The Use of Choice Experiments to Analyze Consumer Preferences for Organic Produce in Costa Rica[1]

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ABSTRACT

Choice Experiments are used to elicit Costa Rican consumer preferences for different attributes of organic and conventional vegetables in a hypothetical market. Focus groups identified a primary concern with the food safety and a secondary interest on the environmental impact of production practices. Two alternative national certification seals were proposed: 1) a "Blue Seal" certifying the Department of Public Health's approval for food safety; and 2) a "Green Seal" certifying Ministry of Agriculture's approval for environmentally sound production practices. Three other attributes were selected: "Appearance", "Size", and "Price". These attributes, together with the proposed labels, were presented in different combinations to a sample of 432 Costa Rican consumers at ten supermarkets located in the urban Central Valley. The results of the multinomial logit model demonstrate that the attributes "Appearance" and "Price" the have the strongest influence over the probability choosing alternative scenarios. Also, there was a significant preference for the "Blue Seal*"* and the *"*Blue Seal" and "Green Seal" combined. The socioeconomic variables turned out to be not significant in consumer choice. The results show a MWTP of 20% for the "Blue Seal" certifying healthy produce, and an additional 19% for the "Green Seal". The favorable acceptance of the certification seals on the part of the Costa Rican consumer can imply a large internal market for organic and ecologically healthy produce.

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Introduction

Decreasing prices for traditional agricultural commodities, such as coffee and bananas, have led to the promotion of non-traditional crops as a means of maintaining agricultural employment in Central America. One of the alternative enterprises being promoted is organic agriculture, which is considered to have increasing potential, given the perceived demand for healthy foods and environmentally conscience production practices. In Costa Rica, there is hope that the development of internal and external markets for organic products will increase farm income, reduce pollution from agricultural inputs, and provide a healthier alternative to traditional foods.

Despite this growing interest in organic production, there remains a concern about the demand for organic products and the price premium that consumers may be willing to pay. Although Costa Rica traditionally exports agricultural products, the internal market for organic produce is of particular interest for five reasons. First, consumers prefer locally grown organic products (FAO, 2001). Second, Costa Rica's middle class population together with expatriates and tourists could provide an upscale market for safer and healthier produce. Third, proponents of organic agriculture consider an export orientated focus to be counter-productive to some of the non-revenue goals of organic agriculture development (Scialabba, 2001). Fourth, Costa Rica has successfully presented itself to the international community and to tourists as being environmentally friendly. Any effort to reduce agricultural pollution could produce positive external environmental and economic benefits. And fifth, a large internal demand for organic produce could stimulate production and create a familiarity with organic production practices and thus a comparative advantage in external markets (FAO, 2001).

Certification labels are an important strategy in the marketing of organic products. Certification is a means to provide information to the consumer by assuring producer compliance with established standards. Given that production processes and certain food safety attributes cannot be observed by the consumer at the time of purchase, certification is required to gain consumer confidence. Producers would like to be certified in order to attain a potential price premium for their products. Consumers demand food safety, the absence of chemical and pesticide residue, and production practices that do not damage the environment. However, certification standards are not universal and different standards may imply regional biases and or bias against imported products (de Haen, 1999). Different ranges of "ecolabeling" may be seen as substitutes for "organic" certification (Armah, 01, Lohr,'98). And adopting certification standards can be a highly politicized process (Lohr, 01).

This study analyzes consumer preference for organic vegetables and certification labels in Costa Rica. Choice modeling is used to assess preferences for attributes of vegetables including ecolabeling. The sensitivity of these preferences to the socioeconomic characteristics of the consumers is analyzed. Furthermore, the willingness-to-pay (WTP) of consumers for different labels is estimated. Whereas other studies have estimated consumer WTP for either food safety or sustainable production, this study employs

choice experiments to assess the value of both of these attributes of the same consumer purchase.

Non-market Valuation of Food Safety and "Green Products"

There is a large body of literature assessing consumer WTP for food safety and for environmentally friendly production practices. Much of these valuation studies utilize the same techniques that have been developed and refined for the non-market valuation of environmental goods and services, especially contingent valuation (CVM). In general, food safety and the environmental characteristics of the production practices are considered separately and their interrelation is sometimes ignored.

Fischer presents a review of methods to value food safety, and lists five techniques: 1) cost of illness; 2) hedonic prices; 3) experimental auctions; 4) conjoint analysis; and 5) contingent valuation. Buzby et al (1995) used CVM to estimate WTP for pesticide free grapefruit among US consumers. Their WTP estimates from a discrete choice elicitation were quite high with a price premium of 134% for a 50% reduction in risk and 138% for a 99% reduction in risk. No explicit mention of the environmental impact of pesticides was made, perhaps due to the isolation of grapefruit production in a limited region of the United Sates. Akgungor et al. (1999) used CVM to estimate WTP for tomatoes free of pesticide residue and estimate a 2% price premium would be accepted. Again, there is no explicit mention of environmental effect of pesticide use in this study.

Other studies have focused on ecolabels in order to estimate consumer WTP for improved production practices. Blend and van Ravenswaay (1999) estimated consumer WTP for ecolables with two distinct levels of environmental claims and two levels of assurance. Food safety claims were not mentioned in these scenarios; however safety was listed as an explanatory variable in the model to explain purchase of ecolabeled apples. Results demonstrate that 40% of consumers would accept a $0.40 price premium for ecolabeling. The authors conclude that environmental concerns significantly affect quantities purchased but the food safety does not.

Recent studies have utilized conjoint analysis, contingent choice, and choice experiments to analyze preferences for ecological or food safety attributes. Johnston et al (2001), used contingent choice to investigate consumer preferences for ecolabeled seafood. Norwegian and US consumers' preferences for sustainable resource management were analyzed. Food safety was not an analyzed attribute. Norwegian consumers were less likely to accept price premiums than their US counterparts, perhaps because they are more familiar with ecolabels and more aware of the tradeoffs assigned to certification. Blamey et al. (2001) used choice experiments to analyze preferences for environmentally friendly toilet paper. Although they do not encounter a price premium for unbleached paper, they estimate a $0.09 price premium for recycled paper and a $0.66 premium for both unbleached and recycled paper. Comparing the results of this study with revealed preference data demonstrated that the market share estimated by choice modelling did not exceed the actual market share. Teisl et al. (1999) used contingent ranking in order to analyze consumer preferences for electricity produced under different production

methods. They used a mall intercept sample and concluded that ecolabels often did not have a significant impact on consumer choice.

Organic Production in Costa Rica

The FAO forecasts that world demand for organic products will continue to grow, with a continued excess demand in developed countries (FAO, 2001). Organic fruits and vegetables are expected to have a larger share of total sales than other organic foods. Certification is considered a prerequisite for exporting organic produce, especially to the European Union, which is considered by some to be the market of greatest potential for Latin American producers (Hoeberichts, 2001). Certification requirements have been considered to be a technical barrier to trade (Movimiento Orgánico Costarricense, 2002). But, Costa Rica is considered to have a comparative advantage for having an image of "green" production. And the Costa Rican government has taken definite steps to support certification and promote organic production (Movimiento Orgánico Costarricense, 2002; Chandler and Tewari, 1997).

In 1998, over 9,000 hectares produced organic products in Costa Rica. This represented an increase of 3,000 hectares over 1997 and 3% of the land area dedicated to permanent crops in Costa Rica. This area includes nearly 3,000 hectares of banana and cacao, nearly 1,400 hectares of beans, and only 43 hectares of vegetables (Movimiento Orgánico Costarricense, 2002, FAOSTAT, 2002). Producers of export crops such as coffee, banana, and cacao have attempted to enter into niche internal and external markets with organic production. And some vegetable farms have had success with organic produce. Using data from one successful operation Garcia (1998) demonstrates that it is possible to have increased farm profits from organic production. At one point the supermarket chain Mas x Menos sold 450 cases of organic vegetables per day or 4% of total vegetables sold by the chain (Rodriguez, 1994). And price premiums for organic vegetables have been reported. Notably, certification has not been necessary for sales in the Costa Rican market, perhaps because of consumer trust (Movimiento Orgánico Costarricense, 2002).

Much of the controversy of pesticide use in Costa Rica centers on banana production, where more than 1000 workers have been sterilized due to pesticide applications. Between 1990 and 1996, pesticide imports increased 80%, mostly due to increased application to bananas. Costa Rica's Plant Health Service conducted a study of 400 samples of vegetables in 1992 and demonstrated that 37% contained pesticide residue and 6% violated the permitted levels (Agne et al, 1999).

Methodology

Choice experiments were used to assess consumer preferences for food safety, environmental, and organic attributes of vegetables. Choice modelling or choice experiments has been developed within the transport and marketing literature and has recently been employed in the valuation of non-market environmental goods and services. Closely associated with conjoint analysis, choice modeling is more closely associated with behavioral theory.

Choice experiments are based on Lancasterian consumer theory as well as random utility theory. The former proposes that consumers make choices not on the simple marginal rate of substitution between goods, but based on preferences for attributes of these goods. Random utility theory states that although consumer utility cannot be known, it can be decomposed into random and systematic components, such that for all consumers $\boldsymbol{i}$:

$$\boldsymbol{U_i = V_i + \varepsilon_i}$$

Furthermore the systematic component $\boldsymbol{V_i}$, can be expressed as a linear function of explanatory variables, such that:

$$\boldsymbol{V_i = \beta' X_i},$$

where $\mathbf{X_i}$ is a vector of explanatory variables associated with the significant attributes of consumer choice (Adamovicz et al).

A critical stage in choice experiments is the selection of the attributes to be analyzed. A meeting of local experts on organic agriculture as well as two focus group meetings with Costa Rican mothers-of-school-aged-children assisted this process. The expert group consisted of researchers, an official from the Ministry of Health, and private sector representatives of the vegetable production and marketing chain. Mothers were chosen for the focus group because housewives were known to participate in 80% of vegetable purchases (Acevedao et al, 1998).

Although the Costa Rican Ministry of Agriculture (MAG) had been in the process of developing criteria for organic certification, there was no consensus definition of organic that could be applied in 2000. Without specifying the details of the certification, the to-be-determined standards were applied. Two labels were proposed. A BLUE SEAL issued by the Ministry of Health was proposed to certify 100% pesticide residue free and healthy produce. A GREEN SEAL, issued by the MAG was proposed to certify organic production practices. Focus groups indicated that these labels would be understood and accepted by consumers.

Focus groups confirmed the confusion associated with organic labels, but affirmed that Costa Rican mothers were informed consumers of vegetables. They were concerned about pesticide residue and the environment impact of vegetable farming. Focus group participants explained that their purchases varied according to price and availability. Given that no representative vegetable, or group of vegetables, was considered predominant, these consumers affirmed their capacity to understand a price premium expressed as a percentage increase in price in their weekly purchase of vegetables.

Since choice experiments allows researchers to avoid *ceteris paribus* and account for associated attributes of consumer choice, a variety of complimentary attributes was considered. Focus groups discussed their concerns that organic produce was considered to be small, of irregular shape, with frequent bruises, and often bug-ridden. Packaging was considered to be an attribute of particular interest to suppliers. These proposed attributes were discussed in focus groups and some were presented and later rejected in pre-testing.

Ultimately the selection of the population, the sampling procedure, the final selection of attributes and levels and the experimental design were all interrelated. The population chosen for analysis was supermarket shoppers responsible for household purchases in the metropolitan San Jose area. This population encompasses the relatively affluent middle class urban consumer, which is considered to be a target group for the expansion of organic and ecolabeled produce. Supermarket shoppers are considered to be critical to the expansion of ecolabeled and organic vegetables (Pearson, 1999). Although most vegetable purchases in Costa Rica are made at farmers' markets, all strata of consumers visit the supermarket.

Shoppers were to be interviewed in front of supermarkets. This necessitated a relatively simple choice set with few attributes. Four attributes were selected. These along with the corresponding levels are presented in Table 1.

Table 1: Attributes and Levels in Choice Experiment

Attribute	**Levels**
Label	1.Without Label 2. Blue Label Certifying Pesticide Residue Free 3. Blue Label and Green Label Certifying Organic Production Practices
Appearance	1. Without insect marks or presence of insects 2. With insect marks and/or the presence of insects
Size	1. Large 2. Small
Price	1. No price premium 2. 10% Increase in Price 3. 20% Increase in Price

Size and appearance were considered by focus groups to be key determinants in vegetable selection. Furthermore, focus groups prioritized food safety and the BLUE LABEL as an important attribute and more important than the GREEN LABEL certifying organic production and environmental standards. The selection of attribute levels NO LABEL, BLUE LABEL, and BLUE and GREEN LABELs was based on the objective of maintaining a simple design. The three levels of price were selected based on literature that suggested that organic produce would require a 20-22% price premium (IFOAM, 1996).

The full factorial design was reduced orthogonally in order to maintain the independence of irrelevant alternatives and allow for the use of the multinomial logit estimation model

Adamowicz et al. 1998). The full design was reduced to 216 choice set combinations. These choice sets were combined so that each choice set contained one combination with BLUE LABEL, one with BLUE and GREEN LABELs and one with NO LABEL. With six replications of each choice set and choice sets presented to survey respondents in groups of three, a total of 432 surveys were prepared (see Volcan 2000 for details of the experimental design).

The survey instrument had four sections: 1) an introduction and brief explanation of the study; 2) general questions relating to the socioeconomic characteristics of the respondent; 3) attitudinal questions to familiarize the respondent with the scenarios and to identify outliers; and 4) three choice sets. The information presented to respondents was considered to be important, and the presentation of a prepared video on organic production was considered. However, this was rejected as being biased. Given that focus groups affirmed that consumers were informed and concerned about food safety, agrichemical residues, organic production, and the environment and that the Ministries of Health and Agriculture were trusted as certifying agents, the information presented was limited to a brief introduction asserting concern for the presence of contaminants in food production and its impact on food safety and on the environment. Respondents were presented with examples of the labels. Neither technical information on organic production nor epidemiological information on food safety risks was presented. Given the time constraints of shoppers the information conveyed was generally no more than that available on the certification label. This in fact replicates the information available at the time of purchase of most eco-labeled products, and replicates the condition of other studies, notably that of Johnston et al, (2001) which used a telephone survey.

Surveys were conducted outside of ten supermarkets in the greater San Jose area. These supermarkets were selected by a random selection of zones on a map. However a variety of supermarkets was chosen in order to include stores that would cater to shoppers of different economic strata. Of these supermarkets, six sell organic produce. Enumerators were trained and supervised by the principle investigator. Questionnaires were applied at random from Thursday through Sunday and at different hours in order to obtain a balance of shoppers.

Results and Discussion

The majority of those approached were willing to participate in the survey, although the exact figure of non-respondents was not collected. All 432 surveys were completed. Only 22% of the respondents were male. This corresponds to other studies which show a predominance of female shoppers. Fifty three percent of respondents were between 30 and 50 years old, and 65% had postsecondary education. These figures do not reflect the general population of Costa Rica. However, given that the population was skewed to include only those that bought food for the household in the San Jose metropolitan area, this is considered to be a representative sample. Also, 78% of survey respondents claimed monthly household earnings over 140,000 colons per month[4]. This is somewhat

[4] The exchange rate in May 2000 was 305 colons per dollar.

greater than the average incomes presented in the household survey prepared for the 1999 State of the Nation[5].

In a series of attitudinal questions the respondents demonstrated: 1) concern for the health risks of conventionally produced vegetables; 2) willingness to accept a less attractive vegetable that was certified to be safe; 3) confidence in the Ministry of Health and the Ministry of Agriculture; 4) a willingness to pay to protect the environment (see Table 2).

Table 2: Responses to Attitudinal Questions			n = 432
	Agree	**Disagree**	**Unsure**
Vegetable produced conventionally with high levels of agrichemicals affect human health.	94%	3	3
Willing to buy less attractive vegetables that are certified to be pesticide residue free	66%	21	13
Reduction in agrichemical use protects the environment	94%	3	3
Trust in Ministry of Health	67%	19	14
Trust in Ministry of Agriculture	70%	13	17
Willing to pay to protect the environment	84%	6	10

Table 3 presents the results of the generalized multinomial logit model for the model

$$Y = \alpha_1 + \alpha_2 + \beta_S + \beta_A + \beta_P + \varepsilon,$$

where the $\boldsymbol{\alpha_i}$ terms represent the coefficients for the label intercepts.

TABLE 3: Results from Generalized Multinomial Logit Model			n = 1296
Test for significance of model $\chi^2_3 = 222.13$			Significance for $\chi^2 \approx 1.00$
	Coefficient	**Standard Error**	**P[|Z|>Z]**
BLUE LABEL (α_1)	1.0923	0.109	0.006
BLUE and GREEN LABEL(α_2)	2.1404	0.104	0.000
SIZE	0.2368	0.086	0.000
APPEARANCE	0.7988	0.088	0.000
PRICE	-0.5517	0.053	0.000

All coefficients are highly significant and of the expected sign. Coefficients for SIZE and APPEARANCE imply significant preferences for increased size and for the absence of insect marks, *ceteris paribus*. The PRICE coefficient is significant and negative as expected. Both label options were significantly preferred to NO LABEL. This signifies a preference for the labels when all other attributes are equal.

In order to facilitate the presentation and the comparison of these different models, elasticities are calculated for the direct and cross effects of the probability of selecting an alternative with the change in an attribute level. Elasticities are presented in Table 4.

[5] The *Estado de la Nación de 1999* reports average monthly income for males as ¢54,000 and ¢44,000 for females.

They present the relative marginal change in probability of choosing an alternative (NO LABEL, BLUE LABEL, and BLUE and GREEN LABEL) with the relative marginal change in an attribute. Direct effects are calculated as:

$$\varepsilon_{X_{ik}}^{P(i)} = \frac{\partial P(i)}{\partial X_{ik}} \frac{X_{ik}}{P(i)} = \frac{\partial \ln P(i)}{\partial \ln X_{ik}} = [1 - P(i)] X_{ik} \beta_k .$$

Cross effects are calculated as:

$$\varepsilon_{X_{jk}}^{P(i)} = \frac{\partial P(i)}{\partial X_{jk}} \frac{X_{jk}}{P(i)} \quad \forall i \neq j.$$

These elasticities demonstrate that PRICE and APPEARANCE have an influence on the probability of choosing NO LABEL and BLUE and GREEN LABELs.

Table 4: Direct and Cross Elasticities of Preferences					n=1296	
Choice	**NO LABEL**		**BLUE LABEL**		**BLUE and GREEN LABELS**	
Elasticity / **Attribute**	**Direct**	**Cross**	**Direct**	**Cross**	**Direct**	**Cross**
SIZE	0.084	-0.035	-0.084	0.035	0.106	-0.012
APPEARANCE	0.267	-0.133	0.104	-0.295	0.350	-0.050
PRICE	-0.442	0.110	-0.238	0.313	-0.515	0.037

Conditional multinomial logit models are used to assess the impact of socioeconomic characteristics of the respondents on their preferences. In the models presented, the socioeconomic characteristics interact with the intercept terms BLUE LABEL and BLUE and GREEN LABELS. The tested models have the form:

$$Y = \alpha_1 + \alpha_2 + w_{i1}\alpha_1 + w_{i2}\alpha_2 + \beta_S + \beta_A + \beta_P + \varepsilon,$$

where $\boldsymbol{w_{ij}\,\alpha_j}$ is the effect of demographic characteristic $\boldsymbol{w_{ij}}$ on the selection of the certification seal alternatives.

TABLE 5: Results from Conditional Multinomial Logit Model with Income			
n = 1296 Test for significance of model $\chi^2_5 = 225.85$ Significance for $\chi^2 \approx 1.00$			
	Coefficient	**Standard Error**	**P[|Z|>Z]**
BLUE LABEL (α_1)	1.1330	0.328	0.001
BLUE and GREEN LABEL(α_2)	1.8181	0.306	0.000
INCOME * BLUE LABEL	-0.0114	0.086	0.895
INCOME * BLUE and GREEN LABEL	0.0877	0.078	0.271
SIZE	0.2357	0.086	0.000
APPEARANCE	0.7980	0.089	0.000
PRICE	-0.5513	0.053	0.000

Table 5 presents the conditional logit model with income as a socioeconomic characteristic. As seen, there does not appear to be an income effect on the preferences for organic vegetables or those that are certified for food safety. Table 6 summarizes the results of conditional logit models with different socioeconomic characteristics. Only

"education" has a significant impact on consumers' preferences, with more highly educated individuals demonstrating greater preferences for both BLUE and GREEN LABELS.

The insignificance of the socioeconomic characteristics of the respondents on their acceptance of certification is explained by the homogeneity of the responses in favor of both certification seals. Indeed 65% of total responses favored both certification seals as opposed to only 9% for no certification seals. Furthermore, the insignificance of demographic characteristics on consumers' preferences for food safety is not inconsistent with the results of ten studies reviewed by Baker and Burnham(2001).

TABLE 6: Results of Conditional Logit Model with Socioeconomic Variables n=1296

Model w	α_1	$\alpha_1 w_1$	α_2	$\alpha_2 w_2$	β SIZE	β APPEARANCE	β PRICE
No Effects	1.09*		2.14*		0.24*	0.799*	-0.55*
Income	1.13*	-0.01	1.82*	0.09	0.24*	0.798*	-0.55*
Age	1.12*	-0.13	2.14*	-0.00	0.24*	0.799*	-0.55*
Education	0.78*	0.15	1.38*	0.34*	0.23*	0.810*	-0.56*
Number of Children	1.11*	-0.01	2.23*	-0.08	0.24*	0.803*	-0.55*
Sex	1.19*	-0.05	2.08*	0.03	0.24*	0.799*	-0.55*
* significant at the 95% confidence level							

Since the assumed utility function is a linear representation of the analyzed attributes, the marginal rate of substitution between any attributes is the ratio between the coefficients. And since the coefficient of the price attribute, γ, can be interpreted as the marginal utility of income within the price range of 0% to 20% increase in vegetable expenditures, then the ratio of any coefficient β_i to the price coefficient can be interpreted as the marginal willingness to pay for that attribute (Bennett and Blamey, 2001). Thus, the marginal willingness to pay (MWTP) for attribute i can be calculated as:

$$MWTP_i = -\frac{\beta_i}{\gamma}.$$

Marginal willingness to pay for the certification labels and for the SIZE and APPEARANCE attribute are listed in Table 7. As seen, the MWTP for the SIZE and APPEARANCE attribute is a relatively low percentage of vegetable expenditures, with a 4.29% increase expenditure for vegetables with a larger size and a 14.48% expenditure for vegetables that are absent of insect marks or the presence of insects. Much larger price premiums are estimated for the certificates. The MWTP for a certificate for the Ministry of Health certifying healthy vegetables that are free of vegetable residue is a 19.80% increase in expenditure. And the MWTP for both the Ministry of Health certificate and the certificate from the Ministry of Agriculture certifying organic production is a 38.80% price premium. These estimated price premiums are not inconsistent with the literature, especially the stated preference estimates of price premiums for food safety. These MWTP estimates are reinforced by the general confidence that Costa Ricans have in their national institutions as certifying agencies.

Table 7: Marginal Willingness to Pay for Attributes in Percentage of Expenditures		
Attribute	Marginal WTP	Standard Error
BLUE LABEL (α_1)	19.80**	2.66
BLUE and GREEN LABEL(α_2)	38.80**	10.14
SIZE	4.29**	1.58
APPEARANCE	14.48**	2.02
** significant at the 99% confidence interval		

Conclusions and Observations

This study demonstrates a positive willingness to pay among Costa Rican consumers for certified food safety and organic production practices. Focus groups and responses to attitudinal questions displayed both a concern for food safety and the environment and trust in government Ministries as certifying agents. Thus, the estimated price premiums of 19% and 39% seem acceptable.

This research demonstrates that choice modelling can be used to analyze consumer preferences for food safety and organic production methods. Choice modelling allows for tradeoffs between different attributes of a good and thus produces more general information than the single attribute contingent valuation method. The ability to estimate price premium for food safety and organic production in the same study, is an important contribution that choice modelling permits.

It has been argued that choice modelling reduces the effect of "yea saying" bias (Hanley et al. 1998). However, the value of the information received from the respondent is a function of the respondents' ability to process information. And this information processing can be constrained in a shopper intercept survey. Although the shopper intercept survey did replicate the decision environment that shoppers face, it did not allow for a complex multi-attribute choice experiment and might have led to hurried decisions. Quick purchase decisions during a shopping visit might favor a "yea saying" response to certification, but this might also be true in an actual purchase.

Costa Rica is an interesting context for this research because the government is actively supporting the development of organic agriculture. This research shows that certification programs would be useful not only for the export market, but for the domestic supermarket shopper as well. Costa Ricans acceptance of their government as a certifying authority facilitates the development of a comprehensive certification program that addresses both food safety and organic production. Such a certification program could support consumers, producers, exporters, and intermediaries.

References

Acevedo, O., M. Arias. and S. Francis. 1998. "Estrategia de Mercadeo de Vegetales Orgánicos para la Empresa Hortifruti S.A.". Proyecto final de graduación para optar al titulo licenciatura en Administración de Empresas.

Agne, S. H. Waibel. and O. Ramirez. 1999. "Diagnostico y recomendaciones sobre criterios económicos y legislación para el uso de plaguicidas en Costa Rica" *Manejo Integrado de Plagas* (Costa Rica) 54:44-52.

Agungor, S., B. Miran and C. Abay. 1999. "Consumers Willingness to Pay for Reduced Pesticide Residue in Tomatoes: The Turkish Case". Paper presented at the Annual Meeting of the American Agricultural Economics Association. August 8-11. 1999. Nashville Tennessee.

Allen, P. and M. Kovach. 2000. "The capitalist composition of nature: The potential of markets in fulfilling the promise of organic agriculture." *Agriculture and Human Values*. 17: 215-219.

Armah, P. 2001. *The Determinants Of Eco-Label Usage In The Organic Produce Market Of Northeast Arkansas* Selected Paper American Agricultural Economics Association - Annual Meeting, August 5-8, 2001, Chicago, Illinois 17 pages

Baker, G. and T. Burnham. 2001. "Consumer Response to Genetically Modified Foods: Market Segment Analysis and Implications for Producers and Policy Makers." *Journal of Agricultural and Resource Economics*. 26(2):387-403.

Blend, J. and E. van Ravenswaay. 1999. Measuring Consumer Demand for Ecolabeled Apples. *American Journal of Agricultural Economics* 81:1072-1077.

Buzby, J, J. Skees, and R. Ready. "Using Contingent Valuation to Value Food Saftey: A Case Study of Grapefruit and Pesticide Residues" in *Valueing Food Safety and Nutrition*. J. Caswell ed. Boulder. Westview Press.

Chandler, M. and H. Tewari. 1997. "Consumer Response to Organic Production: A Case Study of Emerging Trends in Developing Countires". *Agricultural Production and Nutrition* 175-185.

de Haen, H. 1999. "Producing And Marketing Quality Organic Products: Opportunities And Challenges". Presented at Sixth IFOAM Trade Conference: Quality And Communication For The Organic Market. Florence, 23 October 1999. available at www.fao.org/organicag.

FAO. 2001. World Markets for Organic Fruit and Vegetables. available at www.fao.org/organicag

FAO. 2002. FAOStat Agricultural Data. available at http://apps.fao.org/default.

Hanley, N., R. Wright, and V. Adamowicz. 1998. "Using Choice Experiments to Value The Environment". *Environment and Resource Economics*. 11(3-4):413-428

IFOAM. 1996. *Fundamentals of Organic Agriculture: Down to Earth and Further Afield*. Proceedings of the 11th IFOAM International Conference. August 11-16, 1996. Copenhagen.

Lohr, L. 2001 *The Importance Of The Conservation Security Act To Us Competitiveness In Global Organic Markets,* Faculty Series 01-19. Department of Agricultural and Applied Economics. University of Georgia 12 pages.

Pearson, D. "Why do Consumers Choose Organic Food? A Model Based on a Review of Empirical Research" proceedings of INFOAM International Science Conference. Argentina 1998. 104-108.

Sciallabba, N. 2001. "Organic Agriculture Perspectives". paper presented at Conference on Supporting the Diversification of Exports in the Latin America and Caribbean Region through the Development of Organic Agriculture. Port-of-Spain, Trinidad & Tobago, 8-10 October 2001.

Teisl. M, B. Ore and B. Levy. 1999. "Ecocertification: Why it Might Not be a 'Field of Dreams'". *American Journal of Agricultural Economics* 81:1066-1071.

Volcan, M. 2000. *Aplicación del Método 'Experimentos de Selección' para Determinar las Preferencias del Consumidor por Vegetales Orgánicos en Costa Rica'*. Tesis de MS. CATIE. Turrialba. Costa Rica.

Vos, T. 2000. "Visions of the middle landscape: Organic farming and the politics of nature." *Agriculture and Human Values*. 17: 245-256.