



ELSEVIER

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecocon

Analysis

Social Perspectives on Deforestation, Land Use Change, and Economic Development in an Expanding Agricultural Frontier in Northern Argentina

Laura Liliana Huaranca^a, Martín Alejandro Iribarnegaray^a, Federico Albesa^a,
 José Norberto Volante^b, Christian Brannstrom^c, Lucas Seghezzo^{a,*}

^a Instituto de Investigaciones en Energía No Convencional (INENCO), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Universidad Nacional de Salta (UNSA), Avenida Bolivia 5150, A4408FVY Salta, Argentina

^b Instituto Nacional de Tecnología Agropecuaria (INTA), Estación Experimental Agropecuaria Salta, Ruta Nacional 68 Km 172, 4403 Cerrillos, Salta, Argentina

^c Department of Geography, Texas A&M University, College Station, TX 77843, USA

ARTICLE INFO

Keywords:

Argentina
 Chaco Region
 Deforestation
 Land Use Change
 Q Methodology
 Salta

ABSTRACT

The idea that agricultural production and environmental conservation are almost incompatible has divided nature protectionists, advocates for indigenous peoples, and agricultural producers. Discourses seem to cluster along strong, usually dichotomous alternatives such as “production versus conservation”. This apparently hegemonic “common sense” is generally promoted by environmental non-governmental organizations and groups of large-scale agricultural producers, and it is constantly reproduced and exacerbated by the media, despite its negative consequences for social consensus and policy making. We present here results of a study in an expanding agricultural frontier in northern Argentina in which we identified and described social perspectives on deforestation, land use change, and economic development. Following an empirically based, quali-quantitative approach (Q methodology), we found that actual social perspectives did not conform to a simplistic production versus conservation dichotomy. Our case study suggests that some environmental governance processes may consolidate dichotomous debates that favor the interests of powerful groups of stakeholders. Knowledge on social perspectives could help understand complex social-environmental issues and help policy makers take decisions in the direction of more sustainable and inclusive land use practices.

1. Introduction

In a recent article in *The Guardian*,¹ John Palmer, a British anthropologist who has been studying the Wichí culture of northern Argentina for decades, said that deforestation and monocropping are giving a clear message to indigenous peoples in the region: “This world is not a place for you. The world is a place for us, the big spenders, the big money grabbers – that’s who the world is for.” “We have no future” said Amancio Angel, a Wichí leader also interviewed for that article, “... life has become impossible”. Palmer and Angel see no solution for the problem of deforestation and land use change that is so strongly impacting on local livelihoods. The article in *The Guardian*, entitled “Soy destruction in Argentina leads straight to our dinner plates”, does not put forward any solutions either, but it clearly emphasizes the global relevance of this issue by pointing at the complex links between local deforestation and global food chains.

Examples abound of social-environmental problems that seem

impossible to solve. Such “intractable” or “wicked” problems generate social conflicts and deeply divide local stakeholders (Lewicki et al., 2003; Weber et al., 2017). The idea that agricultural production is almost irreconcilable with the protection of local livelihoods and the conservation of the environment is a clear example of an intractable problem that has divided nature protectionists, advocates for indigenous peoples, and those seeking to move conservation into the economic mainstream (Robinson, 2011). On this issue, stakeholders, practitioners, and scientists tend to cluster along strong dichotomous discourses such as “parks versus people” or “nature protectionists versus social conservationists” (Miller et al., 2011). Those discourses articulate divergent normative and descriptive claims founded on deeply contested truths and ethical dimensions, but also on sectoral interests, economic power, and diverging knowledges (Robbins, 2006). The “land sharing” versus “land sparing” debate may be one of the most relevant scholarly discussions on this issue (Fischer et al., 2014). The land sparing approach advocates for agricultural intensification and the

* Corresponding author.

E-mail address: Lucas.Seghezzo@conicet.gov.ar (L. Seghezzo).

¹ Newspaper “The Guardian”, London, 26 October 2018. Last accessed 17 April 2019.

spatial separation of agriculture and conservation. Land sharing, on the other hand, advocates for more integration of production and conservation in shared spaces and highlights the biological and cultural diversity of agroecosystems (Perfecto and Vandermeer, 2010; Tschamntke et al., 2012). A debate framed in terms of these two apparently incompatible alternatives can easily become unproductive and may also negatively influence societal perceptions and policy making, even though it is increasingly being recognized that land sharing and land sparing approaches may not be mutually exclusive (Fischer et al., 2014).

In this study, we identify and describe social perspectives on deforestation, land use change, and economic development in the province of Salta, an expanding agricultural frontier in northern Argentina. Identifying the underlying motivations of local agents will hopefully help us better inform policy makers and promote more sustainable and inclusive land use practices (Swedeen, 2006; Davies and Hodge, 2007). Our case builds on a forest law passed in 2007 that triggered a public debate essentially structured along a dichotomous confrontation between “productivists” and “conservationists”. The arguments and tone deployed by some powerful stakeholders closely mirrored and were sometimes inspired by scholarly discussions such as the land sharing/land sparing debate. We explore here whether such dichotomous views can also be found in the discourses articulated by other relevant stakeholders. We are also interested to know the opinion of local stakeholders about the possible adoption of silvopastoral systems, a production alternative associated with the land sharing approach that is portrayed as a solution to overcome the stalemate between production and conservation in some protected areas (Zabala et al., 2017). Our hypothesis is that a simplistic characterization of the issues of production and conservation in agricultural frontiers obscures the actual subjective positions that stakeholders have and may result from strategies deployed by specific groups, on either side of a false debate, used to legitimize their positions. We undertake an empirically based, qualitative assessment of social perspectives in order to obtain a more comprehensive and rigorous knowledge of the views on these particularly divisive social-environmental issues. As indicated by Robbins (2006), the empirical study of people's discourses allows for a greater understanding of the relations between knowledge and power related to the formulation of environmental policies. The identification and description of actual discourses might also help overcome conflicts and favor coalitions among diverse actors aimed at resolving allegedly intractable social-environmental problems (Hajer and Versteeg, 2005). The results suggest that a simplistic production versus conservation debate overshadowed other concerns that do not neatly fall into these dichotomous categories. Our case study also shows how discussions triggered by specific environmental governance processes can harden and consolidate extreme positions, and how these dichotomous views can become functional with the organizational persistence of relatively powerful stakeholders.

Our main theoretical and methodological framework is the study of the social perception of nature-society relationships. This field is not new (Brookfield, 1969; Grossman, 1977; Porter, 1978) but it gained momentum in environmental sciences and human geography with the rediscovery and gradual adoption of Q methodology (Barry and Proops, 1999; Addams and Proops, 2000; Robbins and Krueger, 2000; Eden et al., 2005). Q methodology is a technique that combines qualitative methods with the statistical rigor of quantitative analysis (McKeown and Thomas, 1988; Brown, 1996). This technique focuses on persons rather than their opinions, and allows for a quantitative measure of people's subjectivity (Watts and Stenner, 2012). Unlike traditional surveys, Q methodology seeks to understand the perspectives held on specific topics by knowledgeable stakeholders rather than a large proportion of the population. Social perspectives are identified by analyzing how some purposively selected participants rank a set of statements according to their degree of agreement or disagreement. Statements are not always straightforward and have to be interpreted in

the context of the rest of the statements. They can also mean different things to different sorters according to their experience and knowledge. Thus, Q methodology has the potential to reveal hidden individual rationalities that are place, time, and context specific (Steelman and Maguire, 1999; Zabala and Pascual, 2016). When the ratings of various participants have high correlation with each other, it means that they hold similar views and therefore belong to the same social perspective (Stephenson, 1965). Each archetypal or model factor is summarized in a weighted average sort that represents the opinions of all those participants who “load” (correlate) with this factor. Factors can be seen as generalizations of the attitudes that people have with respect to a given issue, allowing comparisons to be made between them based on the results of the statistical analysis. As pointed out by Brannstrom et al. (2011), the use of Q methodology in scientific research can be considered both a means to an end, and an end in itself because it provides empirically determined social perspectives (end) and promotes interaction between researchers and respondents in a way that may lead to new insights on the issues under study (means). This method is being used to study social perception on different social-environmental issues such as environmental governance (Brannstrom, 2011), water management (Vugteveen et al., 2010; Iribarnegaray et al., 2014), renewable energy (Ellis et al., 2007; Cuppen et al., 2010; Brannstrom et al., 2011; Frate and Brannstrom, 2017), national forest management (Steelman and Maguire, 1999), wildfire management (Ray, 2011), agriculture (Davies and Hodge, 2012; Walder and Kantelhardt, 2018), carbon offset projects (Lansing, 2013), ecosystem services (Scholte et al., 2015; Hermelingmeier and Nicholas, 2017; Maki Sy et al., 2018), and biodiversity conservation (Niedziałkowski et al., 2018), among others.

2. Materials and methods

2.1. Case study

In the last two decades, the province of Salta in northern Argentina lost about 20% of its remaining native forests (> 1.2 million ha) to agricultural expansion.² Most of this deforestation took place in the so-called “Chaco” region (Grau et al., 2005; Volante et al., 2016). The Chaco is a seasonally-dry forest ecosystem shared by Bolivia, Paraguay, Brazil, and Argentina that is second only to the Amazon in area in the South American subcontinent (Bucher, 1982). The expansion of industrial agriculture in this region was portrayed as a potential land sparing scenario where agricultural intensification could relieve pressure on natural areas (Grau and Aide, 2008; Grau et al., 2008). More recent research, however, found evidence that industrial agriculture and livestock have been systematically advancing onto natural environments irrespective of technological improvements and increased crop yields (Volante and Paruelo, 2015).

In 2007, pressure from environmental organizations and a couple of unusual floods that were associated with deforestation and forest degradation led to the enactment of National Law 26,331 (the “Forest Law”) to regulate the protection, restoration, and management of native forests and the environmental services produced by them. This law mandated provincial States to set up participatory Forest Planning Processes (FPPs) in order to classify native forests into three conservation categories according to a number of technical, environmental, and social criteria. In Category I (high conservation value) only ancestral uses, scientific research, “respectful” tourism, and conservation projects were allowed. In Category II (medium conservation value) “sustainable” production and tourism were permitted under specific management plans. Only in Category III (low conservation value) could deforestation take place for large-scale agriculture or intensive cattle ranching. Categories I, II, and III were to be identified in red, yellow, and green, respectively, in a zoning map that had to be elaborated by

² Data from: www.monitoreodesmonte.com.ar. Last accessed 17 April 2019.

provincial administrations and ratified by the respective Legislatures (Seghezzo et al., 2011; Aguiar et al., 2018). One of the criticisms made to the Forest Law, especially by large producers, was that Category II was, in practice, much closer to Category I than to Category III, further limiting the expansion of agriculture. Although this criticism was partly counteracted with the authorization of silvopastoral systems in Category II, it is true that this law endorsed a rather dichotomous view of forest management. A classification of forests in essentially two classes implicitly promotes the spatial separation of production and conservation (as also advocated by the land sparing approach). In any case, the real influence of this law and the ability of unwilling administrations or weak enforcing agencies to actually reduce deforestation is a matter of ongoing debate (Nolte et al., 2017; Volante and Seghezzo, 2018).

As indicated above, the FPP in Salta was characterized from its inception by the prevalence of a dichotomous understanding of the relationship between nature and society. On the one hand, conservationists, mainly members of environmental non-governmental organizations (NGOs), consistently campaigned to stop deforestation altogether by arguing that clearings authorized by the government would mean that “deforestation in the province of Salta will be well above the national average”.³ Scholars and researchers were also worried about the protection of culturally vulnerable areas threatened by deforestation (Leake et al., 2016). As a local anthropologist put it, “the destruction of native forests leaves indigenous communities at risk of extinction and it can therefore be seen as a potential genocide”.⁴ In fact, representatives of indigenous communities backed by social NGOs filed a lawsuit against the provincial government arguing that deforestation taking place in their territories amounted to “attempted genocide”.⁵

On the other hand, productivists, mostly represented by large-scale agricultural producers (LSAP), lobbied to expand agriculture and livestock to virtually all remaining forests, with some arguing that deforestation should be allowed even in “mountains [and] areas where it doesn't rain”.⁶ Some argued that “Salta could be a cattle-based economic power but it does not develop because of environmental fundamentalists who want to turn the region into a botanical garden”.⁷ Environmental activists were often portrayed as advancing the interests of colonial powers: “European environmentalists prioritize the subsistence of a reptile or a wild animal against that of a human being, especially if this human being lives in a developing country or has a different skin color”.⁸ The government was clear about what side it favored. According to the Minister of Environment and Sustainable Production, it was “a myth that all forests are being cleared in Salta, as some [environmental organizations] say”.⁹ He went on to say that “the political will of the government is to promote a production-oriented profile for the province [and] incorporate more hectares to agricultural production”, something that could only be achieved by “giving more land to agricultural producers”. Similar confrontations were observed in other provinces during FPPs carried out in the framework of the Forest Law (Aguiar et al., 2018) and have also been reported in

agricultural frontiers of neighboring countries (Hecht, 2005; Hoelle, 2015).

The government gradually adopted a more nuanced, but also more ambivalent discourse of “production and conservation” which was also in line with the land sparing approach and was backed by agricultural think tanks and big companies (Seghezzo et al., 2011). Despite this supposedly more balanced approach, government officials were repeatedly accused by environmental NGOs of advancing the agenda of LSAP. Greenpeace Argentina's executive director stated in a press conference that the governor's only goal was “to allow deforestation in protected areas, as requested by land owners”.¹⁰ At the same time, the governor was portrayed in conservative newspapers as little more than a puppet in the hands of environmental NGOs, since he took “heed of their opinions due to opportunism, lack of commitment, or omission”.¹¹ Despite these and other aggressive media exchanges,¹² NGOs, LSAP, and some sectors of the government seemed almost comfortable monopolizing public attention and excluding other stakeholders from the debate in what could be seen as a blend of confrontation and (little acknowledged) partnership. Initial slogans by environmental NGOs such as “Zero deforestation (*Deforestación cero*)”, for instance, lost part of their meaning when these NGOs finally endorsed the zoning map made by the government, in which 1.6 million ha were considered potentially fit for deforestation (Greenpeace and Fundación Ambiente y Recursos Naturales, 2008). This map was not as welcomed by environmental scholars who saw it as too permissive, and LSAP who saw it as too restrictive (Seghezzo et al., 2011). Whether this map significantly affected deforestation rates is still a matter of debate. In any case, in 2014, five years after its approval, this contested map was due to be updated. In an attempt to prevent new conflicts, the government set up a roundtable with different stakeholders. This initiative was criticized in local media as an unacceptable concession to an environmental lobby portrayed as anti-democratic (“Greenpeace now legislates and enforces the law in Salta”¹³) and socially-insensitive (“The dream of Greenpeace: poor people in an undeveloped Salta”¹⁴). Traditional producers associations rejected the invitation to participate in the roundtable arguing that it was being manipulated by environmentalists. Major environmental NGOs, probably uncomfortable in their role of reluctant partners (Farrington and Bebbington, 1993) with the government, also decided to pull out after a few meetings. In an open letter, they argued that there were no warranties that their demands would be heard in a roundtable they defined as “unclear and not inclusive”.¹⁵ Scholars at the roundtable (including some of the authors of this article) felt somewhat betrayed by the desertion of environmental NGOs who, in addition, covertly accused those who stayed of legitimizing with their mere presence a process biased in favor of industrial agriculture. As a matter of fact, without the counteracting weight of environmental NGOs, the relative power of LSAP increased and subsequent government decisions were more easily influenced by them, in a textbook case of a self-fulfilling prophecy.

³ Press release by Greenpeace, Salta, 7 December 2007. Last accessed 4 October 2018.

⁴ Newspaper “Nuevo Diario de Salta”, Salta, 17 April 2009. Last accessed 4 October 2018.

⁵ Newspaper “Clarín”, Buenos Aires, 24 November 2008. Last accessed 17 April 2019.

⁶ Radio interview with a provincial Senator and soybean producer; Newspaper “Nuevo Diario de Salta”, Salta, 12 August 2009. Last accessed 4 October 2018.

⁷ Newspaper “El Tribuno”, Salta, 2 March 2017. Last accessed 4 October 2018.

⁸ Newspaper “La Nación”, Buenos Aires, 21 August 2004. Last accessed 27 September 2018.

⁹ Newspaper “La Gaceta”, Salta, 2 June 2016. Last accessed 4 October 2018.

¹⁰ See: <http://www.greenpeace.org/argentina/es/noticias/Greenpeace-conferencia-en-Salta/>. (Last accessed 17 April 2019).

¹¹ Newspaper “El Tribuno”, Salta, 16 September 2014. See also: Weekly magazine “Cuarto Poder”, Salta, 22 August 2014. Last accessed 24 September 2018.

¹² See, among many other examples: Newspaper “El Tribuno”, Salta, 27 July 2013; Newspaper “El Tribuno”, Salta, 30 July 2013; Newspaper “La Nación”, Buenos Aires, 26 July 2017; Newspaper “La Gaceta de Salta”, Salta, 5 June 2018. Last accessed 24 September 2018.

¹³ Newspaper “El Tribuno”, Salta, 9 October 2014. Last accessed 24 September 2018.

¹⁴ Newspaper “El Tribuno”, Salta, 30 May 2014. Last accessed 24 September 2018.

¹⁵ Newspaper “La Gaceta”, 3 September 2014. Last accessed 3 October 2018.

2.2. Q methodology

Our study was performed following the methodological sequence described in Webl er et al. (2009). The thematic universe or “concourse” of statements on issues related to deforestation, land-use change, and economic development was gathered during more than ten years of field research in the Chaco region. Related topics such as agriculture, agricultural frontier, indigenous communities, native forests, Forest Law, among others, were also used as keywords in the search. Our sources were local and national media, technical and scientific articles, information from NGOs and private companies, participation in meetings and roundtables, formal interviews, and informal conversations with stakeholders from all relevant groups. From an initial set of hundreds of potential statements gathered by three of the co-authors, we finally selected 68 statements that were locally pertinent, could be organized into relevant topics, and sufficiently captured the spread in discourse. As it is usual practice in Q methodology, statements were selected verbatim from the concourse in order to minimize researcher bias (Robbins and Krueger, 2000). Only minor edits were introduced in some statements to improve readability. Statements were classified into five overarching themes: (1) Place-based aspects; (2) Social and cultural aspects; (3) Economic aspects and policies; (4) Governance-related aspects; and (5) Contextual aspects. The full list of themes, sub-themes, and statements is provided as Appendix A. The selection of themes was based on an adapted version of the general framework for analyzing the sustainability of social-ecological systems (Ostrom, 2009). Each theme represents one of the core subsystems in our adapted framework (see Iribarnegaray et al., 2017). As indicated by Webl er et al. (2009), such strategic sampling is commonly used to ensure that Q statements really represent the entire concourse of potential statements. Categories can emerge inductively from a formal or informal analysis, or they can be theoretically inspired, as it was the case in our study. We invited > 100 people to answer the survey, most of them from the province of Salta, of which 69 were interviewed. We finally used 60 valid sorts in the statistical analysis. Respondents were selected from eight groups with potentially distinctive perspectives on the issues under study, namely (number of participants in brackets): agricultural professionals (14), government officials (10), environmental NGOs (4), social-cultural NGOs (5), large-scale producers (6), small-scale producers (4), scholars and researchers (9), and university students with strong opinions on social-environmental issues (8). Q interviews were conducted using the traditional method of sorting paper cards on a quasi-normal distribution (see structure in Table 1) or by means of a web-based Q platform specially developed for this study¹⁶ (Watts and Stenner, 2012; Ormerod, 2017).

Follow-up interviews were conducted in person or via email with representative respondents of each factor for validation and feedback. Q sorts were processed with PQMethod 2.20, a free software developed by Peter Schmolck at the Federal University of Munich.¹⁷ This program performs three basic statistical processes: calculation of the correlation matrix, extraction and rotation of significant factors by principal components analysis, and definition of a set of values for each model factor. Factor analysis reveals underlying patterns in sets of data. In Q methodology, factor analysis identifies patterns among Q sorts. The researcher can then compare the results obtained using different number of factors, which are particular arrangements of the Q statements. In our case, factors were analyzed using the computer-automated rotation called “Varimax”, which maximizes the amount of variance explained with as few factors as possible and minimizes the potential bias that could be introduced by manual rotation. We ran the program for

¹⁶ A beta version of this platform is available for some time at: <http://170.210.201.158/chaq/>. Last accessed 17 April 2019.

¹⁷ Available at <http://schmolck.org/qmethod/>. Last accessed 12 October 2017.

different number of factors and selected the number that best complied with criteria such as significance, distinctness, stability, and simplicity (Webl er et al., 2009). We also estimated the salience ascribed by the factors to the five themes in which statements were grouped. Salience was calculated by adding the Z scores of the statements in each theme (as absolute values) and normalizing that sum to the number of statements in that theme. In such a way, we obtained a mean absolute Z score per theme. Normalization allows for comparisons across themes and is a way of validating their inclusion in the study, since themes with low salience are not relevant for the stakeholders interviewed. Being related to the absolute value of the Z scores, salience is an indication of the extent to which participants agree and/or disagree with a specific theme as a whole. Although it is not by itself a characterization of the factors, it can help better understand the underlying rationale behind each social perspective (Webl er et al., 2009).

3. Results and discussion

Several factors obtained eigenvalues above 1 and could therefore be considered independent (Addams and Proops, 2000). A four-factor solution best complied with the criteria recommended by Webl er et al. (2009) and was the most meaningful under local circumstances. The description of the factors provided in the following sections was based on: (a) values assigned to statistically significant or “distinguishing” statements in each model factor (see Table B.1, Appendix B); (b) the type of respondents who loaded on each factor (marked with X in Table B.2, Appendix B); and (c) supporting qualitative information gathered during the surveys and post-Q interviews. Information between brackets in the descriptions of the factors include the statement number (from #1 to #68), the normalized value assigned to the statement (from -5 to +5), and its statistical significance (* for $p < 0.05$ and ** for $p < 0.01$). We identified each factor with a simple name that relates to its dominant features. We finally provide a comparative analysis to better understand differences and similarities between the factors.

3.1. Description of the factors

3.1.1. Factor A: critical environmentalism

This perspective accounted for 35% of the variance and was built with the sorts of 24 participants including environmental NGOs, members of social-cultural NGOs, scholars, university students, agricultural professionals, and government officials. No producers, irrespective of the scale, loaded on this perspective. As a whole, this view is particularly critical of soy monocropping and large-scale cattle ranching and holds strong positions on the protection of the environment, land rights, and the taxation of commodities. Looking at specific statements, we see that for this perspective deforestation has local and global environmental impacts and monocultures will eventually reduce agricultural profitability (#5: +5**, #6: +4**, #60: -3**). Illegal deforestation should be punished with prison (#30: +5*). This view rejects the idea that environmentalists are responsible for the lack of economic development (#57: -4**), which will not come from large-scale agriculture or foreign investments (#23: -3**, #29: -3*, #64: -3**, #67: -2**, #33: 1**). Worries about local inhabitants are prominent, especially indigenous peoples displaced from their territories with the complicity of a State that fails to provide them with basic services (#20: +4**). The State and the legal system are biased in favor of deforestation and the production of agricultural commodities (#51: +3**, #64: -3**, #21: -2**, 22: +2**, #37: +2**), which increases skepticism of negotiations as a way to solve social conflicts (#53: 1**, #16: 0**). Skepticism is also present regarding the possible adoption of more environmentally-friendly production systems at large scale (#46: +1**, #44: 0*).

3.1.2. Factor B: environmental justice and inclusive dialogue

A total of 17 respondents from all categories except LSAP and

Table 1
Structure of the Q-sort configuration used in our study. Arrows indicate direction of agreement or disagreement.

Values	Less agreement ← (or more disagreement)				Neutrality → (or indifference) ←				More agreement (or less disagreement) →			
	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	
Number of statements	2	3	5	8	10	12	10	8	5	3	2	

students loaded on this factor, which accounted for 10% of the variance. In comparison to Factor A, views held under this factor show a higher concern for social and environmental justice and believe in social dialogue facilitated by the State. Production and conservation are compatible in this view, although opposition to large-scale cattle ranching and soy monoculture is present. Instead, this view advocates for systems that generate local development and respect the rights of local communities. A detailed analysis shows that the environmental movement is not blamed for the economic crisis (#57: -5**). At the same time, the right of vulnerable minorities to participate in decision-making processes is strongly defended (#54: +4**; #16: +4*). The State has a central role in reducing inequalities and mediating social processes (#35: +3**; #50: -2**; #36: -1**; 51:0*). Therefore, negotiation and dialogue can help solve land and cultural conflicts (#53: +2**; #49: -1**; #26: +2*). Value-added agriculture has a positive social function (#33: +3**; #23: -1**) and regional trade has advantages over international trade (#4:0**; #21:0**; #67:0**).

3.1.3. Factor C: local development and support for small-scale producers

This perspective explained 5% of the total variance and was defined by 7 participants. Respondents were agricultural professionals, government officials, and producers. There were no NGOs, scholars, or students in this factor. This view supports agriculture and livestock, arguing for small-scale production systems that can satisfy the demands of local markets. Deforestation statements are not quite so prominent in this factor, but that does not mean it totally lacks environmental sensibility. Distinguishing statements show that this social perspective displays concern for young people leaving the region due to lack of jobs and other opportunities (#19: +5**), which is an indication of the failure of the State in providing infrastructure and basic services (#17: -5**; #68: +4**; #66: +4*). Lack of local development is partly due to the persistence of land tenure conflicts and the idea of returning all supposed ancestral lands to indigenous peoples is strongly rejected (#20: -5**; #27: -4**). The State receives blame for not solving land conflicts (#50: +3**) and not enforcing the Forest Law (#42: -2*) but has a role in regulating regional markets (#32: +3**; #63: +3**). Ambivalence toward the importance of cultural diversity (#15: -2**; #10:0**) and some of the tenets of the environmental movement are present (#7: -4**; #59:0**), but this view is opposed to the expansion of agriculture into protected areas (#28: -2*). Support for small-scale producers (#11: -3*; #12:0**) and land-sharing style silvopastoral systems (#44: +2**) is not based on environmental considerations (#13: -4*) but on economic and cultural reasons (#14: +2*).

3.1.4. Factor D: agricultural production for a globalized economy

This factor included 6 loaders from categories of government, LSAP, small-scale producers, and students. This perspective explains only 4% of the variance but it is unique in its open support of large-scale agriculture and intensive cattle ranching. This social perspective is skeptical of the severity of environmental problems and the disadvantages of monocropping but it also advocates for more responsible agricultural practices and some degree of State control on environmental issues. For example, this factor favors increased fines for illegal clearings (#31: +3**) and imprisonment of those responsible (#30: +2*). Even though cultural and environmental issues are not especially relevant for loaders on this perspective (#10: -4**; #59: -3**; #5: -2**), some environmental sensitivity is present since not all native forests should be open

for agricultural activities (#28: -4*). Unlike Factor C, this social perspective views globalization as essentially good and therefore favors exporting agricultural commodities (#23: +5**; 67: +4**). Current agricultural policies and the Forest Law are seen as a hindrance to develop the region's economic potential (#34: -5**; #14: -2**; #64: +2**; #19: -1**). The State should provide services and infrastructure for the private sector to take full advantage of the global demand for food (#66: +3*; #35: -2**). In terms of governance, this social perspective is opposed to negotiations, especially because the government gives in to the environmental lobby (#48: +4**; #17:0**). Yet LSAP should not dominate the debate (#49: -2**) while the judiciary is not perceived as biased in favor of big companies (#37: -3**). When it comes to production systems, this social perspective is proud of the accomplishments of national producers in terms of the adoption of good agricultural practices (#12: +2**) but would also welcome foreign investors (#29: +2**). Silvopastoral systems are opposed (#45: -5*) but less complex, allegedly more profitable land-sparing type alternatives are favored (#46: -3**). The Forest Law is disliked and blamed for the lack of investments (#24: +2**; #65:0*).

3.2. Consensus and dissensus

As indicated by Webler et al. (2009, p.35), "one of the intriguing uses of Q is to help groups clarify what they agree and disagree about". Toward this end, it may be helpful to concentrate not only on the points of disagreement across perspectives (dissensus) but also on the points of agreement (consensus). In addition, some ideas may be non-confrontational even though they may be non-consensual. Careful attention to these three categories of statements could be important to re-frame organize the debate, focus on the most important issues, help reach compromises, and eventually overcome apparently irreconcilable positions. Specific areas of consensus and dissensus can be identified by making a more complete use of the information provided by the Q software.

As illustrative examples, Figs. 1 and 2 show some specific statements with maximum and minimum level of agreement, respectively, between the factors. These figures were constructed as follows: (i) Darkest central section: the statement with the highest agreement (Fig. 1) and the statement with the highest disagreement (Fig. 2) between all factors; (ii) Intermediate sections: statements with the highest agreement (Fig. 1) and the highest disagreement (Fig. 2) between pairs of factors; and (iii) Light outer sections: the most positive (Fig. 1) and the most negative (Fig. 2) highly significant ($p < 0.01$) distinguishing statement per factor. Similarities and differences between 3 factors at a time are not determined in the Q analysis (sections marked ND in both figures). Factors in the figures are in alphabetical order from left to right and their relative position is irrelevant. Analysis of the consensus statement in the darkest central intersection in Fig. 1 shows that all perspectives agreed on the idea that development cannot be stopped but it must be sustainable, recognizing the need to move from bad to good agricultural practices (statement #3). This statement was the only "consensus statement" identified by the software (meaning that all factors significantly agreed). Q-sort values assigned to statement #3 for factors A, B, C, and D were +4, +3, +4, and +3, respectively (in short: #3; A: +4, B: +3, C: +4, D: +3). On the other hand, as shown in the darkest central intersection in Fig. 2, the main point of disagreement between all factors related to whether the State should guarantee

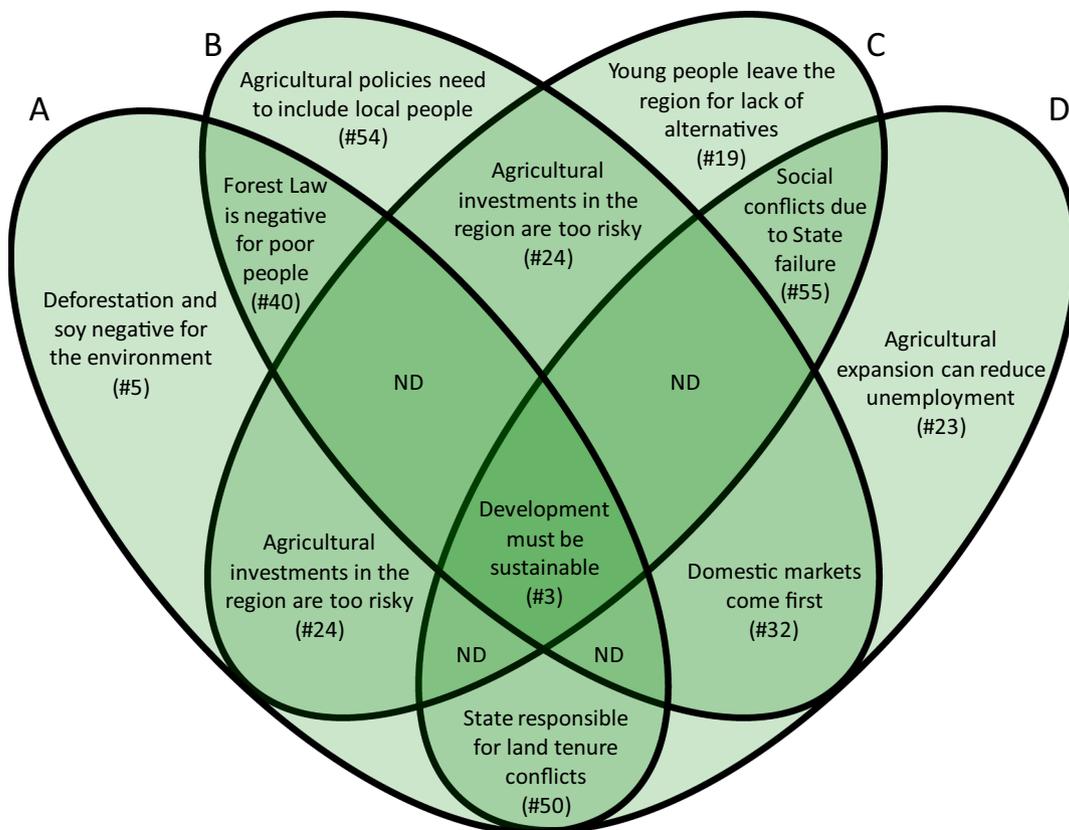


Fig. 1. Consensus. Statements with the highest level of agreement between factors A, B, C, and D. ND: not determined.

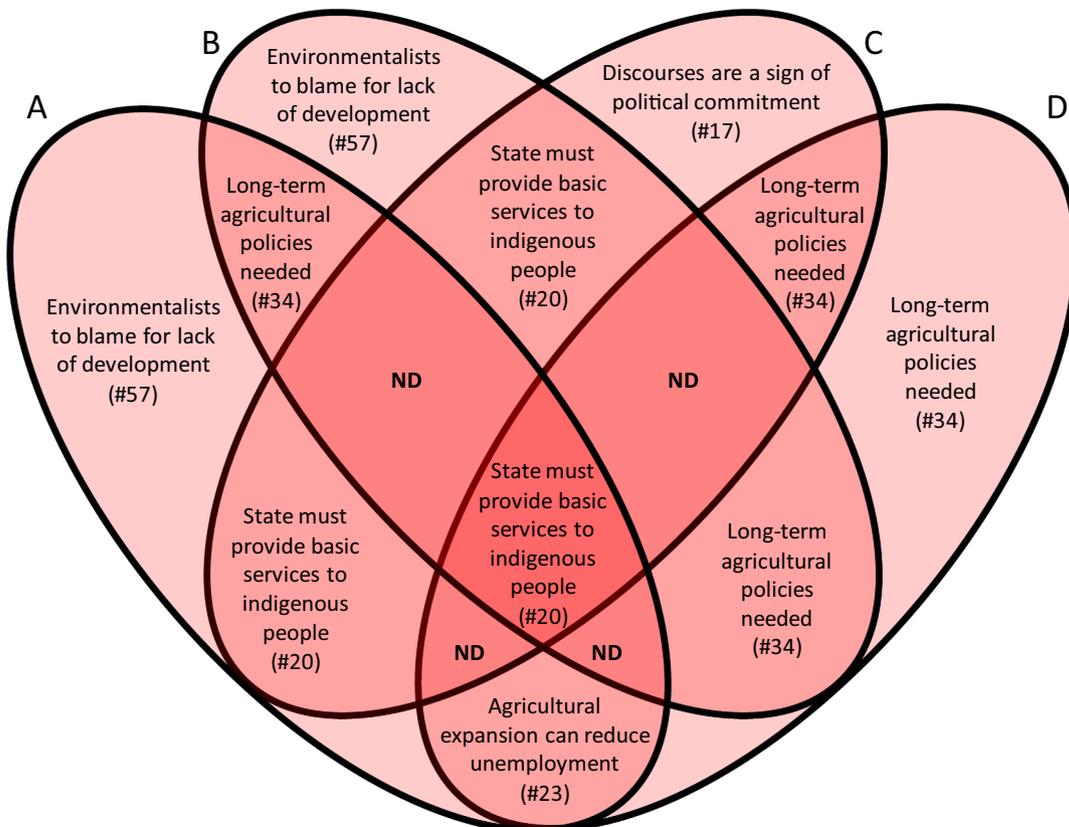


Fig. 2. Dissensus. Statements with the lowest level of agreement between factors A, B, C, and D. ND: not determined.

indigenous communities free access to education, health, and other basic services, and give them full autonomy to occupy, govern, and administer their territory (#20; A: +4, B: +1, C: -5, D:0). Some opportunity for agreement exists with regard to sustainability, which has a more malleable definition, than with the State, which has a more rigid definition and is clearly linked to partisan views. Disagreement about the State would be expected because so much of the differentiation among factors is about things that the State, because of its monopoly on certain kinds of power, is the only entity that can resolve (land tenure and justice, for example). Attention to the points of agreement and disagreement between pairs of factors (intermediate layers of Figs. 1 and 2) could also be useful during decision-making processes. Distinguishing statements shown in the outer layers of Figs. 1 and 2 were used for the description of the factors (refer to Section 3.1).

An analysis of consensus and dissensus such as the one outlined here is only suggestive but it could be used to fine tune the understanding of the differences and similarities between social perspectives. More such diagrams can be built using the other statements where agreements or disagreements were identified and could be used during policy negotiations to easily highlight the specific issues that unite or divide stakeholders. As indicated above, some specific non-consensual but also non-confrontational issues may also be relevant in some situations. An example could be statement #54, related to the participation of local people in agricultural policy making. Factor B strongly agreed with this statement (+4**) and, to a lesser extent, so did Factor A (+2 not distinguishing). Factors C and D were relatively neutral about it (-1* and +1 not distinguishing, respectively) (see Table B.1, Appendix B). Therefore, a policy that would promote more public participation in agricultural policy making might increase overall satisfaction without decreasing the satisfaction of any one perspective.

3.3. Salience

Salience ascribed by the factors to the five themes was consistent with the description of each factor. As shown in Table 2 (last column to the right), normalized mean absolute Z scores were comparable for themes 1 through 4 and slightly lower for theme 5.

A relatively high salience for all themes provides empirical validation of their inclusion in the study. The fact that contextual aspects were the least relevant could be attributed to a tendency to focalize on domestic issues or to a relatively lower interest in global variables. Even though all themes were relevant as a whole, there were differences between factors. Factor A assigned more importance to place-based aspects (Theme 1, normalized Z = 1.07), which is consistent with its environmental profile and its support for the protection of vulnerable areas. Factor B was particularly interested in issues related to local governance (Theme 4, normalized Z = 1.03) and social-cultural aspects (Theme 2, normalized Z = 0.96), in line with its plea for more dialogue among stakeholders and its concern for environmental justice. Factor C put more emphasis on social and cultural aspects (Theme 2, normalized Z = 1.03), something that is coherent with its support of small-scale cattle ranchers. Finally, Factor D assigned more salience to economic aspects (Theme 3, normalized Z = 1.02), in line with its support of a global economy.

Table 2

Salience of different themes for factors A, B, C, and D. Highest normalized Z score underlined for each theme.

Theme	Number of statements	Aggregated Z scores				Normalized Z scores				
		A	B	C	D	A	B	C	D	Mean
1) Place-based aspects	9	9.6	6.6	7.1	8.7	<u>1.07</u>	0.73	0.78	0.96	0.89
2) Social and cultural aspects	11	9.0	10.6	11.4	6.5	0.82	0.96	<u>1.03</u>	0.59	0.85
3) Economic aspects and policies	26	22.2	21.2	19.5	26.5	0.86	0.81	0.75	<u>1.02</u>	0.86
4) Governance-related aspects	11	7.1	11.4	8.5	9.3	0.65	<u>1.03</u>	0.77	0.84	0.82
5) Contextual aspects	11	7.5	5.2	7.7	7.2	0.68	0.47	0.70	0.65	0.63

4. Discussion: confronting the production-conservation dichotomy

In this section we will discuss whether our findings support the hypothesis that local actors have a dichotomous view on issues of production and conservation. We will also try to explain why some social actors apparently struggle to fuel that dichotomy. We will touch upon some methodological issues such as the heterogeneity of the social perspectives in terms of types of stakeholders, and the representativeness of our sample of respondents. We will finish by putting our findings in the context of relevant literature on the subject.

Our results indicate that observed social perspectives do not match the apparently entrenched production-conservation positions regarding Chaco resource governance. Even though Factor A (Critical environmentalism) holds some fundamental positions on the environment, it cannot be automatically associated to traditional environmental “radicals” since respondents are not necessarily against agriculture as a development factor. Factor B (Environmental justice and inclusive dialogue) fits less than Factor A into a purely pro-environment group, and therefore is even less congruent with a production-conservation dichotomy. Environment and development ideas in Factor B are filtered through a lens of justice and inclusion, which appear to be a higher priority than a particular environmental outcome. Factor C (Local development and support for small-scale producers) favors an inward development strategy and articulates a critique of the support provided by the State to small-scale producers. The division between factors B and C seems to be more along issues of indigenous land tenure. Contrary to Factor C, Factor D (Agricultural production for a globalized economy) is in favor of globalizing the economy. Factors C and D, both arguably more in favor of production, represent nonetheless two different understandings of what “development” means. Nor can factors C and D be caricatured as totally anti-conservation, since neither articulates a strong and coherent discourse against the environmental agenda. Instead of conforming to production-conservation categories, the social perspectives identified in this study revealed varying degrees of environmental and economic concerns. Emerging issues defining and dividing social perspectives seem to be more related to land rights for indigenous peoples and the type of market orientation needed for local or regional development. Shifting the focus of attention from production and conservation issues to land rights and economic development could help empower minorities such as indigenous communities and smallholders by contributing to revalue their long-term presence in the region, where they have been making full use of its ecosystems services without jeopardizing its ecological integrity (Seghezze et al., 2017). The potential of Q methodology as a conflict resolving application and a normative tool that can help researchers find a solution that is acceptable to most affected people has been highlighted in Wolf et al. (2011).

Although environmental NGOs are very active in the region and tend to dominate the pro-environment anti-production cause in the media, they do not seem to fully represent the worldview of local relevant stakeholders. However, these NGOs and local activists from the other side of the production-conservation dichotomy (mostly representatives of LSAP and some journalists) keep on fueling the

production-conservation stereotype in Salta.¹⁸ We believe that characterizing the problems of deforestation in a simplistic way was functional to both specific environmental NGOs and some LSAP (but arguably also sectors of the government), since both sides used this continual confrontation to maintain their support bases and, in the case of LSAP, also gain access to more land. We are convinced that this dichotomy was very much in line with their vested interests and entrenched political positions in a context of a weak State with only partial commitment to more inclusive FPPs. It could also be argued that their power struggles are probably not totally genuine, since they can also be interpreted as a concerted attempt to impose a particular type of societal consensus to the entire universe of local stakeholders. Such alleged consensus, which is sold as an objective social fact, may result from hegemonic beliefs associated with the Gramscian notion of “common sense” (Crehan, 2016; Ormerod, 2017). In our case study, the common sense constructed over the years by NGOs and LSAP, and reproduced by the media, was that the debate on deforestation and land use change is limited to only two options: production or conservation. Identifying multiple social perspectives can debunk such simplistic constructions, but it does not necessarily preclude the search of general points of agreement (or disagreement). Although the Gramscian interpretation of common sense is not entirely negative, it has been used mainly to describe conservative discourses that cling defensively to the comfortable and the familiar (Crehan, 2016). It is therefore only logical that powerful actors would appeal to the existence of such a conveniently assumed common sense since it perpetuates their privileges and maintains them at the center of the public debate.

The fact that social perspectives found in our study appear to be quite heterogeneous in terms of actors partly exposes prejudices that link certain categories with particular worldviews (see Table B.2, Appendix B). The distinction we made between large- and small-scale agricultural producers, for instance, was based on the hypothesis that farm size may have some influence on the social perspectives of farmers. However, we did not find strong evidence to back this hypothesis since agricultural producers loaded on different factors irrespective of the scale (mainly factors C and D, with one small-scale producer in Factor B). The separation made between environmental and social-cultural NGOs also proved unnecessary. This division was made under the assumption that purely environmental NGOs may hold a perspective more in line with traditional conservationism. Yet respondents from this category, who loaded on factors A and B, were clearly aware of the problems affecting indigenous communities on issues such as land rights and exclusion from policy making processes. On the other hand, social-cultural NGOs interviewed have been closely working with indigenous communities on these issues for decades, and were purposively selected since they clearly represent the interests and visions of these communities. However, they also loaded on factors A and B, showing a much higher degree of environmental concern than expected. Somewhat surprisingly, the category of government officials showed the highest diversity and loaded on all four factors. On the other end of the spectrum were university students, who loaded overwhelmingly on Factor A (except for one student who loaded on Factor D). A relatively high dispersion was also observed for agricultural professionals, who loaded on 3 different factors (A, B, and C). Scholars and researchers responded in a similar way as NGOs and loaded mostly on factors A and B. Our findings are not necessarily at odds with one of the tenets of Q methodology, which is that participants in a Q study are intentionally selected because researchers “think those individuals have something interesting to say” (Webler et al. 2009, p.9). This selection of potential respondents is a decision that needs to be made by the research team before the interviews are conducted. Respondents in our

study were initially classified in eight different categories and were indeed selected based on the assumption that they might hold different perspectives. However, we did not expect to identify eight perspectives. The expectation was that, taken together, respondents from those categories would “represent the breadth of opinion in a target population” (Webler et al. 2009, p.9). Whether or not these categories are found to neatly correlate with the factors obtained by processing the Q sorts does not by any means invalidate the results of the analysis. As pointed out by Cuppen et al. (2010), actor type or affiliation is not a good proxy for social perspective. High intra-group variability is often found in Q studies, where simplistic labels such as “environmentalists” or “ranchers” do not account for the complexity of social perspectives (Robbins, 2006). The representativeness of the number of respondents per category also deserves some attention. In Q methodology, the number of respondents should not be judged neither by the percentage of respondents in each category related to the total number of respondents in the sample nor by the proportion of respondents relative to the entire population. If a certain category has a distinctive and consistent social perspective on a given issue, this view would appear in the results even if there is only one respondent from that category in the survey. Since researchers do not know in advance the number of factors, there is a tendency to oversample, as we did in some of the categories of our study in which interviewing additional respondents did not entail excessive effort. As indicated by Brown (2009), there is ample evidence that additional Q sorts would probably be redundant and would fall into one of the same factors that could be revealed by a reduced number of sorts, as there is a limited number of independent views that can be held about almost anything.

Complex social perspectives as those identified in this study were also reported in other cases. In the Brazilian State of Bahia, also an agricultural frontier, four significant social perspectives relating to specific roles of the state and private organizations were identified, despite the fact that environmentalists and farmers dominated the environmental governance debate (Brannstrom et al., 2011). A study in New Zealand also found complex social perspectives among groups of farmers in terms of their perception of farming, the importance of marketing, and environmental concerns (Fairweather, 1994). Farmers are individuals who make a living out of particular ecosystem services, and it is unfair to believe that they are all necessarily anti-environment, as shown in studies where environmental subjectivities can be influenced by local modes of governance (Haggerty, 2007). Other studies also pointed out that it is overly simplistic to categorize farmers as anti-environmentalist before determining the historic and political basis for their motivations and beliefs (Shoreman-Ouimet, 2010). On the other hand, environmentalism can sometimes be associated with politics of unsustainability that seem to advance radical ecological change while, at the same time, help preserve local relationships of power (Shoreman and Haenn, 2009). Governments, NGOs, and companies who endorse the land-sparing model might also be pleased with such a dualistic division of social perceptions, since that would provide social leverage to their land use model. However, the oversimplified land sparing approach limits its potential for conservation and may further harm biodiversity without reducing poverty (Grau et al., 2013; Kremen, 2015). It has also been criticized because it fosters a binary and simplistic approach to forest management (Tschardt et al., 2012). Besides, while governments may try to enforce environmental policies to promote agricultural intensification in certain areas, they remain relatively powerless in practice to alter broader land-change dynamics driven by global factors (Brannstrom, 2009).

5. Concluding remarks

A complex picture emerges when social perspectives are identified and described using rigorous quali-quantitative methods such as Q methodology. Our study revealed the existence of four statistically significant social perspectives on the issues of deforestation, land use

¹⁸ Newspaper “El Intransigente”, Salta, 28 July 2013; 30 July 2013; Newspaper “El Tribuno”, Salta, 28 April 2018; 27 September 2018; 8 October 2018. Last accessed 17 April 2019.

change, and economic development in an expanding agricultural frontier in northern Argentina. These perspectives were described as: (A) Critical environmentalism; (B) Environmental justice and inclusive dialogue; (C) Local development and support for small-scale producers; and (D) Agricultural production for a globalized economy. The content of these social perspectives does not support the prevailing notion of two opposed groups, caught in irreconcilable separation, known as conservationists and productivists. Further analysis of areas of consensus and dissensus between these perspectives shows that the Gramsci-style hegemonic common sense taken for granted and advocated by some environmental NGOs, associations of LSAP, and conservative local media, does not reflect the perceptions of all relevant local stakeholders.

The notion of multiple social perspectives can help resolve, advance, or re-formulate dichotomous and fictitious stalemates on environment-development challenges. In this respect, in line with Lewicki et al. (2003), we are convinced that initiatives that help actors examine their own perspectives and those of others can be particularly helpful in solving apparently intractable social-environmental conflicts. Policy makers and practitioners could benefit since policies and norms that are at odds with the underlying motivations of agents may not be efficient (Davies and Hodge, 2007). Following Hoelle (2015, p.167), we see “no equilibrium and certainly nothing resembling sustainability in the economic and ideological system that now proposes dichotomous preservation or market-based solutions”. To finish on a positive note, we also believe that our particular case study benefits from a relatively strong institutional framework and a sufficient number of relatively independent actors and stakeholders that could broker the conflict and facilitate a more consensual solution (Bebbington and Bury, 2009). Therefore, there would be no need to create new institutions in order to tackle all the social-environmental problems surrounding deforestation and land use change, provided the current institutional setting is able to bridge the gap between different stakeholders and work for the benefit of local societies and the protection of the environment.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ecolecon.2019.106424>.

Acknowledgements

This project was funded by CONICET, INTA (Project PNNAT 1128031), ANPCyT (Agency of Scientific and Technological Promotion of Argentina) (Project PICTO Native Forests 2014-0049), and the European Union (Project EUROCLIMA + : Project Forests, Biodiversity, and Ecosystems). We are particularly grateful to the respondents of the surveys. We also want to thank two anonymous reviewers for their insightful comments and constructive suggestions. The usual disclaimers apply.

References

Addams, H., Proops, J., 2000. *Social Discourses and Environmental Policy: An Application of Q Methodology*. Edward Elgar Publishing, Cheltenham and Northampton.

Aguiar, S., Mastrangelo, M., García Collazo, A., Camba Sans, G., Mosso, C., Ciuffoli, L., Schmidt, M., Vallejos, M., Langbehn, L., Cáceres, D., Merlinsky, G., Paruelo, J., Seghezzo, L., Staiano, L., Teixeira, L., Volante, J., Verón, V., 2018. ¿Cuál es la situación de la Ley de Bosques en la Región Chaqueña a diez años de su sanción? Revisando su pasado para discutir su futuro (What is the status of the Forest Law in the Chaco Region ten years after its enactment? Reviewing its past to discuss its future). *Ecol. Austral* 28, 400–417 (In Spanish).

Barry, J., Proops, J., 1999. Seeking sustainability discourses with Q methodology. *Ecol. Econ.* 28, 337–345.

Bebbington, A.J., Bury, J.T., 2009. Institutional challenges for mining and sustainability in Peru. *Proc. Natl. Acad. Sci.* 106 (41), 17296–17301.

Brannstrom, C., 2009. South America's neoliberal agricultural frontiers: places of environmental sacrifice or conservation opportunity? *Ambio* 38 (3), 141–149.

Brannstrom, C., 2011. A Q-method analysis of environmental governance discourses in Brazil's northeastern soy frontier. *Prof. Geogr.* 63 (4), 531–549.

Brannstrom, C., Jepsen, W., Persons, N., 2011. Social perspectives on wind-power development in west Texas. *Ann. Assoc. Am. Geogr.* 101 (4), 839–851.

Brookfield, H.C., 1969. On the environment as perceived. *Prog. Geogr.* 1, 51–80.

Brown, S.R., 1996. Q methodology and qualitative research. *Qual. Health Res.* 6 (4), 561–567.

Brown, S.R., 2009. Q technique, method, and methodology: comments on Stentor Danielson's article. *Field Methods* 21 (3), 238–241.

Bucher, E.H., 1982. Chaco and Caatinga – South American arid savannas, woodlands and thickets. In: Huntley, B.J., Walker, B.H. (Eds.), *Ecology of Tropical Savannas*. Ecological Studies, vol. 42. Springer-Verlag, Berlin, Heidelberg, New York, pp. 48–79.

Crehan, K., 2016. *Gramsci's Common Sense: Inequality and its Narratives*. Duke University Press, Durham and London.

Cuppen, E., Breukers, S., Hisschemöller, M., Bergsma, E., 2010. Q methodology to select participants for a stakeholder dialogue on energy options from biomass in the Netherlands. *Ecol. Econ.* 69 (3), 579–591.

Davies, B.B., Hodge, I.D., 2007. Exploring environmental perspectives in lowland agriculture: a Q methodology study in East Anglia, UK. *Ecol. Econ.* 61, 323–333.

Davies, B.B., Hodge, I.D., 2012. Shifting environmental perspectives in agriculture: repeated Q analysis and the stability of preference structures. *Ecol. Econ.* 83, 51–57.

Eden, S., Donaldson, A., Walker, G., 2005. Structuring subjectivities? Using Q methodology in human geography. *Area* 37 (4), 413–422.

Ellis, G., Barry, J., Robinson, C., 2007. Many ways to say 'no', different ways to say 'yes': applying Q-methodology to understand public acceptance of wind farm proposals. *J. Environ. Plan. Manag.* 50 (4), 517–551.

Fairweather, J.R., 1994. Goals and management styles of New Zealand farmers. *Agric. Syst.* 44, 181–200.

Farrington, J., Bebbington, A., 1993. *Reluctant Partners?: Non-governmental Organizations, the State and Sustainable Agricultural Development*. Routledge, London, New York.

Fischer, J., Abson, D.J., Butsic, V., Chappell, M.J., Ekroos, J., Hanspach, J., Kuemmerle, T., Smith, H.G., von Wehrden, H., 2014. Land sparing versus land sharing: moving forward. *Conserv. Lett.* 7 (3), 149–157.

Frate, C.A., Brannstrom, C., 2017. Stakeholder subjectivities regarding barriers and drivers to the introduction of utility-scale solar photovoltaic power in Brazil. *Energy Policy* 111, 346–352.

Grau, H.R., Aide, M., 2008. Globalization and land-use transitions in Latin America. *Ecol. Soc.* 13 (2), 16.

Grau, H.R., Gasparri, N.I., Aide, T.M., 2005. Agriculture expansion and deforestation in seasonally dry forests of north-west Argentina. *Environ. Conserv.* 32, 140–148.

Grau, H.R., Gasparri, N.I., Aide, T.M., 2008. Balancing food production and nature conservation in the Neotropical dry forests of northern Argentina. *Glob. Chang. Biol.* 14 (5), 985–997.

Grau, R., Kuemmerle, T., Macchi, L., 2013. Beyond 'land sparing versus land sharing': environmental heterogeneity, globalization and the balance between agricultural production and nature conservation. *Curr. Opin. Environ. Sustain.* 5, 477–483.

Greenpeace, Fundación Ambiente y Recursos Naturales, 2008. *Comentarios sobre el proceso de Ordenamiento Territorial de los Bosques Nativos de la Provincia de Salta, acorde a lo establecido por la Ley Nacional 26.331 de Presupuestos Mínimos de Protección Ambiental de los Bosques Nativos* (Comments on the Native Forests Land Use Planning Process of the province of Salta, as required by National Law 26331). Greenpeace and FARN, Buenos Aires (In Spanish).

Grossman, L., 1977. Man-environment relationships in anthropology and geography. *Ann. Assoc. Am. Geogr.* 67 (1), 126–144.

Haggerty, J.H., 2007. "I'm not a greenie but...": Environmentalism, eco-populism and governance in New Zealand experiences from the Southland whitebait fishery. *J. Rural. Stud.* 23 (2), 222–237.

Hajer, M., Versteeg, W., 2005. A decade of discourse analysis of environmental politics: achievements, challenges, perspectives. *Journal of Environmental Policy & Planning* 7 (3), 175–184.

Hecht, S.B., 2005. Soybeans, development and conservation on the Amazon frontier. *Dev. Chang.* 36, 375–404.

Hermelingmeier, V., Nicholas, K.A., 2017. Identifying five different perspectives on the ecosystem services concept using Q methodology. *Ecol. Econ.* 136, 255–265.

Hoelle, J., 2015. *Rainforest Cowboys: The Rise of Ranching and Cattle Culture in Western Amazonia*. University of Texas Press, Austin.

Iribarnegaray, M.A., de la Zerda, M.F.E., Hutton, C.M., Brannstrom, C., Liberal, V.I., Tejerina, W.A., Seghezzo, L., 2014. Water-conservation policies in perspective: insights from a Q-method study in Salta, Argentina. *Water Policy* 16, 897–916.

Iribarnegaray, M.A., Brito, L.A., Salas Barboza, A.G.J., Seghezzo, L., 2017. Water appropriation in the production of tobacco: governance, policies and sustainability. *Int. J. Agric. Resour. Gov. Ecol.* 13 (3), 241–255.

Kremen, C., 2015. Reframing the land-sparing/land-sharing debate for biodiversity conservation. *Ann. N. Y. Acad. Sci.* 1355, 52–76.

Lansing, D.M., 2013. Not all baselines are created equal: a Q methodology analysis of stakeholder perspectives of additionality in a carbon forestry offset project in Costa Rica. *Glob. Environ. Chang.* 23, 654–663.

Leake, A., López, O.W., Leake, M.C., 2016. La deforestación del Chaco Salteño 2004–2015 (Deforestation in the Chaco region in Salta 2004–2015). SMA Ediciones, Salta, Argentina (In Spanish).

Lewicki, R.J., Gray, B., Elliott, M., 2003. *Making Sense of Intractable Environmental Conflicts: Frames and Cases*. Island Press, Washington, DC.

Maki Sy, M., Rey-Valette, H., Simier, M., Pasqualini, V., Figueirese, C., De Wit, R., 2018. Identifying consensus on coastal lagoons ecosystem services and conservation priorities for an effective decision making: a Q approach. *Ecol. Econ.* 154, 1–13.

McKeown, B., Thomas, D., 1988. *Q Methodology*. SAGE Publications Inc, Newbury Park.

Miller, T.R., Minter, B.A., Malan, L.C., 2011. The new conservation debate: the view from practical ethics. *Biol. Conserv.* 144, 948–957.

Niedziałkowski, K., Komar, E., Pietrzyk-Kaszyńska, A., Olszańska, A., Grodzkańska-

- Jurczak, M., 2018. Discourses on public participation in protected areas governance: application of Q methodology in Poland. *Ecol. Econ.* 145, 401–409.
- Nolte, C., Gobbi, B., le Polain deWaroux, Y., Piquer-Rodríguez, M., Butsic, V., Lambin, E.F., 2017. Decentralized land use zoning reduces large-scale deforestation in a major agricultural frontier. *Ecol. Econ.* 136, 30–40.
- Ormerod, K.J., 2017. Common sense principles governing potable water recycling in the southwestern US: examining subjectivity of water stewards using Q methodology. *Geoforum* 86, 76–85.
- Ostrom, E., 2009. A general framework for analyzing sustainability of social-ecological systems. *Science* 325, 419–422.
- Perfecto, I., Vandermeer, J., 2010. The agroecological matrix as alternative to the land-sparing/agriculture intensification model. *Proc. Natl. Acad. Sci.* 107, 5786–5791.
- Porter, P.W., 1978. Geography as human ecology. A decade of progress in a quarter century. *The American Behavioral Scientist* 22 (1), 15–39.
- Ray, L., 2011. Using Q methodology to identify local perspectives on wildfires in two Koyukon Athabascan communities in rural Alaska. *Sustainability: Science, Practice, and Policy* 7 (2), 18–29.
- Robbins, P., 2006. The politics of barstool biology: environmental knowledge and power in greater Northern Yellowstone. *Geoforum* 37, 185–199.
- Robbins, P., Krueger, R., 2000. Beyond bias? The promise and limits of Q method in human geography. *Prof. Geogr.* 52 (4), 636–648.
- Robinson, J.G., 2011. Ethical pluralism, pragmatism, and sustainability in conservation practice. *Biol. Conserv.* 144, 958–965.
- Scholte, S.S.K., van Teeffelen, A.J.A., Verburg, P.H., 2015. Integrating socio-cultural perspectives into ecosystem service valuation: a review of concepts and methods. *Ecol. Econ.* 114, 67–78.
- Seghezze, L., Somma, D.J., Volante, J.N., Buliubasich, E.C., Rodríguez, H., Paruelo, J., Gagnon, S., Hufty, M., 2011. Native forests and agriculture in Salta (Argentina): conflicting visions of development. *Journal of Environment and Development* 20 (3), 251–277.
- Seghezze, L., Venencia, C., Buliubasich, E.C., Iribarnegaray, M.A., Volante, J.N., 2017. Participatory, multi-criteria evaluation methods as a means to increase the legitimacy and sustainability of land use planning processes. The case of the Chaco region in Salta, Argentina. *Environ. Manag.* 59, 307–324.
- Shoreman, E.E., Haenn, N., 2009. Regulation, conservation, and collaboration: ecological anthropology in the Mississippi Delta. *Hum. Ecol.* 37 (1), 95–107.
- Shoreman-Ouimet, E., 2010. Concessions and conservation: a study of environmentalism and anti-environmentalism among commodity farmers. *J. Ecol. Anthropol.* 14 (1), 52–66.
- Stelman, T.A., Maguire, L.A., 1999. Understanding participant perspectives: Q-methodology in national forest management. *Journal of Policy Analysis and Management* 18 (3), 361–388.
- Stephenson, W., 1965. Definition of opinion, attitude and belief. *Psychol. Rec.* 15, 281–288.
- Swedeen, P., 2006. Post-normal science in practice: a Q study of the potential for sustainable forestry in Washington State, USA. *Ecol. Econ.* 57 (2), 190–208.
- Tscharntke, T., Clough, Y., Wanger, T.C., Jackson, L., Motzke, I., Perfecto, I., Vandermeer, J., Whitbread, A., 2012. Global food security, biodiversity conservation and the future of agricultural intensification. *Biol. Conserv.* 151, 53–59.
- Volante, J.N., Paruelo, J.M., 2015. Is forest or ecological transition taking place? Evidence for the semiarid Chaco in Argentina. *J. Arid Environ.* 123, 21–30.
- Volante, J.N., Seghezze, L., 2018. Can't see the forest for the trees: can declining deforestation trends in the Argentinian Chaco region be ascribed to efficient law enforcement? *Ecol. Econ.* 146, 408–413.
- Volante, J.N., Mosciaro, M.J., Gavier-Pizarro, G.I., Paruelo, J.M., 2016. Agricultural expansion in the semiarid Chaco: poorly selective contagious advance. *Land Use Policy* 55, 154–165.
- Vugteveen, P., Lenders, H.J.R., Devilee, J.L.A., Leuven, R.S.E., Van der Veeren, R.J.H.M., Wiering, M.A., Hendriks, A.J., 2010. Stakeholder value orientations in water management. *Soc. Nat. Resour.* 23 (9), 805–821.
- Walder, P., Kantelhardt, J., 2018. The environmental behaviour of farmers – capturing the diversity of perspectives with a Q methodological approach. *Ecol. Econ.* 143, 55–63.
- Watts, S., Stenner, P., 2012. *Doing Q Methodological Research: Theory, Method and Interpretation*. SAGE, Los Angeles.
- Weber, E.P., Lach, D., Steel, B.S., 2017. *New Strategies for Wicked Problems: Science and Solutions in the Twenty-first Century*. Oregon State University Press, Corvallis.
- Webler, T., Danielson, S., Tuler, S., 2009. *Using Q Method to Reveal Social Perspectives in Environmental Research*. Social and Environmental Research Institute, Greenfield.
- Wolf, A., Good, J., Brown, S., Cuppen, E., Ockwell, D., Watts, S., 2011. Q methodology and its applications: reflections on theory. *Operant Subjectivity: The International Journal of Q Methodology* 35 (1), 48–71.
- Zabala, A., Pascual, U., 2016. Bootstrapping Q methodology to improve the understanding of human perspectives. *PLoS One* 11 (2), 1–19.
- Zabala, A., Pascual, U., García-Barrios, L., 2017. Payments for pioneers? Revisiting the role of external rewards for sustainable innovation under heterogeneous motivations. *Ecol. Econ.* 135, 234–245.