RURAL DEVELOPMENT PROGRAMS: A CHOICE EXPERIMENT CONSIDERING HETEROGENEITY IN STATUS QUO

MARIO SOLIÑO MILLÁN[1]
CIFOR-INIA

MARCOS DOMÍNGUEZ TORREIRO[2]
CIFA-CANTABRIA

ABSTRACT

This article explores how choice experiments may help policy makers to evaluate social demands towards multifunctional policy schemes targeting conservation and recovery of environmental, social and cultural assets present in rural areas. In particular, this study is concerned with the much neglected issue of the impact on policy analysis of the definition of a 'status quo' or 'no-policy' scenario either as an objective assessment (SQ-provided) by experts or as a self-reported perception (SQ-perceived) by respondents. Results show that the SQ-perceived approach leads to a better comprehension of the individuals' preferences towards complex policy scenarios such as rural development programs, and also to more accurate social welfare estimates to be included in future cost-benefit analysis of policy proposals.

KEY WORDS

discrete choice experiments; heterogeneous preferences; rural development; status quo

[1] *Departamento de Selvicultura y Gestión de Sistemas Forestales, Centro de Investigación Forestal, Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria. Ctra. de la Coruña, km. 7,5 – 28040 Madrid, solino.mario@inia.es*

[2] *Centro de Investigación y Formación Agraria de Cantabria. C/Héroes del 2 de Mayo, nº27 – 39600 Muriedas, Cantabria, marcosdominguez@cifacantabria.org*

1. Introduction

Stated preference methods, and choice experiments in particular, are recommended for measuring the benefits associated with the implementation of multidimensional policies with an impact on non-use (passive-use) economic values (Bennett and Blamey, 2001; Bateman et al. 2002). Agrarian and rural development policies within the context of mulfunctional agriculture and rural territories is one of the most obvious cases of a multidimensional policy framework suited for analysis by means of choice experiments (Lima-Santos, 2000; Randall, 2002). These policies simultaneously influence the provision of a broad range of non-commodity ouputs (i.e., 'out-of-the-market' goods and services) originated in rural areas, such as landscape and open space amenities, natural hazards prevention, biodiversity preservation, rural economic viability, cultural heritage, etc. (Abler, 2004).

In the European Union (EU), current policy proposals aimed at promoting sustainable development in multifunctional rural areas make use of programs and measures that tackle both human and environmental aspects from an integrated territorial perspective (European Commission, 2008). Moreover, jointness in production of commodity and non-commodity outputs from agriculture has played a major role in the supply of these highly valued multifunctional areas (OECD, 2001).Consequently, rural development programs in the EU have to cope with a wide array of policy issues related to the management of the complex web of interactions knit by humans and the natural environment through centuries, which are simultaneously responsible for and contingent on the subsistance of valuable natural and semi-natural habitats, traditional landscapes, and cultural and ethnographic identity in rural territories (Latacz-Lohmann and Hodge, 2003; OECD, 2003).

The intricate ecological and socioeconomic interactions that constitute the foundations for the analysis and implementation of sustainable rural development policies are usually difficult to become undisputedly and objectively characterized by researchers, whilst at the same time they are usually subjectively apprehended by individuals (Glenk, 2010; Bateman et al., 2002). As a result, the realism of prospective scenarios should depend on the individuals own subjective perceptions as well as on the additional amount of information conveyed to them by researchers as part of the survey instrument.

There are few choice experiments analyzing the influence of the definition of the 'no-policy' or 'status quo' (SQ) scenario on economic welfare estimates. First of all, it is worth noting that in a choice experiment the base alternative or SQ may be specified in several ways (Haaijer et al., 2001; Hess and Rose, 2009). The decision on whether to use objective data or subjective perceptions to define the SQ scenarios depends, among other things, on the availability of widely accepted and reliable data on the current (or future) state of the world scenarios, and on the ability of respondents to define those scenarios based on their own experiences and perceptions (Glenk, 2010).

The most usual way to define a SQ scenario is to present it as a non-specified or 'opt-out' alternative (such as 'no-choice', 'none of them', 'other', 'my current brand', etc.) or as a regular profile that is held constant over all the choice sets (Dhar, 1997; Kontoleon and Yabe, 2003; Street and Burgess, 2007). A novel approach that may lead to more realistic valuation scenarios is to objectively incorporate heterogeneity in the design of the SQ alternative. In this regard, NERA-Accent (2007) defines the status quo attending to objective physical characteristics of the individuals' home-sites. But, as we have noticed before, it may indeed be the case that the actual status quo be not perceived as such by individuals, that the valuation scenarios and ecosystem services are not defined in terms of benefits obtained from ecological systems that the respondent actually cares for, or that data deficiencies make it hard for researchers themselves to define an objective SQ (Bateman et al., 2002; Barkmann et al. 2008; Glenk, 2010).

Therefore, all of the options described above may be affected by the lack of credibility of the provided levels of the SQ alternative and by an asymmetric information bias (Markovits and Vachon, 1989; Thompson, 1996; Fischhoff et al., 1999; Manski, 1999). When faced with complex, unrealistic or incomplete information, respondents may filter in their own future expectations or additional features (or neglect certain information) to simplify or make more real their choice task and to come up with

logical conclusions. In that sense, Banzhaf-Ruby et al. (2001) and Kontoleon and Yabe (2003) found that the opt-out treatment may impact on how consumers perceive the choice tasks and can influence results under certain circumstances, whilst Kataria et al. (2009) found that not accounting for respondent's disbelief in the SQ scenario could lead to biased welfare estimates.

Accordingly, in the present study we look at a less explored way to specify the SQ alternative in choice experiments. It consists on allowing consumers to specify their own subjective status quo (SQ-perceived) prior to the subsequent choice task. Using a natural field experiment (Harrison and List, 2004; Alpízar et al., 2008; Levitt and List, 2009), our aim was to investigate whether decision-making processes over prospective multidimensional policy settings are invariant with respect to the format of the SQ alternative. Two independent samples were presented with a choice experiment survey that differed only with respect to the SQ specification. In previous studies, Marsh and Mkwara (2009) discriminate their sample according to the prior knowledge of the individuals about the environmental program. They conclude that more comprehensive results on the influence of the definition of the SQ on welfare estimates could be obtained by an experimental design that uses a split sample approach. Glenk (2010) also contributes to the analysis of prior specification of individuals' SQ option and asymmetric preference formation in choice experiments, but again his analysis was not designed with the specific aim of testing for potential differences from using a researcher-defined or a self-defined SQ option. To our knowledge, a split sample design is implemented for the first time in our study to analyze the influence of self-reported status quo perceptions (SQ-provided vs. SQ-perceived) on welfare estimates.

The paper is organized as follows. In the next section we give a brief description of the main features of Rural Development Programs in Cantabria, Spain. In Section 3 both the theoretical underpinnings of the Choice Experiments technique and the valuation scenario for the empirical analysis are presented. The comparison between both SQ-scenario formats and the results of the welfare estimates are presented in Section 4. Finally, Section 5 is devoted to conclusions and discussion.

2. Rural Development Programs in Cantabria, Spain

The empirical analysis that we will use to illustrate our theoretical discussion is based on a discrete choice modelling survey designed to evaluate social preferences regarding the implementation of regional rural development programs in Cantabria, Spain. Cantabria is a territory situated north of the Meseta plateau and Picos de Europa mountains, which gently slope down through green valleys and grasslands to the Cantabrian Sea and the Bay of Biscay. As a result of this particular orography, the region splits up into two distinct zones: rural areas situated to the south of the territory vs. urban and peri-urban areas located on a narrow stretch of land along the northern coastline.

Almost 30% of the territory is protected under regional, national or EU (Natura 2000) conservation schemes. Protected habitats are located on both coastal and inland areas, the latter being either natural or semi-natural environments transformed to a certain extent by human action. As far as human action is concerned, cattle breeding has been the main factor responsible for the shaping of the territory through ages, building up traditional landscapes made up of forage crops and semi-natural grasslands in the lowlands as well as deciduous forests and permanent natural grasslands in the mountain areas (including seasonal grazing spots on mountain tops or "puertos"). Besides, traditional agrarian activities not only have shaped the territory, but also the social and ethnographic characteristics of people dwelling in rural areas, which are nowadays recognized as being the most valuable stock of cultural heritage within the region.

However, in the present days in Cantabria -like in many other once upon a time thriving rural regions in the European Union- rural areas are experiencing an ongoing transformation whose main features are, among others, depopulation, abandonment of productive land, scarce infrastructure in terms of access to transport networks and information technologies, and lack of health, education and recreation facilities compared to urban areas (OECD, 2006 and 2009).

To tackle the problems associated with rural decline, Rural Development Programs (RDPs) emerged from the Common Agricultural Policy (CAP) institutional framework as a "second pillar" aimed at promoting the development of agriculture and rural areas from a multifunctional and territorial perspective. Some of the most salient features of RDPs are the mandatory engagement of stakeholders in policy implementation through the Leader governance framework, the presence of voluntary participation schemes (for example, agri-environmental schemes) that remunerate farmers for making efforts in conservation that go beyond compulsory "cross-compliance" requirements, the possibility to take into account private transaction costs when calculating compensation payments, and the acknowledgement of the fact that promoting viable and sustainable rural territories can no longer be based on agriculture alone (European Commission, 2009 and 2008; Paavola, 2007; OECD, 2003; Hodge, 2001). Being the latter one of the main strengths of RDPs, it is also one of its main weaknesses: having to cope with an extensive array of multifunctional policy objectives with only a small fraction of the overall CAP pluri-annual budget.

By passing the Sustainable Rural Development Act in December 2007, Spain has for the first time complemented the set of instruments and objectives from the common policy agenda for rural development in the EU with its own national scheme (Program for Sustainable Rural Development, PSRD). A salient feature of the PSRD is its focus on designing multisectoral policies to cope with the challenge of the sustainable development of rural areas throughout Spain, but again with the caveat of a scarce budget committed for the five-year period 2010-2014.

3. The Choice Experiment

Discrete Choice Experiments (CEs) allow consumers to express their preferences and choose between alternative hypothetical scenarios that differ regarding the magnitude of their effects (Lancaster, 1966; Domencich and McFadden, 1975; Hensher and Johnson, 1981; Louviere et al., 2000; Hanley et al. 2001; Bennett and Blamey, 2001; Bateman et al., 2002). CEs are based on behavioral models predicting the probabilities that a randomly selected individual chooses each of the available alternatives, described as functions of a set of explanatory variables. As far as Rural Development Programs (RDPs) are concerned, CEs allow researchers to infer consumers' preferences and implicit economic values (e.g., marginal willingness to pay and associated Hicksian welfare measures) for several policy attributes embedded in the programs.

Previous to our CE, a social perception survey over a representative sample of the Cantabrian population, focus groups and personal interviews with rural development experts, as well as pilot testing of an earlier version of the choice modelling questionnaire, were all conducted to help identify the most relevant aspects (i.e., attributes, levels, provision rules, timing, etc.) that sustainable rural development policies should tackle in order to give a satisfactory response to the social demands from people living in Cantabria. Building on those previous findings, the most salient dimensions of RDPs that were finally included in our analysis are: (i) recovery and conservation of endangered wildlife; (ii) recovery and conservation of rural landscape; (iii) risk of forest fires; (iv) quality of life in rural areas; (v) recovery and conservation of cultural heritage in the villages; and (vi) policy cost in terms of additional taxes (see Table 1 for detailed description of variables and variable levels).

Face to face interviews were carried out during June and July 2010 to Cantabrian inhabitants older than 18. Two versions of the survey were used, in which two independent samples (Table 2) were provided with a CE questionnaire that either presented the prospective SQ scenario without policy intervention as given (SQ-provided version) or else invited respondents to report their own perceived SQ alternative (SQ-perceived version) based on the pre-defined levels in Table 1.

TABLE 1
ATTRIBUTES AND LEVELS OF THE CHOICE EXPERIMENT

Attribute	Levels	Variable
Endangered wildlife	Loss of endangered species in mountain and coastal areas	SQ-provided (base level)
	Recovery and conservation of endangered species in mountain areas	EWM
	Recovery and conservation of endangered species in coastal areas	EWC
	Recovery and conservation of endangered species in mountain and coastal areas	EWMC
Rural landscape	Deterioration of forest and grassland landscape	SQ-provided (base level)
	Recovery and conservation of forest landscape	RLF
	Recovery and conservation of grassland landscape	RLG
	Recovery and conservation of forest and grassland landscape	RLFG
Risk of forest fires	75% forest surface high risk; 25% forest surface low risk	SQ-provided (base level)
	50% forest surface high risk; 50% forest surface low risk	RFF50
Quality of life in rural areas	Level of provision of small-scale facilities and leisure opportunities less than urban areas	SQ-provided (base level)
	Level of provision of small-scale facilities and leisure opportunities similar to urban areas	QLS
Monuments and traditions at the villages	Loss of cultural heritage	SQ-provided (base level)
	Recovery and conservation of cultural heritage	MTVR
Cost (€/year via increase of taxes)	0	SQ option
	10 25 40 55	TAX

Therefore, the SQ-provided scenario was designed using the results of previous focus groups and social perception surveys, whereas the SQ-perceived scenario was coded using the levels defined by respondents themselves. In both versions, the cost for the SQ alternative was assumed to be '0' (i.e., no additional cost for taxpayers). Figures 1 and 2 show two examples from the sixteen choice cards presented in each of the survey versions, each containing the SQ option and two alternative future policy scenarios resulting from a *D*-Optimal (95.84% efficient) main effects orthogonal design (Street and Burgess, 2007). To simplify the choice task, additional blocking strategy was undertaken and the sixteen choice sets obtained with the initial fractional factorial design were subsequently divided into two blocks of eight choice cards to be confronted by each individual.

TABLE 2
SOCIOECONOMIC CHARACTERISTICS OF THE SAMPLE

Socioeconomic characteristics	**SQ-provided sample**	**SQ-perceived sample**
	Mean (Std. Dev.)	**Mean (Std. Dev.)**
Gender (% women)	48.36	50.66
Age	48.38 (17.41)	48.36 (18.16)
High level of education (%)	15.46	15.79
Number of members in the household	2.83 (1.22)	2.75 (1.14)
Number of children (<18 years old) in the household	0.39 (0.72)	0.38 (0.72)
Annual household income (%)		
- €14,000 or less	38.65	45.33
- Between €14,000 and €35,000	44.44	44.44
- More than €35,000	16.91	10.22
Rural habitat (%)	50.00	50.00
No. of individuals in the sample	304	304

From the observed choices, the researcher will infer the 'implicit price' or marginal willingness to pay (MWTP) for each effect or attribute, and, in addition, the mean individual willingness to pay for the program (Hanley et al., 1998; Bateman et al., 2002). The statistical analysis of individual responses to choice questions are based on the Random Utility Model. This theoretical framework implies that rational individuals ($i = 1, ..., I$) maximise their utility when they have to choose from a set of alternatives ($j = 1, ..., J$) in a given choice set (C), taking into account their budget restrictions and their preferences. The individual's choice may be represented as a lineal function of the explanatory variables (Laureau and Rae, 1985; Smith and Desvousges, 1986; Hanemann and Kaninen, 1999).

In order to analyze the data, a Random Parameter Logit (RPL) model is applied. Flexible methods such as the RPL are very attractive because they are not subject to the undesirable IIA assumption implicit in the traditional Multinomial Logit (MNL) approaches, and also because they provide researchers with a tractable and intuitive form to introduce unobserved preference heterogeneity into the model (Layton, 2000; Train, 2003; Siikamäki and Layton, 2007). In RPL models, the individual's indirect utility function (V_i) incorporates a parameter vector θ that represents the deviations in individual preferences with respect to the mean preference values for the attributes given by β:

$$V_{ij} = \beta_o + S_{ij}\beta + S_{ij}\theta + \varepsilon_{ij} \qquad (1)$$

where β_o is an alternative specific constant (ASC) for each $j \in C$, β is a utility coefficient vector associated with the attribute vector $S_{(1x6)}$, Sj is the vector of attributes that describes alternative j, and ε is an *i.i.d.* type I extreme value random component of utility which cannot be observed by the researcher. The presence of this random component in the utility expression is the key element that enables probabilistic inference to be made on individuals' preferences (Ben-Akiva and Lerman, 1985). As the maximum likelihood estimation of the model requires assumptions to be made on the random distribution of the preference parameters in the population (Train, 2003; Hensher et al., 2005), several distributional forms have been tested (normal, lognormal, triangular, weibull, etc.), and thus the results of the best fitting alternatives are presented in the next section.

4. Results

RPL results for the SQ-provided and SQ-perceived versions are presented in Table 3. Policy attributes were effects-coded with the exception of the cost attribute, which entered the utility functions in a cardinal-linear form. In both models the EWMC and RLFG attributes are assumed to be independently normally distributed. Simulation in NLOGIT to derive the moments of the distribution (mean parameter coefficients and standard deviations of random parameters) was based on 500 Halton draws.

For the purpose of comparing both SQ situational contexts, the RPL model specification was retained for the SQ-provided version, even though the EWMC and RLFG derived standard deviations of parameter distributions were not statistically significant for that version. However, it is worth noting that the Hausman test (Hausman and McFadden, 1984) rejected the IIA assumption for an alternative MNL specification of the SQ-provided model, whilst at the same time the standard chi-square statistic supported the overall significance of the estimated RPL model.

4.1. SQ-Provided

SQ-provided results in Table 3 show that the decision making process of individuals under this treatment is highly responsive to a shift in the quality of life in rural areas in terms of easeness of access to basic services and leisure opportunities (QLS), and to a sustained effort on the recovery and protection of rural cultural heritage (MTVR). Risk of forest fire (RFF50) had been pointed out as a remarkably salient attribute in previous stages of the study (focus groups and pre-testing) but, in spite of that, and according to the significance of the estimated coefficient in the choice model, it seems not

to be influencing the individuals' preferences. A possible explanation for this unexpected result is that the extreme weather events (torrential rains and flooding) occurred in Cantabria during the final survey fieldwork may have affected significance and relative importance of the risk of forest fire attribute in individuals' perceptions and preferences.

Due to the use of a non-linear effects-coding format, we can also differentiate the effect of partial vs. total gains in rural landscape and endangered wildlife conservation attributes with respect to the prospective worst-case SQ-provided scenario. Non-significant coefficients for partial improvements on endangered wildlife conservation (EWM and EWC), together with the significant coefficient for simultaneous recovery in both mountain and coastal areas (EWMC), are indicative of a strong preference towards an integrated territorial approach in biodiversity conservation. The negative and significant estimated coefficient for additional efforts on conservation of grassland landscape (RLG), the non significant coefficient for forest landscape recovery (RLF), and the positive and significant coefficient for simultaneous recovery of grassland and forest landscape (RLFG), suggest that individuals would prefer to devote financial resources towards a simultaneous recovery of forest and grassland landscape or, as a second best option, towards a recovery of forest landscape alone. Dissatisfaction with a policy framework targeting landscape conservation in grasslands alone would make them reject (ceteris paribus) that policy alternative when compared to the SQ option. Finally, the negative and highly significant ASC indicates a propensity to opt for the SQ option in every choice set, which might be attributed to satisfaction with current (prospective) provision levels or to the difficulty implicit in trading-off and committing to a particular policy action (Dhar, 1997).

TABLE 3
CHOICE EXPERIMENT RESULTS

	SQ-provided		SQ-perceived	
	Coeff.	*t*-value	Coeff.	*t*-value
Non-random parameters				
RLG	-0.152	-2.027	0.077	0.841
RLF	-0.010	-0.116	0.146	1.458
QLS	0.335	7.859	0.405	6.765
EWC	-0.015	-0.199	0.322	3.595
EWM	-0.049	-0.651	0.001	0.010
MTVR	0.135	3.392	0.152	3.082
RFF50	0.017	0.450	0.018	0.330
TAX	-0.016	-5.711	-0.029	-6.240
ASC	-0.968	-5.835	-1.183	-7.234
Random parameters				
RLFG	0.280	2.916	-0.027	-0.213
EWMC	0.239	3.226	-0.054	-0.721
Derived standard deviations of parameter distributions				
RLFG	0.191	0.391	1.053	4.136
EWMC	0.003	0.009	0.525	3.300
n	1,433		1,125	
Log-likelihood	-1,436.660		-984.798	
pseudo-R^2	0.0874		0.2032	
χ^2	275.303		502.282	

4.2. SQ-perceived

Within the SQ-perceived sample, it is worth noting that the SQ-provided levels were selected by a majority of respondents as their own SQ-perceived levels, although only 90 individuals (30% of the SQ perceived sample) completely matched the SQ-perceived and SQ-provided alternatives. 95 individuals in the sample (31%) were removed from subsequent analysis because they were not able to report their own subjective SQ for at least one of the attributes in the choice experiment. The degree of correspondence between the SQ-provided and the self-reported SQ-perceived levels varies across attributes (Table 4). For quality of life in rural areas and risk of forest fire it reaches up to 87%, whereas for rural landscape, endangered wildlife and cultural heritage it is between 54% and 61%. Overall, the degree of agreement with our expert assessment on the SQ-provided scenario levels and

the percentage of 'don't know' responses are respectively above and below the results reported in similar studies (Marsh et al., 2010).

TABLE 4
INDIVIDUALS' PERCEPTION ABOUT THE STATUS QUO†

	Rural landscape	Quality of life in rural areas	Endangered wildlife	Monuments and traditions at the villages	Risk of forest fires
Level 1	11.11%	12.21%	13.55%	60.65%*	12.56%
Level 2	21.30%	87.79%*	18.22%	39.35%	87.44%*
Level 3	54.17%*		10.28%		
Level 4	13.43%		57.94%*		

† Figures excluding 'don't know' answers. * SQ-provided level.
Rural landscape: level 1= Recovery and conservation of forest and grassland landscape; level 2= Recovery and conservation of grassland landscape; level 3*= Deterioration of forest and grassland landscape; level 4= Recovery and conservation of forest landscape.
Quality of life in rural areas: level 1= Similar to urban areas; level 2*= Less than urban areas.
Endangered wildlife: level 1= Recovery and conservation of species in mountain and coastal areas; level 2= Recovery and conservation of species in mountain areas; level 3= Recovery and conservation of species in coastal areas; level 4*= Loss of species in mountain and coastal areas.
Monuments and traditions at the villages: level 1*= Loss of cultural heritage; level 2= Recovery and conservation of cultural heritage.
Risk of forest fires: level 1= 50% high risk; 50% low risk; level 2*= 75% high risk; 25% low risk.

Decision-making processes inferred from the SQ-perceived situational context (Table 3) support the view that respondents are more sensitive to partial improvements in endangered wildlife conservation in coastal areas, as revealed by the positive and highly significant estimated EWC coefficient. Non-significant coefficients for EWM and EWMC also suggest that both strategies would be chosen (ceteris paribus) as the most preferred policy alternative when confronted with the SQ-provided attribute levels. Rural landscape conservation is not at any level considered a significant attribute for decision-making when the choice experiment is framed under the SQ-perceived elicitation procedure, as neither the risk of forest fire attribute. Similarly to what happened in the SQ-provided version, quality of life in rural areas would be the most valued attribute in a hypothetical RDP program. Conservation of cultural heritage would also be a positively valued characteristic in any RDP proposal. The ASC is negative and highly significant and could be again interpreted either as a preference for the SQ or as a reluctance to make trade-offs between alternative policy proposals.

4.3. Convergent validity analysis

As a more formal contrast of the similarities or dissimilarities between the two behavioral models than directly inspecting the magnitude and significance of the estimated coefficients in both data sets, a likelihood ratio test (LR) was used to test the null hypothesis of equality in parameter estimates (Louviere et al., 2000). The LR statistic is given by:

$$LR = -2 \cdot [LL_{pooled} - (LL_{provided} + LL_{perceived})] \qquad (2)$$

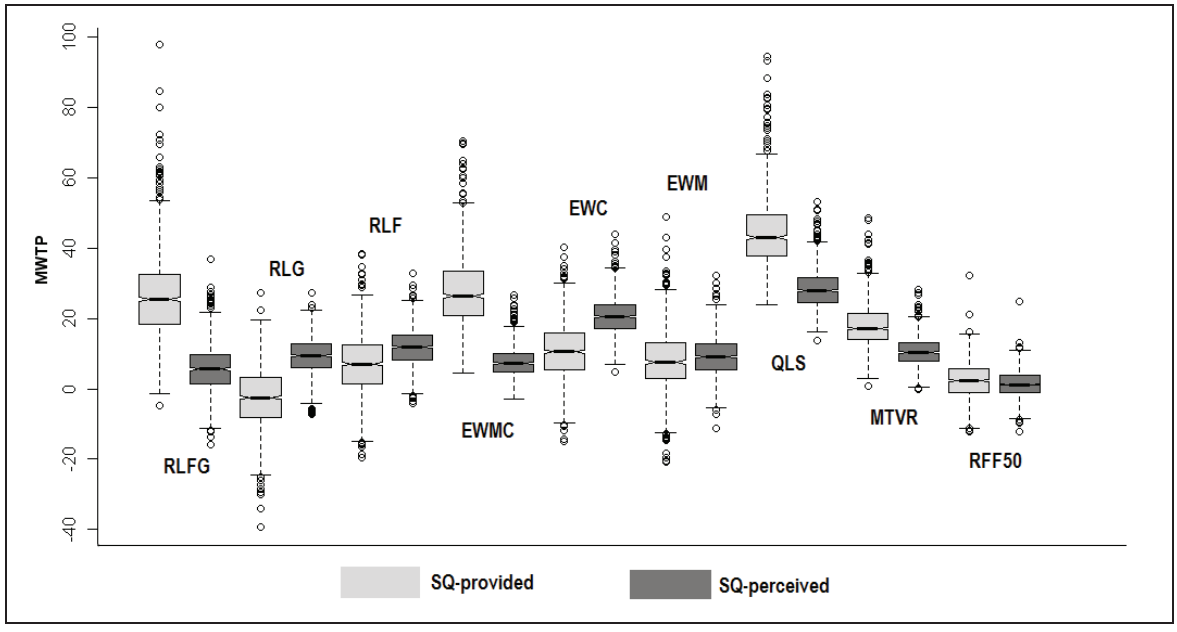
where LL_{pooled} is the restricted log likelihood for the pooled data model, $LL_{provided}$ is the unrestricted log likelihood from the SQ-provided sample and $LL_{perceived}$ is the unrestricted log likelihood from the SQ-perceived sample. The LR test statistic for the comparison was 28.27. The critical chi-square value at 5 per cent significance level, with 13 degrees of freedom is 22.36. Therefore, the null hypothesis of homogeneous preferences resulting from the SQ-provided and SQ-perceived models is rejected.

TABLE 5
MARGINAL WTP ESTIMATES

	SQ-provided		SQ-perceived	
	Mean	t-value	Mean	t-value
RLFG	25.72	2.311	5.85	0.914
RLG	-2.16	-0.269	9.42	1.891
RLF	7.03	0.852	11.80	2.208
QLS	43.12	5.035	27.85	5.396
EWMC	26.74	2.964	7.43	1.899
EWC	10.37	1.313	20.35	3.794
EWM	8.18	0.969	9.31	1.640
MTVR	17.39	3.027	10.46	2.841
RFF50	2.25	0.450	1.24	0.329

Notwithstanding, the results obtained from the "strong pooling hypothesis" (Siikamäki and Layton, 2007) test could be affected by potential scale differences (Louviere and Swait, 1993). Colombo et al. (2009) argue that comparing willingness to pay measures instead of absolute parameter estimates across models should cancel out the impact of scale differences. After transforming individuals' preferences into marginal willingness to pay (MWTP) measures for the effects-coded policy attributes (Lusk et al., 2003), and subsequently applying the Krinsky and Robb (1986) procedure with 1,000 replications to simulate the distribution of the MWTP estimates, we obtain the results shown in Table 5 and Figure 3. Non-overlapping 95% confidence intervals depicted in the notched box plots are supportive of rejecting the hypothesis of equal WTP values across samples (Chambers et al., 1983; Schenker and Gentleman, 2001; Marsh et al., 2010).

FIGURE 3
SIMULATED DISTRIBUTIONS OF MWTP



Finally, once rejected the hypothesis of homogeneous preferences and equivalence in average MWTP measures from both elicitation processes, goodness of fit reported by the pseudo-R^2 (Table 4) favors the use of SQ-perceived model as a basis for rural development policy evaluation and social welfare analysis.

5. Conclusions and discussion

Sustainability of complex biophysical systems, cultural landscapes and valuable ethnographic assets in rural areas is contingent on the maintenance of the intricate web of interactions developed by humans and nature in those territories over centuries. Consequently, current policy proposals in EU countries aimed at promoting sustainable development in multifunctional rural areas are committed with taking into account human and environmental needs from an integrated territorial perspective.

Nowadays, the decision of whether to use stated preference surveys for incorporating individuals' preferences into policy analysis and evaluation must take into account the fact that it is possible for attribute based choice experiments to accommodate the individuals' subjective perceptions (e.g., their own subjective SQ scenario) into the preference elicitation procedure. Self-reported SQ formats help to minimize the risk of unrealistic or forced choice settings being confronted by respondents, and explicitly introduces into the analytical framework heterogeneous individuals' stated perceptions regarding the SQ alternative.

In this study we have found evidence of the distinct impact of alternative SQ formats on the behavioral processes and underlying preference structure of individuals when having to choose among different hypothetical rural development policy settings. Convergent validity tests reject the hypothesis of homogeneous preferences and equivalent average MWTP from both treatments. These results are supportive of previous findings by Kataria et al. (2009) and Marsh et al. (2010) suggesting that welfare estimates may differ between subjective and objective SQ formats.

The probabilistic discrete choice models estimated from both approaches also suggest that the preservation of cultural heritage and the improvement of the quality of life in rural areas are the most valued attributes in rural development policy settings. But, on the one hand, the SQ-provided model shows a strong preference towards an integrated territorial approach in biodiversity and landscape recovery and conservation. And, on the other hand, the SQ-perceived model indicates that individuals are more prone to favor a RDP that concentrates efforts on the recovery and conservation of endangered species in coastal areas, whilst at the same time they seem reluctant to devote additional financial resources to a program focused on landscape recovery and conservation.

Goodness of fit measures from both models indicate that the SQ-perceived results should be favored as a basis for future policy and social welfare analysis. According to the SQ-perceived model estimatesCantabrian inhabitants would be willing to pay on average 58.66 Euros per year for a RDP with a strong commitment towards protecting biodiversity in those rural areas where the natural environment is at risk because of conflicts with intense housing and demographic pressures (i.e., coastal areas), improving the quality of life of rural dwellers, as well as promoting and preserving the traditional cultural identity of rural areas in Cantabria.

Acknowledgements

Financial support from Spanish Ministry of Science and Technology (RTA2008-00100-00-00 and ECO2010-22037) is acknowledged. The authors are grateful to Carmen Gándara, Begoña A. Farizo, Juan Busqué, Raúl Castañeda, Benito Fernández, Manuel Mora, Eva Ranea and María Martínez-Jauregui for helpful comments, and Cristina Teja for graphic design and visual aids. The ideas expressed in this piece of research are solely the responsibility of the authors and do not necessarily reflect the views of the institutions they are affiliated with. All errors and omissions in this paper are the sole responsibility of the authors.

References

Abler, D., 2004. Multifunctionality, Agricultural Policy, and Environmental Policy. *Agricultural and Resource Economics Review*, 33(1), 8-17.

Alpízar, F., Carlsson, F., Johansson-Stenman, O. (2008). Does context matter more for hypothetical than for actual contributions? Evidence from a natural field experiment. *Experimental Economics*, 11(3), 299-314.

Banzhaf-Ruby, M., Johnson, F.R., Mathews, K.E. (2001). Opt-out alternatives and anglers' stated preferences. In: Bennett, J., Blamey, R. (eds). The choice modelling approach to environmental valuation. Cheltenham: Edward Elgar. pp. 157-177.

Barkmann, J., Glenk, K., Keil, A., Leemhuis, C., Dietrich, N., Gerold, G., Marggraf, R., (2008). Confronting unfamiliarity with ecosystem functions: The case for an ecosystem service approach to environmental valuation with stated preference methods. *Ecological Economics*, 65, 48-62.

Bateman, I.J., Carson, R.T., Day, B., Hanemann, M., Hanley, N., Hett, T., Jones-Lee, M., Loomes, G., Mourato, S., Özdemiroglu, E., Pearce, D.W., Sugden, R., Swanson, J., 2002. *Economic valuation with stated preference techniques: a manual*. Cheltenham: Edward Elgar.

Ben-Akiva, M., Lerman, S.R. (1985). *Discrete choice analysis. Theory and application to travel demand*. Cambridge: The MIT Press.

Bennett, J., Blamey, R. (eds) (2001). *The choice modelling approach to environmental valuation*. Cheltenham: Edward Elgar.

Chambers, J.M., Cleveland, W.S., Kleiner, B., Tukey, P.A. (1983). *Graphical Methods for Data Analysis*. Pacific Grove, CA: Wadsworth & Brooks/Cole Publishing Co.

Colombo, S., Hanley, N., Louviere, J. (2009). Modeling preference heterogeneity in stated choice data: an analysis for public goods generated by agriculture. *Journal of Agricultural Economics*, 40, 307-322.

Dhar, R. (1997). Consumer preference for a no-choice option. *Journal of Consumer Research*, 24, 215-231.

Domencich, T. A., McFadden, D. (1975). Urban Travel Demand: A Behavioral Analysis. New York: Elsevier.

European Commission, 2008. *Fact Sheet – The EU Rural Development Policy 2007-2013*. Luxembourg: Office for Official Publications of the European Communities.

European Commission, 2009. The CAP in perspective: from market intervention to policy innovation. *Agricultural Policy Perspectives Briefs*, 1, 1-12.

Fischhoff, B., Welch, N., Frederick, S. (1999). Construal processes in preference assessment. *Journal of Risk and Uncertainty*, 19(1-3), 139-164.

Glenk, K. (2010). Using local knowledge to model asymmetric preference formation in willingness to pay for environmental services. *Journal of Environmental Management*, doi:10.1016/j.jenvman.2010.09.003.

Haaijer, R., Kamakura, W., Wedel, M. (2001). The 'no-choice' alternative in conjoint choice experiments. *International Journal of Market Research*, 43(1), 93-106.

Hanemann, W.M., Kanninen, B. (1999). The Statistical Analysis of Discrete-Response CV Data. In: Bateman, I.J., Willis, K.G. (eds.). *Valuing Environmental Preferences: Theory and Practice of the Contingent Valuation Method in the US, EC and Developing Countries*.Oxford: Oxford University Press.

Hanley, N., Wright, R.E., Adamowicz, W. (1998). Using Choice Experiments to Value the Environment: Design Issues, Current Experience and Future Prospects. *Environmental and Resource Economics*, 11, 413-28.

Hanley, N., Mourato, S., Wright, R.E. (2001). Choice Modelling Approaches: A Superior Alternative for Environmental Valuation?. *Journal of Economic Surveys*, 15(3), 435-62.

Harrison, G., List, J. (2004). Field experiments. *Journal of Economic Literature, 42,* 1009–1055.

Hausman, J., McFadden, D. (1984). Specification Tests for the Multinomial Logit Model. *Econometrica*, 52(5), 1219-1240.

Hensher, D. A., Johnson, L. W. (1981). *Applied Discrete-Choice Modelling*. London: Croom Helm.

Hensher, D.A., Rose, J.M., Greene, W.H. (2005). *Applied Choice Analysis*. Cambridge: Cambridge University Press.

Hess, S., Rose, J.M. (2009). Should Reference Alternatives in Pivot Design SC Surveys be Treated Differently?. *Environmental and Resource Economics*, 42, 297-317.

Hodge, I. (2001). Beyond agri-environmental policy: towards an alternative model of rural environmental governance. *Land Use Policy*, 18, 99-111.

Kataria, M., Hasler, B., Nissen, C.J., Christensen, T., Martinsen, L., Ladenburg, J., Levin, G., Dubgaard, A., Bateman, I.J., Hime, S. (2009). Scenario realism and welfare estimates in choice experiments: Evidence from a study on implementation of the European Water Framework Directive in Denmark. *EAERE 17th Annual Conference*, 24 - 27 June, Amsterdam, The Netherlands.

Kontoleon, A., Yabe, M. (2003). Assessing the Impacts of Alternative 'Opt-out' Formats in Choice Experiment Studies: Consumer Preferences for Genetically Modified Content and Production Information in Food. *Journal of Agricultural Policy Research*, 5: 1-43.

Krinsky, I., Robb, A.L. (1986). On Approximating the Statistical Properties of Elasticities. *The Review of Economics and Statistics*, 68, 715-719.

Lancaster, K.J. (1966). A New Approach to Consumer Theory. *Journal of Political Economy,* 74, 132-157.

Latacz-Lohman, U., Hodge, I. (2001). European agri-environmental policy for the 21st century. *The Australian Journal of Agricultural and Resource Economics*, 47 (1), 123-139.

Laureau, T., Rae, D. (1985). Valuing willingness to pay for diesel odor reduction: an application of the contingent ranking technique. *The Southern Economic Journal*, 55, 728-742.

Layton, D.F. (2000). Random Coefficient Models for Stated Preference Surveys. *Journal of Environmental Economics and Management*, 40, 21-36.

Levitt, S.D., List, J.A. (2009). Field experiments in economics: The past, the present, and the future. *European Economic Review*, 53, 1-18.

Lima-Santos, J.M. (2000). Evaluating multidimensional biodiversity policy: what can we learn from contingent valuation studies of biological resources in the context of rural amenities?. In: OECD. Valuation of Biodiversity Benefits. Paris: OECD Publishing. pp. 79-90.

Louviere, J.J., Hensher, D.A., Swait, J.D. (2000). *Stated choice methods: Analysis and applications*. Cambridge: Cambridge University Press.

Lusk, J.L., Roosen, J., Fox, J.A. (2003). Demand for beef from cattle administered growth hormones or fed genetically modified corn: a comparison of consumers in France, Germany, the United Kingdom, and the United States. *American Journal of Agricultural Economics*, 85(1), 16-29.

Manski, C.F. (1999). Analysis of Choice Expectations in Incomplete Scenarios. *Journal of Risk and Uncertainty*, 19(1-3), 49-65

Markovits, H., Vachon, R. (1989). Reasoning with contrary□to□fact propositions. *Journal of Experimental Child Psychology,* 47(3), 398□412.

Marsh, D., Mkwara, L.A. (2009). Fixed Status Quo Attributes vs People's Perceived Attributes of Water Quality, New Zealand Agricultural and Resource Economics Society Conference Nelson, New Zealand, August 28.

Marsh, D., Mkwara, L., Scarpa, R. (2010). Does Respondent Perception of the *Status Quo* Matter in Non-Market Valuation with Choice Experiments? An Application to New Zealand Freshwater Streams. University of Waikato Working Paper in Economics 10/04.

NERA-Accent (2007). The Benefits of Water Framework Directive Programmes of Measures in England and Wales. Final Report to DEFRA.

OECD (2001). *Multifunctionality: Towards an analytical framework*. Paris: OECD Publishing.

OECD (2003). *Multifunctionality: The policy implications*. Paris: OECD Publishing.

OECD (2006). *The new rural paradigm*. Paris: OECD Publishing.

OECD (2009). *OECD rural policy reviews: Spain*. Paris: OECD Publishing.

Paavola, J. (2007). Institutions and environmental governance: a reconceptualization. *Ecological Economics*, 63 (1), 93-103.

Randall, A. (2002). Valuing the outputs of multifunctional agriculture. *European Review of Agricultural Economics*, 29(3), 289-307.

Schenker, N., Gentleman, J.F. (2001). On Judging Significance of Difference by Examining the Overlap Between Confidence Intervals. *American Statistician*, 53, 182-186.

Siikamäki, J., Layton, D.F. (2007). Discrete choice survey experiments: A comparison using flexible methods. *Journal of Environmental Economics and Management*, 53, 122-139.

Smith, V.K., Desvousges, W.H. (1986). *Measuring water quality benefits. International Series in Economic Modeling*. Boston, Massachusetts: Kluwer Academic Publishers.

Street, D.J., Burgess, L. (2007). *The construction of optimal stated choice experiments*. Hoboken: John Wiley & Sons.

Thompson, V.A. (1996). Reasoning from false premises: The role of soundness in making logical deductions. *Canadian Journal of Experimental Psychology*, 50(3), 315-319.

Train, K. (2003). *Discrete Choice Methods with Simulation*. Cambridge: Cambridge University Press.