

Viticulture and landscape, values for the society in Mendoza, Argentina

Laura Abraham^{1,a}, M. Eugenia Van den Bosch^{2,b}, Laura Alturria¹, Verónica Hidalgo¹, Sonia Fioretti¹, Eugenia Videla¹, and Eduardo Comellas³

¹ Cátedra de Administración Rural, Facultad de Ciencias Agrarias, Universidad Nacional de Cuyo, Almirante Brown 500, Chacras de Coria, Luján de Cuyo, Mendoza, Argentina

² Instituto Nacional de Tecnología Agropecuarias (INTA), EEA Mendoza, San Martín 3853, Luján de Cuyo, Mendoza, Argentina

³ Instituto Nacional del Agua, Belgrano 210 Ciudad de Mendoza, Argentina

Abstract. The landscape is a perception of the agroecosystem valued as aesthetic, cultural, recreational and touristic, for conservation, among others. It is considered an environmental service and cultural heritage according to the International UN Conference 1972 (Paris, France). The agroecosystem of Mendoza's Northern Oasis creates a landscape with the presence of vineyards framed by the Andes, which is a scenic resource characterized as an environmental cultural service. The disordered process of urban growth in North of Mendoza, threatens the provision of the mentioned service. In this paper, a qualitative and a quantitative assessment aim to characterize the perceptions of urban residents on the vineyards landscape. Two methodologies were applied: expert opinion through focus groups and survey data collection. By working with focus groups, positive impacts of this kind of landscape were recognized. In the 638 surveys made in the urban area of Mendoza, a six landscape images valuation was requested (with a score of 1 to 10, where 10 is the maximum). The highest average scores were for the view of Aconcagua, secondly the agricultural landscape with vineyards and mountains and thirdly another view of vineyards in the North Oasis.

1. Introduction

The Northern Oasis of Mendoza Province is an irrigated area, specialized in the growing of grapes, olives, vegetables and other fruit intensive crops. The most important is grape growing which is the result of various historical processes. These vineyards which characterize Mendoza's landscape are visited by thousands of tourists every year. The North Oasis rural area, which currently extends 67.000 ha, has been invaded by the expansion of residential neighborhoods. This process affects the agroecosystem in various aspects: landscape alteration, loss of agricultural land and interruption of the irrigation network, among others [7].

This Oasis contains the Metropolitan Area of Mendoza (MAM), regional center with more than one million inhabitants. The urban area is expanding in a disorganized way into the area under irrigation, transforming traditional vineyard postcards into a mosaic of other uses.

This agroecosystem supplies raw materials for food and wine making industries, and generates positive externalities, which are environmental services. This paper focuses on the provision of environmental cultural services associated to the landscape: recreation, aesthetic and spiritual enjoyment, contemplation, cultural heritage, and

source of local identity. Beyond the touristic value and the commercial consequences that may be assigned to this area, it is assumed that the urban population enjoys the traditional viticulture and therefore assigns a positive value to this landscape.

Ecosystem services are the benefits that people obtain from ecosystems, including the provision of food, fiber, and building materials; the regulation of soil, air, and water quality, among others [6]. In rural areas of the Northern Oasis of Mendoza, cultivated ecosystems, especially vineyards, are providers of environmental services.

"Landscape" is the result of the action and interaction of natural (topography, hydrology, flora, and fauna) and/or human factors (cultural and economic activities) [2]. It is a social perception valued as aesthetic and involves the pleasure that people get to see, visit or even by the mere fact of knowing the existence of certain places or structures. The landscape is a clear example of environmental service since humans receive it from ecosystems and are enriched spiritually from different experiences such as novelty, diversity (slope cultivated with several practices), culture (sacred sites), nature pure (Aconcagua) or conservation (endangered species). Authors such as [8] distinguished the following classification categories for services provided by cultivated and natural landscapes: Cultural identity as a link between people and their environment, heritage values as a link between people with their memory of the past, spiritual

^a labraham@fca.uncu.edu.ar;

^a lalturria@fca.uncu.edu.ar

^b vandenbosch.maria@inta.gov.ar

services in relation to sacred, religious or other forms of spiritual inspiration, source of artistic inspiration, painting, music, aesthetic appreciation, recreation and tourism.

The process of urban growth in North of Mendoza in an expansive and disordered form, called sprawl, threatens the provision of this service. This process, described by [5], is characterized by a great spatial occupancy and a low population growth. It is described as an out of town development on non-urban land, where people is attracted by a lifestyle with low population density, easy access to open space or being away from urban problems associated with poverty and insecurity. Agricultural land is lost as a consequence of this process and therefore the agricultural landscape (in Mendoza is composed by vineyards and other crops).

In this paper, a qualitative and a quantitative assessment that aim to characterize the perceptions of urban residents on the wine landscape was made, applying two methodologies: Expert opinion through focus groups and survey data collection.

2. Methodology

Contingent Valuation (CV) is one of the few known methods used for assess environmental values based in the willingness to pay (WTP) of society or social groups. CV Methods include different techniques where respondents' choice preferences between predefined aspects, with a set of attributes and levels of these, including the status quo option [4]. In this work, the questionnaires were developed based on consultations with qualified informants and focus groups for discussions (FG) which are interested in determining what information is relevant in the questionnaire. A Focus Group is a framework to capture the ideological representations, values, imaginary and affective formations and the overall opinion of a social group on certain facts or topics [1]. It is an open discussion, flexible but planned, with 8 to 12 participants led by a facilitator that promotes the full participation with the opportunity to share different points of views [4] intending to capture a range of information on a particular topic as broad as possible [3]. In this work, four focus groups were conducted, whose participants were: students of agriculture, students of architecture, students of natural resources engineering and a group of producers. The objective of this first part was to establish a wide range of opinions on the vineyards landscape in Mendoza.

In a second part of this work, information search was conducted in six Departments of the MAM through a structured survey with 33 questions. The survey was intended to introduce the concept of landscape, provide information on the issue of urban expansion and know the valuation of different visual images of landscapes and the individual benefits that the landscape provides to each respondent. The questionnaire has also the socio-economic characterization of the respondent. The sample was selected from an urban cartography where 33 radios were drawn at random. In each of them, a group of 20 questionnaires were made to a household's responsible for economic decisions. This process was conducted by students of Agricultural Engineering and Natural Resources Engineering (UNCuyo) between September and



Figure 1. Landscapes' images showed during the survey (Images 1 to 6 from left to right from top to bottom).

December 2012. A total of the 638 surveys were made. In one part of this questionnaire valuation of 6 landscape images of Mendoza was requested considering a scale with scores from 1 to 10 (where 10 is the maximum value). The images were: a view of Aconcagua (Image 1), an urban view (Image 2), a view of Oasis North Vineyards (Image 3), a view of a processing plant for oil and gas (Image 4), a rural landscape without presence of crops (Image 5) and an agricultural landscape with vineyards which shows behind the Andes (Image 6) (Fig. 1 shows all the images). The rest of the questionnaire was intended to determine if urban advance affects the provision of agro-ecosystem services, especially landscape. Also the survey requested the respondents' availability to pay for landscape preservation and for an orderly and systematic growth of the urban area (this part is not presented in this publication).

3. Results

3.1. Focus groups results

Working with focus groups (in the fields of architecture, agronomy, natural resources and wine producers) positive impacts of wine landscape were recognized. In most of the groups, the historical and cultural value of wine landscape was identified. In the "architecture group" some arguments are highlighted, for instance "*that these environments (vineyards) were part of an efficient strategic planning that allowed urban development in a purely desert space*" or "*the insertion of conditioning elements such as plants or crops, including ditches formed an efficient irrigation system*". In the "agronomy group" perceptual subjectivity concepts are reiterated, in phrases as "*it could be better*" or "*there are people who like to see the natural landscape*", "*depends on the perspective form which I look at the landscape*", although positive contribution area also considered as "*aesthetic improvement of the place*". The heritage and cultural value were also recognized in these terms: "*productive and attractive scenery, ancient vineyards producing high quality, which contribute to the aesthetic heritage*". Another group considered "*aesthetic*" presence of "*picturesque plantations*" (group of natural resources). The group of wine producers responded that the agro-ecosystem is seen as "*a green and pure landscape*".

3.2. Surveys results

Within surveys results, people assigned the highest average scores for the natural view of Aconcagua (Image 1), secondly the visual agricultural landscape with vineyards and mountains (Image 6) and thirdly another view of a typical vineyard in the North Oasis (Image 3). The most disfavored view corresponds to a landscape with industrial activities while the rural landscape without crops (Image 5) receives similar scores to the urban view (Image 2).

Table 1. Average Score for landscape images (score from 1 minimum value to 10 maximum value).

Type of Landscape	Average score
Aconcagua view (natural landscape - Image 1)	9,7
Urban view (Street in Mendoza City - Image 2)	6,6
Oasis North traditional Vineyards (Luján de Cuyo - Image 3)	8,3
Processing plant for oil and gas (Industrial area - Image 4)	4,7
Rural landscape (without presence of crops - Image 5)	6,1
Agricultural landscape with vineyards, Andes behind (Image 6)	9,3

When surveys' answers for the images are combined and evaluated, some remarks can be made. It was considered significance evidence when probability level χ^2 (chi square) and ratio of maximum likelihood was less than 5% for nominal variables. In the case of ordinal variables the test Mantel-Haenszel χ^2 (chi square) was considered and significance was used in probabilities of 1% of the same statistics.

The answers were analyzed in aggregate form, and then according to social factors, for example 15% of the responses do not show any significant association because of dispersed answers. An 88% of respondents assigned the maximum score for both natural and cultivated landscapes, less score for industrial and rural images where no crops are observed. By relating the perception of images with social, economic, and geographical characteristics of the respondent it is observed that almost all the images depend on some of these factors. The only exception is image 4 (the industrial plant for petrol and gas) which is perceived with low scores throughout the surveyed population. The analysis of these differences is extensive and beyond the scope of this work, but some observations can be remarked: For example in the valuation of Image 3, the vineyard landscape had higher values assigned the higher the income level of the respondent (Fig. 2).

Following the questionnaire, the respondents were asked about their opinion on urban processes, the use of rural space and its benefits, and a land-use plan. With regard to a future vision of these issues, 85% of the respondents answered that within the next ten years agricultural landscapes of certain Departments of the Northern Oasis will be affected with less area if

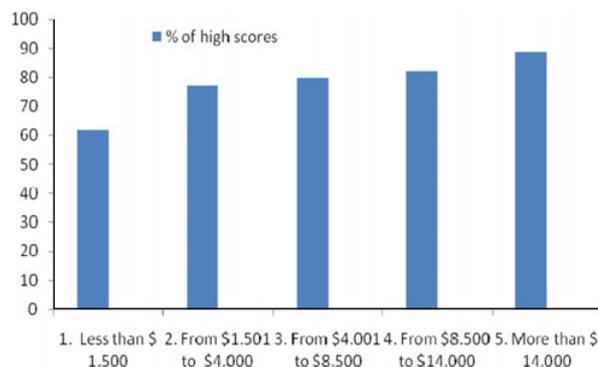


Figure 2. Percentage of high scores assigned to Image 3 (traditional vineyard for the Northern Oasis of Mendoza) related to the household income level (in Argentinean Pesos per month).

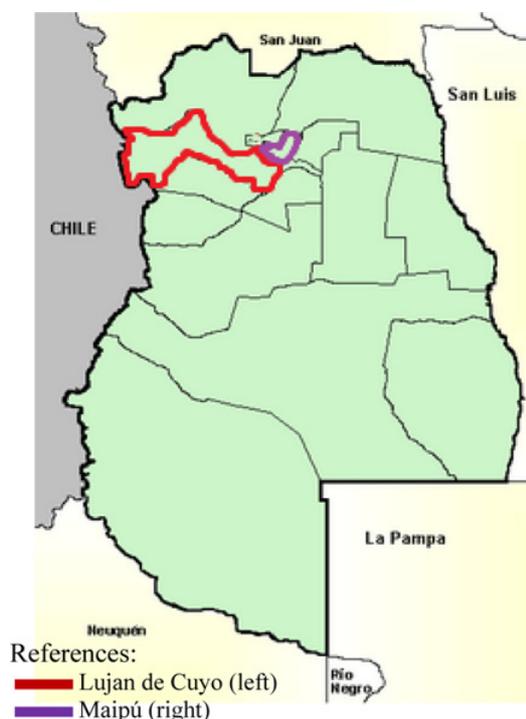


Figure 3. Departments of Mendoza affected by the urban expansion (Left: Luján de Cuyo, right: Maipú).

this trend continues. A 60% of respondents said that there will be an impact of the proliferation of urban areas in cultivated areas (sprawl). The relative number of affirmative responses shows a significant relationship with the level of households' income, as income increases, there are more answers about a negative impact of the proliferation of neighborhoods on cultivated areas. Likewise this process affects the population with higher and post-university education.

The most affected area corresponds to the Departments of Luján de Cuyo and Maipú, characterized by the presence of traditional vineyards (see Fig. 3). The MAM is located in the middle of these two departments and the expansion is over agricultural land.

The 69% of respondents identified these two departments as the most affected ones. A 55% of respondents

answered “yes” to the question related to recreational activities in rural areas, such as biking, hiking, car rides, walks, etc. In addition, 76% of respondents felt that an orderly rural landscape provides benefits. Age is one factor that determines the answers because people over 30 years and adults observe this benefit. The respondents with primary education level have less recognition of this benefit than the rest of the respondents.

4. Conclusions

Working with focus groups it was remarked that the Northern Oasis agro-ecosystem provides environmental cultural services such as the formation of a landscape that is valued from an aesthetic point of view and emotionally due to its heritage. Urban sprawl threatens the provision of this service. Participants said that government measures must be implemented to control the expansion process.

According to the valuation of images society assigns the highest value to natural landscapes such as the Aconcagua. Cultivated landscapes with vineyards show high values (from 1 to 10, between 8 and 10). Non-cultivated rural landscapes are not appreciated.

The negative impacts of expansive urban sprawl on farmlands are considered as very important or important within 57% of respondents.

The most affected Departments are Maipú and Luján de Cuyo which were identified by respondents as the most vulnerable areas.

Most of the respondents practice recreational activities such as biking, hiking, walks in cultivated areas.

In conclusion, the urban habitant values its agricultural environment recognizing that provides benefits.

There is a significant part of the population that recognizes that the process of restructure of the rural

landscape threatens the quality of environmental services, without neglecting other serious environmental problems.

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