

Advances in Determining the Value and Importance of Useful Plants for Rural Populations in Santiago Del Estero, Argentina

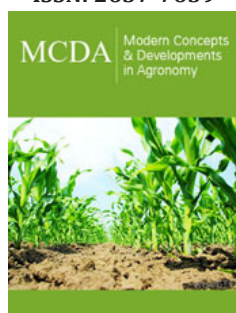
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Abstract

This article presents the results of studies carried out in Santiago del Estero, Argentina that assessed people's willingness to pay (WTP) and willingness to accept (WTA) for useful plants conservation using the Contingent Valuation Methodology (CVM). The WTP of residents in rural areas in Santiago del Estero, Argentina was researched. In this study residents expressed that medicinal, food and dye plants are very important to them. In different parts of the province of Santiago del Estero, 268 families in eleven small towns were surveyed obtaining values of willingness to pay and willingness to accept. The use of useful plants has been passed down over many generations, which ensures the availability of a continuous flow of environmental services. The results expressed in monetary terms that show the importance that environmental services provided by native forests for rural communities.

Keywords: Ecosystem services; Valuation; Medicinal plants; Die plants; Food plants

Introduction

The ecosystem services are components of nature, directly enjoyed, consumed, or used to yield human well-being [1]. Medicinal plant species constitute an important alternative to conventional medicine in a large number of developing countries, especially within poor communities that inhabit rural areas and lack access to health services [2]. Similarly, plants provide extra food supply for people living in poor regions. Nonmarket valuation, and other economic techniques that emphasize exchange values over cultural and ecological values, have been subject to criticism regarding the inability of exchange values to represent the total value of an ecosystem [3]. Many of these forest goods and services do not have a market price to reflect the benefits they provide to society. While several goods such as timber have market prices, or are at least partially traded in the market (such as game for hunting), most forest services are generally non-priced public goods (leisure and recreation, watershed protection, biodiversity, etc.) [4]. Especially in the context of the valuation of ecosystem goods and services, this is an unjustified oversimplification, as there are often trade-offs between the short-term and long-term use of nature. Thus, a suitable valuation method has to take into account irreversibility and long-term consequences. As a consequence, values are not static but dynamic and depend on the co-evolution of the three subsystems nature, economy and society [5]. Bruno and Sarmiento [6] investigated the economic dependence of people who inhabit forests with their services. Studies of indigenous and popular knowledge about natural resources are becoming increasingly important in defining strategies and actions for the conservation or recovery of forests. The key role of indigenous and local knowledge in biodiversity conservation and management has been consistently highlighted within many international directives [7]. The use of plants and plant products for different purposes such as food, wood, medicine, fiber, oil, fodder, aroma and ornament could be traced as far back as the beginning of human civilization [8].

Others studies on medicinal plant use have been conducted in several localities in Santiago del Estero, northern Argentina, by Díaz [9], Sarmiento et al. [10]. Regarding useful plants for food, Sarmiento et al. [11,12] published studies on consumers' tastes and preferences. He also did research on the knowledge of native forest food products in urban populations. The properties of dye plants were valued by Sarmiento and Guerrero Maldonado [13]. These studies and research were carried out within a thematic network of medicinal, aromatic and dye plants in northern Argentina, coordinated by Arraiza et al. [14]. Under the Ecosystem Services approach, ecosystems are considered to be important because of the multiple values they offer. They provide individual utility and economic development (i.e. instrumental value), help to build meaningful relationships between humans and nature (i.e. relational values), and serve as ends in themselves (i.e. intrinsic values) [15-17]. Therefore, ES valuations are crucial since they attempt to reflect these multiple values [18].

Objective

The objective of this paper is to examine the studies about valuation of ecosystem services provided from useful plants in Santiago del Estero, Argentina and to determine information gaps on this topic.

Material and Methods

The study was conducted in different rural areas in the province of Santiago del Estero. The province has a population of 874,006 inhabitants [19] and covers an area of 136,351 km², in northwestern Argentina. The study area lies between latitudes 20° to 30°S and longitudes 62° to 66°W. The inhabitants are mostly rural people with low incomes and far from major urban centers. Productive economic activities aimed at low-scale subsistence are predominant in most of these areas. Surveys were conducted

personally and individually on a population accessed at random in the locations described, and trying to cover as many families as possible. In all the study cases the Contingent Valuation Method was applied. A similar survey was applied in all the sites studied. In the case of medicinal and aromatic plants, 17 surveys were performed in Santos Lugares, 30 surveys in Guampacha and 80 surveys on a sample population within the 18-82 age range, being women the majority [9,10]. Regarding dye plants, the sample population to which the survey was conducted was composed of thirty-five (35) people in the 16-78 age range, and corresponding entirely to women (no man was found dedicated to the craft with sheep wool or to the collection of dye plants) [13]. Between 2017 and 2018, the provision of food plant in others parts of the province were valued [20] with Contingent Valuation Method in 111 cases.

Result and Conclusion

Regarding medicinal species, there are only two other studies in the province and correspond to the western area departments. This work was the first carried out in the sampled areas and the results can be compared with the ones obtained in other studies and will help expand the database in Santiago del Estero (Table 1). Regarding plants for medicinal purposes, of the total respondents, 97.5% obtained them directly from the forest. In addition, 65% said to have cultivated a plant in their garden. Most people obtain the plants from the forest or grow them in their garden. The importance of the natural environment for these people as a source of alternative timber resources is demonstrated. The results can be the basis for researching the development of potential markets of medicinal plants in the region, as Khan and Abdur [21] comment. More research on the use of aromatic plants in Santiago del Estero should be done since there is no research results related to the valuation of aromatic plants in the province. Regarding dye species, there is no history of research in the province.

Table 1: Registered economics values of useful plants in Santiago del Estero 2005-2019.

Place and Year	Sample Size/ Population Size	Ecosystem Service Valuated	Variable	Mean Value US \$/ month	Source
Santos Lugares 2005	17/200	Medicinal plants	WTP	34.35	Sarmiento et al. [10]
Guampacha 2007	30/200	Medicinal Plants	WTP	32.59	Diaz [9]
Villa Figueroa 2008	80/111	Medicinal Plants	WTP	4.5	Sarmiento and Guerrero Maldonado [13]
El Empachao 2008		Medicinal Plants	WTP		
San Jerónimo 2008		Medicinal Plants	WTP	5.07	
Blanca Pozo 2008		Medicinal Plants	WTP		
San Jerónimo 2008	35/35	Dye Plants	WTP	133.44	
Blanca Pozo 2008		Dye Plants	WTA	4.18	
Copo 2019	111/1,097	Foods plants	WTA	51.8	Bruno and Sarmiento [6]
Alberdi 2019					
Figueroa 2019					
Copo 2019	111/1,097	Foods plants	WTP	103.1	
Alberdi 2019					
Figueroa 2019					

This document is the first of its kind in this area. The importance of the implementation of the method and the value found can generate future applications in similar situations. In Salta, Argentina, Lambaré et al. [22] studied and compared the use of dye plants between 1994 and 2000 with those in 2007 and 2008. They also analyzed the current factors in the acquisition and transmission of knowledge related to such use. In relation to rural people's perceptions of the value of natural resources, the healing uses they give to medicinal plants have become a natural heritage they are willing to protect and preserve for future generations. As for the economic value expressed in monetary terms, the environmental service of the plants studied represents money that people avoid spending on medical services due to the free availability of medicinal plants. If the values of Consumer Surplus and Surplus Compensatory calculated for the WTP and WTC are contrasted, it can be noted that the values obtained are very similar for both, although slightly higher than those calculated for WTA and WTP. Regarding food plants, there is no history of research in the province. This document is the first of its kind in this area. In view of the trends to value ecosystem services, it is necessary to find other values of ecosystem services such as the conservation of biodiversity, carbon capture or water quality in the region.

References

- Boyd J, Banzhaf S (2007) What are ecosystem services? The need for standardized environmental accounting units. *Ecol Econ* 63(2-3): 616-626.
- Cadena González AL, Sørensen M, Theilade I (2013) Use and valuation of native and introduced medicinal plant species in Campo Hermoso and Zetaquirá, Boyacá, Colombia. *J Ethnobiol Ethnomed* 9: 23.
- Allen K, Moore R (2016) Moving beyond the exchange value in the nonmarket valuation of ecosystem services. *Ecosyst Serv* 18: 78-86.
- Stenger A, Harou P, Navrud S (2009) Valuing environmental goods and services derived from the forests. *J For Econ* 15(1-2): 1-14.
- Winkler R (2006) Valuation of ecosystem goods and services. Part 1: An integrated dynamic approach. *Ecol Econ* 59(1): 82-93.
- Bruno C, Sarmiento M (2017) Percepción del bosque y sus servicios ecosistémicos por integrantes de la cooperativa Agro Naciente de Colonia El Simbolar, Santiago del Estero, Argentina. VI Jornadas y III Congreso Argentino de Ecología del Paisaje. Facultad de Ciencias Forestales Argentina.
- Pert PL, Ens EJ, Locke J, Clarke PA, Packer JM, et al. (2015) An online spatial database of Australian Indigenous Biocultural Knowledge for contemporary natural and cultural resource management. *Sci Total Environ* 534: 110-21.
- Barata A, Rocha F, Lopes V, Carvalho A (2016) Conservation and sustainable uses of medicinal and aromatic plants genetic resources on the worldwide for human welfare. *Ind Crops Prod* 88: 8-11.
- Díaz R (2007) Valoración económica de servicios ambientales: uso medicinal de la vegetación en las Sierras de Guasayán Santiago del Estero, Argentina Graduation Thesis Universidad Nacional de Santiago del Estero Argentina.
- Sarmiento M, Borsellino S, González A (2005) Aproximación al valor económico ambiental de las propiedades medicinales de plantas nativas en el Chaco Semiárido III Congreso Forestal Argentino y Latinoamericano 2005 Corrientes Argentina.
- Sarmiento M, Barraza J, Bonacina E, Cuello S, Escalada C, et al. (2015a) Conocimiento de productos alimentarios del monte nativo por la población urbana en Santiago del Estero, Argentina. Resumen científico V Jornadas Forestales de Santiago del Estero y I Feria Foresto.
- Sarmiento M, Mazur M, Neme A, Pintos S, Romano L, et al. (2015b) Preferencias declaradas en el consumo de bienes naturales y productos derivados del monte nativo por pobladores urbanos en Santiago del Estero. Resumen científico V Jornadas Forestales de Santiago del Estero y I Feria Foresto.
- Sarmiento M, Guerrero Maldonado N (2009) Valoración económica de servicios ambientales proporcionados por plantas tintóreas en bosques nativos de la región chaqueña en Santiago del Estero Argentina XIII Congreso Forestal Mundial 2009 Buenos Aires Argentina.
- Arraiza MP, Brutti O, Farías G, Guillén S, Sarmiento M, et al. (2008) Creación de una Red Temática de Plantas Medicinales Aromáticas y Tintóreas (RT_PMAT) en el Norte Argentino. *Quebracho (Santiago del Estero)* 15: 71-73.
- Arias Arévalo P, Martín López B, Gómez Baggethun E (2017) Exploring intrinsic, instrumental, and relational values for sustainable management of social-ecological systems. *Ecol Soc* 22(4): 43.
- Arias Arévalo P, Gómez Baggethun E, Martín López B, Pérez Rincón M (2018) Widening the evaluative space for ecosystem services: a taxonomy of plural values and valuation methods. *Environ Values* 27(1): 29-53.
- Chan KMA, Balvanera P, Benessaiah K, Chapman M, Díaz S, et al. (2016) Opinion: why protect nature? Rethinking values and the environment. *Proc Natl Acad Sci* 113(6): 1462-1465.
- Rincón Ruiz A, Arias Arévalo P, Núñez Hernández JM, Cotler H, Aguado Caso M, et al. (2019) Applying integrated valuation of ecosystem services in Latin America: Insights from 21 case studies. *Ecosystem Services* Vol. 36.
- INDEC (2010) Censo Nacional de Población y Viviendas 2010. Argentina: Instituto Nacional de Estadísticas y Censos.
- Bruno C, Sarmiento M (2019) Valoración económica de servicios ecosistémicos, el caso de frutos de algarrobos en Santiago del Estero, Argentina. IV Jornada Internacional de Investigación Científica-XIV Jornada de Investigación. Universidad Nacional Toribio Rodríguez de Mendoza Perú.
- Khan H, Abdur R (2014) Medicinal plants: economic perspective and recent developments. *World Appl Sci J* 31(11): 1925-1929.
- Lambaré D, Hilgert N, Ramos R (2011) Dyeing plants and knowledge transfer in the yungas communities of Northwest Argentina. *Econ Bot* 65: 315.

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