed a survey to assess the student's individual information literacy abilities at both the beginning and end of the term in an introductory undergraduate agribusiness marketing course. To compare the group effect on students' knowledge improvements, a final marketing term project was used as the vehicle to assess and teach information literacy. The ripple effect of group engagement was isolated based on student's pre and post scores, student's demographics, and project scores. Student groups were isolated as targets when they had low average scores on the pre-survey, high ranges in individual competencies (high min-max ranges), high standard deviations, and high change between pre and post scores.

Results show a positive relationship between teams with the widest dispersion in knowledge (pre-score standard deviation) and the team's scores on the post evaluation (p=.001). Teams with low standard deviations on the pre-test scored 66% on the post evaluation, while teams with high standard deviations on the pre-test scored 75% on the post evaluation (p=.008). Consistent with that finding, teams with the highest range in pre-scores, experienced the largest change in scores between the evaluations (p=.043). As expected, teams with low initial scores attribute the most

value to course assignments. This research provides a base for discussion regarding the role of teamwork and the composition of the ideal team. This research will fill a gap in the literature on fitting student improvements to differences in the students themselves, which has broad implications for motivating and educating students about food marketing and food distribution.

Keywords: teaching, teamwork, agribusiness, active learning

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Brand Affiliation in Promoting Locally Produced Food: A Case of University Promoted Beef

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Abstract

Many universities are now marketing agricultural products including beef and dairy. The objective of the study was to examine the role of university brand affiliation in promoting locally produced food, particularly grass-fed beef. It is expected that other local producers will use the results to make informed decisions in marketing their products. The study used the data collected from a survey among Missouri State University alumni and general shoppers. Preliminary results from the analysis show that university alumni were statistically different from other shoppers in willingness to pay more for university produced beef.

Keywords: product attributes, brand affiliation, Willingness-to-Pay

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Introduction

Many universities are now selling agricultural products such as beef (e.g., Washington State University), dairy (e.g., Cornell) and jerky (e.g., Texas A&M) to students and alumni. One of the reasons behind the success of such brand affiliation could be the vast number of students enrolled in the universities, and thousands more alumni who would value the brand (Johnson 2013). Alumni, in particular, who identify with their schools tend to purchase larger quantities of university-branded goods. (Washburn 2004) However, how effective is college brand affiliation in selling agricultural products produced by the universities themselves and those by local producers? A good fit between product and brands – as seen from the eye of the consumer – is important to the success of a co-branded product. (Helmig 2007) Can we successfully replicate the success of brand affiliation in agricultural products? Will the "university steak go with that sweatshirt?" (Johnson 2013).

Research Objectives

The main objective of the study is to examine the role of university brand affiliation in promoting locally produced food, particularly grass-fed beef. Specifically, the study will examine: 1) factors affecting the purchase decisions of locally produced beef; 2) willingness to buy locally produced (university produced) beef; 3) willingness-to-pay premium price for locally produced (university produced) beef 3) and 4) perceived attitude toward locally produced food.

Materials and Method

The study used data from consumer surveys developed and implemented in 2013 to collect information on consumers' purchasing practices for locally produced food products. Two sets of surveys were undertaken. The first was among grocery shoppers at local stores and markets in a medium size metropolitan city in the Midwest. A total of 203 randomly selected shoppers at various stores completed the survey. The second was among the alumni of a regional university with a student population of more than 22,000. The survey was completed online by 141 alumni of Darr School of Agriculture at Missouri State University. Statistical differences between the two groups on the basis of socio demographic characteristics and meat purchase pattern are depicted in Table 1 (see Appendix).

A comparative analysis was conducted to highlight key differences between these two types of consumers. Probit models were estimated to examine the impacts of product attributes and socio-demographic variables on willingness to buy and willingness to pay for university produced beef products.

Results

Preliminary results from the analysis show that alumni were statistically different from other shoppers in willingness to pay more for university produced beef. More than 70% of the alumni were willing to pay more for locally produced MSU beef. Only 60% of the other shoppers were willing to pay more for locally produced MSU beef.

There were significant differences in the value placed on product attributes. Alumni placed a higher value on previous experience with a product than other shoppers. Attributes such as brand

name, leanness, antibiotics free and a grass-based diet were not as important to alumni as they were to general shoppers.

The variable with the largest positive effect on willingness to pay was the "natural" factor, which included attributes such as grass-fed, source verified, antibiotics free and hormone free, with the "confidence" factor following closely behind. "Confidence" represented guaranteed satisfaction and tenderness, and also previous experience with using the products.

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Appendix

Table 1. Socio-demographic and beef consumption

Characteristic	University Alumni	Other Shoppers
Gender (Female)***	31%	65%
Education***	College Degree	Some College and Associate Degree
Age*	50 years	40 years
Household with Children***	81%	60%
Household Income***	$75,000	$40,000
Ethnicity	Caucasian/White	Caucasian/White
Beef Consumption**	More than once a week	Once a week
Purchase from custom processor (1=Never; 2=once a year; 3=every six months; 4= once a month, 5=once a week)***	1.85	1.47
Purchase of ground beef (1=Never; 2=rarely; 3=once a month; 4= every 2-3 weeks, 5=once a week or more)***	2.91	2.77

Note. ***=less than 1%; **=less than 5%, *=less than 10% significance level

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Integration of Local Food Programs in Salt Lake County to Benefit Prisoners, Juvenile Delinquents and Meals on Wheels Clients

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Abstract

Horticulture Extension faculty in Salt Lake County was presented a challenge in spring of 2014 to identify sources of local produce to benefit homebound Meals on Wheels clients through the newly developed Meals Plus Program (MPP). Although the delivery of produce to clients was not a problem since the Salt Lake County Meals on Wheels Program regularly distributed cooked meals to approximately 1,500 clients in 2014, the budget for the MPP did not include money to purchase produce from a local grocer or farmer. USU Extension horticulture faculty was tasked with sourcing local produce through community partnerships; three partnerships were developed in 2014 to supply approximately 130 seniors with weekly shares of fresh produce.

Keywords: local produce, food assistance program

Participating Partners

USU Extension utilized Master Gardener volunteers to plant, harvest and maintain the one-quarter acre Meals Plus Harvest Garden located at a popular Salt Lake County park. The Meals Plus Harvest Garden, situated adjacent to a popular weekend farmers' market, provided an opportunity to advertise the MPP to the public through signage and provided an opportunity for the public to volunteer with the program through Master Gardener led volunteer workdays.

The Salt Lake County Jail Horticulture Program was the second local food program to donate to the MPP in 2014. The Jail Horticulture Program is a partnership between the Salt Lake County Jail and USU Extension. Participating prisoners grow produce on a 1.5 acre garden and sell as a vendor at the downtown farmers' market. In 2014, the MPP received excess produce from the Jail Horticulture Program.

The Green Urban Lunchbox was the third participating partner in 2014. This not-for-profit program works with the SLCgreen's Fruit Share Program to maintain and harvest registered fruit trees around Salt Lake City. One goal of the SLCgreen's Fruit Share Program is to provide fresh fruit to local food-assistance programs; hence, a partnership with MPP was a natural fit.

Program Growth in 2015

One additional producer has committed to contribute produce in 2015. Bell Organic, a local community supported agriculture producer, has committed to work with Genesis Youth Center to provide residents with court-ordered community service hours the opportunity to work on an urban farm. In exchange work hours, Bell Organic will donate produce to the MPP in 2015.

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Overview and Economic Impact of the Mississippi Blueberry Industry

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Abstract

U.S. per capita consumption of blueberries has risen in the past decade, fueled in part by the industry's efforts to promote the health benefits associated with blueberry consumption. As a response to increased consumer demand, blueberry acreage in Mississippi has significantly increased, from about 80 acres in 1981 to 2,700 acres in 2012. Production in the state consists mainly of Rabbiteye or Southern Highbush varieties, 50% of which is sold wholesale through marketing cooperatives (MDAC 2013). This study estimates the economic impact of this industry on Mississippi's agricultural economy.

Keywords: impact analysis, economic multipliers, IMPLAN

Methodology

Economic impacts of the Mississippi blueberry industry were estimated using statistical data available from USDA-ERS (2013) and USDA-NASS (2014) on the value of production for 2012. IMPLAN® was used to derive the economic multipliers that capture the secondary impacts of intermediate purchases by blueberry firms on other economic sectors (indirect effects) and on household consumer spending by individuals employed by the blueberry industry (induced effects), in addition to direct impacts for output/sales, labor income (wages and salaries), employment, value-added (the residual value of a sector's output after it pays for its inputs), and taxes paid. Impact estimates for 2012 are expressed in 2014 dollars using the GDP Implicit Price Deflator to account for inflation.

Results

Economic impacts of the Mississippi blueberry industry in 2012 were estimated at $39.02 million in output, $23.70 million in labor income, 320 jobs, and $22.10 million in value-added (Table 1). Output by the Mississippi blueberry industry totaled $15.55 million in 2012. Adding this to indirect and induced effects resulted in a total impact of $39.02 million. This estimate does not include the economic impact of taxes paid by producers, workers, and input suppliers in the industry. Blueberry industry workers within Mississippi earned a total of $15.12 million in wages and salaries from production and sales of blueberries. Combining this with secondary impacts, which totaled $8.58 million, resulted in a total labor income impact of $23.70 million. More than 63% of this total labor income effect was from the wages and salaries earned at the producer level throughout the state. The industry also employed 92 people directly to produce its output, while intermediate purchases and household consumer spending supported the employment of an additional 229 individuals. Finally, direct value-added impacts were estimated at $8.65 million, which combined with $13.45 million in secondary impacts, resulted in a total value-added impact of $22.10 million.

Table 1. Total Economic Impact of the Mississippi Blueberry Industry, 2012

Impact Type	Output ($ million)	Labor Income ($ million)	Employment (jobs)	Value Added ($ million)
Direct Effect	15.55	15.12	92	8.65
Indirect Effect	5.87	2.09	69	2.79
Induced Effect	17.60	6.49	160	10.66
Total Effect	39.02	23.70	320	22.10
Multiplier	2.51	1.57	3.50	2.56

The total economic impact of the Mississippi blueberry industry extends beyond its initial output/sales, labor income, employment, and value-added values. These activities create income for state workers and taxes for local, state, and federal governments, which also create secondary impacts in the form of indirect and induced effects. The total effect of taxes paid to state/local and federal governments was estimated at $3.75 million. Overall, the economic impact of the blueberry industry to Mississippi's economy is significant as reflected in the measures of economic activity described.

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