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Abstracts

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Does Instruction Enhance Students' Knowledge of Nutrition Facts?

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Abstract

Pretest and posttest results suggest that statistically significant differences exist between students' performance on two nutritional quizzes. The findings also indicate that scores are higher on the posttest for students' knowledge about the percent daily values for the selected nutrients. Overall, female students outperform male students on both tests. From the results, nutritional instruction is an effective tool to enhance students' knowledge of the Nutrition Facts labels.

Keywords: percent daily values, Nutrition Facts, students, McNemar Test, nutrition education

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Introduction

Nutritional Facts labels first appeared on processed food products in the United States in May 1994. The new food labels were standardized and displayed information on serving size, number of servings, calories, calories from fat, total fat, saturated fat, cholesterol, sodium, total carbohydrates, dietary fiber, sugars, and protein among others. Percent daily values (% DVs) for selected nutrients are displayed on the labels and are based on a 2000-calorie per day diet. The intent is to give consumers easier access to nutritional information at points of purchase to improve their diets and in so doing combat rising healthcare costs resulting from the rapid increases in overweight and obesity rates ((Ollberding, Wolf, and Contento 2010).). Ironically, almost 20 years after implementation of the standardized labels, overweight and obesity rates and costs for treating diet-related illnesses have skyrocketed. These realities led Ollberding and colleagues (2010) to argue that label use alone could not adequately modify behavior to effect changes in health status. Thus, research continues to find answers to the current dilemma of Americans having easy access to nutritional information and yet they continue to gain weight.

Four years after implementation, Levy and Fein (1998) argued that labels provided a wealth of nutrition information, informed consumers about the nutritional characteristics of foods, and were easily accessible to consumers wanting to adopt healthy eating habits. However, they warned that food labels could only be useful if the nutritional information they conveyed were easy to understand. They praised the architects of the Nutrition Facts for using percentages to convey nutrient values rather than absolute amounts and, thereby, eliminate the need for consumers to conduct rigorous mathematical or computational analyses when comparing nutrients. With the need for quantitative analyses reduced, consumers can simply compare %DVs of the nutrients in the foods they are buying and can ignore how the nutrients are measured. Levy and Fein (1998) also suggested that nutritional education should focus on teaching consumers how to improve their diets using easy tasks such as comparing food products or determining whether a food was high or low in a particular nutrient.

Grimes, Riddell, and Nowson (2009) noted that use has improved diet quality, reduced energy intake, and increased fruit and vegetable consumption and other health-related activities. However, use is not widespread across all ethnic groups and targeted nutrition education is still warranted. These researchers postulated that consumers had a basic understanding of the links between high salt intake and high blood pressure, but were confounded by the relationship between salt and sodium. And because sodium rather than salt is listed on food labels, many consumers could not make an easy transition from sodium to salt if they wanted to buy low-salt food items. They recommended more user-friendliness regarding sodium and salt in future food labeling and educational endeavors to help shoppers to accurately choose low-salt food items.

Stran and Knol (2013) indicated that nutrition educational efforts should separate men from women because the factors which determined usage were different. From their findings, frequent label users were more likely to be women, older adults, Caucasians, from higher-income households, or to have had healthier diets. Respondents who were not concerned about health and weight used labels at lower rates than their corresponding counterparts. Hawthorne and colleagues (2006) also inferred from their study that educational programs are effective in teaching young adults how to use Nutritional Facts labels to make healthier food choices.

Colleges and universities are excellence avenues for promoting health and well-being of young adults. However, researchers are often alarmed by the high percentages of students who are overweight or obese (Feldman, Harwell, and Brusca, 2013) and suggested the need for research targeting this segment of the population. Misra (2007) opined that young adults' attitudes, knowledge, and levels of label use must also be studied. This view was also supported by Sharf, et al. (2012) whose findings showed that young adults' perceptions of their knowledge of food labeling information was contrary to their test scores. Thus, they concluded that food labels alone were insufficient in increasing nutrition knowledge, necessitating the need for more targeted education programs.

We concur with the view that young adults need greater nutritional education, and our study selects a cross-section of university students or young adults to receive such information. The study is timely because of the rising numbers of university students who are overweight or obese at the national and state levels. Thus, students need access to nutritional information especially in a classroom setting so they can have better tools to make healthier food choices.

Objectives

The study's main objective is to document the level of nutritional knowledge among a cross-section of university students. The specific objectives are to (a) examine students' knowledge of the Nutrition Facts on % DVs for total fat, saturated fat, cholesterol, calcium, sodium, potassium, dietary fiber, and carbohydrate; (b) determine the role of gender in knowledge; and (c) assess the effectiveness of formal instruction in enhancing nutritional knowledge.

Data and Procedures

Data

The study's data were compiled from a sample of 305 university students during fall 2011 and spring 2012. The questionnaire captured students' knowledge of the information on Nutrition Facts panels, knowledge about vitamins, frequency of reading labels, frequency of consuming fresh fruits and vegetables, perceptions of health and weight, levels of physical activity, and selected demographics characteristics (age, academic classifications, majors, hometown, residency, marital status, race, and gender). A nutritional quiz was first given to all participants, and then 133 students in the biology courses were taught how to read and interpret the information on the Nutrition Facts labels. A follow-up quiz was given to determine the effectiveness of nutritional instruction they received.

Test Statistics

The chi-square test for independence between two categorical variables and the McNemar's test for paired proportions are used to analyze the data. The McNemar test is appropriate because data from the pretest and posttest scores are related. Further, it acts like a paired version of the chi-square test and is used here to analyze whether the proportion of correct scores on the two

quizzes are the same for each micronutrient studied. In other words, it is used to measure the effectiveness of the nutritional education strategy.

Empirical Results and Discussion

Descriptive Statistics

The average age of the participants in the full sample was 23 years old; freshmen comprised 21 percent of the respondents, sophomores, 34 percent, juniors, 28 percent, and seniors, 17 percent; 37 percent lived on campus; 71 percent were women, while 87 percent had never been married. The average score for all students was 55 percent. The pretest score for students enrolled in the introductory biology courses was 53 and the posttest score was 62 percent.

Chi-Square Tests for Independence

Table 1 shows the overall performance on the pretest by all participants, performance by gender, and corresponding chi-square and p-values. From the results, participants' knowledge of % DVs for the selected nutrients is very low. Although there are marginal differences in knowledge levels between male and female students on questions related to the % DVs for total fat, cholesterol, and carbohydrate, the overall performance is less than desirable. Similar observations are appropriate for students enrolled in the introductory biology courses. Gender differences exist between performance levels for knowledge on cholesterol, fiber, and carbohydrate, but not for total and saturated fats, calcium, sodium, and potassium (Table 2). The finding for total and saturated fats is somewhat disconcerting because these two micronutrients are often found in high levels in many of the food products students regularly consume, and are often singled out as some of the main drivers of the overweight and obesity epidemic at the state and national levels.

Table 1. Performance on Pretest Quiz for All Participants

Nutrition Facts	Percent Correct Total	Percent Correct Males	Percent Correct Females	Chi-Square Values	P-Values
100% DV Total Fat	14	19	12	3.206*	0.073
100% DV Saturated Fat	39	41	38	0.257	0.612
100% DV Cholesterol	34	43	30	4.898**	0.027
100% DV Calcium	49	52	48	0.579	0.447
100% DV Sodium	10	9	11	0.156	0.693
100% DV Potassium	59	57	60	0.247	0.619
100% DV Dietary Fiber	12	8	13	1.760	0.185
100% DV Carbohydrate	37	27	42	5.395**	0.020

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

After instruction scores on the posttest increased for all the selected questions on % DVs (Table 3). Knowledge of total fat and dietary fiber remained below 50 percent; however, the other categories increased for male and female students, with females scoring higher. The results in Table 3 also suggest that students' performance on the questions for saturated fat, cholesterol,

sodium, and potassium are statistically significantly associated with gender. In the case of the recommendations for saturated fat and sodium, females outscored males by a margin of more than 20-percentage points. Performance on questions related to total fat, calcium, dietary fiber, and carbohydrate is invariant to gender.

Table 2. Pretest Performance by Students in Biology Courses

Nutrition Facts	Percent Correct Total	Percent Correct Males	Percent Correct Females	Chi-Square Values	P-Values
100% DV Total Fat	20	22	18	0.306	0.580
100% DV Saturated Fat	29	24	33	1.096	0.295
100% DV Cholesterol	31	40	25	3.161*	0.075
100% DV Calcium	46	52	42	1.215	0.270
100% DV Sodium	11	12	11	0.042	0.838
100% DV Potassium	56	54	57	0.087	0.768
100% DV Dietary Fiber	12	6	16	2.753*	0.097
100% DV Carbohydrate	40	30	46	3.243*	0.072

(*) implies statistical significance at the 10% level of probability.

Table 3. Posttest Performance by Students in Biology Courses

Nutrition Facts	Percent Correct Total	Percent Correct Males	Percent Correct Females	Chi-Square Values	P-Values
100% DV Total Fat	33	34	33	0.030	0.861
100% DV Saturated Fat	59	42	68	9.155***	0.002
100% DV Cholesterol	66	54	74	5.297**	0.021
100% DV Calcium	69	66	71	0.378	0.539
100% DV Sodium	59	44	68	7.087***	0.008
100% DV Potassium	77	68	82	3.386*	0.066
100% DV Dietary Fiber	47	42	49	0.686	0.407
100% DV Carbohydrate	63	58	66	0.916	0.339

(*), (**), and (***) imply statistical significance at the 10, 5 and 1% levels of probability, respectively.

McNemar Tests for Paired Proportions

Table 4 shows comparisons between pretest and posttest scores for students in the introductory biology courses. The uncorrected chi-square values for differences between paired proportions are all statistically significant at the one percent level of probability or better. Thus, the null hypotheses that scores are the same for both tests are rejected. The rejection of the null hypotheses implies that students performed better after formal instruction on how to read and interpret information on % DVs. Thus, instruction is an effective tool to enhance students' knowledge of Nutrition Facts labels.

Table 4. Comparisons Between Pretest and Posttests Scores in Biology Courses

Nutrition Facts	Percent Correct Pretest	Percent Correct Posttest	Chi-square Values	P-Values
100% DV Total Fat	20	33	5.400**	0.028
100% DV Saturated Fat	29	59	18.778***	0.000
100% DV Cholesterol	31	66	32.970***	0.000
100% DV Calcium	46	69	13.928***	0.000
100% DV Sodium	11	59	54.370***	0.000
100% DV Potassium	56	77	12.645***	0.001
100% DV Dietary Fiber	12	47	25.830***	0.000
100% DV Carbohydrate	40	63	13.535***	0.000

(**) and (***) imply statistical significance at the 5 and 1% levels of probability, respectively.

Summary and Conclusions

The study's objectives were to examine students' knowledge of the recommendations for % DVs for selected micronutrients from the Nutrition Facts labels; determine the role of gender in knowledge, and to assess the effectiveness of instruction in enhancing nutritional knowledge. The results suggested that students knew very little about the information on the Nutritional Facts labels, that gender played a role in knowledge, and that instruction was an effective tool in enhancing students' nutritional knowledge. Despite these successes, our efforts must continue because knowledge of total fat and dietary fiber remained low, and male students underperformed in all categories. Lowering daily fat intake and increasing daily intake of fiber through increased consumption of fresh fruits and vegetables and whole grains are effective tools to combat rising overweight and obesity rates. Our findings also suggest that incorporating practical nutritional information in introductory biology courses is effective in reaching greater numbers of students beyond those enrolled in nutrition-based courses.

Given the budgetary challenges at the state level, Louisiana residents must become more proactive in improving their eating habits. Many college students are ill-equipped to make healthy food choices because oftentimes it is the adults in the family who make the food purchasing decisions. Left to their devices in college, it is easy for students to adopt unhealthy eating habits from the environment. Thus, learning how to read and use food labeling information to make healthier food choices are excellent first steps to lower healthcare costs and reduce diet-related diseases. State universities can play a vital role in this effort by teaching students in the mandatory introductory biology courses how to read and use food labeling information to make healthier food choices.

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Gabon: A Guide to Improving the Coastal and Inland Fishery Industries

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Abstract

Improving the coastal and inland fisheries sectors in Gabon will promote economic growth, economic diversification, job creation, food security, healthier diets amongst the population, educational initiatives, and combat gender bias. However, improvements will require additional investment funding. The country currently depends primarily on profits from the oil industry, but it is looking for ways to diversify into other industries. Gabon is a fish-rich country; however, lack of funding, lack of development strategies and organization, poor infrastructure, lack of trained workers, and high market prices have left the fisheries industry relatively neglected and antiquated. This additional investment funding will foster economic growth and bring profitability to not only the country and its investors, but to Gabonese citizens as well.

Keywords: Gabon fisheries, aquaculture, diversification

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Introduction

Gabon is located in West Central Africa, bounded by the Atlantic Ocean at the Equator, the Republic of the Congo, Cameroon and Equatorial Guinea (Figure 1). The country's major natural resources include petroleum, natural gas, diamonds, niobium, manganese, uranium, gold, timber, iron ore and hydropower (KPMG 2012). El Hadj Omar Bongo Ondimba – one of the longest-serving heads of state in the world – dominated the country's political scene for four decades (1967-2009) following independence from France in 1960.

Figure 1. Map of Gabon

Source. Central Intelligence Agency: The World Factbook 2013

President Bongo introduced a nominal multiparty system and a new constitution in the early 1990s. Allegations of electoral fraud during local elections in 2002-03 and the presidential elections in 2005, however, exposed the weaknesses of formal political structures in Gabon. Following President Bongo's death in 2009, new elections brought Ali Ben Bongo, son of the former President, to power. Despite constrained political conditions, however, Gabon's small population (estimated at 1.6m in 2013), abundant natural resources, and considerable foreign support have helped make it one of the more prosperous and stable African countries (KPMG 2012).

Gabonese coastal waters are rich in fish, mollusks, and crustaceans. Among those found are bass, barracuda, snapper, Nile perch, and African sea catfish. Despite being a fish-rich country, Gabon still imports fish to meet its own needs, primarily due to fish catch and production falling short of national demand. Because the country currently depends on oil sales, it has neglected promising industries such as this and lacks an organized development strategy. The fisheries industry could boost the economy, creating jobs to combat the high unemployment rate,

providing food to combat poverty, and making the fish industry another key source of income to shift away from oil dependency, and thus attracting investors to help fund it and other development.

In Gabon, the fishing is divided into three (3) categories: (i) industrial fisheries, (ii) maritime fisheries and (iii) inland fisheries. To this is added aquaculture. As shown in Table 1, total catch in 2003 amounted to 44,854 tons. (Organisation des Nations Unies pour l'Alimentation et l'Agriculture 2005). Traditional fishing accounts for two-thirds of total catch. The waters off the Gabonese coast contain large quantities of fish, estimated to be able to support an annual catch of 15,000 tons of tuna and 12,000 tons of sardines. Plans for a cannery, fish-meal factory, and refrigerated storage facilities are underway. By international agreement and Gabonese law, an exclusive economic zone extends 200 miles off the coast, which prohibits any foreign fishing company to fish in this zone without governmental authorization. However, since Gabon has no patrol boats, foreign trawlers (especially French and Spanish) often illegally capture tuna in Gabonese waters (Netherlands-African Business Council 2011).

Improving the coastal and inland fisheries sectors in Gabon will promote economic growth, economic diversification, job creation, food security, healthier diets amongst the population, educational initiatives, and combat gender bias. These improvements require additional investment funding. Gabon is a fish-rich country, but lack of funding, lack of development strategies and organization, poor infrastructure, lack of trained workers, and high market prices have left the fisheries industry relatively neglected and antiquated.

To derive economic benefit from the fishing reserves that the country had been unable to tap due to lack of resources, Gabon signed a five-year fishing treaty with the European Union (EU) on December 3, 1998. This treaty allowed for an annual catch of 9000 tonnes of tuna by a fleet of 75 European large fishing boats within Gabon's 19.2 km limit. In return, Gabon was to receive 178.2 million CFA francs annually or 534 million CFA francs during the protocol's three-year duration. However, Gabonese officials say Gabon will be hard-pressed to verify the amount and makeup of the catch, since neither of its coastal guards have the logistical means necessary to access and intercept suspected boats. The problem is further compounded by the fact that foreign fishing boats in Gabonese waters have an economic advantage over locals. They pay no customs duties or VAT, giving them a competitive edge (Inter Press Service News Agency).

Fish production by aquaculture is limited to tilapia culture, practiced on a small scale around the big towns. The development of this production encounters enormous structural difficulties, including lack of a national marketing channel, which would give way to integrated activities and access to food at prices compatible with the value of the end product. Insufficient skills in hydraulics and techniques of breeding also remain problematic. The largest breeding facility, located in High Ogooué (Sodepal, a subsidiary of Comilog) produced only a few tens of tonnes.

The production of tilapia by aquaculture long remained very marginal. Only in 1994 did the culture of tilapia start again, growing gradually and reaching its peak in 1999-2000, with production estimated at 558 tonnes (Table 1). It has since relapsed to about 120-150 tons per annum currently. Compared to other countries in the area, Gabon has less potential for aquaculture, but even the existing potential has not been exploited to an optimal level. Production contributed an

estimated $1,329,000 US in 1999 and $976,300 US in 2000 in GDP, with approximately the same quantity of fish (FAO 2002). The financial value is not strictly correlated with the produced quantity, as it also depends on the selling price (AQUASOL 2013). Processed products, such as smoked fish, salted fish, dried and grilled fish also sold well on the Gabonese market and in the countries of the sub-region (Cameroon, Congo, Equatorial Guinea). Gabonese are among the largest consumers of fish per capita in Africa compared to countries such as Senegal (24 kg), Tunisia (10.1 kg), Mauritania (10 kg) and Morocco (7.5 kg) to name a few. Women play an important role as fish processors and wholesalers (Food and Agriculture Organization of the United Nations 2007).

Table 1. Fish Catch from 1997 to 2003

	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Industrial fishing	10431	13964	11384	11732	9481	10964	12493
P. marine artisanal	24843	30645	29200	24900	23496	20509	22781
Inland fisheries	9442	9442	10000	10838	8943	9400	9500
Aquaculture	57	57	558	558	102	73	80
Total	44773	54108	51142	48028	42022	40946	44854

Note. Units in tonne
Source. ADP

Planning Fishery Expansions

Gabon needs to develop its poor fishing infrastructure – boats, nets, equipment. Its fishing industry will not perform well without proper equipment, as its people will not have competitive access to fish. Investment will help lower prices, produce better quality of fish, and increase jobs. Fishing, for the country, can provide increased food security, combating protein malnutrition in a country where 8.8% of children under the age of five years are underweight. This investment would also help combat overexploitation of resources by external countries.

As the fishing industry involves production, transportation, processing, and distribution, this makes way for job creation. Fish farming increases jobs for women and combats youth unemployment rate. Fisheries can also be an attractive area for educational purposes, especially among youth, including research centers, colleges and universities, and trade skills development.

Export opportunities exist for any excess supply, especially to neighboring countries– Cameroon, Congo, Equatorial Guinea. Funding would allow Gabon to concoct development strategies, beginning with developing and updating fish statistical data and combating illegal fishing through added tracking and patrolling systems.

Aquaculture systems, concentrating on Tilapia production methods, and beginning with the cheapest to construct ponds, would allow tilapia production specialists to stimulate natural productivity more readily. Tanks or raceways imply greater expense to construct, but can increase control of the production processes, as can cages, the least costly method of growing larger tilapia. However, the latter are limited by availability of high quality sites, and they can be

subjected to potentially devastating environmental extremes if not properly accounting for the site selection and operational plans (AQUASOL 2013).

Marketing opportunities include Wholesale-to-Restaurants, and Retail-to local Fish Markets (directly to consumers), with issues in advertising/promotion being resolved by road signs, flyers, and increasing product forms, recipes, pricing schemes, and differentiation by product size, taste, and quality for type of fish. Considerations of culture, social class, target markets, and type of consumers, domestically and in neighboring countries must become part of this marketing planning. Costs of feed, equipment, construction, storage, processing, electricity, water, fish, labor, taxes initially would require financing from external or micro-credit sources, as in other start-ups (Northeastern Regional Aquaculture Center).

Conclusions and Implications

With government and/or private investment funding, development strategies can promote industry organization, infrastructure improvement, and innovation of better quality and quantity of fish and fish products. In case studies of fish farming and ocean harvesting, we find these improvements would reduce the current high market prices, making products more affordable for the consumers and encouraging increased purchasing actions. Education initiatives, such as training programs for workers, college programs for students, aquaculture and management courses available to the youth in schools, ongoing research projects, and advocacy of healthy eating, can be created.

This industry expansion and enhancement can reduce the unemployment rate and lack of job skills among workers, and thus it will raise health awareness. This can also motivate the creation of small businesses, such as aquaculture suppliers, fish farms, production centers, etc., which will also help trained workers to make use of their skills. This additional investment funding will foster economic growth and bring profitability to not only the country and its investors, but to Gabonese citizens as well.

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Consumer Preferences and Willingness to Pay for Multi-Labeled Produce at Farmers' Markets

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Abstract

Differentiating products through labeling has been shown to be an effective strategy for increasing market share and pricing over undifferentiated products. This study examines consumer willingness to pay for multiple labeled (by both production type and origin) differentiated produce among farmers' market shoppers in Utah. Three primary differentiating claims are investigated, including conventionally grown of unknown origin, conventionally grown local (in state), and organically grown of unknown origin. Results indicate that consumer willingness to pay for products grown conventionally in Utah (locally) outweigh that for either organically or conventionally grown of unknown origin. Information on organic production practices increased the likelihood of purchasing products conventionally grown in Utah, while it had negative impacts on preferences for conventionally and organically grown of unknown origin. Results provide insight into the potential impact of certain labeling programs on grower revenues.

Keywords: Consumer willingness to pay, fresh produce, labeling, local, organic

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Introduction

Product differentiation is shown to be an effective strategy in increasing market share and pricing over undifferentiated products. Generally, product differentiation is revealed through labels. Labels convey specific information about attributes of products that otherwise look similar in the market place. Food labels, in particular, indicate production practices, origin, nutritional facts, etc. Examples of labels related to production practices include organic, grass-fed, natural, hormone or pesticide free, etc. Origin labels indicate a specific geographic area of production, such as region, state, or country.

Previous research suggests that consumers are willing to pay premiums for products exhibiting local origin and organic production labels. For example, Hu et al. (2012) find that consumers are willing to pay more for products labeled as produced in state or in a well-identified multi-state region. Carpio and Isengildina-Massa (2009) confirm this, finding that consumers in South Carolina are willing to pay premiums for locally produced foods. Several studies show consumers are willing to pay premiums for organic foods (Li et al. 2007; Govindasamy and Italia 1999; Huang 1996). Interestingly, Yiridoea, Bonti-Ankomah, and Martin (2005) report that consumer demand for organic produce depends on the price differential between the conventionally grown and organic product, rather than the price of the organic product alone. Curtis and Cowee (2011) suggest that the increased consumer demand for local and organic foods is a result of consumer food safety and health concerns. Environmental concerns have also been shown to motivate consumption of organic foods (Raab and Grobe 2005; Gifford and Bernard 2004).

While differentiation of foods by production method and origin is common at farmers' markets and in community supported agriculture (CSA) programs, consumer preferences for fresh produce with multiple labels sold through direct markets are not well documented (Howard and Allen 2010). A study by Onozaka and Thilmany-McFadden (2011), using web-based survey data of 1889 grocery store shoppers, found significant interactive effects between production practice and origin claims and concluded that consumers do differentiate some production claims if information on origin is provided, and vice versa. Hence, this study examines farmers' market consumer preferences and willingness to pay for labeled products by production method and origin. Results indicate that consumer willingness to pay and the probability of purchasing fresh produce grown conventionally in-state outweigh that for either organically or conventionally grown produce of unknown origin.

This study adds to the existing literature on consumer preferences for differentiated products, specifically the impact of combining origin and production labels. Results provide insight into the potential effectiveness of labeling programs and label combinations in securing price premiums for fresh produce. This information will assist produce growers who direct market their products to more effectively manage their production and pricing strategies.

Data Overview

Consumer preferences and willingness to pay for organically grown and conventionally grown local fresh produce were evaluated through in-person survey data collected from 819 consumers

at farmers' markets in Utah in the summer of 2011. The four farmers' markets were located on the Wasatch Front in Utah, resulting in a consumer sample from relatively highly populated urban areas. Table 1 provides an overview of the sample statistics and includes differences in consumer characteristics, attitudes, and concerns for those respondents who prefer conventional local and those who prefer organic produce of unknown origin.

Table 1. Survey Sample Statistics

Variables	Most Important Label		Overall Sample
	Conventional Local	Organic Unknown Origin	Mean
Primary shopper	77%	77%	76%
FM visits per season	4 to 7	4 to 7	4 to 7
Home garden	67%*	60%	63%
Join CSA	57%	54%	52%
Food safety concerns (1-5 scale)	4.31***	4.42	4.29
Diet/health concerns (1-5 scale)	4.32**	4.46	4.32
Family size (# people)	3	3	3
Age (years)	40*	36	42
Female	66%	60%	62%
Married	59%	56%	59%
Annual Income ($USD)	$70,451	$76,771	$70,000
FM presence attributes (1-5 scale)	3.57*	3.64	3.60
FM convenience attributes (1-5 scale)	3.66	3.67	3.66
Agriculture enthusiast (1-5 scale)	4.31	4.18	4.20
Environmental shopper (1-5 scale)	3.43**	3.62	3.52

Statistically significant differences between local and organic label importance at the 1% (***), 5% (**) and 10% (*) levels respectively.

The majority of the respondents are married females in their early 40's who shop at farmers' markets often and serve as the primary shopper for their household. More than half of the respondents have a home garden and indicate they would join a CSA program. A representative average respondent is 42 years old with a 4-year college degree, with an annual household income of $70,000. The average household size is roughly 3 people. In general, respondents had strong food safety and diet/health concerns, rated at 4.29 and 4.32 out of a possible 5. This result is consistent with previous studies finding similar concerns among farmers' market shoppers (Curtis and Cowee 2011). Respondents also rated agricultural open space and supporting local farmers as very important (agriculture enthusiast). Purchasing items with low environmental impact (environmental shopper) and farmers' market convenience (location, parking, hours, etc.) and presence (events, activities, arts and crafts) attributes were rated as at least important (rated 3.52, 3.66 and 3.6 respectively)

Respondents that prefer organic produce are younger, higher income individuals with strong food safety and diet/health concerns. They are less supportive of local agriculture, but place a higher importance on purchasing products with low environmental impact. Those that prefer local origin are more often home gardeners, more likely to join a CSA program and place a higher importance on agricultural open space and supporting local farmers. They are also more

likely to be female and married. They are less interested in the additional activities at farmers' markets such as concerts/music, family activities, and food vending (FM presence attributes).

Preferred Label Results

Respondents were asked to indicate their preferences between organically grown of unknown origin, conventionally grown local and conventionally grown of unknown origin for three produce items. Figure 1 illustrates respondent preferences for green peppers, cucumbers, and yellow squash. As shown, the majority of respondents prefer locally grown produce followed by organically grown produce. For example, 61% of all respondents would purchase conventionally grown local green peppers, 26% would buy organically grown of unknown origin, while only 13% would purchase conventionally grown of unknown origin. For cucumbers, 66% of all respondents would purchase conventionally grown local, 25% would buy organically grown of unknown origin, while only 9% would buy conventionally grown of unknown origin. Results for yellow squash follow the same trend. Differences are statistically significant at the 10% level or better.

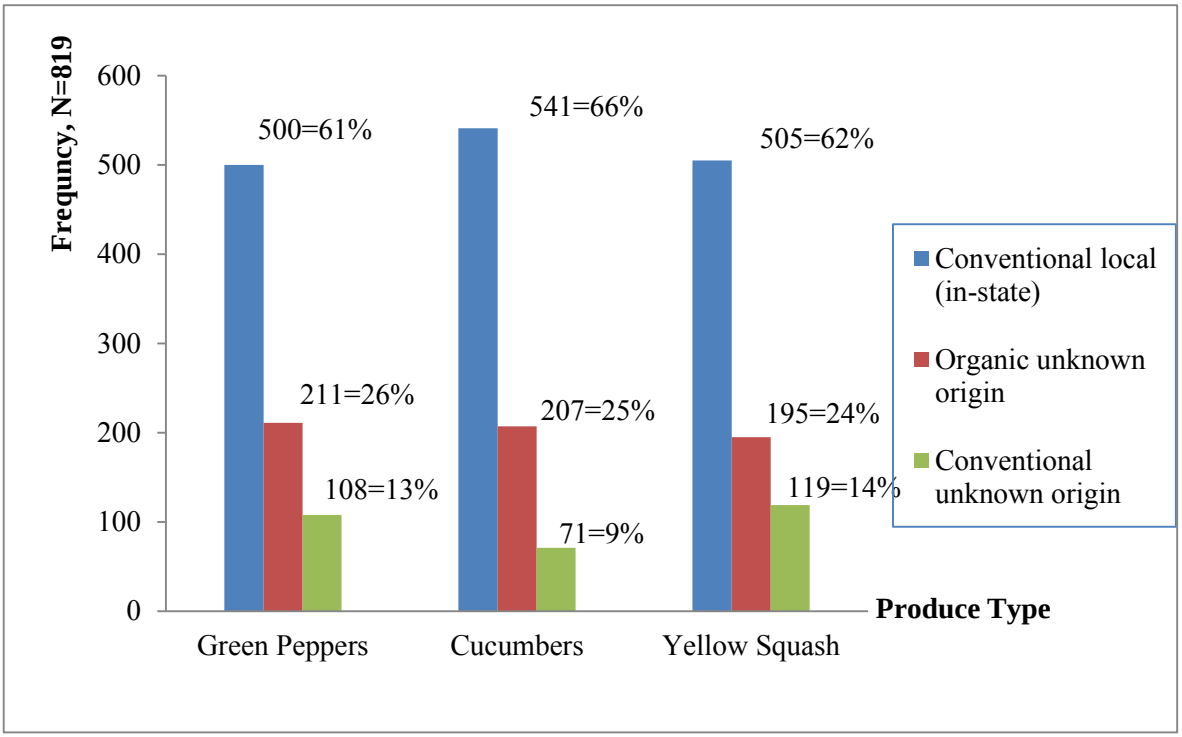

Figure 1. Consumer Preferences by Production Method/Origin

Additionally respondents were asked "When purchasing fresh produce, which label is most important?" An overview of their responses is given in Table 2. Sixty percent responded that they most preferred a product of Utah (in-state). The second most important label was "a product of USA" (20%) and 12% of the respondents preferred organic produce regardless of origin. Few respondents preferred foods from outside the US.

Table 2. Preferred Labels

Label	Frequency	Percentage
A product of UT (Local)	493	60%
A product of US (Domestic)	160	20%
A product from outside the US (Foreign)	17	2%
Organic regardless of origin	96	12%
Natural regardless of origin	38	5%
Other	15	1%
Number of Observations	819	100%

Willingness to Pay Results

For each fresh produce item, respondents were presented with differing prices for conventional of local origin and organic of unknown origin and asked to indicate which produce item they would choose. Twenty versions of the survey were distributed representing prices ranging from a 30% discount to a 100% premium over the current price of the conventional of unknown origin item. The price of the conventional of unknown origin item was identical across survey version. A random utility model, estimated via conditional logit (Greene 2008) was used to estimate preferences for each produce item and label combination. Table 3 provides average WTP results and associated imputed confidence intervals in terms of price per pound for green peppers, cucumbers, and yellow squash.

Results in Table 3 indicate that on average, consumers at farmers' markets are willing to pay more per pound for fresh produce conventionally produced in–state than organic or conventionally produced of unknown origin. Interestingly, consumer WTP for organic produce was lower than the price of conventionally grown of unknown origin produce in the case of green peppers and yellow squash, actually denoting the need for a price discount ($2.49 for green peppers and $1.89 for yellow squash). Specifically, consumers were willing to pay $4.00 per pound for green peppers conventionally grown in Utah. They were willing to pay $1.94 per pound green peppers that are organically grown of unknown origin. The WTP for a pound of local conventional cucumbers was $2.21 while the WTP for a pound of organic cucumbers from an unknown location was $1.25. Consumers at farmers' markets are willing to pay $2.25 for a pound of conventionally grown local yellow squash and $1.00 for those that are organically grown of unknown origin.

Table 3. Willingness to Pay Estimates by Produce Type ($/Pound)

	Green Peppers		Cucumbers		Yellow Squash	
WTP & Confidence Intervals	Conventional Local	Organic Unknown Origin	Conventional Local	Organic Unknown Origin	Conventional Local	Organic Unknown Origin
WTP	$4.00	$1.94	$2.21	$1.25	$2.25	$1.00
Lower limit	$3.02	$1.29	$1.47	$.80	$1.79	$.69
Upper limit	$5.73	$2.86	$4.50	$2.38	$3.00	$1.36

Conclusions

Consumer survey data collected at attended farmers' markets in Utah in 2011 is used to assess consumer preferences and willingness to pay for differentiated fresh produce. The majority of respondents preferred locally grown produce followed by organically grown produce and conventionally grown of unknown origin. Consequently, willingness to pay for conventionally grown local produce is higher than organically grown of unknown origin. This study provides valuable information for local growers regarding the opportunity for price premiums when using origin labels alone or in conjunction with production labels, such as organic, although target consumers differ in some respects. For example, consumers with strong preferences for organic produce are younger, higher income individuals, with strong diet/health concerns and are less likely to have a home garden or join a CSA program.

The results suggest that there is a viable market for local produce growers who label their produce with origin information or use a state or regional designated labeling program. Consumer preferences and pricing estimates should be weighed against the cost of participation in labeling and/or certification programs.

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Dairy Product Trade Potentials between Gulf Cooperation Council Countries, European Union Selected Countries and the United States

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Abstract

The objective of this research is to investigate the potentials trade of dairy products between origin countries including selected EU countries and the U.S. on one hand, and Gulf Cooperation Council (GCC) countries, on the other hand. Results showed that when destination country's real GDP increases by 1% value of dairy products exports increases by 0.28%. The model also showed that when destination country's population increases by 1% dairy products exports increase by 0.32 %. Further, the gravity model is found to be sensitive to the set of selected independent variables.

Keywords: dairy products trade, Gravity Model, Gulf Cooperation Council Countries, European Union, United States.

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Background

The Gulf Cooperation Council is a group of six Gulf States; namely, Kingdom of Saudi Arabia, United Arab Emirates, Oman, Kuwait, Qatar, and Bahrain (hereafter denoted by GCC). Total population is estimated at 44.5 million in 2010. This total population is distributed between the GCC countries as follow: Kingdom of Saudi Arabia 27.3 million (or 60% of the region's population), United Arab Emirates 8.4 million, Kuwait 3.0 million, Oman 2.8 million, Qatar1.8 million, and Bahrain 1.2 million (World Bank 2013). The region is located east to both of the Arabian Gulf and the Gulf of Oman, provided with an advantageous global location so as to be a hub for trade between the west and east sides of the worldwide countries. Nowadays, many of the countries in this region receive and ship millions of merchandized trade that varies from spices to automobiles to airplanes parts. Such location, accompanied with the increasing economic growth in the region and increasing demand for dairy products, make it a highly potential destination for dairy exports from major dairy products' producers and exporters in the European Union countries (e.g. Denmark, France, Germany, and the Netherland), as well as the United States. This research selected such major dairy-products exporting countries to be the origin of dairy products. Meanwhile, this research is considering the GCC countries to be the destination countries for dairy products. GCC countries face a challenging environment and a declining stock of natural resource endowment that is preventing local supply from meeting the increasing demand for livestock products, including dairy products. In such condition, investigation of the factors that influence trade in food products, especially protein products, becomes of a high interest to research community as well as policy-makers on both sides of the trade origins and destinations.

Gross Domestic Product (GDP), adjusted by purchasing power parity for each of the GCC countries, the importing countries of dairy products in this research, were reported to be $564, $318, $125, $123, $68, and $27 billion for Saudi Arabia, United Arab Emirates, Kuwait, Qatar, Oman, and Bahrain, respectively in 2010 (World Bank 2013). Per capita of these GDP values in the GCC countries are widely different from one country to another. Per capita GDP for the GCC countries were estimated to be $78, $46, $42, $27, $24, and $23 thousand for Qatar, Kuwait, United Arab Emirates, Oman, Bahrain, and Saudi Arabia, respectively in 2010. Per capita GDP in the exporting countries were estimated to be $47, $42, $41, $38, and $34 in the United States, Netherlands, Denmark, Germany, and France, respectively in 2010 (World Bank 2013).

Total Imports of dairy products from the selected EU origin countries (Denmark, Netherlands, Germany, and France) to the GCC countries are estimated to be about 250 thousand ton of milk equivalent products and worth about $800 million in 2010. Meanwhile, dairy products' imports from the United Sates to the GCC countries are estimated to be 28 thousand tons valued at $94 million in 2010 (UNCOMTRADE 2013). This research main objective is to explore the relationship between factors such population, per capita GDP changes as well as the distance between dairy products exports from origin countries and the GCC countries to provide insight into future trading potentials. And to further develop future findings about the best fit econometric model to represent such important relations.

Research Objectives

The goal of this research is to explore demand for imports' characteristics of dairy products' imports by GCC countries from the selected EU countries (Denmark, France, Germany, and Netherlands) and U.S. To achieve this goal, this research identified threefold objective which is:

- To identify best fit gravity model's specifications for modeling dairy products trade between the three trade blocks (U.S., selected EU, and GCC countries) in order to estimate model's parameters under the gravity model approach (including the distance as an explanatory variable in the gravity logarithmic model). Model detailed description is described in the methodology section of this document;
- To discuss socio-economic drives (explanatory variables) for such demand for dairy products in the GCC countries using gravity model 2000-2010 panel data model for dairy products trade model that illustrates the relationship between value of exports and the selected explanatory variables; and
- To measure responsiveness of dairy products trade changes due to changes in the gravity model's explanatory variables (e.g. population and GDP).

Previous Studies Review

Gravity model approach has been used intensively to analyze trade flow between counties including trade on food products. Kay Cao and Robin Johnson (2004 and 2006) published two studies that apply the gravity model's theoretical framework. In their first study in 2004, the authors stated that the commodity-specific gravity model, as derived by Bergstrand (1985 and 1989), explains bilateral trade flows as a function of the two countries' income, per-capita income (or population), transportation costs, and other factors that may be aiding or restricting trade such as tariffs, exchange rate, prices, and health regulations (Cao and Johnson 2004). Their second study published in 2006 defines the gravity model as a model that adapts the gravitational concept to the form of any exchange between two groups. In its basic form, the amount of trade between two countries is a function of their national incomes and the distance between them, which is used as a proxy for transportation costs. Any flow from country i to country j can be explained by economic forces at the flow's origin, economic forces at the flow's destination, and the economic forces, either aiding or resisting the flow's movement from origin to destination (Bergstrand 1985). These models commonly uses dummy variables in order to capture contiguity effects, cultural and historical similarities, common languages, regional integration, political blocs, and patent rights (Cao and Johnson 2006).

A relatively recent study by Sarker and Jayasinghe (2007) showed that the proliferation of regional trade agreements in recent years has intensified the debate on the desirability of these agreements in themselves and their coexistence with multilateral free trade under the WTO. This study contributes to this debate by analyzing trade creation and trade diversion effects of the European Union on trade flows of six major agri-food products from 1985 to 2000. An extended gravity model is estimated employing pooled data and generalized least squares methods. The results show that the economic developments in the EU countries since the mid-1980s have served to boost agri-food trade significantly among the members. Some of the growth in intra-

EU trade in agri-food products came at the expense of nonmembers as the EU reduced the degree of relative openness to trade with nonmembers during this period and diverted trade from the rest of the world into the intra-EU block of trade channels.

Previous studies showed that Gravity model is a suited econometric model to illustrate the trade flows of merchandise trade between the trade partners. However, these studies show wide range of models specification. This research explores the above issue using four models that are different from each other on the set of included explanatory variables in each model as specified below in the methodology section.

The Gravity Model

The gravity model used for this research includes value of dairy product exports from the origin to the destination countries as the dependent variables. Origin countries are selected EU countries (Denmark, France, Germany, and Netherlands) and the U.S. Destination countries on the other side are the six GCC countries (Saudi Arabia, United Arab Emirates, Kuwait, Oman, Qatar, and Bahrain). The following equation (1) defines the dependent variable as well as the set of independent/explanatory:

$$(1)\quad \ln EXP_{ijt} = \alpha_i + \lambda_j + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln P_{jt} + \beta_4 \ln DIST_{ij} + \mu_{ijt}$$

Where

$\ln EXP_{ijt}$ = *log value of dairy products exports from origin country* $_i$ *to destination country* $_j$ *at time* $_t$
α_i = *Constant*
λ_j = *annual* time effect for 2000 – 2010 time period
Y_{it} = GDP or Per Capita GDP in country i at time t
Y_{jt} = GDP or Per Capita GDP in country j at time t
P_{jt} = Population in country j or Population under 14 years
$DIST_{ij}$ = *is the distance between the countries (*Appendix*)*
μ_{ijt} = *Disturbance term*

Dairy Products Gravity Model Scenarios

Four gravity model scenarios are selected for this research as illustrated in in Table 1. The first model, Model 1 is different from the other three models in including nominal value of GDP variable along with total population for the destination countries as independent variables in the gravity model. The second model, Model 2 used nominal value of GDP along with population under 14 years for the destination countries as independent variables in the gravity model. The third model, Model 3 used GDP values adjusted with purchasing power parity with the population under 14 years combination at the destination countries. Results showed that R^2 of 0.81 or 0.82 indicate overall strong models fitness of the data describing the relationships between the dependent and selected independent variables. Furthermore, F test results of all four models showed very small P–values that approaching zero values which again indicate high

models fitness. However, these results of each model's independent variables significance and magnitude are different as described in the results section of this document.

Table 1. Dairy Products Gravity Model Scenarios

Item	Model 1	Model 2	Model 3	Model 4
Model's Basic Features	Independent Variables Include: Destination Country's Nominal GDP and Total Population	Independent Variables Include: Destination Country's Nominal GDP and =< 14 Yrs Population	Independent Variables Include: Destination Country's GDP PPP Adjusted and =< 14 Yrs Population	Independent Variables Include: Destination Country's GDP PPP and All Population - Best Model
R^2	0.82	0.81	0.82	0.82
F Test Value	151.9	140.9	151.5	154.4
P – Value	0.000	0.000	0.000	0.000

Results

Table 2 below shows the four gravity models results. In the first model, Model 1 the log of nominal GDP is not significant (0.5 T test value and 0.596 P-Value) which indicates model's failure to represent the relationship because the GDP variable is essential variable in the model specification. Model 2 results showed that both log of nominal GDP and log of population under 14 years old are significant variables showing T values 6.2 and 2.1 values respectively. Model 3 which included log of GDP adjusted with purchasing power parity (PPP) and log of population under 14 years old independent variables also failed because the direction (negative sign) between the population under 14 years old as independent variable and the dependent variable (value of exports) is not correct. It is expected that when the number of people under 14 years old increases the value of exports increases. The best model representing the relationship between the value of exports and the independent variables was found to be Model 4. Model 4 was selected to be the best model due to presence of larger number of significant variables compared to the other three models, Models 1 to 3. Model 4 results also show no-misspecification of variables direction similar to what occurred in Model 3. Both major independent variables (log of GDP – adjusted by PPP and log of all population) are found to be significant in Model 4. The distance variables which used to approximate the level of shipment costs between the origin country and the destination country were found to be significant in all four models. Interpretations of the best model results are included in the conclusions section of this paper.

Table 2. Gravity Model for Dairy Products between Selected EU[1], U.S. and GCC Countries

	Model 1			**Model 2**			**Model 3**			**Model 4**		
Model Fitness (R^2)	0.8			0.8			0.8			0.8		
F Test	151			141			152			154		
Explanatory Variable	B	T	P	B	T	P	B	T	P	B	T	P
Constant	11.8	8.7	0.0	16.4	12.0	0.0	17.5	15.6	0.0	14.1	1.0	0.0
Log GDPj (Billion $)	0.0	0.5	0.6	0.4	6.2	0.0						
Log GDPj (Billion $) – adjusted by PPP							0.6	8.5	0.0	0.3	2.7	0.0
Log All Population (by thousands)	0.5	6.2	0.0							0.3	3.0	0.0
Log Population =<14 Yrs old				0.2	2.1	0.0	-0.1	-0.8	0.4			
Log Distance (Km)	-1.2	-9.7	0.0	-1.2	-9.4	0.0	-1.1	-9.2	0.0	-1.2	-9.8	0.0
Pair Trading Countries (Dummy)	0.0	-13.6	0.0	0.0	12.8	0.0	0.0	-13.4	0.0	0.0	-13.6	0.0.
Border Countries (Dummy)	1.4	7.6	0.0	1.4	7.2	0.0	1.4	7.7	0.0	1.4	7.6	0.0
EU Countries[1] (Dummy)	-1.3	-4.8	0.0	-1.3	-4.7	0.0	-1.2	-4.4	0.0	-1.3	-4.8	0.0
Year 0 – 2000	-0.1	-0.6	0.6	-0.1	-0.3	0.8	-0.1	-0.4	0.7	-0.1	-0.7	0.5
Year 1 – 2001	0.0	-0.1	0.9	0.1	0.3	0.8	0.0	0.1	0.9	0.0	-0.2	0.9
Year 2 – 2002	-0.1	-0.3	0.8	0.0	0.1	1.0				-0.1	-0.3	0.7
Year 3 – 2003				0.0	0.2	0.8	0.1	0.3	0.7			
Year 4 – 2004	0.1	0.4	0.7	0.0	0.2	0.8	0.1	0.7	0.5	0.1	0.4	0.7
Year 5 - 2005	0.1	0.5	0.6	0.0	-0.1	0.9	0.2	0.4	0.1	0.6	0.6	
Year 6 – 2006	0.1	0.4	0.7	0.2	0.9	0.4	0.1	0.7	0.5	0.1	0.4	0.7
Year 7 - 2007	0.3	1.5	0.1	0.4	2.1	0.0	0.4	1.9	0.1	0.3	1.6	0.1
Year 8 – 2008	0.6	3.0	0.0	0.1	0.5	0.6	0.6	3.4	0.0	0.6	3.2	0.0
Year 9 – 2009	0.2	1.0	0.3	0.2	1.0	0.3	0.2	1.2	0.2	0.2	1.0	0.3
Year 10 - 2010	0.4	1.9	0.1				0.2	1.0	0.3	0.2	1.0	0.3

[1]Selected EU Countries are Denmark, France, Germany, and Netherlands
GCC countries are: Kingdom of Saudi Arabia, United Arab Emirates, Kuwait, Qatar, and Bahrain
PPP = Purchasing Power Parity which is defined to be rates of currency conversion that eliminate the differences in overall price levels between countries

Conclusions

Recent data sources provided by the UN COMTRADE and USDA, foreign agricultural services food trade extraction tool made it possible to aggregate dairy products trade in one commodity (i.e. milk equivalent). Such aggregation was not possible without such data and the tools. The following is the interpretation of the gravity Model 4 responsiveness, the best model shows that when destination country's real GDP (PPP adjusted) increases by 1% value of dairy products' exports increases by 0.28%. The model also shows that when destination country's total population increases by 1% values of dairy products' exports increases by 0.32%. As anticipated, if the distance between the origin and destination countries increases by 1% the value of dairy exports decrease by 1.19%. Dairy products' trade between U.S. and selected EU countries (Netherlands, Denmark, Germany, and France) one on side and the GCC countries (KSA, UAE, Kuwait, Bahrain, Oman, and Qatar) one the other side, is expanding due to the exponential

economic growth as well as population increases in the GCC countries' trade block. Gravity model is a suitable economic model to predict changes in dairy products' trade between the trading blocks. However, the model is sensitive to explanatory variables' choices. The set of log GDP adjusted by purchasing power parity, log of population, log of distance, and binary variables to represent each pair country, and countries' geographic adjacency (sharing borders) are found to be the best combination of independent variables in the gravity model for dairy products' trade between origin countries and destination countries. These research findings can be useful to policy makers assessing the potential for dairy products' trade between the three trading partners EU, the U.S., as the exporting countries, and the GCC countries as the importing countries in the future.

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Appendix

Gravity Model Distance Matrix between Selected Origin and Destination Countries.

Distance (in Km)	United Arab Emirates	Kuwait	Bahrain	Oman	Saudi Arabia	Qatar	U.S.	Netherlands	France	Denmark	Germany
United Arab Emirates	0	861	428	470	768	300	11,337	5,126	3,238	3,120	4,782
Kuwait	861	0	457	1,324	549	599	10,493	4,259	4,344	4,170	3,917
Bahrain	428	457	0	875	421	142	10,950	4,731	4,799	2,885	4,388
Oman	470	1,324	875	0	1,122	734	11,807	5,579	5,663	5,469	5,235
Saudi Arabia	768	549	421	1,122	0	485	10,842	4,479	4,460	4,450	4,142
Qatar	300	599	142	734	485	0	11,091	4,822	4,898	4,730	4,479
U.S.	11,337	10,493	10,950	11,807	10,842	11,091	0	7,782	8,035	7,734	8,098
Netherlands	5,126	4,259	4,731	5,579	4,479	4,822	7,782	0	771	477	343
France	3,238	4,344	4,799	5,663	4,460	4,898	8,035	771	0	1,242	871
Denmark	3,120	4,170	2,885	5,469	4,450	4,730	7,734	477	1,242	0	501
Germany	4,782	3,917	4,388	5,235	4,142	4,479	8,098	343	871	501	0

Source. Map Crow. http://www.mapcrow.info/

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Global Food Security: Emerging Economies and Diverging Food Markets

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Abstract

Global food security in the last decade has been a topic around many international agencies, organizations, and governments. Global food security can have a broader or a narrower definition, depending on the source. Nevertheless, most of the authors agree that it has become one of the 21st century's greatest challenges.

This paper addresses global food security in terms of (1) availability, (2) access, (3) utilization, and (4) stability of food. These are the dimensions that Food and Agriculture Organization of the United Nations (FAO) has established for the definition of food security. This paper also gives an overview of the recent Global Food Security Index (GFSI) created by the Economist Intelligence Unit (2013). It is observed that emerging countries play a significant role in global food availability and there is a need for international organizations, governments, academic institutions, private enterprises, and the population itself to work together in order to face the challenge of feeding the world.

Keywords: food security, emerging markets, dimensions of global food security

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Definition and Metrics of Global Food Security

FAO provides a wide definition of global food security saying that it is a situation that "exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO 2006). Under this definition the world will be "food secure" when every person in the world has continuous and sustainable access to enough and nutritious food. The ultimate goal is the eradication of world hunger and undernourishment.

Part of the complexity of measuring and achieving a state of global food security is due to its wide definition and scope. The scope of global food security includes every sector of the economy: agriculture, industry, and even services. Furthermore it encompasses social, environmental, and political dimensions. Throughout the years, there have been several approaches taken by public and private institutions for measuring food security within countries, regions, or even worldwide. The GFSI is one of the most recent tools for the measurement of the state of global food security. It has been created by the Economist Intelligence Unit (2013) and is constructed by 27 indicators (Table 1), which in conjunction, consider the core issues of affordability, availability, and quality of food across a set of 107 developing and developed countries.

Table 1. Indicators within the Global Food Security Index (GFSI)

	1. Affordability		2. Quality and Safety		3. Availability
1.1	Food consumption as a share of household expenditure	2.1	Sufficiency of supply	3.1	Diet diversification
1.2	Proportion of population under the global poverty line	2.1.1	Average food supply	3.2	Nutritional standards
1.3	Gross domestic product per head (PPP)	2.1.2	Dependency on chronic food aid	3.2.1	National dietary guidelines
1.4	Agricultural import tariffs	2.2	Public expenditure on agricultural R&D	3.2.2	National nutrition plan or strategy
1.5	Presence of food safety net programs	2.3	Agricultural infrastructure	3.2.3	Nutrition monitoring and surveillance
1.6	Access to financing for farmers	2.3.1	Existence of adequate crop storage facilities	3.3	Micronutrient availability
		2.3.2	Road infrastructure	3.3.1	Dietary availability of vitamin A
		2.3.3	Port infrastructure	3.3.2	Dietary availability of animal iron
		2.4	Volatility of agricultural production	3.3.3	Dietary availability of vegetal iron
		2.5	Political stability risk	3.4	Protein quality
		2.6	Corruption	3.5	Food Safety
		2.7	Urban absorption capacity	3.5.1	Agency to ensure the safety and health of food
				3.5.2	Percentage of population with access to potable water
				3.5.3	Presence of formal grocery sector

Source. http://foodsecurityindex.eiu.com/Index

The overall score for the GFSI is calculated from a simple weighted average of the evaluated indicators within the above mentioned three categories (affordability, availability, and quality of food), and scaled from 0-100, where 100 equals the most favorable (Economist 2013). On the GFSI calculated for the year 2013, North American countries are on the top, led by the United States, with a score of 86.8. In contrast, the Sub-Saharan African countries are markedly at the bottom of the index with an average of 32.9. Seventy percent of the 28 Sub-Saharan African countries are in the lowest quartile of the GFSI and only twenty nine percent are landlocked.

Dimensions of Food Security

As mentioned earlier, food security is a holistic concept that addresses a wide range of dimensions, including availability, access, utilization, and stability of food (FAO 2006). In terms of availability, in order for a country to achieve food security, the total food supply needs to equal its actual food demand, not only in quantitative but also in a qualitative way (variety, nutrient content, and safety). Food supply involves elements such as production, imports, exports, and also changes in national stocks. Similarly, demand involves the amount of food needed to feed, seed, manufacture, and the amount wasted to post harvest loss. Figure 1 shows the world current status of food supply in terms of kilocalories (kcal), per capita, per day. As is shown in this figure, the most food insecure countries are in Central Africa. Although, worldwide, per capita food supply rose from about 2,200 kcal/day in the early 1960s to more than 2,800 kcal/day in 2009, this per capita supply increase alone has not necessarily resulted in a reduction in hunger. This is because food insecurity is often the result of lack of access, poor ability to utilize food, and unstable conditions (FAO 2013).

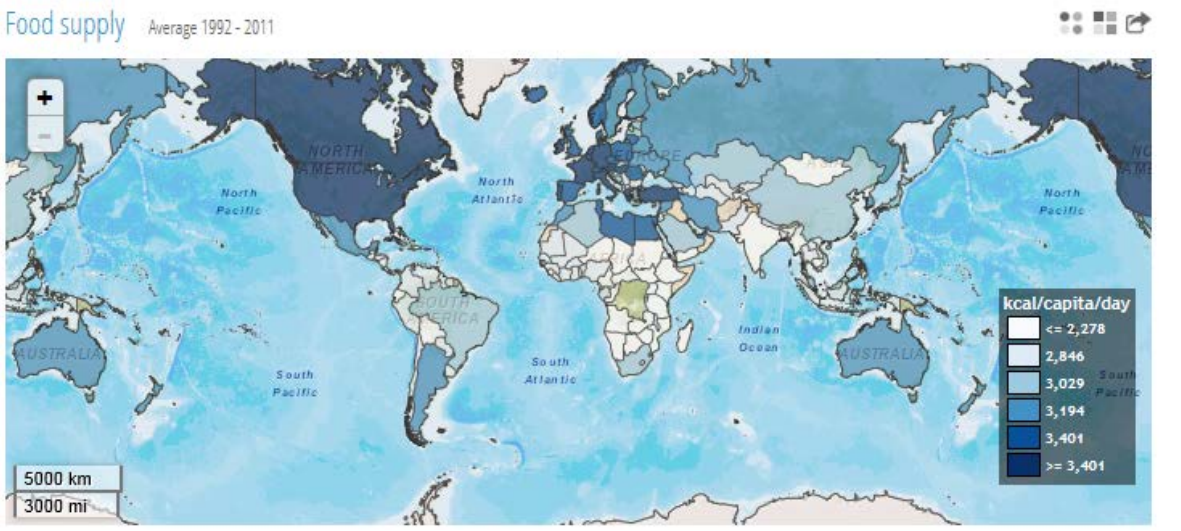

Figure 1. World Status of Food Supply in kcal/capita/day (Average 1992-201)
Source. http://faostat.fao.org/site/385/default.aspx

Regarding food affordability, global food insecurity may not be caused by the unavailability of food, but by insufficient purchasing power, inappropriate distribution, or inadequate use of food

at the household level (FAO 2012). Similarly regarding the stability dimension, the principal constraints to guaranteeing a dietary minimum to everyone at all times rely also on social factors, such as rural-urban migration as well as changes in dietary habits, economic factors,including an increase or a decrease in household income, and environmental factors such as drought, floods, over-production, currency devaluation, etc.

The Role of Emerging Countries in Reducing Global Food Insecurity

Emerging countries have played a significant role in increasing global food availability in the past decade. As they have increased their agricultural production in order to meet their growing demand, fast increases in food supplies in emerging countries have raised concerns regarding social and environmental impacts.

From 2003 to 2012, the share of Brazil, Russia, India, China, and South Africa in the World GDP grew from 9% to 21%. China itself tripled its own contribution from 4% to 12%. Economic growth in these emerging countries in general has been strongly related with agricultural development (World Bank 2013).

Brazil produces most of the food it consumes; however, it imports the commodities in which it has a deficit, including wheat and rice. Brazilian rice imports are projected to increase 26%, to reach 43 kg per capita in 2018. In spite of this, Brazil is the largest world exporter of sugar (48%)[1], ethanol (40%), beef (18%), coffee (30%), and orange juice (39%), as well as the second largest exporter of soy beans (32%) and poultry meat (27%). The significant market share gain of Brazil in global trade of agricultural products is also reflected by the loss of market share by the U.S. (Valdes, Vidigal, and Rezende 2009).

Russia, another emerging market, during the 2000s, became a large agricultural importer, especially of meat and processed foods, and a major grain exporter, in reverse of its agricultural production and trade during the Soviet period. Similarly, India is now a net food grain exporter, ranking among the top three rice exporting countries (Gulati, Landes and Ganguly 2009). Nevertheless, it still periodically imports wheat. China is self-sufficient in most major commodities. After three decades of dietary change, consumption of traditional staple grains (wheat and rice) has stagnated (Henneberry and Gale 2009). China remains as an importer of soybeans, palm oil, and cassava beans, and is a leading exporter of garlic (FAO-STAT 2013).

South Africa's major imported commodity in 2012 was rice. The South African government plans to become one of the top 10 export producers of high-value agricultural products, such as wines, indigenous rooibos, and honey bush teas (GCIS 2013).

Despite the many commonalities between the BRICS countries, these countries have very different economic structures. Thus, in order to maintain their economic growth, governments, private industries, and firms need to foresee the transformation of BRICS in terms of the investments needed in infrastructure, education, and training.

1. Figures in parentheses reflect global market shares.

Conclusions

Food security is everyone's business. Therefore, analysis must include criteria from all relevant stakeholders; such as the international organizations, governments, academic institutions, the society, and the private sector.

Moreover, rather than focusing on poverty alleviation and the diminishment of undernourishment, the achievement of a state of global food security would also mean an increase in households' ability to purchase food, market access improvement, and possibly the redefinition of the food production system. Achievement of global food security would also involve the rupture of the vicious cycle of economic stagnation caused by low labor productivity as a consequence of poor access to food.

In the near future, achieving food security for the world population would require producing the kinds of foods that will ensure nutritional security. With the growth in per capita incomes in certain world regions, the demand for protein-rich foods is expected to increase. By and large, the shares of vegetables, fruits, meat, dairy, and fish in total food expenditure are expected to increase, while shares of grains and other staple crops are expected to decline (FAO 2009). It is important to mention that despite the anticipated food production growth in many countries, their dependence on international trade is expected to strengthen. This is because more open trade and WTO-supported reduction in trade barriers, will encourage specialization and exports according to the comparative advantage of each country.

Some emerging countries, such as China, have undergone significant increases in economic and agricultural growth. However the wealth and their food are unequally distributed. Therefore, economic growth does not always indicate a reduction of poverty and an increase in food security. Food security may be determined by the ability of each country to include the poorest population in the nation's development. This can be achieved by creating the proper infrastructure and providing the poor with new or better income opportunities and/or ways to reduce their financial constraints. Finally, despite the different environments and situations among regions, it can be stated that there is a global commitment to provide adequate, affordable and nutritious food.

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The Role of Nutrition and Women's Empowerment in Human Capital Development

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Abstract

Nutritional status and the empowerment of women have massive implications on the physical and mental development of their children. We explore the role of nutrition of women and children in the household and further posit the importance of the mother's human capital. Increases in women's human capital positively affect the efficiency of management and the allocation of other inputs for household production, especially for staples, vegetables and poultry. A model for human capital is postulated in which the primary input variables are the education of men, the education of women, health, training and a mother's human capital. Due to the amplifying and intergenerational benefits of women's human capital, we find that investments in women's capital have greater positive benefits and implications for long-term food security and economic development than traditional academic models credit.

Keywords: nutrition, food insecurity, poverty, women's empowerment.

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Introduction

Good nutrition is not only a concern for the health and development of an individual but also has major implications for the health and productivity for an entire country. "Good nutrition starts in the household, but the benefits ripple outward. The health and productivity gains from ending malnutrition can elevate an entire country's economic growth and human development" (UNDP 2012a, p 86). While malnutrition can negatively impact an individual at any stage, it is during pregnancy and the first two years of a child's development that malnutrition can cause permanent damage to the growth, cognitive capacity, and the immune system of the child (UNDP 2012a). Thus, the nutrition of women – prior to pregnancy, during pregnancy, and while breast feeding – significantly impacts the human capital potential of their children.

Physical and mental development stunting, as well as the increased likelihood of perinatal diseases, are highly associated with mothers who were malnourished prior to and during pregnancy. For a child, the first 1,000 days of life, beginning at conception, are the most vital for development. It is during this time frame that irreversible damage can be caused by malnutrition (UNDP 2012a). Thus, the health and nutrition of both women and children are a vital concern for developing countries (Figure 1).

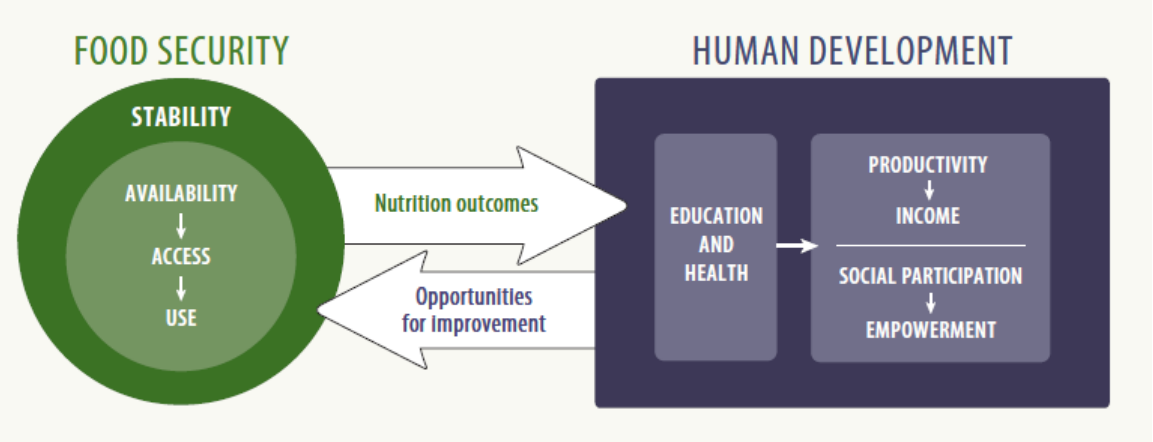

Figure 1. Nutrition Outcomes Are at the Intersection of Food Security and Human Development
Source. UNDP Africa Human Development Report 2012a

Economists have long recognized that human capital was an important input for economic development but strayed away from explicitly analyzing the effects of investments in human capital (Shultz 1961). This analysis was avoided for many reasons, among them that it was associated with cultural, moral and philosophical stigmas. For many, it was offensive to consider man as a form of capital, because it reminisced on the ugly past of treating man as property: i.e., slavery. Despite these social limitations, it was clear that human capital was a vital input for economic development and that different levels of investment in human capital resulted in differing rates and levels of economic return (Shultz 1961). But the analysis of investments in human capital cannot stop there. What must now be asked is, "Are all investments in human capital equal? And, do increases in men's and women's human capital have the same effects and implications?"

For the past half century, economists, politicians, and activists alike have been promoting the suffrage, equality and empowerment of women worldwide. But today, the importance of women's role in development is still not generally isolated and emphasized economically. Analysts have been wary of postulating the idea that men and women are possibly unequal in effecting differential returns to human capital development. Thus, our objective is to further analyze the role of women in human capital development within developing nations.

The benefits of nutritional improvements and social empowerment of women, the nexus of intergenerational changes in human capital (Figure 2), suggests a hypothetical model that highlights the cumulative and intergenerational importance of women's human capital. That is, at the margin, investments in women's human capital, at least in rural communities and developing nations, have greater positive implications in human capital development than do investments in men's. Because children are the future human capital resource of a country, it is vital to more effectively invest in and promote the development of those intellectual and physical resources.

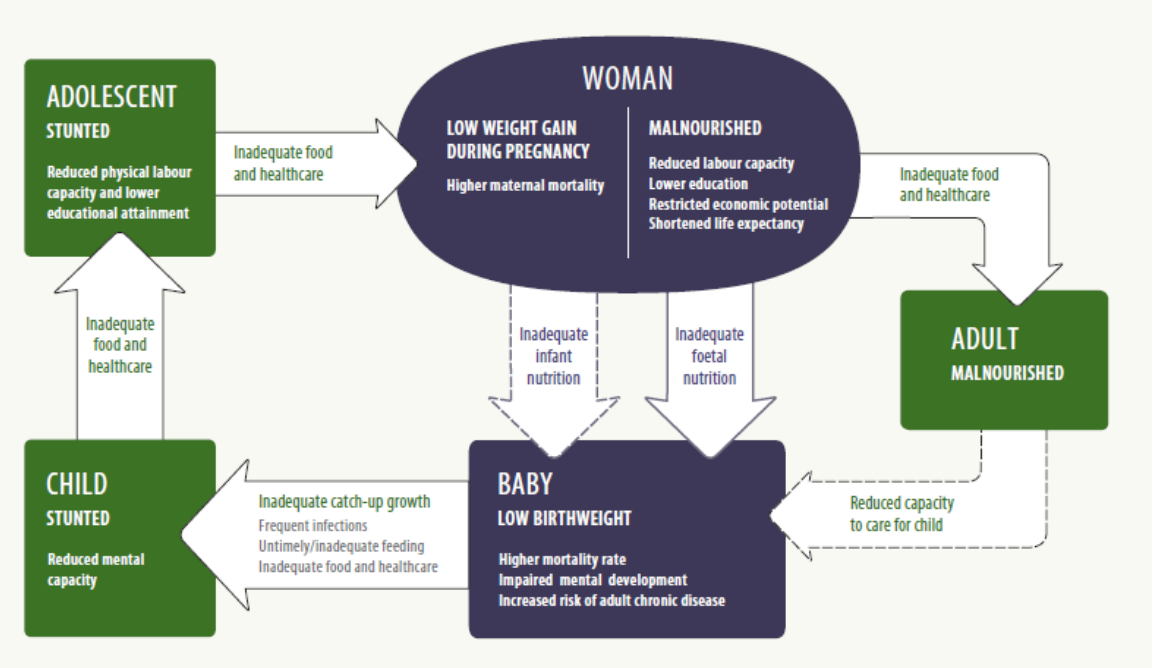

Figure 2. Intergenerational Effects
Source. UNDP Africa Human Development Report 2012a

A Model for Household Production in Development

Many women in developing countries participate in the informal production/ marketing sector of the economy, but the magnitude of this role can be undervalued. The household production function is a vital component of household welfare in developing nations. Management plays a primary role in this function, and increases in women's human capital positively affect the efficiency of management and the allocation of other inputs for household food production, especially for staples, vegetables and poultry.

Initially, most economic models of household production and consumption prescribed households as single production and consumption bodies with a unitary structure (Doss 2013). This unitary structure implied that there was conformity in household decision-making and that the household decision-making process was not affected by the distribution of and access to resources within the household. The unity structure also assumes that there are no conflicting dynamics between household members in the decision-making process (Doss 2013). Since the initial introduction of the unitary model, research has shown that the household decision-making process is much more complex than originally implied, especially for households that do not fit the western assumption of the nuclear family and may have multiple spouses and generations within a 'family unit'.

Collective models contrast to the unitary model in that they treat the household as a collection of different decision-making units, instead of representing the household as single conformed unit (Elad 1999). The concept of different measures of utilities for different household members has a real effect on the evaluation of household welfare. Under the unitary structure model, household utility was the same for all household members, because it was assumed that they all had equal access to household resources household utility could be measured by a general indicator such as total household income. But what if members of a household do not have equal access to resources or there are disparities between members? Then the assumptions of the unitary structure of the household would not hold true, and it would be necessary to find better indicators of the welfare of different household members.

Empowerment can be described as the process through which an individual gains access to the ability to make more choices (Kabeer 1999). Women's empowerment is often associated with increased access to education, income-earning opportunities, health care, legal rights, etc. Women's empowerment also relates to increases in participation in household decision-making processes and thus the allocation of resources within the household. Research has shown that increases in women's involvement in the household decision-making process have positive implications for the health, education, and nutrition of their children (Todaro and Smith 2003). Typically, the main inputs in the household production function have been considered to be Land (D), Labor (L) and Capital (K). The household transforms these intermediate inputs into final goods that they can use and consume (Ironmonger 2000). However, another component and an important input for household production to consider is Management (M):

$$\text{HH production } Q = f(D, L, K, M) \quad (1)$$

Management is a measure of the ability to optimally allocate and organize resources in production. The quality and productivity of management as an input depends largely on the household's ability to internally negotiate and allocate resources to maximize utility. Efficient management is affected by the household's equity, education, social climate, and experience, or the household's accumulation of human capital.

A subset of the collective models, which treats households as a collection of decision-making units, includes cooperative bargaining models (Doss 2013). Bargaining power is the capability of different members of the household to exert influence on the other members. Women's bargaining power affects their ability to participate and negotiate in the household decision-making process. Since bargaining power is a social dynamic, it is physically unobservable and

difficult to truly capture and quantify. Yet much research strongly suggests that education, income and assets (both physical and social) all contribute to women's bargaining power (Doss 2013). From the assumptions that women's bargaining power is positively affected by education, income and acquisition of assets (Doss 2013), and that human capital is vital for economic productivity (Todaro and Smith 2003) as well as a function of education, health, training and empowerment, it can therefore be implied that women's bargaining power is also positively affected by increases in human capital. Increases in women's bargaining power, corresponds with their ability to participate in the household decision-making process. Women's participation in the household decision-making process is associated with more equitable resource allocations and increases in child health, education, and overall welfare. It is thus hypothesized that increases in women's human capital have a greater positive impact on households, communities and society as a whole than men's. Additionally, in the biological sense, a mother's health and nutrition (or lack thereof) during pregnancy and breastfeeding affects the child's health and development, which are fundamental building blocks to the child's human capital. Thus, a child's human capital is based on the accumulation of his/her mother's human capital, posited:

$$(2) \qquad HK = h(E_m, E_f, H, T, MHK, Ch),$$

Where HK= HDI, combining indicators of life expectancy, educational attainment and income into a composite human development index….expressed as a value between 0 and 1…. "Using disaggregated HDIs at the national and sub-national levels helps highlight the significant disparities and gaps: among regions, between the sexes, between urban and rural areas and among ethnic groups. The analysis made possible by the use of the disaggregated HDIs should help guide policy and action to address gaps and inequalities." (UNDP 2013).

E_m= Expected Years of Schooling, Male
E_f= Expected Years of Schooling, Female
H= Health (Relative Life Expectancy)
T= Training
MHK = Mothers Human capital
Ch = under five mortality (per 1,000 births)

Through marginal analysis and due to the amplifying and intergenerational benefits of women's human capital, we find that investments in women's capital have greater positive benefits and implications for long-term food security and economic development than traditional academic models have given credit (Huguley 2013).

Conclusions and Implications

The intent of this research was to explicitly analyze the role of women's human capital in overall human capital development. While much of this research focuses on improvements in women's human capital in relation to the benefits it has to the human capital of their children, this should not take away from the fact that improvements in women's human capital have positive implications in their own right. However, what truly separates the difference between investments in men's and women's human capital is the intergenerational implications of women's human capital. We conclude with reaffirming that investments in men's and women's human capital can have very different implications. In countries where inequalities between men

and women are high, investments in women's human capital have greater positive implications for the long-term development of such countries than do equivalent investments in men's.

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Consumer Preferences for Local Food Products in North Carolina

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Abstract

With growing interests and concerns about nutrition and health, it has become increasingly important to understand what is preferred – extending consumer expenditure dollars towards organic or towards local food products. We address this issue by evaluating the perceptions of North Carolina consumer choices for organic, local and/or other 'labeled' food products. We investigate these preferences by conducting consumer focus groups in five locations throughout the state from three regions - Coastal, Piedmont, and Mountain. Forty-five participants were asked to participate in a 30 to 60 minute focus group assessing their attitudes about and perceptions of organic and/or local food products. Consistent patterns in all groups revealed that although females served as primary food purchasers, several households shared responsibilities based on their household preferences for local foods. Most individuals made the distinction between organic and local through labeling and held a stronger preference for local foods versus organic foods.

Keywords: organic, local, focus groups

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Introduction

The movement for organic and/or local food products is continuing to grow in the state of North Carolina. Although farmers markets serve as the most utilized sales outlet by North Carolina organic farmers, little market research has been conducted on consumer preferences for organic and/or local food products. Organic food sales have been identified as the largest growth segment in U.S. agriculture with sales increasing from $3.6 billion in 1997 to $26.7 billion in 2010. At least 78% of U.S. consumers have purchased organic foods occasionally and 40% buy more organic food than they did one year ago (Organic Trade Association 2011). Areas where increased organic production may be beneficial are grain crops due to the need of organic feed for organic livestock producers. Although interest and consumption are increasing, organic producers and manufacturers have had to deal with a weaker U.S. economy and high costs while organic imports are on the rise due to domestic shortages. All of which may provide incentives for farmers seeking viable alternative enterprises. There is, however, a concern of the 'locally grown' label on food products. Due to explicit and implicit costs associated with organic certification, farmers may find that providing local food products more beneficial than organic production adoption.

In this study, we utilize focus groups as an appropriate method for gaining a better understanding of whether North Carolina consumers prefer organic to local food products (Chang and Zepeda 2004; Zepeda et al. 2006). As noted by Zepeda et al. (2006), focus groups are useful in investigating consumer attitudes and knowledge about food products and should provide information to support further research. Ultimately, our findings are expected to provide insight on opportunities that might exist for local small-to-medium scale producers within the state.

Description of the Focus Groups

This study encompassed five focus groups involving a total of 45 participants conducted in five key cities in the mountain, piedmont, and coastal regions of North Carolina from September 2012 through August 2013. Participants who frequent five premier farmers markets in the three regions - Asheville (mountain region), Greensboro, Charlotte, and Raleigh-Durham (piedmont region), and Wilmington (coastal region) – were asked to participate in a 30 to 60 minute session to address questions regarding their attitudes about and perceptions of North Carolina organic and/or local food products. Asheville, a city of over 80,000 people located in western North Carolina, has a growing interest or movement towards local products in general according to the Appalachian Sustainable Agriculture Project (2007). Buncombe County, where Asheville and other surrounding cities are located, has over 89.06% Caucasian/White population, followed by 7.48% Black and 2.78% Hispanic or Latino of any ethnic group (U.S. Census Bureau 2013).

The piedmont region is the most densely populated region in the state of North Carolina. Greensboro, High Point and Winston-Salem, also known collectively as the Piedmont Triad, have a metropolitan population of over 1.6 million people and located in the north central section of the piedmont. Greensboro is the primary city with approximately 270 thousand people. In terms of demographic characteristics of Guilford County (includes Greensboro and High Point) in 2010, 64.53% of the population was Caucasian, 29.27% Black, 2.44% Asian, and 3.8% Hispanic and Latin American of any race (U.S. Census Bureau 2013). Charlotte, located in the

south central section of the piedmont, has over 775 thousand people with several surrounding counties contributing to the overall metropolitan population of approximately 2.3 million people. Charlotte's demographic characteristics are more diverse than the Piedmont Triad region with 64.02% White, 27.87% Black, 3.15% Asian and 13.1% Hispanic and Latino of any race in Mecklenburg County (includes Charlotte and surrounding cities) (U.S. Census Bureau 2013). The Research Triangle of the piedmont refers to the Raleigh, Durham, and Chapel Hill metropolitan area, where almost 2 million people reside. The Research Triangle region is unique because it houses the world's largest research park, Research Triangle Park. The majority of the park rests in Durham County with other portions in Wake County. Therefore, the focus group for this segment of the region took place in Durham County. In 2000 the county was 50.91% Caucasian, 39.46% Black or African American, and 7.63% Hispanic or Latin American of any ethnic group.

Wilmington is the primary city of the coastal region located in the southeastern segment. The Wilmington metropolitan area includes New Hanover, Brunswick and Pender Counties and in 2012 had a combined population of over 260 thousand people. New Hanover County (includes Wilmington and surrounding cities) has a population of 76.8% Caucasian, 14.5% Black or African American, and 1.2% Asian, 2.04% Hispanic or Latino of any ethnic group (U.S. Census Bureau 2013).

The study consisted of five groups of shoppers who frequent five premier farmers markets in the three regions identified previously. All 45 participants were recruited from pre-existing events as recommended by Kruger (1994) and utilized by Zepeda, et al. (2006). Study participants were recruited from the premier farmers markets on "high traffic days" as identified by the farmers' market managers throughout the data collection period. Participants were then asked to meet at a local Cooperative Extension office. Each cooperating participant was asked a series of questions regarding their attitudes about and perceptions of organic and/or local food products and awarded a souvenir and a $25 gift card for participation.

Greensboro included four women and three men, ranging in age from 42 to 58 years. All of the female participants were primary shoppers with one male as a primary shopper and one sharing responsibilities. Six of the participants were Caucasian with one African American. Participant incomes ranged from $52,000 to $165,000 per year with the highest education levels ranging from associates degrees to doctoral degrees or professional degrees. Charlotte included four men and 3 women, ages 35-61 years. All participants were primary shoppers with income ranging from $71,000 to $125,000 annually. Three participants were African American, one American Indian, and three Caucasian with the highest level of education obtained ranging from attending college without completion to bachelor's degrees. Wilmington included six women and three men, ranging in age from 39 to 66 years. Seven participants were Caucasian and two African American. All participants were primary shoppers with income ranging from $20,000 to $110,000 per year with highest education level ranging from bachelors to masters degrees. Raleigh-Durham included eight women and five men, ages 18-84 years. Eight participants were primary purchasers, one participant shared the responsibility, and the remaining participants were not primary shoppers or refrained from addressing the question. Seven participants were African American, four Caucasian, one White/American Indian, and one participant identified other as their ethnic group. Incomes of participants ranged from $300 to $100,000 annually.

Asheville included six women and two men, ranging in age from 22-75 years. Seven participants were Caucasian and one White Hispanic or Latin American with incomes ranging from $0 to $40,000 per year. Six participants were primary shoppers and two did not identify themselves as primary shoppers. The highest education level obtained by participants ranged from high school to doctoral or professional degrees.

Findings

Focus groups were asked a series of structured, open-ended questions concerning their attitudes about and perceptions of organic and/or local food products. The group was able to talk individually or to respond to each other with no limits place on the time. In addition to evaluating the perceptions of consumer choices for organic and locally grown products in their market, we noted the differences among consumers in the three regions identified in the state. It appears as if there were slight differences in feedback among all groups in the Piedmont region (Greensboro, Charlotte, and Raleigh-Durham), which was expected due to similar demographic and socioeconomic characteristics. The greatest difference was found between the coastal (Wilmington) and western (Asheville) regions of the state.

Differences, Similarities and Definitions

Participants were asked to distinguish between organic and local foods and whether or not they believe they were essentially the same. Greensboro, Charlotte, Raleigh-Durham, and Asheville primarily made distinctions through labeling (i.e., organic certification, local farmer grown, and other advertisements). Wilmington primarily made the contrast through price. The groups were also asked to provide their definition of local and responses ranged from products produced within a 50- to 200-mile radius. Major differences were found between Charlotte, Wilmington and Asheville, where they identified local as products grown, specifically, in North Carolina plus 50- to 100-mile radius. Further discussion revealed that there were out-of-state markets such as Tennessee, Georgia, and South Carolina closer than food products produced in the eastern regions of the state. The coastal region also served out-of-state and agritourism markets such as Myrtle Beach, Hilton Head, Charleston, and other coastal beaches in South Carolina. However, some farmers markets may hold standards of only supplying foods produced in North Carolina or specifically labeled as out of state to protect North Carolina agriculture. The groups felt that locally grown and organic had similar benefits. Many in the group purchased organic because it was pesticide free, but substituted locally grown often because of the price difference. One difficulty the shoppers have is that many of the farmers markets do not have a dedicated section for organic vegetables. The shoppers have to go to the individual stalls, some which are not marked as organic. This made it more difficult for the shopper who wanted to purchase organic.

Knowing the Farmer

In terms of knowing-your-farmer, all groups responded positively and expressed that knowing-your-farmer would help the customer become more knowledgeable of the product, establish trust through farmer integrity, realize whether safety standards have been met, and rely on a high quality product. They also felt that even if a farmer did not meet organic standards, the farmer did not use chemicals as heavy as did other farmers, making the produce safer.

Willingness-to-Pay, Factors, and Retail

All groups with the exception of Wilmington were willing to pay more for locally produced products considering knowing-your-farmer benefits and for certified organic food products. A few participants in Wilmington were somewhat uncertain due to the limited knowledge of USDA certification versus organic food products labeled by producers without certification. Many in the other regions also were unsure about certification.

Participants in all groups were also asked about factors leading to the decision to buy local food. Attributes were consistently presented as healthy, affordable, community-support, quality, taste, color, nutrition, price, and freshness. When asked about other trusted sources for local food and other products, participants presented similar responses – regional supermarkets (i.e., Harris Teeter, Food Lion, and Lowes Foods), specialty grocers (i.e., the Fresh Market, Whole Foods, Earth Fare, and Trader Joe's), producer and consumer cooperatives, and other regional, state, county, and/or city farmers markets.

Conclusion

There has been a large increase in demand for organic foods in the last decade. Many consumers have also increased the purchases at roadside and local farmers markets. This study was intended to look at consumer preferences for local versus organic foods in North Carolina. Focus group sessions were held in five regions throughout the state to determine that preference.

The consumers in this study list the benefits of local versus organic as almost the same, better nutrition, fresher, better quality, better taste and helps the local community. They note that organic vegetables have no artificial chemicals. The shoppers are willing to pay more for organic foods, but note the price difference. They tend to buy both local and organic, but purchase more local. Most tend to define local as grown in North Carolina or within 50 to 100 miles.

One issue identified is the lack of understanding the definition of organic certification, and what it takes to be organic. A program to educate the consumer is needed.

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An Analysis of the Economic Impact of Cap-and-Trade Policy on the California Food Processing Industry: A Look at Processed Tomatoes and Dairy Products

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Abstract

California Cap-and-Trade policy, sets a statewide limit on sources responsible for an estimated 85 percent of the state's greenhouse gas emissions. To maintain the cap as per the policy, individual industrial facilities in California must obtain enough allowances to cover their emissions either by purchasing allowances at auction or reducing their emissions by operating more efficiently. This research report analyses the economic impact of the Cap-and-Trade policy on the California food processing industry. The results indicate that the average cost of production in tomato processing industry may ultimately increase by 7 to 21 percent and by about 1.5 to 3 percent in dairy product manufacturing industry.

Keywords: Cap-and-Trade policy, greenhouse gas emissions, food processing

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Introduction

The Global Warming Solutions Act of 2006, or Assembly Bill (AB) 32, is a California State Law that was signed in September 2006. The AB 32 requires California to return to 1990 levels of greenhouse gas emissions by 2020. It is expected that implementing all the programs under AB 32 will lead to a reduction of 15 percent in greenhouse gas (GHG) emissions compared to a 'business-as-usual' scenario in 2020 if we did nothing at all (ARB 2011). A key element of the AB 32 is the Cap-and-Trade policy, which sets a statewide limit on sources responsible for 85 percent of California's greenhouse gas emissions, and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy (ARB 2011).

The Cap-and-Trade policy came into effect on January 1, 2012, and sets the cap in 2013 at about 2 percent below the emissions level forecast for 2012. The cap will decline by about 2 percent until 2014 and by 3 percent annually from 2015 to 2020. The program also has carbon emission allowances for each industrial sector, which is basically a 'permit' for every ton of carbon dioxide and other GHGs they emit. The allowances will be set at about 90 percent of average emissions computed from recently available data. The allowances will be distributed to each industrial facility, which are covered under this program, for free in the start, but to be purchased later in the program. As the cap goes down every year, the facilities have to obtain enough allowances to cover their emissions either by purchasing allowances from the market or reducing their emissions by operating more efficiently. Auctions for allowances have been held since August 2012. The distribution of allowances will be updated annually for industries according to the production and efficiency of each facility. During the transition period allowances will be also made for industries that are determined to be in risk of having their production replaced by imported products (ARB 2013a).

In order to meet the requirements of Cap-and-Trade regulations, firms along with buying allowances from auctions organized by ARB on a quarterly basis, can also purchase allowances from others or purchase offset credits. An offset credit can be generated by a project that reduces emissions or acts as a sink for greenhouse gases. These offset credits are allowed for up to 8 percent of a facility's compliance obligation and presently they are restricted to only emission reduction projects in the US only.

Using an established benchmarking procedure the ARB has segmented industries subject to regulation into one of three categories with associated allowance assistance provisions. Based on this procedure food manufacturing firms in California that are determined to emit over 25,000 metric tons of CO2 per year are placed in the medium leakage risk ARB classification. Industries in the medium risk category are initially awarded 100% of their allowances free of charge, whereas in period two free allowances will decline to 75% and fall to 50% during the third compliance period. At present, the Cap-and-Trade policy exempts production agriculture from the new regulations (ARB 2013a).

The implementation of the Cap-and-Trade policy introduces a new cost to food processors in California. When food processors outside California are not subjected to these new costs, it may lead to distortion of competition in these markets. In this context, the Cap-and-Trade policy may lead to carbon leakage, which is defined as "the ratio of emissions increase from a specific sector

outside the country (as a result of a policy affecting that sector in the country) over the emission reductions in the sector" (Reinaud 2008). In other words, due to increased costs, the processing sector may move away from areas where carbon emission constraints exist to areas where they do not exist. Reinaud (2008) explains that due to asymmetric policies on carbon emissions, the carbon leakage may happen by various channels. It may be through short-term competitiveness channel, where products from carbon-constrained regions may lose their market shares to unconstrained competitors, leading to change in product trade flows. It may also happen through the investment channel, where differences in returns on investment due to asymmetric carbon emission policies may lead to firms relocating to areas of less stringent carbon emission policies. It may also lead to postponing the investment to expand or maintain the production facility in the carbon-constrained region.

In this context, this research report analyses the economic impact of this Cap-and-Trade policy on California food processing industry, with examples focusing on tomato processing industry and dairy industry.

Methodology

This report takes into consideration the annual carbon emissions reported by various food-processing firms in California and published by California Air Resources Board for 2012 (ARB 2013b). The carbon emission allowances for a typical tomato processing plant and dairy processing plant are tabulated according to the timetable for emission reduction put forward by the Cap-and-Trade policy. The rate of decline of the emissions cap will be 2 percent annually until 2014 and 3 percent annually from 2015 to 2020. The value of the beyond baseline allowances that have to be purchased has been calculated by taking into consideration the settlement price of allowances determined in the allowance auctions conducted by ARB, $14 per allowance (ARB Auction Report 2013c). The allowance price for the second period was $10.71, is the price for 2016 vintage allowances during the first auction period. For the final period a forecast of $18 per allowance is allocated based on the first auction mean price, settlement price and vintage allowance price (author's calculation). The cost of emission adjustments were apportioned to the unit cost of processing and a percent increase in average cost of production is determined. This procedure is applied to California tomato processing and dairy processing industries and the results are presented below.

Results and Discussion

Tomato Processing Industry

The state of California has the largest tomato processing industry among all countries in the world. California is responsible for the production of about 95 percent of the total processing tomatoes in the United States and 30 percent of the world (see Figure 1). As many firms in this industry emit more than 25000 tons of CO2 equivalents, the Cap-and-Trade policy may impact the competitiveness of those firms. In this research, we have assumed that a tomato processing facility with a processing capacity of 240 tons per hour has a processing cost of $0.27 per pound (proprietary industry information). In table 1 the three compliance periods and the corresponding emission caps and allowances permitted are presented. The results show that due to the Cap-and-

Trade policy, the average cost of production is estimated to increase by 7 percent in the second compliance period, and by 21 percent in the third compliance period.

Dairy Product Manufacturing Industry

California has one of the largest dairy processing industries in the United States. It ranks first in the production of many categories of dairy products in the United States. It produces about 35 percent, 21 percent and 45 percent of all the butter, cheese and non-fat dry milk produced in the United States (See Figure 2). Many of these facilities have large capacities and emit more than 25,000 tons of carbon emissions, and therefor come under the purview of Cap-and-Trade policy. In this research, we have analyzed the impact of the Cap-and-Trade policy on a dual product manufacturing plant of Butter and non-fat dry milk (NFDM). We have assumed that a 199.5 million pound milk processing plant per year producing butter and NFDM will emit 33571 tons of CO2 equivalents. We have also assumed that 90 percent of the emissions are due to manufacturing of NFDM and butter manufacturing contributes only 10 percent of the total emissions in such a dual product plant. The processing cost per pound of NFDM is taken as $0.20 per pound (CDFA 2012). In table 2 the three compliance periods and the corresponding emission caps and allowances permitted are presented. The results show that due to the Cap-and-Trade policy, the average cost of production is estimated to increase by only 1.5 percent in the third compliance period. But, when a higher price for allowances if assumed, $38 per allowance as per the new U.S. government standard (Drajem 2013), the cost of production of a pound of NFDM is estimated to increase by 3.2 percent.

The results suggest that the California Cap-and-Trade policy may increase the cost of food processing in California as seen from the case study of tomato and dairy processing industries. Higher production costs may be pushed back either in the form of lower prices to producers of raw materials and/or higher prices for consumers along with lower margins for processors themselves depending upon the level of substitutability of the product and the amount of increase in processing costs. These changes may lead to producers shifting to other more remunerative crops; consumers moving to cheaper imported goods or goods from ‘not-constrained’ regions as well as the processing industry curtailing any potential capacity expansion plans. These repercussions could be mitigated to some extent by an increasing demand for locally grown products and/or for products produced with lower carbon footprint. Presently however, the Cap-and-Trade policy of California would seem to have a potential to result in negative impacts for the California food processing industry.

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Appendix

Table 1. Impact of Cap-and-Trade on Tomato Processing Industry

Period	Baseline Emission	Emission Allowance Required	Allowance Cost within Admission Adjustments	Beyond Baseline Purchased Allowance	Reduction Allowance Cost	No Reduced Emissions Scenario Cost	Additional Cost Per Pound No Change	Additional Cost Per Pound Adjustment	Percent Increase in Average Cost
2012	49,292	48,306	$0	986	$13,802	$13,802	$0.00	$0.00	
2013	49,292	47,340	$0	1,952	$27,327	$27,327	$0.00	$0.00	
2014	49,292	46,393	$0	2,899	$40,583	$40,583	$0.00	$0.00	
Period 1 Total	**147,876**	**142,039**	**$0**	**5,837**	**$81,712**	**$81,712**			
2015	49,292	45,465	$121,734	3,827	$40,983	$162,717	$0.02	$0.01	0.067799
2016	49,292	44,556	$119,299	4,736	$50,722	$170,021	$0.02	$0.01	0.070842
2017	49,292	43,665	$116,913	5,627	$60,266	$177,179	$0.02	$0.01	0.073824
Period 2 Total	**147,876**	**133,686**	**$357,945**	**14,190**	**$151,971**	**$509,916**			
2018	49,292	42,792	$385,125	6,500	$117,006	$502,131	$0.05	$0.04	0.209221
2019	49,292	41,936	$377,422	7,356	$132,411	$509,834	$0.05	$0.04	0.212431
2020	49,292	41,097	$369,874	8,195	$147,508	$517,382	$0.05	$0.04	0.215576
Period 3 Total	**147,876**	**125,825**	**$1,132,421**	**22,051**	**$396,926**	**$1,529,347**			
Post Program Cumulative Emissions Reduction	443,628	401,550							
Annual Emissions Reductions	49,292	41,097							

Baseline CO2 Emissions 49,292 metric tons
Assuming 2% reduction in emission allowance per year beginning in first year 2012
Seasonal Tonnage 10,000,000
Average Cost of 240 Ton Per Hour Tomato Past Factory, $0.24 per pound

2012-14	Period 1 Emission Per Metric Ton Cost $14.00	Assuming Initial Free Allowances at Baseline Level; Purchase O
2015-17	Period 2 Emission Per Metric Ton Cost $10.71	75% of baseline allowances for second period; Purchase 25%
2018-20	Period 3 Emission Per Metric Ton Cost $18.00	50% of baseline allowances for third period; Purchase 50%

Table 2. Impact of Cap-and-Trade on Dairy Processing Industry (Butter/NFDM Plant)

Period	Baseline Emission	Emission Allowance Required	Reduced Emissions Allowance Cost % Phase-in Purchased	Required Beyond Baseline Purchase Allowance	Above Reduced Allowance Cost	Fixed Baseline Cost	Additional Cost Per Pound No Change	Additional Cost Per Pound Adjusted	Percent of Marginal Cost No Change
100% Free									
2012	33,571	32,900	$0	671	$9,400	$9,400	$0.00005	$0.00000	
2013	33,571	32,242	$0	1,329	$18,612	$18,612	$0.00009	$0.00000	
2014	33,571	31,597	$0	1,974	$27,639	$27,639	$0.00014	$0.00000	
75% Free									
2015	33,571	30,965	$82,908	2,606	$27,912	$110,820	$0.00056	$0.00042	
2016	33,571	30,346	$81,250	3,225	$34,545	$115,795	$0.00058	$0.00041	
2017	33,571	29,739	$79,625	3,832	$41,045	$120,670	$0.00060	$0.00040	
50% Free									
2018	33,571	29,144	$262,295	4,427	$79,689	$341,983	$0.00171	$0.00131	
2019	33,571	28,561	$257,049	5,010	$90,181	$347,229	$0.00174	$0.00129	
2020	33,571	27,990	$251,908	5,581	$100,463	$352,370	$0.00177	$0.00126	
End Period Total 100% Purchased	**33,571**	**27,990**	**$503,815**	**5,581**	**$100,463**	**$604,278**	**$0.00303**	**$0.00253**	1.51%

Assumptions
Baseline CO2 Emissions: 33571 metric tons
Reduction in emission allowance per year: 2%
Volume Processed: 199500000lb
% NFDM Production/ Emissions: 69% / 90%
% Butter Production / Emissions: 31% / 10%

2012-14	Period 1 Emission Per Metric Ton Cost $14.00	Assuming Initial Free Allowances at Baseline Level; Purchase O
2015-17	Period 2 Emission Per Metric Ton Cost $10.71	75% of baseline allowances for second period; Purchase 25%
2018-20	Period 3 Emission Per Metric Ton Cost $18.00	50% of baseline allowances for third period; Purchase 50%

Table 3. Impact of Cap-and-Trade on Dairy Processing Industry (Butter/NFDM Plant)- with higher prices for allowances

Period	Baseline Emission	Emission Allowance Required	Reduced Emissions Allowance Cost % Phase-in Purchased	Required Beyond Baseline Purchase Allowance	Above Reduced Allowance Cost	Fixed Baseline Cost	Additional Cost Per Pound No Change	Additional Cost Per Pound Adjusted	Percent of Marginal Cost No Change
100% Free									
2012	33,571	32,900	$0	671	$9,400	$9,400	$0.00005	$0.00000	
2013	33,571	32,242	$0	1,329	$18,612	$18,612	$0.00009	$0.00000	
2014	33,571	31,597	$0	1,974	$27,639	$27,639	$0.00014	$0.00000	
75% Free									
2015	33,571	30,965	$82,908	2,606	$27,912	$110,820	$0.00056	$0.00042	
2016	33,571	30,346	$81,250	3,225	$34,545	$115,795	$0.00058	$0.00041	
2017	33,571	29,739	$79,625	3,832	$41,045	$120,670	$0.00060	$0.00040	
50% Free									
2018	33,571	29,144	$553,733	4,427	$168,232	$721,965	$0.00362	$0.00278	
2019	33,571	28,561	$542,658	5,010	$190,381	$733,040	$0.00367	$0.00272	
2020	33,571	27,990	$531,805	5,581	$212,088	$743,893	$0.00373	$0.00267	
End Period Total 100% Purchased	**33,571**	**27,990**	**$1,063,610**	**5,581**	**$212,088**	**$1,275,698**	**$0.00639**	**$0.00533**	3.20%

Assumptions
Baseline CO2 Emissions: 33571 metric tons
Reduction in emission allowance per year: 2%
Volume Processed: 199500000lb
% NFDM Production/ Emissions: 69% / 90%
% Butter Production / Emissions: 31% / 10%

2012-14	Period 1 Emission Per Metric Ton Cost $14.00	Assuming Initial Free Allowances at Baseline Level; Purchase O
2015-17	Period 2 Emission Per Metric Ton Cost $10.71	75% of baseline allowances for second period; Purchase 25%
2018-20	Period 3 Emission Per Metric Ton Cost $18.00	50% of baseline allowances for third period; Purchase 50%

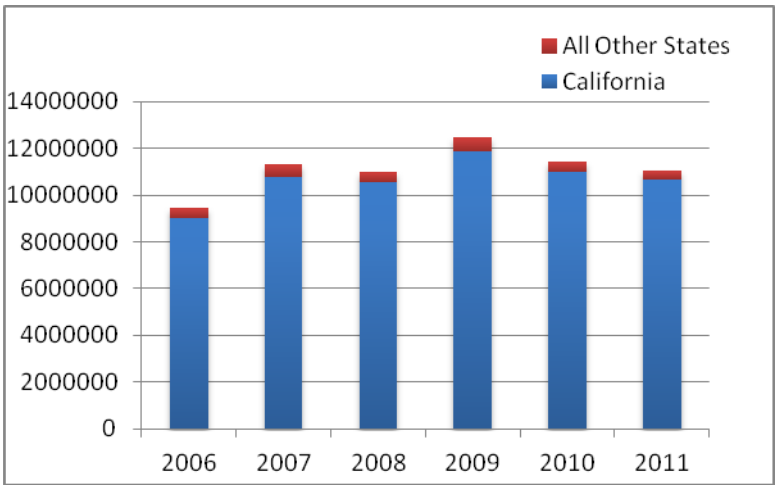


Figure 1. Share of California in U.S. Tomato Processing (million tons)
Source. World Processing Tomato Council, 2012

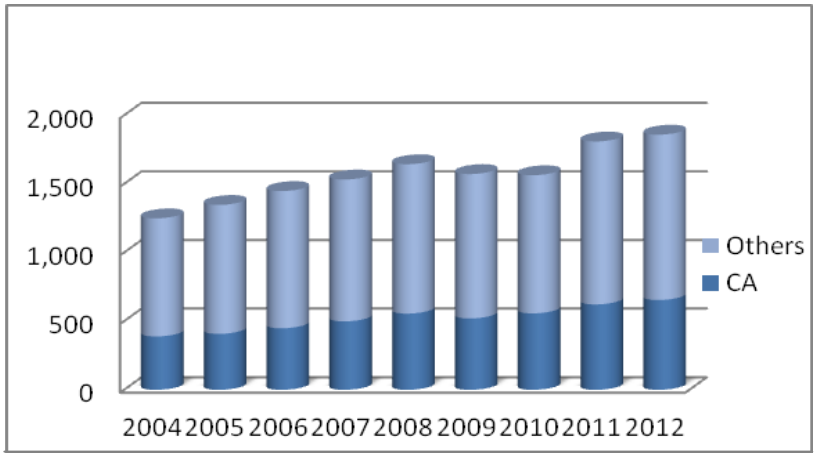
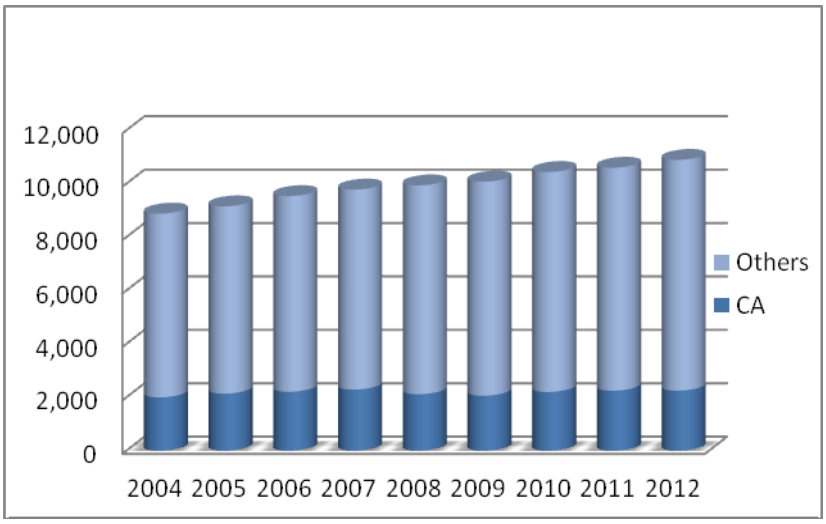
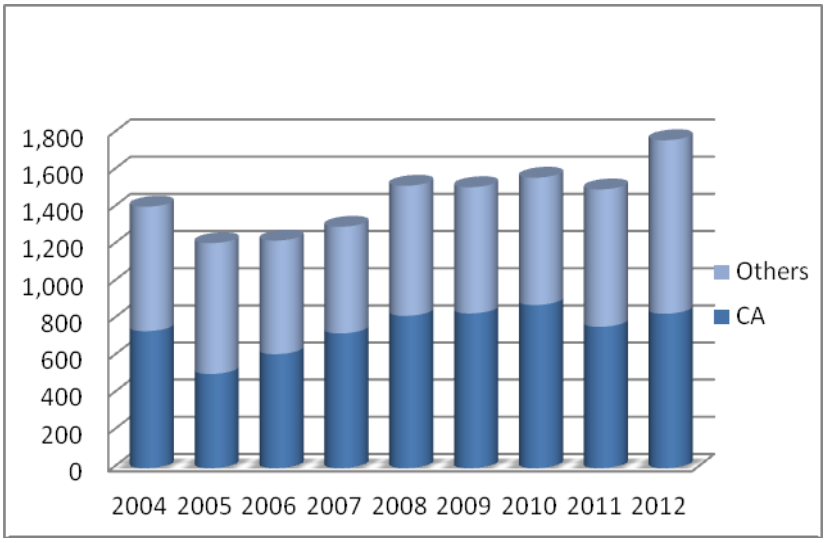


Figure 2. Share of California in U.S. Dairy Product Manufacturing (Million lb)
2 (a): Butter.
Source. USDA



2 (b): Cheese (all types).
Source. USDA



2 (c): Non-fat Dry Milk (for humans).
Source. USDA

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Food Marketing Information Literacy: Pedagogical Approaches and Student Success

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Abstract

Given the shift toward an increasingly knowledge-based economy, educators and employers have expressed the need to emphasize information literacy among students (Sternhold and Hurlbert 1998). An information-literate student recognizes the need for information and is able to locate, evaluate, and effectively use the needed information (American Library Association 2013). These skills are particularly useful in food marketing, where effective sales rely on thorough market research. Market information originates from diffuse sources, which makes it necessary to find, compare, and verify information from multiple publications. The increase in information accessibility poses the additional challenge to critically evaluate the sources, assess the information requirements, and evaluate whether the search should be further pursued. In order to most effectively teach information literacy, there is a need to assess how much guidance to provide students. Should students be guided by the instructor or rather be independent in their quest for information literacy?

Our study determines the difference between the impact of a guided vs. self-directed instruction method on students' information literacy skills. We designed a survey to assess the students' information literacy abilities, their familiarity with agribusiness research databases, their confidence at finding key pieces of information, and demographic information. In addition, objective questions tested the students' ability to locate specific types of information through common agribusiness databases. We collected data from two different sections of the same course; one section employed a guided teaching approach and the other used self-directed learning. Results indicate that a scaffolding approach, the increased usage of research databases through guided learning, will enhance information literacy more than self-directed learning. This suggests an emphasis on guided learning of information literacy in undergraduate education, however raises questions about the role of student independence. Our research provides a unique contribution by evaluating two teaching methods simultaneously in multiple sections of one food marketing class with the goal to enhance information literacy. The availability of this research provides insight to

researchers who investigate the design, development, and improvement of teaching methods for effective student learning.

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The Life Cycle Assessment for a Sustainable Georgia Food Hub

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Abstract

A food hub (USDA) is "a business or organization that is actively coordinating the aggregation, distribution and marketing of source-identified locally or regionally grown food products," sourced from primarily small- to mid-sized producers to wholesalers, retailers, institutional buyers, or consumers at a central location. A food hub can also act as a central facility providing knowledge and technical support to its grower community. Georgia recognizes a dozen aggregation hubs that have a minimum of five farms (sources) plus one viable wholesale market.

Sustainability has three components – economic/profitability, societal well-being/quality of life, and environmental quality/enhancement. The challenges to developing a business case for sustainability are two-fold: forecasting and calculating benefits and costs for a hundred-year investment plan, and gauging the system-wide effects of sustainability investments in a life cycle assessment (LCA). A LCA is system-oriented because it attempts to integrate environmental requirements into each stage of the product development and marketing process so that total impacts caused by the entire system can be reduced. The LCA normally follows three distinct steps: an inventory analysis that identifies materials and energy resources and their flow patterns; an impact analysis of qualitative and quantitative assessments of the consequences to the environment; and an improvement analysis that contemplates actions that can be taken to improve upon current conditions.

The inventory analysis requires cooperation by all participants (farmers, markets, aggregation/distribution facility) to provide relevant, verifiable and quantifiable data on all processes, equipment, structures, labor, and land to quantify the carbon dioxide equivalent (CO2e) contribution and sequestration (capture) to derive annual net carbon values (the impact assessment). The improvement analysis can be relevant and useful, especially if the net annual carbon is near carbon neutrality, as management strategy adjustments could be made without knowingly reducing product quality.

A price-based and an energy-based carbon footprint were derived for each facility using time-series and cross-sectional analysis for two Georgia food hubs (goat meat and purple hull peas food hubs). Carbon emission totals were calculated for each food hub by resource use and time

involved, and then converted into total CO2e's for the aggregation and distribution facility, only. Farmer and marketer collaborators in each food hub were unwilling to complete the inventory questionnaire. The calculated net carbon footprints for the two food hubs were:

Food Hub	**Carbon Contribution**	**Carbon Sequestered**	**Net Carbon**
	---------- MT CO2e/year----------		
Goat Meat	2,173	157	2,016
Hull Peas	1,733	125	1,608

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Marketing U.S. Lentils in Sri Lanka: A Consumer Preference Analysis

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Abstract

Lentils continue to occupy an important place in the human diet, especially in the developing countries as a source of protein, soluble and insoluble fiber, complex carbohydrates, vitamins and minerals. According to the UN comtrade, U.S. has exported $ 14.8 million worth lentils to the world in 2010. Proper understanding of that segment of population who pay more attention to the country of origin label is vitally important in strategic lentil marketing. Thus, the objective of this study is to identify the socio-demographic, preference and behavioral attributes of consumers who think that country of origin is important while purchasing red lentils, using a logit model. An intercept survey of 300 consumers was carried out in 5 different districts of Sri Lanka. Survey was carried out between July-August 2010 in three outlet types – grocery store, supermarket and other shops. Results indicate that frequency of lentil consumption per day, those who use non-packed red lentils, those who use packed red lentils with store's own label, those who think brand is an important attribute, those who work in the government sector, those who make between Rs. 45,001 and 55,000 and those who make between Rs. 55,001 and 65,000 are more likely to consider country of origin as an important factor while purchasing red lentils. Similarly, those who buy red lentils from wholesale shop, those who consider color of red lentils as an important attribute, those who consider overall appearance as an important attribute, and number of employed males in a household are less likely to consider country of origin as an important factor while shopping for red lentils. Those who promote U.S. lentils in Sri Lanka will be able to strategically market lentils with specific attributes to target consumers in Sri Lanka, based on the results from this study.

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Consumer Preferences for U.S. Food Products in Ghana

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Abstract

Food exports remain one of the few bright spots in the US trade balance. While the US balance of trade in many sectors continues to be negative, food exports continue to outstrip food imports. Efforts to maintain this competitive advantage requires a good understanding of the food preferences of consumers in countries in emerging markets such as Ghana. Such improved knowledge will help US food exporters to remain competitive and improve their market share as competition from other countries such as China and the European Union intensifies.

A market survey was conducted to elicit responses from 750 respondents in Accra, Ghana, in West Africa. Respondents were screened for prior poultry purchase experience. All respondents were persons responsible for meat purchasing in their households. Information was obtained from the respondents on their preference for poultry from countries such as the US, EU, Brazil, China and South Korea. Information was also obtained on the perceived quality and tastes of poultry from each of the countries. The data were collected by using a five-point Likert rating scale questionnaire. The percent of consumers that expressed preferences for poultry from different countries were compared.

Almost 70 percent of the respondents expressed a preference for poultry from the US. About 57 and 30 percent of the respondents expressed the same preference for poultry from the EU and China, respectively. The percent of respondents who ranked the quality of US poultry products as high exceed those that gave the same ranking to the quality of poultry from the EU and China. US poultry products also received the highest ranking based on the taste. The results suggest that Ghanaian consumers are receptive to US poultry products and associate poultry quality with the country of origin.

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A Disconnect between Appreciation of the Farmland and Commitment to Pay for Preservation: A Case for the Mid-Atlantic Farm Products and Agritourism

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Abstract

The objective of this study was to investigate the influence of public socioeconomic and value characteristics on willingness to pay more for direct market farm products and patronage of agri-tourism sites. Beyond contingent valuation approaches, this study provides an alternative approach to farmland preservation debate by contextualizing analysis on paying more for products associated with farmers' markets and agri-tourism. We argue that in order to continue enjoying Mother Nature's provisions, the public needs to directly show its willingness to politically and financially support activities that enhance land preservation. In a sense, we investigate how the actual community market behavior reflects desirability and preference for paying more toward supporting land preservation.

The research suggests that there may be a connection between farmland preservation and local farmers. Those appreciating this connection see long terms benefits and are willing to invest their dollars to enhance preservation efforts. Perhaps support of direct farmers' markets and agri-tourism activities may turn out to be a more effective way for farmland preservation complementing federal and state legislations. Those likely to vote with their dollars to support farmland preservation are individuals who increase variety of fruit and or vegetable consumption. Also individuals, who prefer to buy locally sourced farm products, visit and spend in direct farmers' markets and agri-tourism sites will more likely favor measures to support farmland preservation. The results of this study further suggest that mature, older people, people whose level of education is beyond high school are more likely to be supportive of farmland preservation. Given the scope of the survey data used, not all aspects about farmland preservation and support of local farmers are included in this study. Future studies should incorporate people's opinions on a wider spectrum of farmland preservation, and specific farmers markets and agri-tourism activities to allow more comprehensive analysis.

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Flavor of Georgia: Entrepreneurship and Value Added Products

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Abstract

The University of Georgia's Flavor of Georgia program coordinated through the College of Agriculture's Center for Agribusiness and Economic Development offers small businesses wider exposure for their locally produced barbecue sauces, jellies, preserves, cheeses, and meats. During a statewide competition, entrants' products are evaluated by food science professionals and marketers each year. Since the program went statewide in 2007, over 750 Georgia food products have been submitted to the competition. Survey results indicate that 77% of the 2013 Flavor of Georgia finalists reported increased interest in their products while 86% reported more business contacts; 45% reported an increase in sales and 27% reported an increase in profits.

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Vendor and Consumer Differences in Perceptions of Food Quality in Ghana

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Abstract

Food vendors are intermediaries between consumers and producers. To be successful, vendors must reflect consumer preferences. Consumer preferences may not be satisfied if they differ from those of vendors. This is especially so for imported food products such as poultry where intermediation by vendors may involve guessing which quality attributes consumers prefer. Consumers may also prefer poultry products from certain countries or have a preference for certain poultry brands. If information available to buyers and sellers are asymmetric, buyers may not find much value in the available products. Sellers may also be unable to take full advantage of available business opportunities by satisfying consumer demand. Such business opportunities could be substantial for poultry sellers in Ghana where most of the poultry is imported. This study assesses vendor and consumer differences in the perceptions of the quality attributes of poultry products in Ghana.

A market survey was conducted in 2011 and 2012 to elicit responses from 750 respondents in Ghana in West Africa. The survey elicited information on general food attitudes and preferences. The mean responses of consumers and poultry vendors relative to their poultry quality and country of origin preferences were compared.

Ghanaian consumers and vendors indicate that the United States (US) is the most preferred country of origin for poultry products. China was the least preferred country of origin by consumers and vendors. These results may be explained by the perception by both consumers and vendors that poultry from the US is of the highest quality. Poultry from China is perceived by both groups as having the least quality. With the exception of China, US branded poultry products do not seem to have much of an edge over those from the European Union (EU). Both poultry con-

sumers and vendors indicate that they are most likely to buy Ghanaian poultry products. Both groups were least likely to buy poultry products from China. For all countries, vendor scores are higher than those of consumers. The only exception is Ghana where consumer scores exceed vendor scores on country of origin, poultry quality, poultry brand and likelihood of purchase. Vendors are more likely to perceive imported poultry, and poultry from the US is viewed as both desirable and of high quality. Marketing US poultry products based on a combination of country of origin and branding may be a winning strategy to increase the market share for US poultry products in Ghana.

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Willingness to Buy Organically Grown Ethnic Greens and Herbs: An Econometric Analysis

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Abstract

To increase profitability, many farmers have been adopting the move towards growing specialty crops, such as ethnic herbs and greens. The growing immigrant population also brings a niche demand for familiar foods of their homelands. The total population of United Stated increased by 9.5% from 282.1 million in 2000 to 309 million in 2010. From 2000 to 2010, Hispanic population increased by 34% from 35.6 million to 47.8 million, while Asian population increased by 32% from 10.7 million in 2000 to 14.2 million in 2010, which exceeded the 9.7% growth rate for the mainstream population in this time period. Organic sector is one of the fastest growing agricultural markets in the U.S and sales of organic products have increased on average by 20% annually, since 1990. Increased consumption of organic produce among ethnic consumers is also a significant contributor to the produce market. But so far no study has made significant attempt to document ethnic consumers' willingness to buy organic ethnic greens and herbs. The main objective of this study is to gather market information on ethnic customer behavior towards willingness to buy organic ethnic greens and herbs in the east-coast region of United States. A survey questionnaire was prepared for ethnic groups including Hispanics and Asians in east-coast region from Florida to Maine including Washington DC and based on random sampling, 1,117 samples of shoppers who purchased ethnic greens and herbs were interviewed in 2010. The survey instrument asked respondents whether they were willing to buy organically grown ethnic produce, and based on this, a logit model was developed to predict the willingness to buy organically grown ethnic greens and herbs. Of the total sample, 75.2% of the respondents were willing to buy organically grown ethnic greens and herbs. The variable AVAILABILITY indicated that better availability and wider variety of ethnic greens and herbs positively influence consumers' willingness to buy organic ethnic greens and herbs. The variable FOODSAFETY indicated that those who are concerned about food safety are more likely to buy organic ethnic greens and herbs. Those who read food label and those who use ethnic greens and herbs for health reasons are more likely to buy organic ethnic greens and herbs. As expected, income played an important role in the willingness to buy organic ethnic greens and herbs.

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Bed and Breakfast: An Analysis of Consumer Preferences for Eco-Agritourism

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Abstract

Agritourism, which includes on farm direct to consumer sales, educational tours, agritainments and outdoor recreational activities, generated $566 million in aggregate for 23, 350 U.S farms in 2007. The State of New Jersey, which promotes agritourism actively, generated $57.53 million in 2005 from agritourism activities. Govindasamy et al. (1998) found that New Jersey farm operators who engaged in direct marketing and agritourism were likely to complement higher income levels than farmers who did not undertake such activities. Tourism and Agriculture rank as New Jersey's number two and three industries, respectively. Operating in the most densely populated state, New Jersey growers are increasingly surrounded by a mobile, affluent population that demands quality fresh agricultural products. Furthermore, the growing suburban and urban populations in the Mid-Atlantic region increasingly have little or no direct connection to the agricultural industry. Past agritourism studies have focused on outcomes and benefits that encourage farmers to start agritourism and other on-farm activities, whereas, other studies focused on demand for on-farm agritourism activities such as pick-your-own, farm visits, and on-farm recreational trips. In order to promote direct marketing and agritourism as a method for complementing and or supplementing on-farm income, it is necessary to explore consumer interests, needs, and preferences pertaining to these activities and opportunities. Thus, the objective of this study is to identify the socio-demographic, preference and behavioral attributes of consumers who participate in bed and breakfast activity as an agritourism event, using Logit model. The results from the model indicate that the chi-square statistics exceeds its critical value and, thus, rejects the null hypothesis that none of the explanatory variables is statistically significant. Furthermore, the model achieved 77.00% success in-sample prediction rate. Out of forty independent variables, ten variables are statistically significant at least at the 10% level.

The results indicate that those consume a wider variety of fruits, those who learn about agritourism from on-farm market sign, those who think that basic amenities at agritourism site is important, those who are retired and those who earn between $60K and 79K are more likely to

participate in bed and breakfast activity as an agritourism event. On the other hand, those who learn about agritourism from newspaper, number of children below 17 years of age in the household, males, those with 2-year college education, homemakers and those who earn between $20K and 39K are less likely to participate in bed and breakfast activity as an agritourism event. Agritourism operators will be able to target potential consumers based on the results of this study to attract more customers to their bed and breakfast agritourism activity to enhance their economic opportunity.