

Consumer willingness to pay for organic and locally grown produce on Dominica: insights into the potential for an “Organic Island”

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Abstract With the intent of improving agricultural revenues and solidifying her place as an ecotourism destination, it has been proposed that the island nation of The Commonwealth of Dominica convert all agriculture to organic production. This study explores Dominica’s current and potential domestic demand for organic and/or “locally grown” produce. Surveys were conducted with Dominican consumers to assess their opinions and willingness to pay for these products, and evaluated using a maximum likelihood estimation procedure. On average, Dominican consumers are willing to pay 17.5 % more for organic, and 12 % more for locally grown, produce. These results were varied significantly across demographic segments of the sampled population, respondent tastes and preferences, the health status of their family, and the extent to which they were early adopters of new products. Despite several expected challenges of a successful transition to organic, implementation of this policy may offer a net positive welfare increase for Dominica’s permanent residents. Results from this analysis suggest that, from the perspective of domestic consumers, Dominica should continue to pursue the possibility of becoming an “Organic Island.”

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1 Introduction

Dominica faces a unique set of challenges. As with many other Caribbean nations, Dominica has historically been dependent upon agriculture. Over the past several hundred years, the island's economy has been largely supported through the concentrated mono-cropping of export-oriented crops. Today, approximately 40 % of Dominica's labor force is employed in the agricultural sector (CIA 2013).

Due to its lack of white sand beaches, unlike its neighboring countries, Dominica has not economically benefitted from being a typical tourist destination. Instead, Dominica has attempted to increase tourism by catering to the preferences of eco-/wellness tourists. In an effort to bridge its agricultural foundations with the ecological preservation needed to support its tourist industry, the government of Dominica now has interest in transforming Dominica into an organic island ("Organic Dominica") by 2015.

On its face, this economic development strategy appears widely advantageous. Moreover, a significant number of farmers have expressed genuine interest in organic production and have begun to adjust their production from conventional to organic practices. Some important and potentially limiting technical and social hurdles exist, however. From the production perspective, Dominica currently has no farms certified as organic. While out of necessity, practices used by many of Dominica's small producers are organic, they cannot be accredited as such due to an absence of local regulations and a local auditing process. Additionally, there is need for technical expertise to support organic production and for a national lab to assist with water, soil, and plants testing. The volunteer-based Dominica Association of Organic Movement (DOAM), in collaboration with Dominica's Division of Agriculture, and support from US-AID and other groups, has been leading efforts to develop an internationally recognized organic certification process to help overcome these other technical barriers (Chemonics 2007).

Challenges remain on the consumer demand side as well. Tourists and foreign students offer an important source of foreign exchange and are anticipated to welcome the conversion to organic production. The impact on Dominica's permanent population, however, is not as clear. As organic production tends to be more labor intensive than conventional production, to the extent producers need to adjust their production practices and use more labor, those employed in the agricultural sector will benefit. Use of organic inputs, however, is generally more costly and particularly so when procuring them on a small island. For a majority of the population, it can be anticipated that conversion to an organic island will likely increase domestic food prices. This will have important consequences.

1.1 Study objectives

Evaluating the impact of Dominica's organic transition on domestic consumers will require further information about both the consumer willingness and ability to pay more for organic products and changes in production costs. This study is focused on the first of these challenges as they apply to the potential demand for fruits and vegetables.

Specifically, the study seeks to (1) assess Dominican consumer willingness to pay (WTP) for (a) organic and (b) locally grown produce products and (2) identify factors that contribute to, or detract from, consumer WTP for (a) organic and (b) locally grown produce.

In addressing these objectives, this study explores issues of produce availability and factors which currently limit consumer ability to purchase organic and/or locally grown products. Results generated from this study will help to inform whether, from the perspective of Dominica's domestic market, converting Dominica to an organic island improves economic social welfare.

2 Background

2.1 Historic and situation overview

The Commonwealth of Dominica, West Indies, is a middle-income, Small Island Developing State (SIDS) located north of the coast of Venezuela. Dominica has a small landmass covering an area of 750 km² and a population of 72,660. Dominica's economy is small, open, and vulnerable and as a member of the Eastern Caribbean Currency Union has an exchange rate pegged to the US dollar (IMF 2007). Unemployment, however, is high (23 %; CIA 2013), and food security is an important problem. Indeed, in a study by Wall-Bassett et al. (2012), 28 % of adult respondents reported that they went hungry or did not eat enough because there was not enough money for food, and over half (58 %) reported that they were financially unable to feed their children balanced meals. Of those who are employed, 40 % of Dominica's labor is employed in agriculture,¹ while the industrial and services sectors, respectively, account for 32 and 28 % of labor employment (2002 est.; CIA 2013). Per capita GDP is \$7,021 USD (2010; United Nations 2012). Dominica is considered a developing country (IMF 2013).

Historically, Dominica's economy has been highly dependent upon monocrop farming of cash crops. This started with sugar some 300 years ago (Honychurch 1995) and has continued with the dominant production of coffee, limes, vanilla, and finally bananas (Chemonics 2007). Concentrated monocropping and heavy reliance on cash crops, in general, have left the Dominican economy vulnerable to natural disasters and the volatility of international commodity markets. Particularly challenging was legislation implemented in 2001 that ended country-specific allocations for preferential access to the European Union market for bananas (Alexandraki and Lankes 2004). Losing this preferential access made it difficult for Dominica and other Caribbean islands to compete with large-scale banana producers in Central and South America. Timing of this loss of preferential access coincided with an economic and financial crisis. After years of increasing public debt, by 2001, Dominica's government faced a liquidity crisis (lack of cash flow) and was able to secure additional critical financing only at damagingly high interest rates (IMF 2005). Aggravating the situation were concurrent agricultural losses from a severe drought and the reduction in tourism resulting from the September 2001 terrorist attacks. Collectively,

¹ This value reinforces the importance of agriculture to Dominica's economy. This proportion is considerably higher than that reported in neighboring countries: the percent of labor employed in agriculture is 10 % in the Barbados, 11 % in Granda, 22 % in Saint Lucia, and 26 % in Saint Vincent and the Grenadines (CIA 2013).

these factors necessitated the intervention of the International Monetary Fund, and Dominica entered into a structural stabilization agreement in 2002 (IMF 2002).

Dominica's response to this crisis included a commitment to diversify its economic base. While its location along common cruise ship routes would naturally suggest tourism as an option, due to a lack of white sand beaches, it is not possible to market Dominica as a typical Caribbean tourist destination. Thus, in an effort to attract non-traditional tourists, beginning in the late 1990s, Dominican tourism initiatives emphasized the island's natural and relatively untouched amenities and targeted eco- and wellness tourists. Recently, this focus has expanded to include agro-tourism (Chemonics 2007).

To help ensure that Dominica's terrain and ecosystems are maintained for ecotourism, the Dominican government is embarking on a programme to establish Dominica as an "organic island" (Casimir et al. 2006). This initiative would require that all agricultural production on the island be produced consistent with accepted organic practices. All inputs used in agricultural production (i.e., germplasm, fertilizer) would also be required to be certified organic² under the proposed program. In addition to increased tourism, leaders and farmers in Dominica recognize the potential that organic production could provide residents in terms of healthier and safer food, healthier soils, greater biodiversity, and even reductions in poverty (Scialabba 2007). Most importantly from an economic development perspective, given the strong international demand for organically produced foods, this change could open large and potentially lucrative markets for Dominica's agricultural output.³

2.2 Preference for and valuation of organic and locally grown foods

Food intake and lifestyle habits influence one's wellness, and/or the risk one has for diseases such as cancers, diabetes, heart disease, hypertension, and obesity. While commonly associated with North American lifestyles, these illnesses are also a cause of morbidity and mortality in Dominica and elsewhere in the Caribbean region (Cubillos-Garzón et al. 2004) where these illnesses are largely associated with recent dietary transitions (CARICOM 2010). Many Dominicans, especially those living in urban areas, now frequently eat fast foods high in cholesterol instead of eating traditional foods that have higher nutritional value. According to Jew et al. (2009), dietary changes from healthy to processed foods has resulted in chronic diseases worldwide that could be avoided with an appropriate food intake level.

Though consumer preference and WTP for healthy food is diverse in any society, trends are clear that the market for organic product is increasing developed world (Janssen et al.

² One could argue that to truly be an "Organic Island," all imported food products and agricultural inputs should be certified as such. Given the cost and challenges of producing livestock on the island, a significant amount of meat and meat preparations are imported (Casimir et al. 2006). Further, as Dominica has limited capacity to grow feedstock except legumes, feedstuffs are generally imported from nearby islands (Chemonics 2007). Sourcing organic versions of these products would be difficult and would significantly increase the price of both domestic and imported protein sources. This, in turn, would adversely affect Dominica's poor who already face some food insecurity. As such, it is proposed that organic foods, including meats, be imported specifically for use in hotels and restaurants in order that these venues may be fully organic (Casimir et al. 2006).

³ For example, a large supermarket chains in the United Kingdom has approached a number of regional governments with a view to entering into arrangements with local farmers to produce organic produce for their retail locations. Further, a number of companies in the United States are seeking to secure supplies of organic fruits and root crops from producers in Jamaica, Dominica, and other Windward Islands (Chemonics 2007).

2009; Yiridoe et al. 2005; Vander Mey 2004). Further, many nutritionists and proponents of organic products argue that organic foods reduce the risk and delay the onset, of the chronic age-related diseases. While there remain calls to investigate the health claims used to promote organic foods and foodstuffs (Rosen 2010), increasingly, evidence suggests that organic fruits and vegetables provide more micronutrients for a given food volume than does the conventionally grown produce and that these organic products may include important protective phytonutrients like polyphenols and antioxidant pigments (Benbrook et al. 2008; Hunter et al. 2011).

The concept and evaluation of “locally grown” food markets have not been well explored in developing country contexts. This is not unexpected as the attribute of “locally grown” has little relevance to many consumers in these settings who may be challenged by issues of food insecurity, inaccessibility, and/or safety. This issue is relevant, however, in instances where local production is export oriented and domestic consumption is largely (or historically) satisfied through imports. This is the case for Dominica. Transitioning agricultural production for use by domestic consumers and the domestic tourism industry, rather than exports, has been suggested for the Caribbean (Timms 2006; Torres and Momsen 2011). This approach has an added benefit of helping to reduce the carbon footprint of the tourism industry (Gössling et al. 2011).

It is uncertain whether preference for organic and locally grown products would hold in a developing country where the attributes and potential benefits of these foods are less well known. As consumers commonly have concerns about food safety and quality (Wilcock et al. 2004; Grunert 2005), and as most who are familiar with organic products view them as being healthier than conventional alternatives (Hughner et al. 2007), it is likely that with information, if given the option, developing country consumers would also prefer organic products. There thus remains a need to determine whether Dominican consumers are willing to pay a premium for organic or locally grown foods. Regardless of the answer, this information will be of use in assessing feasibility of a converting Dominica into an organic island.

3 Survey, sampling, and data collection

Though Dominica’s population is small, the population’s food demand preferences are diverse. Dominica’s domestic population is largely composed of descendants of enslaved Africans brought to work on the island’s colonies. There is also a unique and small population of Carib Amerindians on the island. Tourists and those attending the island’s international medical school are an additional source of demand.

A survey was administered to consumer purchasers of produce to assess their WTP for organic and locally grown produce. The survey collected information on consumer sociodemographic characteristics, household food purchasing habits, and consumer attitudes and opinions regarding attributes of organic and locally grown produce.⁴ The survey instrument was based on published literature (Van der Mey 2004; Teratanavat and Hooker

⁴ The ability and WTP for organic and locally grown produce will also vary between consumers and businesses that purchase these products. Surveys were also developed and administered to: (1) fresh food vendors and, (2) foodservice operators (i.e., restaurants). As Dominica hosts a relatively small number of these establishments, it was possible to collect only a limited number of observations from these groups (8 vendors, 28 foodservice operations respectively). Due to the small number of observations, a complete analysis of these markets is not possible. These results do, however, offer an interesting complement to the consumer results and are reported where appropriate.

2006; DFNC 2001; Lusk and Hudson 2004; Govindasamy et al. 2001) and in consultation with subject experts. An iterative pretesting approach was used that included feedback from the study and interview team, Dominican government officials, and potential respondents. To minimize the time needed for survey administration, a structured questionnaire format in which a majority of the questions were close-ended was selected. Due to its relative priority among research objectives, the survey was structured such that questions first explored consumer WTP for organic produce and then that for local produce. The survey question used to collect respondent WTP for organic products is replicated in the Appendix; an equivalent question was used to collect information concerning WTP for local produce.⁵

Surveys were distributed at nine locations of varying population densities (rural, suburban, urban) frequented by those of varied socioeconomic backgrounds. A wide geographic and demographic variation among these survey sites was intentionally selected to capture the most representative sample of Dominica's population possible. The interview locations included the primary market areas and rural centers where most of Dominica's consumers shop. The Roseau market is located in the capital (population 14,874) and is Dominica's prime fresh produce market. Portsmouth and Mahaut are the second and the third largest cities with populations of 3,600 and 2,400, respectively. Other surveyed sites include the suburban area of Pointe Michel, and the rural areas of Calibishie, Salisbury, Castle Bruce, La Plaine, and Marigot (Fig. 1). Surveys were administered from May to August 2009.

Consumer participants were recruited through a systematic intercept approach⁶. The interviewer made their introduction, shared a brief synopsis of the project, and obtained their verbal consent to participate. Surveys were administered as face-to-face interviews because this approach yields higher response rate and a higher quality of responses (Miller et al. 2007). This approach also offered the benefits of allowing respondents of various literacy rates to participate and to ask any clarifying questions. Interviews were conducted by a Dominica citizen familiar with both the island's food production practices and the food marketing environment. A majority of interviews were conducted in English, the most common language of both the island's domestic population and visitors; in a few instances where preferred by respondents, interviews were conducted in Dominican Creole French. On average, interviews lasted 19 min.

4 Descriptive characteristics of consumer respondents

Table 1 summarizes several key sociodemographic characteristics of the sampled individuals and compares them to available data for Dominica's overall sociodemographic profile. On the basis of gender, the surveyed individuals proportionally represent Dominica's population. White and Asian respondents and individuals living in rural areas were slightly oversampled. The lack of published data for educational level, household income

⁵ The complete survey is available upon request from the corresponding author.

⁶ In this application every x th person who passed a selected point in the open market (e.g., a bench or light post) or x th customer of a roadside stand was approached and asked about their willingness to participate. In instances where a selected individual opted not to participate, the next x th person was approached. This approach was selected to help ensure that participants were randomly selected; in not using this technique participant selection may be biased toward individuals who appear more friendly and/or likely to participate.

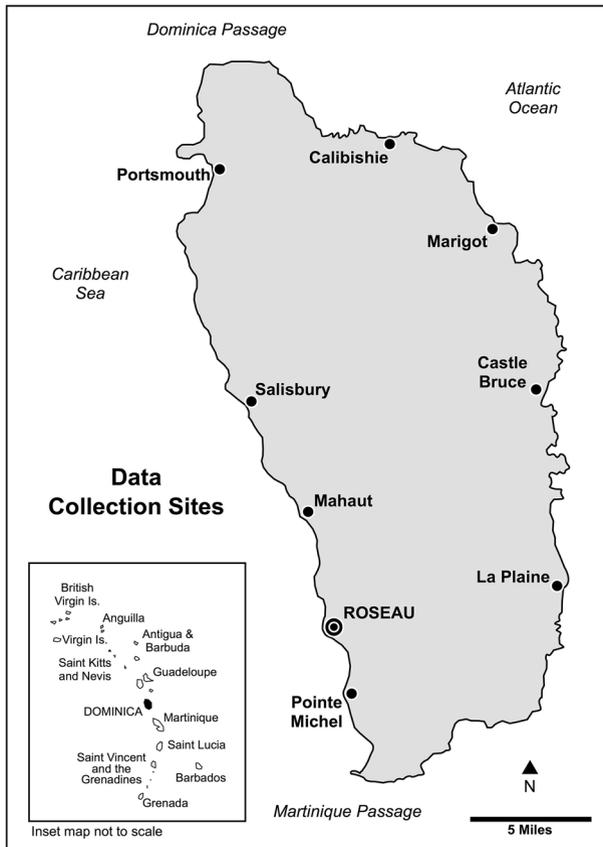


Fig. 1 Map of data collection locations

level, and marital status prevented a comparative analysis of these sampled characteristics to the overall population. Despite some deviation, the sample does generally reflect the diversity of Dominica's resident population.

4.1 Food purchasing behaviors

Of the 188 usable responses, 74.0 % were the primary food purchaser for their household. On average, surveyed households spend \$223.28 XCD (82.39 USD) weekly or 34.5 % of their income on food purchases. Of this, \$64.99 XCD (23.98 USD) or 10.0 % of their income is spent on fruits and vegetables. Ninety-two percent reported that their families make an effort to eat healthy foods. Over one-fifth (22.5 %) of respondents indicated that a household member has nutrition-related health problems.

4.1.1 Demand for organic products

A majority of consumers (98.5 %) indicated that they were familiar with the term "organic." Respondent's understanding of this term was somewhat limited, but generally

Table 1 Demographic characteristics of surveyed consumers compared with Dominica's overall population

Demographic characteristic	Category	Percent (%) of Surveyed respondents	Percentage (%) of Dominica's population ^a
Gender	Male	45.7	51.2 %
	Female	54.3	48.8 %
Age (in years)	18–24	14.9	
	25–34	27.7	
	35–44	32.0	76 % ^b
	45–54	20.2	
	55+ years	5.3	10.2 ^c
Location	Urban	21.3	
	Suburban	29.3	74 % ^d
	Rural	48.9	26 % ^e
Education	Primary/secondary	38.3	n/a
	Vocational/2 and 4 year college	44.7	n/a
	Graduate studies	17.0	n/a
Monthly household income (XCD)	<\$999	17.0	n/a
	\$1,000–1,999	26.1	n/a
	\$2,000–2,999	22.3	n/a
	\$3,000–3,999	11.2	n/a
	>\$4,000	23.4	n/a
Ethnicity	Black	68.0	86.8 %
	Mixed/Indigenous	17.0	11.8 %
	Asian	7.0	n/a
	White	8.0	0.8
Marital status	Single	59.0	n/a
	Married	37.0	n/a
	Divorced/separated	4.0	n/a

$n = 188$ consumers; 2.71 XCD = 1 US Dollar

^a Proportion of population age 15–64 years

^b Proportion of population over 65 years is 10.2 %

^c Proportion of urban and suburban in population

^d Proportion of rural in population; *n/a* not applicable

^e Source of data <https://www.cia.gov/library/publications/the-world-factbook/geos/do.html> (CIA Factbook)

correct; through an open-ended question, most reported that they understood the term to refer to products grown without hormones or chemicals. Survey results clearly indicate substantial interest in purchasing and selling organic products. Despite this strong interest, however, 45.4 % of consumers reported organic products are not available where they most commonly shop. Moreover, 35.1 % of all consumers reported lack of availability as the primary factor that limited/prevented their purchase of organic products. This was particularly true for consumers in the more rural northern portion of the island where few

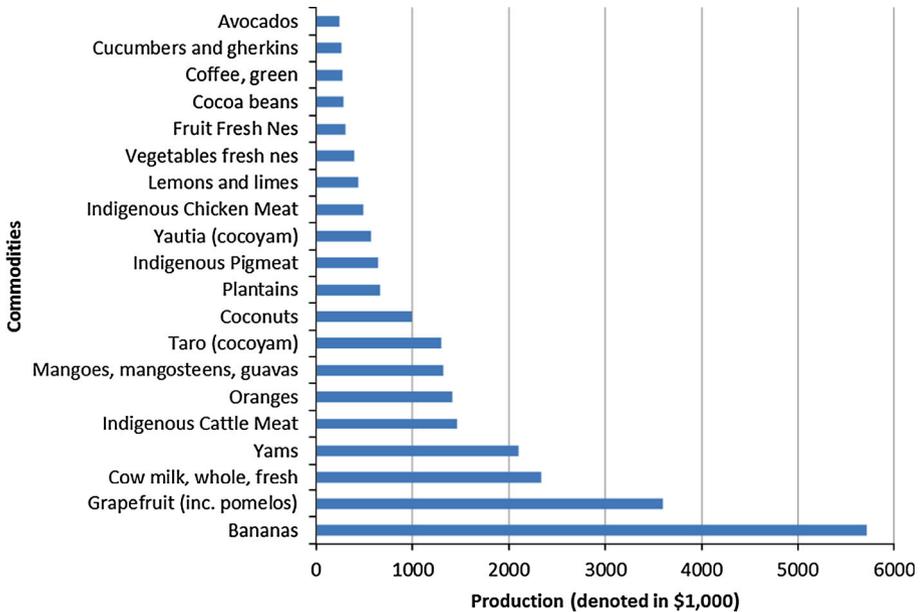


Fig. 2 Dominica's main agricultural products in 2010. *Source* FaoSTAT 2012

producers undertake organic production. When available, leafy greens (lettuce, cabbage, and spinach), carrots, tomatoes, cucumbers, and bananas are the most commonly purchased organic products. Less commonly purchased organic products include a wide variety of other fruits and vegetables and a few animal products (chicken, milk, eggs).

A complementary survey of food vendors ($n = 28$) found that a majority (84.6 %) sell or have a desire to sell organic products.⁷ Those currently selling organic products most commonly stock organic string beans, sweet corn, eggplants, herbs (parsley, thyme, chives), and Irish potatoes. These vendors, however, noted that their supply of these organic products is limited and indicated an interest in selling a more extensive variety than they are currently able to procure. In particular, survey responses by both consumers and food vendors also indicate that there is considerable unmet demand for organically produced poultry, beef, pork, goat meat, milk, and eggs on the island.

4.1.2 Demand for locally grown products

Nearly 72 % of surveyed consumers defined "locally grown" as food that was grown on the island of Dominica. Other consumer definitions described "locally grown" as an island subarea located near their household (22.3 %), or as grown somewhere within the Caribbean region (6.3 %).

Fresh and prepared food vendors defined "locally grown" as foods produced on Dominica (84.5 and 85.1 %, respectively). All vendors selling locally grown foods indicated that it was either "very important" or "extremely important" to their customers that the food they sold was grown on the island. Similarly, prepared food vendors also reported

⁷ Additional details of this survey are presented in George (2010).

that it was “very important” to their customers that their prepared food was grown in Dominica and, ideally, in their local community.⁸

4.1.3 Factors limiting consumption of organic and locally grown produce

Limited availability and variety of organic products, lack of an organic standard and certifying institution, and the currently high price premiums for these products were identified as constraints to the consumption of organic products. The lack of proper certification from a recognized and respected institution is the most problematic of these challenges. Several respondents noted that they were not confident that products marketed as organic truly were. In particular, food vendors and food service operations who sell organic products want verifiable assurance that organic practices had been adhered to. With an accepted certification program, customers would be able to distinguish organic from conventionally produced foods, and once trust is established between producers and consumers, consumers would likely increase the quantity of organic food purchases and the price premium they are willing to pay.

5 WTP model specification and empirical results

5.1 Contingent valuation and WTP

This study employs a contingent valuation method to determine the price premia consumers are WTP for locally produced and organic produce grown in Dominica relative to conventionally produced produce of unspecified origin. Contingent valuation is a commonly used, non-market-based approach to valuation. This approach provides individuals the opportunity to state their additional WTP for an item relative to another item, or how much they would have to be paid to accept an item they perceived to have lower value. Because the elicited values are contingent upon the described market, this approach has become known as the contingent valuation method (Venkatchalam 2004).

5.2 Consumer WTP empirical model

Consumer WTP for organic and locally grown foods is hypothesized to be dependent on a variety of respondent household characteristics and attitudes. The conceptual specification of the equations used to estimate either WTP for organic produce or WTP for locally grown produce is presented in Eq. (1):

$$\text{WTP}_i = \alpha + \beta_1 Y_i + \beta_2 Z_i + \beta_3 \pi_i + \mu_i \quad (1)$$

where WTP_i maximum price that respondent i is willing to pay for the product; Y_i annual household income of respondent i ; Z_i vector of household sociodemographic characteristics of respondent i ; π_i vector of risk, cost concerns, and attribute perceptions of respondent i of the product, α and β_1 , β_2 , and β_3 are the model parameters to be estimated, and μ_i is a random error term.

Consumer WTP for organic and locally grown produce was separately estimated. In each case, WTP was conceptually specified as a function of household economic

⁸ Given the extensive diverse variety of crops produced by Dominica’s smallholder farmers, respondents were not asked which specific products were desired but not available locally. An overview of the variety of Dominica’s agricultural production is presented in Fig. 2.

characteristics, socio-demographic characteristics, health status of household members, and respondent perceptions of the relative risk and attributes of organic, locally grown, and conventionally grown produce (Eq. 1). For each respondent considered, sociodemographic characteristics included gender, age, marital status, educational level, family size, ethnicity, business occupation, existing household nutritional problem, and location of residence. Respondents were asked a wide variety of questions to determine their risk concerns, cost concerns, and attribute perceptions toward organic or locally grown products. On the basis of these results, variables were constructed to model these attributes. Those included in the final model were measures of importance (of product freshness, consuming food grown without chemicals, and produce price), measures of strength of belief (that conventional products are safe, that organic is too costly, that locally grown foods are more nutritious), preference (for organic produce, for local produce), willingness to try new food products, and desire to support local producers.

The econometric procedure employed to estimate consumer mean WTP for both organic and locally grown produce was adapted from the contingent valuation literature for situations where the observed value of the dependent variable falls within an interval range (Stewart 1983; Bhat 1994). The specific WTP question for organic produce was posed as follows: “Suppose your favorite fruit or vegetable regularly costs \$2.00 per kg. Relative to this baseline value, please check the box that contains your maximum willingness to pay for an organic version of this product.” The twelve closed-interval response options were provided that allowed respondents to express their WTP a premium, or need to receive a discount, to purchase an organic version of a \$2.00/kg conventionally produced version of the same product⁹. An equivalent interval-based question was also used to estimate consumer WTP for locally grown foods. The latent structure of the WTP models has the following form:

$$WTP_i = \mathbf{x}'_i\beta + u_i \quad (i = 1, \dots, N), \tag{2}$$

where WTP_i is the true (but unobserved) WTP for the i th individual, X_i is a vector of explanatory regression variables (representing the economic factors, sociodemographic factors, and individual risk and quality perceptions), β is a conformable vector of parameters to be estimated, and u_i is a random variable with cumulative distribution function F . The observed information concerning the dependent variable is that it falls into a certain interval k with a lower boundary value given by $A_{(k-1)}$ and an upper boundary value, A_k . Therefore, the probability that WTP_i falls in the k th interval is given by

$$P(A_{(k-1)} \leq WTP_i \leq A_k) = P(WTP_i \leq A_k) - P(WTP_i \leq A_{(k-1)}) \quad i = 1, 2, \dots, N. \tag{3}$$

Making use of Eq. (2) and the distribution of u_i , Eq. (3) can be rewritten as

$$\begin{aligned} P(A_{(k-1)} \leq WTP_i \leq A_k) &= P(u_i \leq A_k - \mathbf{x}'_i\beta) - P(u_i \leq A_{(k-1)} - \mathbf{x}'_i\beta) \\ &= F(A_k - \mathbf{x}'_i\beta) - F(A_{(k-1)} - \mathbf{x}'_i\beta) \quad i = 1, 2, \dots, N. \end{aligned} \tag{4}$$

Using a dummy variable d_{ik} to indicate whether a consumer chooses interval k , the log likelihood function for this model, assuming a random sample of n individuals from the population of interest and a total of K intervals, is given by:

⁹ Relative to a baseline price of \$2.00, respondent consumers were asked to indicate which of twelve closed intervals contained their maximum WTP to pay value for each item. The twelve bounded intervals were [0, 1.09], [1.10, 1.39], [1.40, 1.59], [1.60, 1.79], [1.80, 1.89], [1.90, 2.00], [2.01, 2.10], [2.11, 2.20], [2.21, 2.40], [2.41, 2.60], [2.61, 2.90], and [2.91, 4.00].

$$\log L = \sum_{i=1}^n \log \sum_{k=1}^K d_{ik} \{F(A_k - x'_i \beta) - F(A_{(k-1)} - x'_i \beta)\} \quad (5)$$

Estimating parameters for Eq. (5) requires assuming a specific distributional form for F ; most commonly, it is assumed that the distributions are normal and lognormal (Bhat 1994). Models were estimated for both distributions to evaluate the sensitivity of estimated results to the distribution assumption. Maximization of the log likelihood function (5) was performed using MATLAB.

There was little difference between the results estimated using the normal versus the lognormal distribution; this suggests that results are robust with respect to assumptions regarding the error term distribution. Given space constraints, results are only presented for the models that assume a normal error distribution. Following the empirical literature, both homoscedastic (restricted model, constant variance) and heteroscedastic (unrestricted model, non-constant variance) versions of both WTP models were estimated. The heteroscedastic model allows the estimated variance to change with the level of the explanatory variables. Heteroscedasticity was incorporated into the estimation procedure using the multiplicative form $\exp(\mathbf{z}'_i \alpha)$, to estimate the sample standard deviation, where \mathbf{z}'_i is the vector of explanatory variables and α is a parameter vector to be estimated. Likelihood ratio tests rejected the homoscedastic model in favor of the heteroscedastic specification. For both WTP models, the null hypothesis that the value of the explanatory variables does not affect the variance of their distribution was rejected at the 5 % level. Correcting the estimated models for heteroscedasticity had a minimal impact on estimated model parameters, indicating that the mean WTP function is not sensitive to the heteroscedastic correction. For completeness, results for both the homoscedastic and heteroscedastic corrected models are presented and interpreted in the next sections.

5.3 WTP for organic and locally grown produce

Table 2 summarizes the consumer responses for organic and locally grown produce. A majority of respondents indicated that they are willing to pay a price premium for organic (87.7 %) or locally grown (76.5 %) produce as compared to conventional versions of the same product. As expected, a few respondents indicated that they would only purchase organic (or locally grown produce) if it were less expensive than the same conventionally produced product. Overall, there was a 54.3 % sample correlation coefficient for consumer willing to pay a price premium for both products.

Estimated mean WTP strongly indicates that consumers are willing to pay a price premium for both organic and locally grown products. Relative to the \$2.00/kg baseline price, mean consumer WTP is \$2.35/kg (17.5 % more) for organic products and \$2.24/kg (12.0 % more) for locally grown non-organic products. These reported WTP values are average values across two consumer types. The WTP for local (organic) is the average valuation of the attribute across consumers who regularly buy organic and non-organic (local and non-local) products.¹⁰

¹⁰ The survey design does not allow us to explore the complementarity or substitutability of the local and organic attributes. As such, we do not know if the WTP value for organic products is dependent upon the product growing location and vice versa. This also implies that the total WTP for a local organic product is not necessarily (and is, indeed, unlikely to be) the direct sum of the reported WTP values for the organic and local attributes.

Table 2 Distribution of self-reported WTP values for organic and locally grown produce

Interval group	WTP lower bound (\$)	WTP upper bound (\$)	Interval midpoint (\$)	Midpoint WTP relative to conventional baseline (%)	Distribution of respondents reported WTP	
					Organic (%)	Locally (%)
1	0.00	1.09	0.545	-47.5	1.6	3.7
2	1.10	1.39	1.245	-37.5	1.1	4.3
3	1.40	1.59	1.495	-25.0	0.5	3.2
4	1.60	1.79	1.695	-15.0	0.5	1.1
5	1.80	1.89	1.845	-7.5	1.1	2.7
6	1.90	2.00	1.950	-2.5	7.4	8.5
7	2.01	2.10	2.055	2.5	23.9	22.3
8	2.11	2.20	2.155	7.5	12.8	12.8
9	2.21	2.40	2.305	15.0	12.2	10.1
10	2.41	2.60	2.505	25.0	16.5	12.2
11	2.61	2.90	2.755	37.5	8.5	6.9
12	2.91	4.00	3.455	47.5	13.8	12.2

Upper- and lower-bound prices are relative to a baseline price of \$2.00. Sample size: $n = 188$

The maximum likelihood values for the estimated parameters included in the final models that explain consumer WTP for organic or locally grown produce are reported in Table 3 for both the homoscedastic and heteroscedastic WTP models. To facilitate the comparison between the estimated organic versus the estimated locally grown model, it is important to note that the same individuals provided the survey data used to estimate the two WTP equations.

Table 3 presents parameter estimates for the organic and locally grown WTP models. The models have eight explanatory variables in common. The organic model is further augmented by additional four explanatory variables unique to understanding organic produce demand; the locally grown model is similarly augmented by two additional variables. Variables common across models include of respondent age (six intervals; 1 = lowest and 6 = oldest), monthly household income (five intervals: 1 lowest, 5 highest), marital status of household head (married = 1, else = 0), and presence of a nutritional health problem in household (yes = 1, no = 0). Other variables included in both models reflected respondent opinion concerning the following: importance that produce is grown without chemicals, the importance of product freshness, importance of price as a consideration in food purchases, and extent of agreement that conventionally produced foods are safe to eat. In each case, five options were provided to respondents to rate the extent of their agreement with each statement. In analyzing these variables, relatively strong ratings (i.e., very important, important) were categorized as 1 and other ratings (i.e., moderately important, of little importance, and unimportant) as 0.

The four additional explanatory variables included in the organic model reflect respondent preference for organic over conventional foods (yes = 1, no = 0), importance that food is produced locally (very important and important responses = 1, other ratings = 0), respondent household is among first to try new food products (among first to try = 1, other ratings = 0), and belief that organic foods are too costly (strongly agree and agree = 1, other ratings = 0). While several were examined, few additional variables offered an improved understanding demand for locally grown produce. The two additional

Table 3 Consumer WTP for organic and locally grown produce in Dominica

	Organic		Locally grown	
	Homoscedastic model	Heteroscedastic model	Homoscedastic model	Heteroscedastic model
<i>Mean</i>				
Intercept	1.350*** (0.246)	1.288** (0.186)	1.477*** (0.174)	1.483*** (0.172)
Age	0.066** (0.030)	0.061** (0.028)	-0.006 (0.032)	-0.005 (0.030)
Married	-0.149** (0.068)	-0.107** (0.061)	-0.148** (0.072)	-0.112** (0.065)
Income	0.053*** (0.023)	0.040** (0.020)	0.053** (0.024)	0.049** (0.023)
Nutritional health problems in household	0.206*** (0.073)	0.149** (0.068)	0.128** (0.077)	0.118* (0.077)
Consider product freshness important	0.064 (0.134)	0.029 (0.132)	0.388*** (0.141)	0.332*** (0.141)
Consider conventionally produced foods as safe to consume	-0.097* (0.067)	-0.048 (0.060)	-0.212*** (0.069)	-0.142** (0.062)
Important or very important that produce is grown without chemicals	0.097* (0.065)	0.055 (0.058)	0.114** (0.068)	0.036 (0.066)
Price of Produce is an important or very important consideration	-0.066 (0.063)	0.010 (0.062)	-0.152** (0.067)	-0.089* (0.065)
Agree that organic foods are too costly	-0.163*** (0.060)	-0.181*** (0.059)		
Preference for organic over conventionally produced produce	0.423*** (0.168)	0.527*** (0.094)		
Important that food is produced locally	0.183*** (0.073)	0.205*** (0.067)		
Among first to try new food products	0.057** (0.029)	0.056** (0.026)		
Purchase locally grown foods to support local business			0.365*** (0.070)	0.449*** (0.078)
Purchase locally grown foods because they are more nutritious			0.292*** (0.069)	0.217*** (0.0065)
<i>Standard deviation (σ)</i>				
Intercept	0.388*** (0.023)	-1.515*** (0.451)	0.414*** (0.024)	-0.705 (0.112)
Married		-0.412*** (0.133)		
Nutritional health problems in household				0.193* (0.149)
Consider conventionally produced foods as safe to consume				-0.181* (0.138)
Price of produce is an important or very important consideration		-0.337*** (0.126)		
Agree that organic foods are too costly		-0.305** (0.135)		
Preference for organic over conventionally produced produce		1.019** (0.450)		

Table 3 continued

	Organic		Locally grown	
	Homoscedastic model	Heteroscedastic model	Homoscedastic model	Heteroscedastic model
Purchase locally grown foods to support local business				-0.541*** (0.153)
Purchase locally grown foods because they are more nutritious				-0.541** (0.274)
Log likelihood	-424.656	-414.075	-436.044	-430.122

$n = 188$

The heteroscedastic model was estimated using the multiplicative form $\sigma = \exp(\alpha'z)$, where z is the vector of explanatory variables and α is a parameter vector

Numbers in parentheses are asymptotic standards errors

*** (**, *) significance at the 1 (5, 10) % level, respectively

variables specifically related to assessing WTP for locally grown production were included and consist of respondent desire to support local businesses (yes = 1 and no = 0) and belief that locally grown produce is more nutritious (yes = 1, no = 0).

As reported in Table 3, estimated parameter values for both the organic and locally grown models are not dramatically impacted by the estimation approach (homoscedastic versus heteroscedastic) and are thus robust with respect to the estimation technique. However, likelihood ratio tests rejected the null hypothesis of constant error variance at the 0.01 significance level for the organic equation and at the 0.05 significance level for the locally grown equation. Thus, the heteroscedastic models provide better estimates of parameter standard errors and associated p values.

Other demographic and household characteristics, such as education level, respondent gender, and ethnic background, which are commonly found to be related to WTP for organic products, were insignificant in this study and as such are not included in the final models.

5.3.1 Organic model

Respondent age, monthly household income, and having at least one household member with a nutritional health problem are all statistically significant and positively correlated with WTP. Consistent with prior studies, results reveal that respondents with at least one household member with a nutritional health problem were willing to pay a positive price premium for organic products. Moreover, as would be expected, the magnitude of their WTP premium is larger for organic products than locally grown non-organic products. Surveyed individuals generally reported that they understood the potential benefits of organic production as improved food safety handling practices and elimination of synthetic chemicals and thus offering health benefits due to reduced residues. While “locally grown” was considered to offer benefits of freshness, this did not always translate to a perceived improved nutrient content. As anticipated, respondents with a preference for organic foods are willing to pay a greater premium for organic foods than those who do not share the preference. Other variables positively correlated with the WTP are the willingness of respondents to try new foods and respondent preference for locally produced foods. Surprisingly, only a weak positive statistical relationship between WTP for organic produce

and the importance that food be grown without chemicals was estimated (0.17 in the heteroscedastic model). This marginal significance may be attributable to the sample size in combination with the multicollinear relationship between explanatory variables concerning preference for products that are grown without chemicals and preference for organic foods.

Marital status is significant but negatively related to WTP. Other studies have not found a consistent relationship between marital status and WTP or actual amounts paid for organic produce (positive: Botonaki et al. 2006; insignificant: Groff et al. 1993; negative: Lin et al. 2008). This unexpected finding could be attributable to the additional financial commitments married households have (e.g., children or elders) and reduced disposable income these households have to pay a premium for organic foods after controlling for household income. A strong negative statistical relationship was also estimated for individuals who responded that organic foods were too expensive and their reported WTP.

No statistically significant relationship was detected between the explanatory variables—product freshness, conventionally produced foods are safe, or food is available at an affordable price—and WTP for organic foods. A weak non-statistically significant negative relationship was estimated between conventional foods are safe and mean WTP for organic products. Thus, not unexpectedly, there is some support for the hypothesis that individuals who believe conventionally produced food is safe have a lower WTP for organic than those who believe otherwise.

5.3.2 *Locally grown model*

Five of the eight variables common to both the organic and locally grown WTP models were both statistically significant and had the same signs on estimated parameter values. The three parameter estimates that differ either in sign or significance are age, product freshness, and the strength of belief that conventional foods are safe. First, in the organic model, a strong positive relationship was estimated between respondent age and WTP. However, age is not significant in explaining WTP for locally grown foods. This might indicate that older individuals are more concerned with nutrition and more strongly identify healthy food as being organic production than locally grown production. Second, respondents stating that they believe conventional foods are safe to consume have a statistically significant lower WTP for locally grown foods relative to those who do not share this belief. Only a marginally significant negative statistical relationship between the strength of belief and WTP was estimated for the organic model. Third, in contrast to the organic model, a strong positive relationship was estimated between the importance of product freshness and consumer WTP for locally grown foods. This result is consistent with other recent research (Darby et al. 2008).

The variables unique to the locally grown model were both statistically significant at the 0.01 probability level. Individuals stating a desire to support local business and/or are of the belief that locally grown food are more nutritious have a greater WTP for locally grown foods.

5.3.3 *Relative importance of variable attributes on consumer WTP*

Table 4 reports the semi-elasticities or percentage change in WTP for a one-unit change in each explanatory variable when all other explanatory variable values are maintained at their mean values. The reported semi-elasticities were derived for the heteroscedastic corrected version of the organic and locally grown food models.

Organic produce Several results are worth highlighting. Factors which were found useful in explaining consumer WTP for organic products were diverse but all intuitively consistent. The preference for organic over conventionally produced foods was strong and translated to 22.4 % higher WTP for organic products. Consumers who felt it important that food is produced locally were willing to pay 8.7 % more for organic products than a consumer who does not share that belief. Similarly, with all other explanatory variables held at their respective mean values, those who reported that they are among the first to try new products were WTP 2.4 % more for organic produce than those who would not describe themselves in this way.

Consumers who simply prefer organic foods or who believe them to be of better quality than non-organic are willing to pay an average of 22.4 % more for these products. Those who are among the first to try new food products could be considered food innovators or early adopters. These individuals like the novelty of new food products and, in the case of Dominica's organic produce, are willing to pay a small price premium (2.4 %) for it.

Locally grown produce Those who believe that purchasing locally grown foods also has a positive impact on local businesses were willing to pay a notable 20.1 % price premium for these products. Further, and consistent with the earlier discussion regarding product freshness, the perceived nutrition offered by locally grown produce was also an important determinant of WTP (+9.7 %). Product freshness was also very highly valued by some respondents. Those who considered freshness "important" were willing to pay, an average of, 14.8 % more for locally grown produce than respondents who did not similarly value this attribute.

Organic and locally grown produce Those that agree that conventionally produced foods are safe to consume are not willing to pay more for either organic or locally grown produce. While this result was anticipated for organic products, the large and significant negative impact for locally grown products was not expected. On average, Dominican

Table 4 Percent change in WTP for organic and locally grown produce given a one-unit change in the independent variables: heteroscedastic model

	Organic	Locally grown
Age	2.6 %**	-0.2 %
Married	-4.6 %**	-5.0 %**
Income	1.7 %**	2.2 %**
Nutritional health problems in household	6.3 %**	5.3 %*
Consider product freshness important	1.3 %	14.8 %***
Consider conventionally produced foods as safe to consume	-2.0 %	-6.4 %**
Important or very important that produce is grown without chemicals	2.3 %	1.6 %
Price of produce is an important or very important consideration	0.4 %	-4.0 %*
Agree that organic foods are too costly	-7.7 %**	
Preference for organic over conventionally produced produce	22.4 %***	
Important that food is produced locally	8.7 %***	
Among first to try new food products	2.4 %**	
Purchase locally grown foods to support local business		20.1 %***
Purchase locally grown foods because they are more nutritious		9.7 %***

The change in WTP for dummy variables represents the difference in WTP when the dummy increases from zero to 1

*** (**, *) significance at the 1 (5, 10) % level, respectively

consumers who believe conventionally produced foods are safe would require a 6.4 % price discount to be willing to accept produce grown locally. This finding indicates that many Dominican consumers who view outputs from conventional growing practices as safe, view domestically grown produce (whether organic or not) to be inferior to conventionally grown produce from elsewhere. This result is supported by findings concerning price. Individuals for whom price is an “important” or “very important” consideration, a 4 % price discount would be required to get the average consumer willing to accept locally grown Dominican produce as compared to the same produce grown elsewhere. Neither of these variables was significantly related to consumer WTP for organic fruits or vegetables.

Conversely, respondents with household members who have nutritional health problem reported a higher WTP for both organic and locally grown produce. Having a family member affected with such an ailment lead respondents to be WTP an additional 6.3 % price increase relative to their baseline WTP (on average 17.3 %) for organic products. This would translate to a WTP of 23.6 % (or \$0.47) more for a \$2.00 conventional product. Similar results were observed at the 10 % confidence level for locally grown products. Here, a 5.3 % price increase was willing to be paid by those with ill family members above and beyond the (average) 12 % increase already willing to be paid for locally grown products. Respondents clearly attributed some wellness benefits to conventionally produced local products over those from unidentified locations.

Collectively, these results suggest that most consumers prefer that their food is both organic and local.¹¹ When asked explicitly about the costs of organic foods, however, there was significant and strong agreement that organic foods are too costly. Considering these results in light of the previously reported findings suggests that purchasers of Dominica’s locally grown products are more price sensitive than organic buyers, but that the cost of organic products are, nonetheless, limiting consumer’s willingness to purchase them.

6 Discussion and policy implications

To comprehensively estimate the net economic impacts of converting Dominica to an organic island in terms of agricultural sector profitability and employment, additional information on organic production cost and regional export demand is needed. Currently, no information is available for organic production cost in Dominica¹². However, studies in other regions suggest that the cost of organic production relative to conventional production can vary substantially with resource and technology availability and the specific crops grown.

In most developed country research, switching from conventional to organic production increases production cost. For example, increased labor requirements and the use of relatively more expensive organic pesticides and fertilizers have been estimated to increase fruit and vegetable production cost by more than 20 % in some settings with tight labor markets (e.g., Brumfield et al. 2000). However, it is unlikely that the increased cost of organic production relative to conventional production in Dominica will be as large as the relative difference reported for developed countries for two reasons. First, conventional agricultural production in Dominica uses less efficient production technologies and does not enjoy the economies of scale observed in efficient agricultural sectors of developed

¹¹ This result is consistent with findings from vendor survey that asked vendors to rate the importance of these attributes to their customers.

¹² To the authors’ knowledge.

countries. Secondly, Dominica's high unemployment and underemployment rate would allow the additional labor needed for organic production to be hired without bidding up the wage rate to attract additional workers from other sectors of the economy.

Additional research is needed to accurately estimate the difference between conventional and organic production expenses in Dominica. Complicating this is the concern that the availability of organic agricultural production inputs in Dominica is quite limited and that increased demand for these inputs would certainly exacerbate their scarcity. This issue has been recognized and efforts have been proposed to foster the domestic production of organic inputs (Casimir et al. 2006). It is unlikely, however, that all required inputs could be domestically supplied, especially in the short run. Thus, due to Dominica's island status, the costs of sourcing and transporting organic inputs must be included in this relative cost assessment.

Additional opportunity costs of organic production must also be considered. These opportunity costs are the potential yield losses associated with possible increases in pest populations and crop diseases and potential declines in soil fertility. Seufert et al. (2012) report that organic fruit yield is frequently lower (−3 %) and vegetable yield can be significantly lower (−26 %) than conventional production. Given that the average price premium Dominican consumers are WTP for organic produce is 17.5 % per kg, the price premium may be unable to offset both the increased production cost and potentially lower yield for some crops. Furthermore, organic production often incurs additional start-up expenses beyond explicit production costs. Start-up expenses may consist of employee training, facility and procedure changes to adhere to organic requirements, and the cost of the certification audit program.

A potential net economic benefit of conversion is that the increased labor intensity of organic production relative to conventional production would provide job opportunities for Dominican residents. Dominica's overall unemployment rate is 23 % (2000; CIA 2013) and among poor households is 40 % (UNDP 2013). Thus, despite the labor intensiveness of organic farming, converting Dominica to an organic island could prove to be an effective economic development strategy because additional jobs and purchasing power would be created without putting upward pressure on the island's wage rate.

In addition to the direct additional income and employment impacts from organic production, if Dominica successfully develops an organic farming input industry, additional upstream jobs would be created. Moreover, additional downstream jobs and revenues sources would be created if organic products can be marketed to neighboring islands. The conversion to organic will also likely provide additional economic benefit by enhancing Dominica's burgeoning ecotourism industry.

Beyond these overall economic benefits, however, other welfare effects of the transition to an organic island must also be considered. If Dominica were to become very successful exporting a small number of organically certified products, this could result in decreasing the amount and/or variety of organic products for local markets. The final consumer welfare consequences of this outcome would depend on the degree of complementarity or substitutability between local and organic attributes¹³.

¹³ Few studies have explored the degree of complementarity/substitutability between the local and organic attributes for fresh produce and the results are far from conclusive. Onozaka and McFadden (2011), for example, found that local and organic have independent values. On the other hand, Costanigro et al. (2012) and Yue and Tong (2009) found that these two attributes are substitutes. More recently, Meas et al. (2013) found that the complementary or substitution relation depends upon the definition of local.

Dominica's residents would also be impacted in other ways from living on an organic island. Agricultural workers would no longer be exposed to non-organic inputs. Consumers, in general, would gain additional access to healthy and pesticide-free foods, which may decrease the incidence of adverse health issues. Combining these impacts, organic products are likely to benefit both individuals and the government through reduced long-term health care costs. It will be important, however, to avoid further exacerbating Dominica's already notable income inequality. For low-income households who do not benefit from an increase in household wage income (e.g., through agriculture or tourism sectors), or a decrease in household costs (e.g., healthcare), will be confronted with higher food prices. Transfer payments or an organic product price subsidy may be needed to compensate households made worse off by the organic conversion.

7 Conclusions and future research

Dominican consumers are willing to pay more for both organic and locally grown produce. Even though 45.4 % of all consumers reported that organic products are not available where they most commonly shop, 80.1 % of the same consumers indicated they agreed or strongly agreed with the statement "I would buy more organic produce if it was more readily available." Among the organic foods identified as most desired were tomatoes, cabbages, carrots, citrus, "ground provisions" (yam, taro), plantain, bananas, lettuce, and spinach. On average, consumers are willing to pay a 17.5 % price premium for organic and a 12.0 % premium for locally grown produce relative to produce supplied and produced by conventional sources.

Frequently mentioned factors that now limit or inhibit the consumption of organic products consisted of limited supply, the lack of an organic standard and certifying institution, and the perceived high price premium. An accepted certification program would allow customers to distinguish organic foods from conventionally produced foods and improve consumer confidence with regard to product quality. If consumer confidence in product quality is enhanced, consumers are likely to increase both the quantity they consume and the premia they are willing to pay for organic produce. Moreover, implementation of an organic certification program might attract more farmers and processors to organic production if they believed the program would enhance domestic sales and the probability of exporting organic produce to other Caribbean islands or beyond.

Converting Dominica to an organic island would serve to reduce Dominica's chronically high unemployment rate given the relative labor intensiveness of organic to conventional production. Moreover, the documented consumer higher WTP for locally grown foods, indicates that, if given the option, consumers would substitute locally produced products for imported food supplies. This import substitution would further increase agricultural employment. Further, the island may benefit from an increase in tourism as the novelty of visiting an "organic island" is likely to attract additional eco-tourists.

There is a strong need for additional research on this topic. As starting point, information concerning the WTP for specific organic products on other Caribbean islands would be useful to better understand regional demand and export opportunities. Further, a more complete understanding of the scale of demand for organic produce within the region would permit an efficient reallocation of Dominica's agricultural land to products with the greatest profit potential. It is very clear that most consumer would purchase additional organic and locally grown produce should it become more widely available at a reasonable

price. Overall findings suggest that, from the perspective of domestic consumers, Dominica should continue to explore the possibility of becoming an “organic island.”

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Appendix

The question used to capture respondent WTP for organic products is reproduced below. An identical question was used later in the survey to capture WTP for locally grown products.

The question used to capture respondent WTP for organic products is reproduced below. An identical question was used later in the survey to capture WTP for locally grown products.

22. Suppose your favorite fruit or vegetable regularly costs \$2.00 per kg. Would you pay slightly more for an organic version of this product?

Yes _____ (go to Q.22a) No _____ (go to Q.22b)

22a. How much would you be willing to pay for an organic version of this product?

- i. Between \$2.01 and \$2.10? _____
- ii. Between \$2.11 cents and 2.20? _____
- iii. Between \$2.21 cent and \$2.40? _____
- iv. Between \$2.41 cent and \$2.60? _____
- v. Between \$2.61 cent and \$2.90? _____
- vi. More than \$2.91? _____

22b. How much would you be willing to pay for an organic version of this product?

- i. Between \$1.90 and \$2.00 _____
- ii. Between \$1.80 and \$1.89 _____
- iii. Between \$1.60 and \$1.79 _____
- iv. Between \$1.40 and \$1.59 _____
- v. Between \$1.10 and \$1.39 _____
- vi. Less than \$1.10 _____

References

- Alexandraki, K., & Lankes, H. P. (2004). The impact of preference erosion on middle-income developing countries. *International Monetary Fund WP/04/169*.
- Benbrook, C., Zhao, X., Yanez, J., Davies, N., & Andrews, P. (2008). New evidence confirms the nutritional superiority of plant-based organic foods. The Organic Center. http://www.organiccenter.org/science.nutri.php?action=view&report_id=126. Accessed June 5, 2013.
- Bhat, C. R. (1994). Imputing a continuous income variable from grouped and missing income observations. *Economic Letters*, 46(4), 311–319. doi:10.1016/0165-1765(94)90151-1.
- Botonaki, A., Polymeros, K., Tsakiridou, E., & Konstantinos, M. (2006). The role of food quality certification on consumers' food choices. *British Food Journal*, 108(2), 77–90. doi:10.1108/00070700610644906.
- Brumfield, R. G., Rimal, A., & Reiners, S. (2000). Comparative cost analyses of conventional, integrated crop management, and organic methods. *HortTechnology*, 10(4), 785–793.
- CARICOM. (2010). CARICOM Regional Food and Nutrition Security Policy. Retrieved October 20, 2013, from http://www.fao.org/fileadmin/templates/righttofood/documents/project_m/caricom/CARICOM_RegionalFoodandNutritionSecurityPolicy-5october2010.pdf.
- Casimir, A. -M., Oderson, D., Petersen-Polo, J., McCarthy, M., St. Ville, O., & Chesney, P. (2006). Transforming Dominica into an Organic Island. Consultancy report for the Government of the Commonwealth of Dominica, Ministry of Agriculture and the Environment, and the SIDS Unit, UNEP/ROLAC.

- Central Intelligence Agency (CIA). (2013). The World Factbook 2013–14—Dominica. Washington, DC. <https://www.cia.gov/library/publications/the-world-factbook/index.html>. Accessed June 5, 2013.
- Chemonics International. (2007). Dominica Organic Agriculture Movement and Development of Organic Production in Dominica. Produced for review by US Agency for International Development.
- Costanigro, M., Kroll, S., & Thilmany, D. (2012). Local, organic, conventional—Asymmetric effects of information and taste on label preferences in an experimental auction. *Selected Paper, AAEA/EAAE Food Environment Symposium (Boston, MA)*. AgEcon Search. Retrieved October 1, 2013, from <http://ageconsearch.umn.edu/handle/123199>.
- Cubillos-Garzón, L. A., Casas, J. P., Morillo, C. A., & Bautista, L. E. (2004). Congestive heart failure in Latin America: The next epidemic. *American Heart Journal*, *147*(3), 412–417. doi:10.1016/j.ahj.2003.07.026.
- Darby, K., Batte, M. T., Ernst, S., & Roe, B. (2008). Decomposing local: A conjoint analysis of locally produced foods. *American Journal of Agricultural Economics*, *90*(2), 476–486. doi:10.1111/j.1467-8276.2007.01111.x.
- Dominica Food and Nutrition Council (DFNC). (2001). Dominica Food Consumption Pattern and Lifestyle Survey (1996). Commonwealth of Dominica. The Dominica Food and Nutrition Council (DFNC) in Collaboration with the Government of Dominica and the Caribbean Food and Nutrition Institute. Dominica.
- George, N. (2010). *Willingness to pay for locally grown and organically produced fruits and vegetables in Dominica*. MS thesis prepared for the Department of Applied Economics and Statistics, Clemson University, Clemson, SC.
- Gössling, S., Garrod, B., Aall, C., Hille, J., & Peeters, P. (2011). Food management in tourism: Reducing tourism's carbon 'footprint'. *Tourism Management*, *32*(3), 534–543. doi:10.1016/j.tourman.2010.04.006.
- Govindasamy, R., DeCongelio, M., Italia, J., Barbour, B., & Anderson, K. (2001). Empirically evaluating consumer characteristics and satisfaction with organic products. New Jersey Agricultural Experiment Station P-02139-1-01.
- Groff, A. J., Kreider, C. R., & Toensmeyer, U. C. (1993). Analysis of the Delaware market for organically grown produce. *Journal of Food Distribution Research*, *24*, 118–125.
- Grunert, K. G. (2005). Food quality and safety: Consumer perception and demand. *European Review of Agricultural Economics*, *32*(3), 369–391. doi:10.1093/euragg/jbi011.
- Honychurch, L. (1995). *The Dominica story: A history of the Island*. London, UK: Macmillan Education.
- Hughner, R. S., McDonagh, P., Prothero, A., Shultz, C. J., I. I., & Stanton, J. (2007). Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behavior*, *6*, 94–110. doi:10.1002/cb.210.
- Hunter, D., Foster, M., McArthur, J. O., Ojha, R., Petocz, P., & Samman, S. (2011). Evaluation of the micronutrient composition of plant foods produced by organic and conventional agricultural methods. *Critical Reviews in Food Science and Nutrition*, *51*(6), 571–582. doi:10.1080/10408391003721701.
- International Monetary Fund (IMF). (2002). Dominica: Statistical appendix. IMF Country Report No. 02/224.
- International Monetary Fund (IMF). (2005). Dominica: Statistical appendix. IMF Country Report No. 05/383.
- International Monetary Fund (IMF). (2007). Dominica: Seventh review under three-year arrangement under the poverty reduction and growth facility and financing assurances review—Staff report. IMF Country Report No. 07/1.
- International Monetary Fund (IMF). (2013). *World economic outlook*. Washington, DC: International Monetary Fund.
- Janssen, M., Heid, A., & Hamm, U. (2009). Is there a promising market 'in between' organic and conventional food? Analysis of consumer preferences. *Renewable Agriculture and Food Systems*, *24*(3), 205–213.
- Jew, S., AbuMweis, S. S., & Jones, P. J. (2009). Evolution of the human diet: Linking our ancestral diet to modern functional foods as a means of chronic disease prevention. *Journal of Medicinal Food*, *12*(5), 925–934.
- Lin, B. H., Smith, T. A., & Huang, C. L. (2008). Organic premiums of US fresh produce. *Renewable Agriculture and Food Systems*, *23*(3), 208–216.
- Lusk, J. L., & Hudson, D. (2004). Willingness-to-pay estimates and their relevance to agribusiness decision making. *Review of Agricultural Economics*, *26*(2), 152–169.
- Meas, T., Hu, W., Batte, M. T., Woods, T., & Ernst, S. (2013). Local is the new organic: Do consumers agree? *Selected Paper, AAEA Annual Meetings (Washington, DC August 2013)*. AgEcon Search. Retrieved October 1, 2013, <http://ageconsearch.umn.edu/handle/151265>.

- Miller, K. W., Wilder, L. B., Stillman, F. A., & Becker, D. M. (2007). The feasibility of a street-intercept survey method in an African-American community. *American Journal of Public Health, 87*(4), 655–658.
- Onozaka, Y., & McFadden, D. T. (2011). Does local labeling complement or compete with other sustainable labels? A conjoint analysis of direct and joint values for fresh produce claim. *American Journal of Agricultural Economics, 93*(3), 693–706.
- Rosen, J. D. (2010). A review of the nutrition claims made by proponents of organic food. *Comprehensive Reviews in Food Science & Food Safety, 9*, 270–277.
- Scialabba, N. (2007). *Organic agriculture and food security*. Rome: Food and Agriculture Organization of the United Nations. Retrieved October 1, 2013, from <ftp://fao.org/paia/organicag/ofs/OFS-2007-5.pdf>.
- Seufert, V., Ramankutty, N., & Foley, J. A. (2012). Comparing the yields of organic and conventional agriculture. *Nature, 485*(7397), 229–332. doi:10.1038/nature11069.
- Stewart, M. B. (1983). On least square estimation when the dependent variable is grouped. *Review of Economic Studies, 50*(October), 737–753.
- Teratanavat, R., & Hooker, N. (2006). Consumer valuations and preference heterogeneity for a novel functional food. *Journal of Food Science, 71*(7), S533–S541.
- Timms, B. (2006). Caribbean agriculture-tourism linkages in a neoliberal world: Problems and prospects for St. Lucia. *International Development Planning Review, 28*(1), 35–56.
- Torres, R. M., & Momsen, J. H. (Eds.). (2011). *Tourism and agriculture: New geographies of consumption, production, and rural restructuring*. New York, NY: Routledge.
- United National Development Program (UNDP). (2013). UNDP in Barbados and the OECS—About the Commonwealth of Dominica. http://www.bb.undp.org/content/barbados/en/home/countryinfo/the_commonwealth_of_dominica.html. Accessed June 5, 2013.
- United Nations Statistics Division. (2012). *National accounts statistics: Main aggregates and detailed tables, 2010*. New York, NY: United Nations Statistics Division.
- Vander Mey, B. (2004). The globalization of food and how Americans feel about it: Results of two surveys. *Journal of Food Distribution Research, 35*(1), 1–12.
- Venkatachalam, L. (2004). The contingent valuation method: A review. *Environmental Impact Assessment Review, 24*, 89–124.
- Wall-Bassett, E. D., Vander Mey, B. J., & Guiste, P. (2012). Food security in three regions of Dominica: Baseline data and social epidemiological exploration. *Journal of Hunger & Environmental Nutrition, 7*, 234–238.
- Wilcock, A., Pun, M., Khanona, J., & Aung, M. (2004). Consumer attitudes, knowledge, and behavior: A review of food safety issues. *Trends in Food Science & Technology, 15*, 55–66.
- Yiridoe, E. K., Bonti-Ankomah, S., & Martin, R. C. (2005). Comparison of consumer perceptions and preference toward organic versus conventionally produced foods: A review and update of the literature. *Renewable Agriculture and Food Systems, 20*(4), 193–205.
- Yue, C., & Tong, C. (2009). Organic or local? Investigating consumer preference for fresh produce using a choice experiment with real economic incentives. *HortScience, 44*(2), 366–371.