Agriculture, Environmental Services and Agro-Tourism in the Dominican Republic

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Abstract

This paper analyzes the links between agriculture and tourism. A contingent valuation study assesses tourist's willingness to pay (WTP) for agro-tourism and agriculture's positive environmental services and related positive externalities. The paper analyzes factors influencing tourist preferences in the Dominican Republic (DR) -- tourist income, the local tourist destination, sex, and nationality stand out among these factors. Estimates are given for different WTP scenarios according to farming systems. The study argues that a well developed agro-tourism industry would result in a market mechanism generating additional income of US $251 to US $364 million annually. Agro-tourist activities would have the added benefit of promoting sustainable agricultural practices.

Keywords: agriculture, Dominican Republic, contingent valuation, environment, tourism

1. Introduction

This study analyses the relationship between agriculture and tourism in the Dominican Republic (DR) from two perspectives. The first is agriculture's relatively small role as a supplier of food to tourists. The second is how agriculture can accommodate tourist preferences for agro-tourism. Agro-tourism is

defined here as a set of rural activities, including participating in farming activities; exploring local culture; enjoying the landscape and agro-biodiversity; observing organic and conventional agricultural practices; and sampling tropical fruits and vegetables. This study argues that in the DR, a more developed agro-tourism sector would both improve conventional tourist sector competitiveness and improve sustainable agricultural practices by maintaining and increasing positive externalities and non-market services provided by agriculture.

Agro-tourism has the potential to play an important role in a country whose economy is largely dependent on income derived from agricultural exports and recreational tourism. Yet, in the DR, the positive externalities and environmental services generated by agriculture are not internalized by market instruments nor by economic policy mechanisms that help it to respond to tourist preferences for rural settings. The result is a lost opportunity to provide more jobs, more income, a more viable rural society and a more sustainable and diverse environment.

This study aims to evaluate, in a holistic sense, the roles of agriculture and their contribution to local, regional, national, and global sustainable development, as well as their potential to improve country's ability to compete with other tourist destinations. In particular, the objectives of this study are to: identify the preference levels and willingness to pay (WTP) of tourists for agro-tourism in the Dominican Republic; define a typology of agro-tourists; and estimate the potential economic contribution of agro-tourism and the willingness of tourists to support environmental services provided by agriculture. The study presents the results from a survey on national and international tourist preferences and WTP for visits to rural destinations.[1]

This study assesses agro-tourism's potential in two farming systems which represent the predominant agricultural systems in the DR: 1) organic coffee production in Río Limpio, in the province of Elias Piña; and 2) conventional agriculture in the San Juan de la Maguana Valley, with intensive production of rice, beans, and other subsistence crops under irrigation.

The paper is organized as follows. First, the history of the relationship between tourism and agriculture in the DR is presented, followed by a profile of the then the tourist market in the DR. Next, the methodology is discussed. Results are analyzed in subsequent sections, including the construction of a typology of agro-tourists, the analysis of the determinant factors for preferring agro-tourist activities and the estimation of the potential economic contribution of agro-tourism. Finally, the conclusions are presented.

2.   History of the Relationship between Tourism and Agriculture in the Dominican Republic

Up until the end of the 1980s, when the tourist industry first began to develop, the DR was internationally known as a predominantly agricultural country, highly dependent on the income generated from the export of coffee, cocoa, tobacco, and sugar cane (Shaw 2002).[2]

A characteristic of this period was the weak link between the agricultural and tourist sectors.. In the 1980s, changes in development policy lead to linking of these sectors, particularly with respect to specific farm products[3]. By 1994, hotel consumption represented the following proportions: fruits and vegetables 34%, greens 3.8%, eggs 25.2%, dairy 8.7%, meat 6.8%, fish and shellfish 4.4%, and

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[1] Guidelines from a selected group of studies that applied the Contingent Valuation Method (CVM) in developing countries helped shape our study. See Krutilla (1967); McConnell (2002); Hanemann (1994); Randall et al. (1994); Diamond (1994); Azquetaq (1994); Dixon et. al. (1994); Herrera (1995); Cooper (2000); Alberini et al.. (2000) and ROA methodological papers by FAO. http://www.fao.org/es/esa/roa/forum/user/.

[2] See Shaw (2002). Pages 198-200, for a detailed overview of the six stages of tourists development.

[3] The Central Bank's incentive policies for the tourist sector were promoted in by INFRATUR until the 1979 legat reform and later by DEFINPRO. According to Veloz et al. (1978), INFRATUR registered a greater rate of financing to the tourist sector, reaching US $41.4 million, four time greater than the amount financed in 1977 (See Lizardo and Guzmán, (2002)).

processed meats 0.9%. The hotel sector paid $25.0 million dollars for these products, equivalent to 4.6% of agricultural GDP.[4]

The tourist sector expanded during the 1990s with the introduction of new economic reforms, including commercial, tax and exchange rate reforms. These policy reforms also fostered the emergence of new agro-processing industries and a rapid growth of some agricultural products, eg, fruits, vegetables and poultry meat. The more traditional agro-export sector shrank during the 1990s. Therefore, the economic reforms and the country's transition to an economy based increasingly on services mark the appearance of integration possibilities between tourism and agriculture, sectors that would now trade not only in goods for direct use, but also in services for non-direct use. Agro-tourism provides an opportunity to increase agriculture's participation in the tourist sector through the provision of goods and services in the form of the cultural and environmental amenities associated with agriculture.

3. The Dominican Republic tourist market

During the last 10 years, tourism in the Dominican Republic contributed an annual income exceeding US $3,000 million, attracting more than 3.0 million foreign tourists, generating more than 150,000 jobs, contributing more than US $1,000.0 million to the treasury from taxes, and sustaining a contribution of more than 6.0% of the GDP. The hotel sector is the most important component of tourism. The DR has more than 52,000 hotel rooms, a quantity that exceeds the total number of rooms in all the Caribbean Islands together. Ninety% of the rooms are located along the coasts; 50% are concentrated in the eastern part of the island (Punta Cana, Bávaro, La Romana, Bayahibe, and Juan Dolio); and 30% are in Puerto Plata in the northern part of the DR.[5]

Most conventional tourism in the DR is located along the coast in a tourism development zone with service infrastructure (airports, highways, aqueducts, electric generators, waste management services, hospitals, schools, and related services).[6] While beach recreational tourism represents 90% of the tourist activity, other attractions such as infrastructure for conventions and event-based tourism, health-related tourism, sports tourism (marines, ports, golf courses, and sport facilities), cultural tourism, and ship cruise tourism are being created.

Paradoxically, ecotourism and rural tourism, which require less investment, are not being developed, in spite of the Caribbean's reputation as a "hotspot" due to its particular location, which allows the observation of migratory and endemic species, at the same time offering exotic sites for the enjoyment of adventure tourism, mountaineering, and cave exploration, among other activities.[7]

Two possible reasons help explain why rural tourism has not been developed in the DR. The first explanation is that the tourist-resort model found along the coastal zones excludes alternative sites. According to urban and regional planners, the territorial arrangement of tourist zones has been conceived in a way that separates them from other zones of economic activity. Agricultural zones are among those separated from the tourist areas.

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[4] See Castellanos (1996): It is important to stand out that for the year 1994 the quantity of room available was 28,967, which represents the half of today. It not includes values of craftsmanship goods made with agriculture raw material

[5] See Tourist Bulletin of National Association of Hotels and Restaurant of the Dominican Republic. ASONAHORES. 2002. Pag. 40.

[6] The participation of the different tourist offering in the DR are the followings: All inclusive plan (TI=57.35%); American Plan (AP=17.65%); European Plan (EP=16.18%); Medium American Plan (MAP=5.88); Full American Plan (FAP=2.94%). (ASONAHORES, 2002). Other important aspect to remark is that tourism of recreation and pleasure represents 96% of tourist preferences; hotels are the most preferred lodge for the 94% of tourists; the gender distribution is more or less equal (51.2% male; 48.8% female); the younger segment of the population (21-49 years) represents 65% of tourists; the average of daily expenses is around of US $100; and the days stay in the country is around of 10.

[7] According to Conservation International, the RD is defined as one of the 10 "hotspots", or priority areas for the conservation of the biodiversity in the world. See Kheel (2003). Cornell University. Thesis. Also see the web sites, www.sectur.com.do/ www.dominicana.com.do

The territorial arrangement shows the principal attraction to be the sea and the coast. The make-up of the tourist industry in the DR today exacerbates the difference in standards of luxury resorts and the communities that surround them which often lack even basic services. Investment in public infrastructure is focused on urban centres and little is invested in the rural and agricultural zones.

A second explanation relates to the oligopolistic structure of international tour operators. More than 80% of the tourists that arrive in the DR come into the country with one of the five large tour operators. These operators offer packages with few or no activities beyond the resort complexes that make up their chains. Neither the tourist sector nor the local non-tourist sector have made initiatives to develop complimentary services or to better integrate into the existing network. As mentioned, the limited infrastructural development and institutional mechanisms within local communities are not conducive to the types of services required to respond in a systematic way to niche demands like agro-tourism, eco-tourism, and cultural tourism.

This is in spite of a System of Protected Areas composed of some 70 conservation areas totalling 12,691.78 km^2 (8,031.28 km^2 of which are inland, and 4,600.5 km^2 are coastal), which make up 16% of the total national territory. The Protected Area registries indicate that only half a million visitors, 92% of whom are foreigners, visit the protected areas. This represents, in economic terms, a small complimentary income from a modest tariff, the only way in which conventional tourism gives economic support to eco-tourism. This is a marked contrast to Costa Rica, where rural tourism, particularly eco-tourism, generates more income than resort tourism.

A final observation is that the classification criteria and measurements of tourist demands in the DR are limited exclusively to conventional tourism. The classification of the tourist demand does not include in any explicit way motivations associated with agriculture and agro-tourism. Therefore, measures to evaluate satisfaction levels and preferences among tourists are limited to factors such as natural beauty, quality of the beach and climate, hospitality, prices, golf courses, casinos, tranquillity, historical richness, and past visits.

New surveys are required to analyze the preference levels for an integrated package: recreational and pleasure tourism, agro-tourism, eco-tourism, cultural tourism, and the WTP for both the actual tourist market and the potential tourist market. Identifying new opportunities for tourism could contribute to the promotion of supplementary agricultural roles associated with the conservation of natural resources.[8]

4. Methodology

This study evaluates whether agro-tourism has the potential to complement conventional tourism in the DR. The first step is to understand the characteristics of the tourists interested in agro-tourism in the DR. Second, what is the tourist's WTP for agro-tourism in the DR. Third, what are the factors that determine a tourist's WTP to enjoy agro-tourism. Fourth, what is the tourists' WTP for the existence of positive externalities associated with agriculture. And finally, what is the potential income that the development of agro-tourism could represent to the national economy.

In this paper, agro-tourism is defined as attractions and activities in and around agricultural communities that tourists participate in. Examples include visits to farms to sample tropical fruits and vegetables, participating in farming activities, exploring the local agricultural culture, enjoying the landscape and biodiversity provided by agricultural areas, and observing the practices of organic farms, appreciating the benefits to conservation and natural resources.

The study is based on a sample survey of non-resident visitors interviewed in the country's three major airports during the high tourist season of 2003. The size of the sample is 712 and the margin of error is 3.75%. Some 81% of those surveyed were foreigners and 19% were non-resident Dominicans.

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[8] Studies on the relationship between agriculture and tourism in the DR were taken from Castellanos (1996), assessing the inter-sector demand for goods and services, labor employment, and the negative environmental impact that each sector produces.

The survey questionnaire includes 17 questions, divided into six sections: i) preferences for different tourist activities; ii) preferences for activities linked to agro-tourism; iii) importance assigned by tourists to the factors that diminish the practice of agro-tourism; iv) tourists' WTP to participate in agro-tourism in two distinct farming systems; v) WTP for the existence of positive externalities from agriculture; and, vi) tourist socio-demographic characteristics and geographic location where the survey was applied.

The first three sections of the questionnaire were structured with 0-6 range responses, where 0 means little preference or importance; 3 means indifference; and 6 means strongly preferred or very important. Data analysis was organized into three groups. 0-2 represents the range of irrelevant answers; 3 indicates indifference, and 4-6 the range of relevant responses.

The study evaluates the preferences and WTP to enjoy agro-tourism in rural zones where prevailing agriculture systems demonstrated distinct characteristics in terms of agricultural practices, history and cultural manifestations in the area. One of the selected communities is Río Limpio, located in the province of Elías Piña, on the Haitian border, and adjacent to the Nalga de Maco National Park. This community is characterized by the production of coffee and organic vegetables, and a strong local commitment to protect the natural resources. The second locality is the San Juan de la Maguana valley, characterized by intensive production of rice, beans, and other subsistence crops. These communities preserve vestiges of Taíno culture and have strong magic and religious beliefs. Both localities are near the national parks Sierra de Bahoruco and Enriquillo.

Interview aids included: a) a map to show the interviewee the geographic location of the two places selected for agro-tourism, as well as six other places that are relatively well known by their ecological, cultural, recreational and adventure attractions in the DR; and b) a brief description informing the interviewee of the amenities they would find in each of the tourist sites and surrounding areas.

Among the considerations and assumptions of the CVM applied here include the following: i- When assigning values to non-use goods and services provided by agriculture, the preference levels assigned to their existence value may tend to be lower than the preference levels resulting from the survey, due to numerous biases that can be introduced during the interview process.;

ii- In determining and characterizing the non-use direct vales of agriculture's positive externalities it is possible several find limitations should be taken into account:

One concern is whether the non-use values refer to a specific place or are generalized. For our purposes they are generalized, since the farming systems and positive externalities found were representative of agriculture in all regions of the DR;

Another concern is the individual's motivation for showing a WTP for positive environmental externalities among several options (to address this concern a range of econometric models were estimated to assess this motivation);

A third concern is the identification of the segments of the population that would benefit from positive environmental externalities. To address this matter, we use primary information to define a typology of agro-tourists, based on their WTP for agro-tourism and positive externalities of agriculture as well as the relative importance they assign to disincentive factors related to agro-tourism (appropriate infrastructure, transportation costs, personal security and surrounding attractions). This typology identifies tourists that would enjoy agro-tourism amenities and would be willing to support sustainable agriculture or contribute to the solution of environmental problems by different means (ie, consume products from sustainable farming systems in developing countries or paying higher taxes for supporting farming systems that reduce CO_2 emissions). We recognize that local rural populations also benefits from the development of agro-tourism through income generation and the amenities and positives externalities of agriculture created in its own environment.

iii-. A budgetary restriction to tourist's WTP for amenities related to agricultural systems and for the existence of positive externalities should be applied. This study adopted the FAO (2000)

recommendation that the value of multiple WTP be taken into account should not exceed 5% of the tourist's annual income.

In determining agro-tourism's potential income, this study uses the analysis of conglomerates, or "clusters", to construct a typology of agro-tourists according to the following dimensional analyses: i) preference levels for participating in agro-tourism in the DR, on a scale of 0-6, ii) disincentive factors for engaging in agro-tourism in the DR, iii) and, WTP for agro-tourism in organic agricultural systems of Río Limpio, the conventional agricultural system of San Juan de Maguana, or in both sites.

Based on the segmentation of the potential market for agro-tourism in the DR, the study evaluates six distinct scenarios to determine the income that could be generated. These scenarios are constructed on the basis of two assumptions: i) discerning distinct groups of agro-tourists based on their WTP for agro-tourism and for supporting sustainable agricultural practices, and ii) no discrimination among agro-tourists. In each case, the potential income is evaluated by assuming distinct values for the WTP for agro-tourism and support for sustainable practices. These values are the mean, median, and mode of the respective WTP within each scenario.

5. Agro-tourism and tourist preferences

The tourists that visit the DR are primarily people who enjoy beaches. Around 90% of those interviewed indicated that they had relevant preference levels for recreational tourism: sun, beach and sand. Other activities with high preference levels were cultural tourism, adventure tourism, and sports tourism. Eco-tourism and agro-tourism are the activities with the lowest percentages of relevant preference and highest percentages of indifference among tourists.

The tourist activities most offered as compliments to beach tourism are adventure tourism and cultural tourism. About 30% of the tourists in the survey were offered eco-tourism as an activity to be enjoyed in the Dominican Republic and 19% were offered agro-tourism.

Of the total surveyed, 14.9% had participated in agro-tourism in the DR at some point, of which 43.6% are non-resident Dominican tourists and 56.4% are foreign tourists. Only 8.4% of the foreign tourists that visited the country choose to participate in some type of agro-tourism activity.

The majority of tourists with preferences for agro-tourism preferred to enjoy the rural landscape and explore local agricultural cultures. A minority were interested in how organic fruits and vegetables are produced. The percentage of tourists who wanted to get involved in farming activities was very low. This distribution of preferences among agro-tourist activities is the same as the distribution among tourists who had demonstrated having relevant preferences for activities different from agro-tourism.

In the case of foreign tourists, the agricultural practices considered of greatest importance are those that best conserve natural landscapes and forest resources,, followed to a lesser degree by the conservation of habitat, biodiversity, and agricultural traditions and cultures.

Foreign tourists showing preferences for agro-tourism identified several concerns: personal security, the lack of facilities and infrastructure and the absence of attractions around the agro-tourist destination. For a smaller percentage, transportation costs and the distance between their place of lodging and the agro-tourist sites represented the primary disincentives.

Finally, tourist preferences regardless of relevance levels indicate that the Santo Domingo museums, Samaná Bay, Saona Island, and Enriquillo Lake are the most visited sites to complement their trip to DR. Samaná Bay and Saona Island are the most preferred sites. The places which tourists would be most likely to reject are, in order of importance, Enriquillo Lake, the Duarte Peak, and the Haitises National Park.

6. Who would prefer agro-tourism in the Dominican Republic

We have estimated an ordered logit model to determine what kind of tourist would enjoy an agro-tourist experience in the DR. In the model, the ranking of preferences for agro-tourism is explained as a function of the tourist's socio-demographic and economic characteristics, as well as his or her preference for certain recreational activities.

The survey questionnaire asked a sample of tourists to specify preferences for agro-tourist recreational activities, on an scale from 0 to 6, where 0 means not preferred and 6 highly preferred. Tourists were also asked about their preference level for other recreational activities that might substitute or complement agro-tourism. Those tourist activities are: i) adventure tourism, ii) beach recreation, iii) eco-tourism, iii) cultural tourism, and iv) sports tourism. Since the attractiveness of agro-tourism can be associated with a variety of activities linked to agriculture and the rural lifestyle, tourists were asked to specify their preference levels for enjoying certain amenities associated with agro-tourism. Those amenities are: i) participation in crop planting activities, ii) exploration of local rural lifestyles, iii) enjoyment of rural landscapes; and iv) acquiring knowledge about organic production.

The socio-demographic and economic characteristics considered are: i) dummy variables for gender, education, USA nationality, Canadian nationality, European nationality, Dominican nationality, ii) continuous variables age, age squared, log of annual income, and number of children travelling iii) dummy variables airport of arrival Puerto Plata and Punta Cana. There are no a priori hypotheses assigned to the coefficients associated with these variables, except in the cases of Dominican nationality and number of children travelling, the coefficients of which were expected to be negative. The variables Punta Cana and Puerto Plata are used in order to capture any fixed effect associated with tourists that visit different tourist poles in the DR. The Puerto Plata pole is located on the north side of the country and the Punta Cana pole is located on the southeast side. With respect to alternative tourist activities to be developed in the DR, it is expected that preferences for eco-tourism and agro-tourism will complement each other (See the Data Appendix, Note 1).

The results are presented in Table 1. The demographic and economic characteristics with significant impact on the preference levels for agro-tourism are higher education and entry into the country by Puerto Plata. In the first case, the impact is negative, while in the second case positive. The variables women, log (income), Dominican, USA nationality, Canadian, and European have coefficients with positive signs, but they are not significantly different from zero. The number of children travelling, although with the expected negative sign, is also not significantly different from zero.

Eco-tourism, Cultural tourism and Sport-tourism are all positively and significantly associated with agro-tourism. Those respondents who highly prefer eco-tourism, cultural tourism or sport-tourism are also highly prefer agro-tourism. Beach tourism, on the other hand, is negatively related to agro-tourism. The types of agro-tourism amenities that tourists prefer are exploration of local rural lifestyle and learning about organic production. Both activities are associated with the culture and heritage of rural people. The DR has a relatively well-known reputation as an organic producer of goods such as coffee, bananas and cocoa. The Dominican tourist sector can take advantage of this reputation to increase product differentiation and to compete with other tourist destinations. An interest in organic production can also be exploited by local hotels when selecting the food they offer to tourists.

7. Willingness to Pay for Agro-tourism and its Determinants

Tourists were asked to value two sites with high agro-tourism development potential yet markedly different farming systems. The expressed their WTP for: i) an agro-tourist experience in Río Limpio, ii) an agro-tourist experience in San Juan de la Maguana, and iii) an agro-tourist experience in both sites. The unconditioned average of tourists' WTP for agro-tourism in the communities of Río Limpio

and San Juan de la Maguana is US $131 and US $128 respectively. The average grows to US $205 when the tourist is offered the option of visiting both places as part of the same package.

Table 1 Determinants of agro-tourism preferences. Ordered logistic model estimation results

Regressors	Coefficient	Robust Std. Err.	z	P>|z|
Socio-demographics and economic variables				
Women	0.0899	0.1622	0.55	0.579
Age	-0.0101	0.0485	-0.21	0.836
Age squared	0.0002	0.0006	0.29	0.774
Higher education	-0.4457	0.1822	-2.45	**0.014**
Log(Income)	0.1142	0.1015	1.13	0.261
Dominican nationality	0.0664	0.3190	0.21	0.835
USA nationality	0.1561	0.2735	0.57	0.568
Canadian nationality	0.1811	0.3227	0.56	0.575
European nationality	0.0949	0.3117	0.30	0.761
Number of children travelling	-0.2599	0.1033	-2.52	**0.012**
Puerto Plata	0.5372	0.2637	2.04	**0.042**
Punta Cana	-0.1363	0.2015	-0.68	0.499
Level of preference for agro-tourism competing activities				
Tourism of adventure	0.0263	0.0684	0.38	0.701
Beach tourism	-0.1449	0.0702	-2.07	**0.039**
Eco-tourism	0.5065	0.0914	5.54	**0.000**
Cultural tourism	0.3642	0.0965	3.77	**0.000**
Sport tourism	0.2154	0.0646	3.33	**0.001**
Level of preference for agro-tourism amenities				
Participating in Planting activities	0.1223	0.0773	1.58	0.114
Exploring Local Rural Lifestyle	0.2863	0.0967	2.96	**0.003**
Enjoying rural landscape	-0.0700	0.0826	-0.85	0.397
Knowing about organic production	0.2613	0.0769	3.40	**0.001**
Ancillary Parameters Estimation				
μ1	3.2544	1.2966		
μ2	4.3935	1.2932		
μ3	5.2400	1.2973		
μ4	6.7070	1.3099		
μ5	8.2010	1.3266		
μ6	9.8268	1.3434		
Number of observations	577			
Wald chi2(12)	392.47			
Prob > chi2	0.0000			
Pseudo R2	0.2200			

Levels of importance for conservation practice range from 0 (highly important) to 6 (highly important). Bold p>|z| indicates the coefficient is significantly different from 0 at 5% or 10%. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

One aim of this study is to analyze to what extent tourists' valuation of agro-tourism in different farming system differs, as well as to understand the driving factors that help explain those differences. For analyzing the determinants of tourist's WTP for agro-tourism in different farming system, we

estimate a SUR model. In this model, the tourist's WTP for each one of the three options considered are determined by tourist's socio-demographic and economic characteristics, and his/her preference level for agro-tourism amenities and for other competing tourist activities. The specification of a SUR model rests on the assumption that the errors terms in each regression equation are correlated. Estimated results are presented in Table 2.

For each of the three alternatives, tourist WTP for agro-tourism increases relative to a tourist's income. Also, women and people younger than 40 years have a greater WTP for agro-tourism. The impact of the nationality dummy variable does not appear to differ significantly from zero in the specific case of WTP for agro-tourism in Río Limpio, San Juan de la Maguana and for both sites. The only exception was in the case of Río Limpio and San Juan de la Maguana, where Canadian nationality had a negative impact on WTP. Tourists arriving at Puerto Plata were less willing to pay for agro-tourism in the DR. Travelling with children has a negative impact on WTP in all three alternatives, although they appear to be not significantly different from zero.

Table 2 Determinants of willingness to pay for agro-tourism. SUR model estimation results

Regressors	Coefficient	Std. Err.	z	P>|z|
Dependent Variable; Log(WTP for Rio Limpio)				
Socio-demographics and economic variables				
Women	0.2189	0.0741	2.95	**0.003**
Age <40	0.169	0.0755	2.24	**0.025**
Higher education	0.0195	0.0856	0.23	0.819
Log(Income)	0.2609	0.0561	4.64	**0.000**
Dominican nationality	-0.2025	0.15411	-1.31	0.189
USA nationality	-0.1599	0.1412	-1.13	0.257
Canadian nationality	-0.2528	0.1519	-1.66	**0.096**
European nationality	-0.0854	0.1635	-0.52	0.601
Number of children travelling	-0.0827	0.0519	-1.59	0.111
Punta Cana	-0.6947	0.1114	-6.24	**0.000**
Puerto Plata	0.0975	0.1016	0.96	0.338
Level of preference for agro-tourism competing activities				
Tourism of adventure	0.0698	0.0273	2.55	**0.011**
Beach tourism	0.0362	0.0341	1.06	0.287
Eco-tourism	-0.0276	0.0282	-0.98	0.329
Cultural tourism	-0.003	0.0334	-0.01	0.991
Sport tourism	-0.036	0.0238	-1.51	0.131
Level of preference for agro-tourism amenities				
Participating in Planting activities	0.0153	0.0275	0.56	0.577
Exploring Local Rural Lifestyle	-0.0123	0.0336	-0.37	0.713
Enjoying rural landscape	0.0478	0.0369	1.3	0.195
Knowing about organic production	0.0626	0.0281	2.22	**0.026**
Constant	1.1786	0.6168	1.91	**0.056**
				Cont…

Table 2 Determinants of willingness to pay for agro-tourism. SUR model estimation results

Regressors	Coefficient	Std. Err.	z	P>|z|
Dependent Variable; Log(WTP for San Juan de la Maguana)				
Socio-demographics and economic variables				
Women	0.2099	0.0793	2.64	**0.008**
Age<40	0.1895	0.0808	2.34	**0.019**
Higher education	-0.0019	0.0916	-0.02	0.983
Log(Income)	0.3099	0.0601	5.15	**0.000**
Dominican nationality	-0.2343	0.165	-1.42	0.156
USA nationality	-0.2004	0.1512	-1.33	0.185
Canadian nationality	-0.3551	0.1626	-2.18	**0.029**
European nationality	-0.1226	0.1751	-0.7	0.484
Number of children travelling	-0.0306	0.0556	-0.55	0.582
Punta Cana	-0.4617	0.1193	-3.87	**0.000**
Puerto Plata	0.0959	0.1088	0.88	0.378
Level of preference for agro-tourism competing activities				
Tourism of adventure	0.0692	0.2933	2.36	**0.018**
Beach tourism	0.02	0.0364	0.55	0.583
Eco-tourism	-0.0282	0.0302	-0.93	0.35
Cultural tourism	-0.0058	0.0357	-0.16	0.871
Sport tourism	-0.0079	0.0255	-0.31	0.755
Level of preference for agro-tourism amenities				
Participating in Planting activities	0.0191	0.0294	0.65	0.515
Exploring Local Rural Lifestyle	0.0007	0.036	0.02	0.984
Enjoying rural landscape	0.0625	0.0395	1.58	0.114
Knowing about organic production	0.0383	0.0301	1.27	**0.204**
Constant	0.5731	0.06605	0.87	0.386
				Cont…

Table 2 Determinants of willingness to pay for agro-tourism. SUR model estimation results

Regressors	Coefficient	Std. Err.	z	P>|z|
Dependent Variable; Log (Wtp for Both Sites)				
Socio-demographics and economic variables				
Women	0.2131	0.0903	2.36	**0.018**
Age<40	0.2178	0.0921	2.37	**0.018**
Higher education	-0.0051	0.1043	-0.05	0.961
Log(Income)	0.3063	0.0684	4.47	**0.000**
Dominican nationality	-0.0779	0.1878	-0.42	0.678
USA nationality	-0.0293	0.1721	-0.17	0.865
Canadian nationality	-0.1859	0.1851	-1	0.315
European nationality	-0.0582	0.1993	-0.29	0.770
Children travelling	-0.0096	0.0633	-0.15	0.879
Punta Cana	-0.7346	0.1357	-5.41	**0.000**
Puerto Plata	0.0616	0.1239	0.5	0.619
Level of preference for agro-tourism competing activities				
Tourism of adventure	0.0616	0.0333	1.97	**0.048**
Beach tourism	0.0402	0.0415	0.97	0.332
Eco-tourism	-0.0314	0.0344	-0.91	0.361
Cultural tourism	-0.0178	0.0407	-0.44	0.661
Sport tourism	-0.0247	0.0291	-0.85	0.394
Level of preference for agro-tourism amenities				
Participating in Planting activities	0.0227	0.0335	0.68	0.498
Exploring Local Rural Lifestyle	0.0084	0.041	0.21	0.836
Enjoying rural landscape	0.0647	0.0449	1.44	0.150
Knowing about organic production	0.0455	0.0343	1.33	0.185
Constant	1.0093	0.7518	1.34	0.179
Equation***	RMSE	R-sq	Chi2	P
Log(WTP for Rio Limpio)	0.7634	0.2717	176.84	0.0000
Log(WTP for San Juan de la Maguana)	0.8174	0.1974	116.57	0.0000

Levels of preference for agro-tourism range from 0 (not preferred) to 6 (highly preferred). Bold p>|z| indicates the coefficient is significantly different from 0 at 5% or 10%. Number of observations= 494. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

  Adventure tourists have a higher WTP for agro-tourism in each of the three alternatives considered. Tourists that greatly prefer to learn about organic production systems have a higher WTP for visiting Río Limpio. None of the others agro-tourism amenities appear to have an impact significantly different from zero for the alternatives presented.

  The hypothesis that the error terms for each of the three equations are not correlated is rejected. Several cross-equation hypotheses are tested in order to see if the impact of a tourist's socioeconomic variables and preference for agro-tourism amenities and other recreational alternatives impact

differently the WTP for agro-tourism in the two distinct farming systems. The hypothesis that the impact on the average WTP of the variable women is similar for each of the three agro-tourism alternatives is not rejected. A similar situation occurs with the variables log income and people younger than 40 years.

The hypothesis that the coefficients corresponding to competing agro-tourism activities are jointly equal to zero on each one of the WTP equations is not rejected by a conventional level of significance. Thus, the levels of tourist preference for recreational activities that might compete with agro-tourism appear to have no impact on the average WTP for the three agro-tourist experiences considered.

Finally, a set of hypotheses is tested in relation to tourist preferences for agro-tourism amenities. The first test is whether the coefficients corresponding to tourist preferences for agro-tourism amenities are simultaneously equal to zero in the three equations. The hypothesis is rejected at a significance level of 10%. However, the hypothesis that the coefficient of the preference levels for each agro-tourism amenity is the same can not be rejected at more restrictive significance levels. Thus, once the impact of preference for agro-tourism amenities is evaluated jointly, there is no particular amenity that has a differentiated impact on the average WTP.

8. Willingness to pay for positive agriculture externalities

The study also evaluates tourists' WTP for the existence of positive externalities associated with agriculture or the existence of practices that reduce agricultural negative externalities (See the Data Appendix, Note 2). The agricultural practices considered are those associated with soil conservation, efficient water use, biodiversity, habitat conservation, forest conservation, natural landscape conservation, conservation of rural traditions and culture, and development of organic agriculture.

While some tourists would think that the adoption of conservation practices would only have a local or regional impact (and consequently, no direct impact over their way of life), others perceive that the adoption of these practices would have global benefits that would impact them indirectly. Hence, tourist WTP reflect, in part, the tourist's perception of the scope and nature of the externalities generated by the adoption of conservation practices.

To analyze the determinants of tourists' WTP for positive externalities and related agricultural environmental services or for practices that reduce negative externalities, we estimated a WTP regression with corrections for sample selectivity. The estimated results are presented in Tables 3.1-3.7. In all regression equations that evaluate WTP for the adoption of each one of the conservation practices considered, intercepts are positive but they are significantly different from zero in the cases of forest conservation, habitat and biodiversity conservation and water conservation practices.

Table 3.1 Determinants of willingness to pay for adoption of soil conservation practices - Heckman correction model estimation results

Regressors	Coefficient	Robust Std. Error	Z	P>|z|
Log(WTP Soil Conservation Practices)				
Women	0.0241	0.1141	0.21	0.833
Edad1	0.541	0.1928	2.8	**0.005**
Log(income)	0.2468	0.0657	3.76	**0.000**
Higher Education	0.0936	0.1255	0.75	0.456
Dominican nationality	0.0083	0.2226	0.04	0.97
USA nationality	-0.3658	0.2061	-1.77	**0.076**
European nationality	0.1818	0.2521	0.72	0.471
Canadian nationality	-0.5446	0.2348	-2.32	**0.02**
Puerto Plata	0.0788	0.1702	0.46	0.643
Punta Cana	0.3425	0.1449	2.36	**0.018**
Constant	0.4201	0.7456	0.56	0.573
Number of observations	623			
Censored observations	328			
Non-censored observations	295			
Wald test	chi2(10)	36.1600	Prob>chi2=	**0.0001**
Selection Equation: Disposition to pay for adoption of soil conservation practice				
Importance of:				
Soil Conservation Practices	0.0915	0.0345	2.65	**0.008**
Efficient Water Use	0.0584	0.0479	1.22	0.223
Habitat and Biodiversity Conservation	-0.009	0.0616	-0.15	0.883
Forest Conservation	-0.0202	0.0837	-0.24	0.809
Natural Landscape Conservation	0.0241	0.0803	0.3	0.764
Traditions and Rural Lifestyle Conservation	0.0917	0.0495	1.85	**0.064**
Organic Production	0.0471	0.0376	1.25	0.211
Constant	-1.3377	0.3116	-4.29	**0.000**
/athrho	-0.8136	0.2617	-3.11	**0.002**
/lnsigma	0.0999	0.0938	1.06	0.287
Rho	-0.6715	0.1436		
Sigma	1.1051	0.1037		
Lambda	-0.7421	0.2224		
Wald test of independence equations (rho=0):	chi2(1)=	9.66	Prob>chi2=	**0.0019**

Levels of importance for conservation practice range from 0 (highly important) to 6 (highly important). Bold p>|z| indicates the coefficient is significantly different from 0 at 5% or 10%. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

Table 3.2 Determinants of willingness to pay for adoption of soil conservation practices - Heckman correction model estimation results

Regressors	Coefficient	Robust Std. Error	Z	P>|z|
Log(WTP for Adoption of Efficient Water Use Practices)				
Women	0.0467	0.1012	0.46	0.644
Age < 25	0.5068	0.1616	3.14	**0.002**
Log(income)	0.1861	0.0624	2.98	**0.003**
Higher Education	0.148	0.107	1.38	0.167
Dominican nationality	-0.0472	0.1726	-0.27	0.784
USA nationality	-0.3773	0.165	-2.29	**0.022**
Europe nationality	0.1871	0.2242	0.83	0.404
Canada nationality	-0.4004	0.1939	-2.06	**0.039**
Puerto Plata	-0.1013	0.1711	-0.59	0.554
Punta Cana	0.2042	0.1292	1.58	0.114
Constant	1.095	0.6562	1.67	**0.095**
Number of observations	610			
Censored observations	248			
Non-censored observations	362			
Wald test	Chi2(10)	32.2900	Prob> chi2=	**0.0004**
Selection Equation: Disposition to pay for adoption of efficient water use practice				
Importance of:				
Soil Conservation Practices	0.0519	0.0342	1.52	0.129
Efficient Water Use	0.1436	0.0446	3.21	**0.001**
Habitat and Biodiversity Conservation	-0.1348	0.0694	-1.94	**0.052**
Forest Conservation	0.0048	0.0766	0.06	0.949
Natural Landscape Conservation	0.0535	0.0685	0.78	0.435
Traditions and Rural Lifestyle Conservation	0.0971	0.0531	1.83	**0.068**
Organic Production	0.0154	0.0404	0.38	0.702
Constant	-0.8194	0.2316	-3.54	**0.000**
/athrho	-0.9747	0.1878	-5.19	**0.000**
/lnsigma	0.1226	0.0678	1.81	**0.071**
rho	-0.7507	0.0819		
sigma	1.1304	0.0767		
lambda	-0.8487	0.1423		
Wald test of independence equations (rho=0):	Chi2(1)=	26.9400	Prob > chi2=	**0.0000**

Levels of importance for conservation practice range from 0 (highly important) to 6 (highly important). Bold p>\|z\| indicates the coefficient is significantly different from 0 at 5% or 10%. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

Table 3.3 Determinants of Willingness to Pay for Habitat and Biodiversity Conservation Practices - Heckman correction model estimation results

Regressors	Coefficient	Robust Std. Error	Z	P>|z|
Log(WTP Adoption Habitat and Biodiversity Conservation Practices)				
Women	0.1109	0.1052	1.05	0.292
Age< 25	0.4985	0.1879	2.65	**0.008**
Log(income)	0.1477	0.0650	2.27	**0.023**
Higher Education	0.2089	0.1164	1.79	**0.073**
Dominican nationality	-0.3319	0.2251	-1.47	0.14
USA nationality	-0.5220	0.2202	-2.37	**0.018**
European nationality	-0.0415	0.2595	-0.16	0.873
Canadian nationality	-0.6369	0.2319	-2.75	**0.006**
Puerto Plata	-0.0563	0.1653	-0.34	0.733
Punta Cana	0.1337	0.1418	0.94	0.346
Constant	1.643	0.6806	2.41	**0.016**
Number of observations	620			
Censored observations	253			
Non-censored observations	367			
Wald test	chi2(10)	27.3100	Prob>chi2=	**0.0023**
Selection Equation: Disposition to pay for adoption of habitat and biodiversity conservation practices				
Importance of:				
Soil Conservation Practices	0.0921	0.0359	2.56	**0.01**
Efficient Water Use	-0.0063	0.0475	-0.13	0.894
Habitat and Biodiversity Conservation	0.0497	0.0581	0.86	0.392
Forest Conservation	0.0071	0.0752	0.09	0.925
Natural Landscape Conservation	0.0494	0.0694	0.71	0.476
Traditions and Rural Lifestyle Conservation	0.0197	0.0485	0.41	0.684
Organic Production	-0.0054	0.0386	-0.14	0.887
Constant	-0.7145	0.2359	-3.03	**0.002**
/athrho	-0.7278	0.2474	-2.94	**0.003**
/lnsigma	0.1081	0.0788	1.37	0.17
rho	-0.6217	0.1517		
sigma	1.1141	0.0877		
lambda	-0.6926	0.2166		
Wald test of independence equations (rho=0):	chi2(1)=	8.6600	Prob>chi2=	**0.0033**

Levels of importance for conservation practice range from 0 (highly important) to 6 (highly important).
Bold p>|z| indicates the coefficient is significantly different from 0 at 5% or 10%. Source: Elaborated
using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

**Table 3.4 Determinants of willingness to pay for forest conservation practices -
Heckman correction model estimation results**

Regressors	Coefficient	Robust Std. Error	Z	P>|z|
Log(WTP Adoption Forest Conservation Practices)				
Women	0.1322	0.1014	1.3	0.192
Age <25	0.4702	0.1871	2.51	**0.012**
Log(income)	0.1907	0.0692	2.76	**0.006**
Higher Education	0.1816	0.1144	1.59	0.113
Dominican nationality	-0.2071	0.1985	-1.04	0.297
USA nationality	-0.3556	0.1942	-1.83	**0.067**
European nationality	0.0398	0.2359	0.17	0.866
Canadian nationality	-0.5452	0.2128	-2.56	**0.01**
Puerto Plata	-0.1647	0.1643	-1	0.316
Punta Cana	0.01907	0.1352	0.14	0.888
Constant	1.2089	0.7061	1.71	**0.087**
Number of observations	609			
Censored observations	229			
Non-censored observations	380			
Wald test	chi2(10)	27.3100	Prob> chi2=	**0.0023**
Selection Equation: Disposition to pay for adoption of forest conservation practices				
Importance of:				
Soil Conservation Practices	0.0811	0.0342	2.37	**0.018**
Efficient Water Use	0.0146	0.0465	0.32	0.753
Habitat and Biodiversity Conservation	-0.0391	0.0696	-0.56	0.575
Forest Conservation	0.0041	0.0772	0.05	0.958
Natural Landscape Conservation	0.1262	0.0698	1.81	**0.071**
Traditions and Rural Lifestyle Conservation	0.0342	0.0467	0.73	0.464
Organic Production	0.0149	0.0391	0.38	0.701
Constant	-0.7861	0.2182	-3.6	**0.000**
/athrho	-0.9994	0.1765	-5.66	**0.000**
/lnsigma	0.1573	0.0664	2.37	**0.018**
rho	-0.7613	0.0742		
sigma	1.1704	0.0777		
lambda	-0.8911	0.1399		
Wald test of independence equations (rho=0):	chi2(1)=	32.0400	Prob > chi2=	**0.0000**

Levels of importance for conservation practice range from 0 (highly important) to 6 (highly important). Bold p>|z| indicates the coefficient is significantly different from 0 at 5% or 10%. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

Table 3.5 Determinants of willingness to pay for natural landscape conservation practices - Heckman correction model estimation results

Regressors	Coefficient	Robust Std. Error	Z	P>|z|
Log(WTP Adoption Natural Landscape Conservation Practices)				
Women	0.1612	0.1014	1.59	0.112
Age <25	0.5039	0.1861	2.71	**0.007**
Log(income)	0.2393	0.0727	3.29	**0.001**
Higher Education	0.1617	0.1086	1.49	0.137
Dominican nationality	-0.0609	0.1853	-0.33	0.742
USA nationality	-0.2995	0.1819	-1.65	**0.100**
European nationality	1.1791	0.2403	0.75	0.456
Canadian nationality	-0.4823	0.2012	-2.4	**0.017**
Puerto Plata	-0.1311	0.1651	-0.79	0.427
Punta Cana	-0.0118	0.1344	-0.09	0.93
Constant	0.5994	0.7285	0.82	0.411
Number of observations	614			
Censored observations	224			
Non-censored observations	390			
Wald test	chi2(10)	29.6100	Prob> chi2=	**0.0010**
Selection Equation: Disposition to pay for adoption of natural landscape conservation practices				
Importance of:				
Soil Conservation Practices	0.0785	0.0335	2.34	**0.019**
Efficient Water Use	0.0297	0.0444	0.67	0.504
Habitat and Biodiversity Conservation	-0.0406	0.0667	-0.61	0.543
Forest Conservation	0.0131	0.0731	0.18	0.858
Natural Landscape Conservation	0.1047	0.0648	1.61	0.106
Traditions and Rural Lifestyle Conservation	0.0415	0.0462	0.9	0.37
Organic Production	-0.0066	0.0381	-0.17	0.863
Constant	-0.6917	0.2134	-3.24	**0.001**
/athrho	-0.9944	0.175	-5.68	**0.000**
/lnsigma	0.1591	0.0669	2.38	**0.017**
Rho	-0.7592	0.0741		
Sigma	1.1724	0.0784		
Lambda	-0.8901	0.1406		
Wald test of independence equations (rho=0):	chi2(1)=	32.2900	Prob > chi2=	**0.0000**

Levels of importance for conservation practice range from 0 (highly important) to 6 (highly important). Bold p>|z| indicates the coefficient is significantly different from 0 at 5% or 10%. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

Table 3.6 Determinants of willingness to pay for natural landscape conservation practices. - Heckman correction model estimation results

Regressors	Coefficient	Robust Std. Error	Z	P>|z|
Log(WTP Adoption Traditions and Rural Lifestyle Conservation Practices)				
Women	0.1111	0.1193	0.93	0.352
Age< 25	0.5454	0.2025	2.69	**0.007**
Log(income)	0.2083	0.077	2.71	**0.007**
Higher Education	0.0987	0.1351	0.73	0.465
Dominican nationality	-0.1677	0.2288	-0.73	0.464
USA nationality	-0.3419	0.2106	-1.62	0.104
European nationality	0.2092	0.2774	0.75	0.451
Canadian nationality	-0.4275	0.2263	-1.89	**0.059**
Puerto Plata	-0.2288	0.1893	-1.21	0.227
Punta Cana	-0.0091	0.1602	-0.06	0.955
Constant	1.0435	0.7836	1.33	0.183
Number of observations	615			
Censored observations	293			
Non-censored observations	322			
Wald test	Chi2(10)	24.2000	Prob> chi2=	**0.0071**
Selection Equation: Disposition to pay for adoption traditions and rural lifestyle conservation practices				
Importance of:				
Soil Conservation Practices	0.0958	0.0368	2.6	**0.009**
Efficient Water Use	0.0975	0.0471	2.07	**0.039**
Habitat and Biodiversity Conservation	-0.0265	0.0623	-0.43	0.67
Forest Conservation	-0.1064	0.0861	-1.24	0.217
Natural Landscape Conservation	0.0234	0.0773	0.3	0.761
Traditions and Rural Lifestyle Conservation	0.1702	0.0522	3.26	**0.001**
Organic Production	0.0077	0.0401	0.19	0.846
Constant	-1.0922	0.2607	-4.19	**0.000**
/athrho	-0.7937	0.1827	-4.34	**0.000**
/lnsigma	0.1832	0.0726	2.52	**0.012**
rho	-0.6605	0.1031		
sigma	1.2011	0.0872		
lambda	-0.7933	0.1737		
Wald test of independence equations (rho=0):	Chi2(1)=	18.8600	Prob > chi2=	**0.0000**

Levels of importance for conservation practice range from 0 (highly important) to 6 (highly important). Bold p>\|z\| indicates the coefficient is significantly different from 0 at 5% or 10%. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

Table 3.7. Determinants of willingness to pay for adoption of organic production system Heckman correction model estimation results

Regressors	Coefficient	Robust Std. Error	Z	P>|z|
Log(WTP Adoption of Organic Production System)				
Women	0.1859	0.1227	1.52	0.13
Age< 25	0.5217	0.1876	2.78	**0.005**
Log(income)	0.1783	0.0735	2.43	**0.015**
Higher Education	0.0751	0.1273	0.59	0.556
Dominican nationality	-0.1845	0.2107	-0.88	0.381
USA nationality	-0.3951	0.2009	-1.97	**0.049**
European nationality	0.2165	0.2552	0.85	0.396
Canadian nationality	-0.4319	0.2341	-1.84	**0.065**
Puerto Plata	-0.1587	0.1893	-0.84	0.402
Punta Cana	0.0886	0.1529	0.58	0.562
Constant	1.2489	0.7681	1.63	0.104
Number of observations	621			
Censored observations	328			
Non-censored observations	293			
Wald test	chi2(10)	23.4500	Prob> chi2=	**0.0092**
Selection Equation: Disposition to pay for adoption of organic production system				
Importance of:				
Soil Conservation Practices	0.0974	0.0368	2.64	**0.008**
Efficient Water Use	0.0306	0.0481	0.64	0.524
Habitat and Biodiversity Conservation	-0.0509	0.0624	-0.82	0.415
Forest Conservation	-0.0445	0.0811	-0.55	0.582
Natural Landscape Conservation	0.0345	0.0816	0.42	0.672
Traditions and Rural Lifestyle Conservation	0.1292	0.0512	2.52	**0.012**
Organic Production	0.0906	0.0389	2.33	**0.020**
Constant	-1.319	0.3155	-4.18	**0.000**
/athrho	-0.8171	0.2262	-3.16	**0.000**
/lnsigma	0.1241	0.0874	1.42	0.156
Rho	-0.6734	0.1236		
Sigma	1.1321	0.0991		
Lambda	-0.7624	0.2013		
Wald test of independence equations (rho=0):	chi2(1)=	13.0400	Prob > chi2=	**0.0003**

Levels of importance for conservation practice range from 0 (highly important) to 6 (highly important). Bold p>|z| indicates the coefficient is significantly different from 0 at 5% or 10%. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

People younger than 25 years make up the segment of the tourist market that are willing to pay an extra amount of money to encourage the adoption of farming practices that create positive environmental externalities. In relation to the impact of income, the coefficients on variable Log of income are positive and significantly different from zero in all equations. Similarly, the coefficients of the variable Higher Education positively affect WTP, but the hypothesis that these coefficients are equal to zero cannot be rejected at conventional significance levels, except in the case of the tourist's WTP for the adoption of habitat and biodiversity conservation practices.

Tourists from the USA and Canada tend to be willing to pay less for positive externalities resulting from certain conservation practices. Although the coefficients of the variable European nationality are positive in most cases, they are not significantly different from zero. The opposite situation occurs with the variable Dominican nationality that presents negative but not significantly different from zero coefficients.

The level of importance assigned to the existence of soil conservation practice is the major explanatory variable that impacts tourists' WTP for the existence of other conservation practices. But in the case of organic production, the decision to support or not to support the adoption of this practice is correlated with the importance that tourists assign to the preservation of rural lifestyle and traditions, as well as the importance assigned to the promotion of organic agriculture.

9. Typology of agro-tourists

One of the objectives of this study is to define a typology of agro-tourists. Conglomerate (or cluster) analysis was used to identify the existence of four groups of agro-tourists according to their preference levels, their behaviour in terms of WTP, and factors that would discourage them from participating in agro-tourism activities. The following categories were identified:

Group 1 – 'Authentic' Agro-tourists: these tourists do enjoy agro-tourism, but they are not overly enthusiastic. They are the ones who assign the least importance to disincentive factors against agro-tourism, and show the greatest WTP to engage in agro-tourist activities. They also represent 17.8% of the tourists that showed interest in agro-tourism. 80% of this group is willing to pay for the existence of positive externalities associated with the adoption of conservationist farming practices.

Group 2 – Discreet Agro-tourists: these tourists do not feel particularly attracted to agro-tourism, yet have a relatively high WTP for an agro-tourist activity. They place importance on factors such as distance, transport prices, and personal security. In this group, we find 29.9% of the tourists with an interest in agro-tourism. 66% of the tourists in Group 2 are willing to pay for the existence of positive externalities associated with the adoption of conservationist farming practices.

Group 3 – Passionate Agro-tourists: these tourists have a high preference for agro-tourism, yet are less willing to pay for these activities. They assign an intermediate value to the factors that affect agro-tourism. Around 30% of the tourists interested in agro-tourism belong to this group. 79% of tourists in this group is willing to pay for the existence of positive externalities associated with the adoption of conservationist farming practices.

Group 4 – Demanding Agro-tourists: these tourists have the highest preference levels for agro-tourism, exhibit a relatively low WTP, and assign the greatest importance to the disincentive factors. 21.9% of the tourists interested in agro-tourism fall within this group, with 71% willing to pay for the existence of positive externalities associated with the adoption of conservationist farming practices (see tables 4 and 5).

Table 4 Number of agro-tourists with positive WTP for agro-tourism in the Dominican Republic

Agro-tourist categories	Total	Organic Farming Systems	Conventional Farming Systems	Both Farming Systems
Authentic agro-tourists	432,886	234,076	158,147	40,663
Discreet agro-tourists	715,306	377,389	220,447	117,470
Passionate agro-tourists	752,761	396,497	225,240	131,024
Demanding agro-tourists	549,631	334,395	129,393	85,843
Total	2,450,584	1,342,357	733,227	375,000

Clusters elaboration using SPSS 10 Program. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

Table 5 Number of agro-tourists with positive WTP for existence of positive externalities of agriculture in the Dominican Republic

Agro-tourist Categories	Total	Organic Farming Systems	Conventional Farming Systems	Both Farming Systems
Authentic agro-tourists	347,210.7	187,748.8	126,847.0	32,614.8
Discreet agro-tourists	470,946.6	248,467.0	145,139.2	77,340.4
Passionate agro-tourists	596,700.4	314,296.3	178,543.6	103,860.6
Demanding agro-tourists	391,262.9	238,043.8	92,110.3	61,108.8
Total	1,806.121	988,556	542,640	274,925

Clusters elaboration using SPSS 10 Program. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

All tourists place importance on personal security, infrastructure, and surrounding attractions as disincentives for the practice of agro-tourism. Extrapolating from the sample data and the number of tourists that visited the DR in 2002, we estimate that about 2.4 million tourists could be interested in participating in one agro-tourism activity in the country and about 1.8 million is willing to pay for the existence of positive externalities associated with the adoption of conservationist farming practices (see figures 1 - 3).
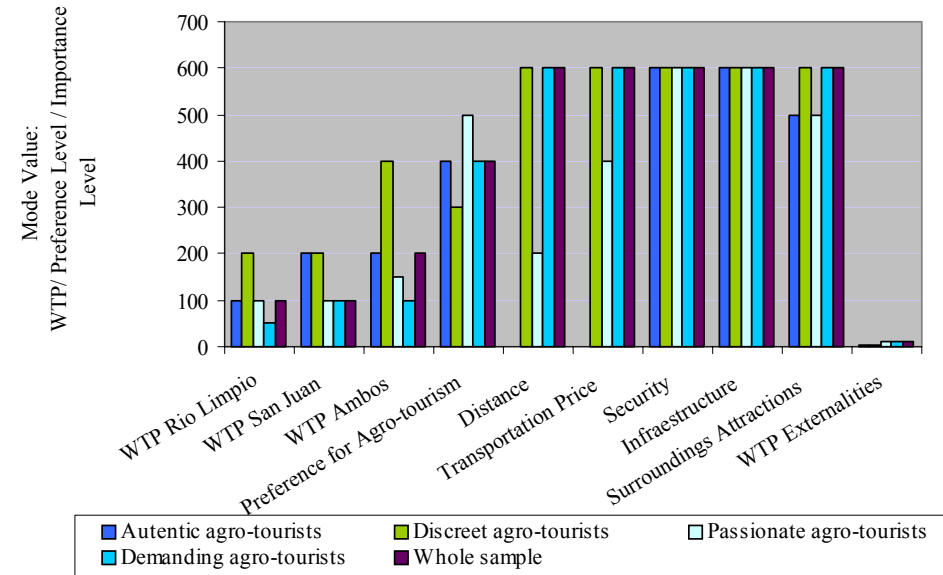
**Figure 1 Agro-tourist typology descriptive statistics by tourist categories
Mean value**
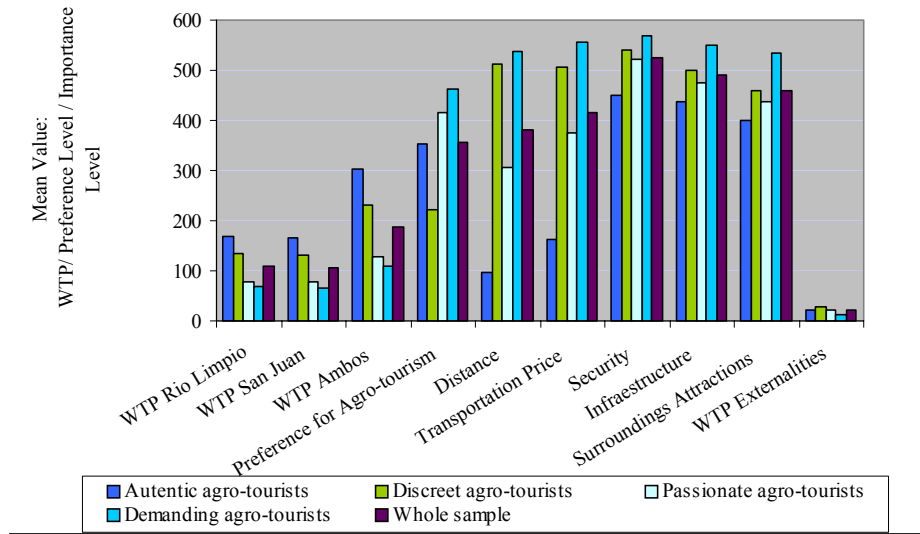
**Figure 2 Agro-tourist typology descriptive statistics by tourist categories
Median value**
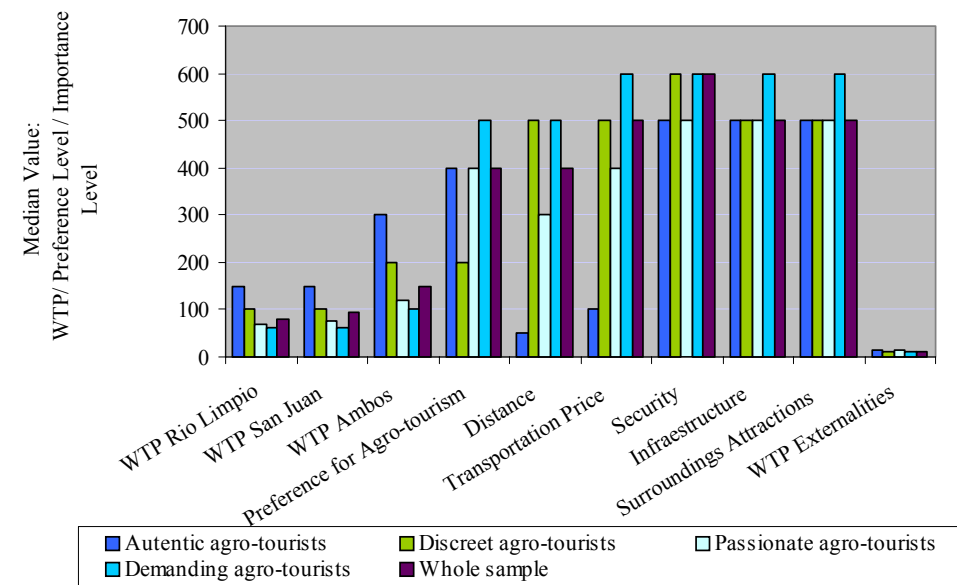
**Figure 3 Agro-tourist typology descriptive statistics by tourist categories
Mode value**

10. Potential Economic Contribution of Agro-tourism

Based on the agro-tourist typology presented in the last section, the potential economic contribution of agro-tourism is assessed given different scenarios. The assumptions are: i) the existence of a price discrimination mechanism in which each agro-tourists category pays either the median, mean or mode WTP corresponding to each group, ii) the existence of non-price discrimination mechanism in which all agro-tourists pay the value corresponding to either the whole sample median, mean or mode WTP (see table 6).

   In the most conservative scenario, price discrimination is not allowed and tourists would spend the whole sample mean value of WTP for agro-tourism and for the existence of positive externalities associated to the adoption of conservationist farming practices. In the most optimistic scenario, price discrimination exists and each agro-tourist category would spend the group modal WTP for agro-tourism and the existence of positive externalities associated to sustainable agricultural practices (see table 7).

   The conservative estimation presents the case where WTP for agro-tourism and the existence of positive externalities associated to sustainable practices could generate an income of US $251 million, which represents 8.4% of the tourism income and 9.8% of the farming GDP in 2002. Income generation within the most optimistic scenario would reach US $364 million, representing 12% of the tourism income and 14% of the farming GDP.

Table 6 WTP for agro-tourism and existence of positive externalities of agriculture in the Dominican Republic

Agro-tourist	WTP US$			
	Agro-tourism			*Positive*
	Organic Farming Systems	*Conventional Farming Systems*	*Both Systems*	*Externalities of Agriculture*
Median WTP				
Authentic agro-tourists	150	150	300	15
Discreet agro-tourists	100	100	200	10
Passionate agro-tourists	70	75	120	13
Demanding agro-tourists	60	60	100	10
Whole Sample	80	95	150	10
Mean WTP				
Authentic agro-tourists	167	164	304	22
Discreet agro-tourists	135	130	230	27
Passionate agro-tourists	77	79	129	22
Demanding agro-tourists	70	64	111	14
Whole Sample	109	106	186	22
Mode WTP				
Authentics	100	200	200	5
Discreet agro-tourists	200	200	400	5
Passionate agro-tourists	100	100	150	10
Demanding agro-tourists	50	100	100	10
Whole Sample	100	100	200	10

Clusters elaboration using SPSS 10 Program. Source: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA- FAO/INTEC Project.

11. Conclusions

This study analyzes the links between agriculture and tourism. A contingent valuation study is presented assessing tourist's willingness to pay (WTP) for agro-tourism and agriculture's positive environmental services and related positive externalities. The paper analyzes factors influencing tourist preferences in the Dominican Republic (DR) -- tourist income, the local tourist destination, sex, and nationality stand out among these factors. Among the important findings are that tourists interested in participating in agro-tourism in the DR are basically motivated by the cultural experience. People interested in agro-tourism are also highly motivated to explore local cultures, and to practice eco-tourism and sports tourism.

   A tourist's WTP for agro-tourism in the DR increases as income levels increase; is higher among both women and tourists younger than 40 years old, and is lower for tourists travelling with children.

   Sustainable agricultural production practices tend to provide the types of amenities preferred by agro-tourists, essentially those relative to lifestyle and rural culture. No single amenity has a particular influence on the determination of WTP. The WTP for amenities linked to a rural setting correspond to the integrated value of all the amenities that define preferences for a rural setting.

Table 7 Estimated potential income from agro-tourism and support of positive environmental externalities of agriculture

	Pricing Scheme	
	Price Discrimination among Agro-tourists	*Non Price Discrimination among Agro-tourists*
US$ Millions		
Conservative Scenario	272	251
Optimistic Scenario	364	333
% Tourism Income		
Conservative Scenario	9.1	8.4
Optimistic Scenario	12.1	11.1
% Farming GDP		
Conservative Scenario	10.6	9.8
Optimistic Scenario	14.1	12.9

Assumptions: Aggregate tourism income: US$3,000 millions in 2002.   Dominican Republic GDP: US$22,596 millions in 2002. Farming GDP/DR GDP: 11.4% in 2002. Conservative Scenario with price discrimination: Median WTP for each agro-tourist category. Optimistic Scenario with price discrimination: Mode WTP for each agro-tourist category. Conservative Scenario with non price discrimination: Whole Sample Median WTP . Optimistic Scenario with non price discrimination: Whole Sample Mean WTP. ource: Elaborated using data from Survey of Agro-tourism in the Dominican Republic 2003. ROA-FAO/INTEC Project.

Agro-tourism offers the potential to involve 78% of the tourists that visit the DR, who are attracted to positive externalities associated with the adoption of conservationist farming practices. Some 60% of agro-tourists stated their interest in organic farming systems rather than conventional farming systems. A relevant finding is that tourist's WTP for the existence of positive externalities associated with conservationist farming practices does not reflect any discrimination among farming systems in which positive externalities associated to the adoption of conservationist farming practices takes place.

The economic contribution of agro-tourism and the existence of positive externalities associated with conservationist farming practices could exceed US $251 million annually, which would represent 8.4% of the tourism income in 2002 and 10% of the farming GDP. A more optimistic scenario indicates that the income generated could be as much as US $364 million, which represents 12% of the tourism income in 2002 and 14.1% of the farming GDP.

Agro-tourism represents an important option to satisfy both immediate and future priorities associated with the goals of sustainable development by linking agriculture and tourism in the DR. An initial strategy to develop agro-tourism in the short-term in the DR should consider the need for better infrastructure and personal security for agro-tourists in the rural areas and effective collaboration with tour to promote this new tourist market for the DR.

Data Appendix

Note 1: The model estimated is the following:

$$y^* = \beta X + \delta Z^* + \alpha W^* + \varepsilon$$

where y^* is tourist level of satisfaction due to the enjoyment of agro-tourism, Z^* is a vector of tourist levels of satisfaction due to enjoyment of other tourist activities that may compete with agro-tourism, and W^* is a vector of tourist levels of satisfaction due to enjoyment of some specific amenities associated with agro-tourism. The vector X represents tourist's socio-demographics and economic characteristics. The variable y^* is unknown. But we observe from the survey data that tourist ranks his/her level of preference for agro-tourism from 0 to 6, so

$$
\begin{aligned}
\boldsymbol{y} &= 0 & \text{if} && y^* &\leq 0, \\
&= 1 & \text{if} && 0 < y^* &\leq \mu_1, \\
&= 2 & \text{if} && \mu_1 < y^* &\leq \mu_2, \\
&= 3 & \text{if} && \mu_2 < y^* &\leq \mu_3 \\
&= 4 & \text{if} && \mu_3 < y^* &\leq \mu_4, \\
&= 5 & \text{if} && \mu_4 < y^* &\leq \mu_5, \\
&= 6 & \text{if} && \mu_5 &\leq y^*
\end{aligned}
$$

The variables in vectors Z^* and W^* are also unknown, but we can take as proxies the ranking of the level of preferences indicated by the tourist in the Survey with respect to each competing tourist activities as well each agro-tourism amenities. We estimate the following probabilities: *P(y=0); P(y=1); P(y=2), P(y=3), P(y=4), P(y=5)* and *P(y=6),* conditioned on tourist demographic characteristics and tourist's preferences for alternative agro-tourism competing activities and tourist's preferences for agro-tourism amenities.

Note 2: The model estimated is the following.

Suppose that y* and z* are two latent variables, where y* measures tourist level of satisfaction due to his/her contribution to the adoption of a certain conservation practice, and z* measures tourist level of commitment with the adoption of the conservation practice considered. Both latent variables are generated by the following bivariate process

$$
\begin{bmatrix} y_i^* \\ z_i^* \end{bmatrix} = \begin{bmatrix} \mathbf{X}_i\boldsymbol{\beta} \\ \mathbf{W}_i\boldsymbol{\gamma} \end{bmatrix} + \begin{bmatrix} u_i \\ v_i \end{bmatrix}, \qquad \begin{bmatrix} u_i \\ v_i \end{bmatrix} \sim NID\left(\mathbf{0}, \begin{bmatrix} \sigma^2 & \rho\sigma \\ \rho\sigma & 1 \end{bmatrix} \right)
$$

where Xi is a vector of observations on tourist's socioeconomic characteristics and Wi is a vector of tourist's perceptions of how important is the adoption of a set of conservation practices on a scale from 0 to 6, where 0 means not important and 6 means extremely important. β and γ are unknown parameter vectors, σ is the standard deviation of ui and ρ is the correlation between ui and vi. It is imposed a restriction that the variance of vi is equal to one because just the sign of z* is observed. In fact only the variable y and z are observed, which are related to y* and z* in the following way:

$$
\begin{aligned}
y_i &= y_i^* \quad \text{if } z_i^* > 0; & y_i &= 0 \quad \text{otherwise;} \\
z_i &= 1 \quad \text{if } z_i^* > 0; & z_i &= 0 \quad \text{otherwise.}
\end{aligned}
$$

This is a model with sample selectivity where observations are classified in two types: ones for which yi and zi are observed to be zero and ones for which zi=1 and $y_i = y_i^*$. In this model tourist's level of commitment with the adoption of a certain practice is a function not only of his/her perception of the importance of this particular practice, but also the perception of the importance of other conservation practices, acknowledging the possibility that two or more practice can interact, developing a relationship of complementing or substituting each other.

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