FARMERS' WILLINGNESS TO CARRY OUT WILDLIFE HABITAT IMPROVEMENT ACTIONS - RESULTS OF A CVM EXPERIMENT

F. SPALATRO*, M. GENGHINI* G. BAZZANI**

*Istituto Nazionale per la Fauna Selvatica, Via Ca' Fornacetta 9, 40064 Ozzano Emilia (BO)
** Centro di Studio sulla Gestione dei Sistemi Agricoli e Territoriali (GeSTA) – CNR, via Fanin 50, 40127 Bologna

Abstract

Promotion of wildlife habitat improvement actions is a key issue in the agro-environmental policy. Both European and Italian regulations establish financial contributions for farmers willing to adopt selected ecological farming methods (organic farming, integrated pest management, conservation tillage) or to create or maintain natural elements in farmland habitats (small woods, hedges, wet-lands). The efficient allocation of the limited budget permits to maximize the environmental effect of the adopted measures which are always site specific.
In this paper we present the results of an experimental research conducted in Italy in 2001. A contingent valuation study was conducted to estimate the farmer's willingness to accept compensation to carry out selected wildlife and environmental measures on part of the farmland. A single bounded discrete choice format is adopted. We discuss two different wildlife and environmental measures: game crops and crops residues maintenance. The study allows to quantify the probability distribution of farmers' participation rate for both. Such "response curve" represents the economic tool which can help policy makers to design future intervention. The results show a positive willingness to carry out wildlife habitat improvement actions by farmers, at reasonable costs for the public administration.

Introduction

Potentially, agriculture does not produce only goods. Some farming methods, in some areas, may contribute to the social welfare through environmental, social and landscape services (OECD, 2001). In particular, some farming methods have proven to be effective for preserving and improving wildlife habitat (Genghini, 1994). In addition, at the national and local level, wildlife management and hunting activities may improve nature conservation and economic integration with local farming activities (AAVV, 1995; Genghini and Bazzani, 1999).
Environmentally sound farming practices are boosted through specific national and european measures. The European Wild Birds (79/409) and Habitat (92/43) directives, the agro-environmental regulations (797/85, 2078/92, 2080/92) and the Rural Development Plans (1257/99) are examples of the most recent and important policies adopted in this direction (Dixon, 1994). In Italy, L. 157/92 has introduced important economic measures to promote wildlife habitat management actions. The law establishes financial contributions for farmers willing to adopt selected ecological farming methods (organic farming, integrated pest management, conservation tillage) or to create or maintain natural elements in farmland habitats (small woods, hedges, wet-lands). The sums offered by each regional regulation, based on the national law, are defined by several parameters: the foregone income for the most common cultivations, the implementation cost of each measure, and the indications given within the EU agro-environmental measures.

Formatiert: Nummerierung und Aufzählungszeichen
Gelöscht: ti
Gelöscht: s
Gelöscht: low land cultivation
Gelöscht:

However, in each geographical area normally coexist different types of farmers and farming activities, various cultivation efficiencies, different experiences with wildlife damages and various preferences towards environmental and wildlife problems. Consequently, some farmers, due to ecological or hunting motivations, may accept smaller financial contribution than other farmers, that may have a personal aversion against hunting activities or may fear greater loss caused by wildlife populations.
The policy maker who must allocate a fixed budget among farmers through a selected measure, may be interested in knowing the probability distribution of farmers' participation rate. We define here the "response curve" as the percentage of farmers who would decide to ask for the contribution, for each contribution level. We expect a non decreasing response curve: increasing contribution level must be associated with non decreasing participation rate.
The response curve estimation is the objective of our research. Its knowledge may allow a better policy definition, based on farmers' preferences and costs rather than on general EU indications. Also, our goals is to verify the effect that some socio-economic variables may have on willingness to carry out measures.

Gelöscht: the

1. Survey areas

Formatiert: Nummerierung und Aufzählungszeichen

Gelöscht: Area geografica dell'indagine

Our target is the farmers' population in both Parma and Ravenna provinces located in Emilia-Romagna (see table 1). Parma extends over 3,449 square km, with around 400,000 inhabitants in 47 towns. Ravenna has 18 towns and a total of around 350,000 people over 1,859 square km.
Ravenna's province is mainly flat (82.6% of the total area). On the plain lives 95.5% of the population. In proximity of the coast, agriculture is mainly intensive, and is dominated by cereals, alfalfa and sugar beet. Moving inland, crops incidence decreases while intensive orchards and vineyards gain importance. Medium and high hills are located in the Southern part (17.4% of the total area), where grasslands and forests become predominant in some cases. Crops, especially those for animal feeding, regains importance at orchards and grapes expense.

Gelöscht: e

Parma's province is more heterogeneous and includes plain, hills and mountains. The latter covers 43% of the total area. Most residents live on the plain (61.4%), where rotations between winter cereals and forage crops prevail, and poplars are fairly widespread. In the hilly area, where 30.3% of the population lives, main cultivations are forage crops and winter cereals, with increasing grasslands and forests (20.9% of the total area). In the mountain area, agricultural land covers only 42.6% of the total area with a prevalence of forests and grasslands (51% of the total area), while crops are less representative.

Gelöscht: e
Gelöscht: e
Gelöscht: -fall
Gelöscht: fodder
Gelöscht: fodder
Gelöscht: -fall
Gelöscht: and AUA

2. Methodology

Formatiert: Nummerierung und Aufzählungszeichen

Contingent valuation (CVM) is a direct evaluation method that, through interviews (face to face, postal or by telephone), tries to evaluate willingness to pay (WTP) or willingness to accept (WTA) a monetary compensation for non market goods or services. CVM is based on the idea that there is a latent demand/offer that may be estimated through WTP or WTA declaration for goods and services.
In this research, we focus on farmer's willimgness to carry out selected wildlife and environmental measures on part of her own farmland. We prefer a single bounded discrete choice format (Hanemann, 1984): respondents are asked to answer yes or no to a money offer for measure's implementation.

Gelöscht: interviewee

Farmer's utility $u \equiv u(k, y; s)$ is assumed to be function of net farm income y, of socio-economic characteristics s and of a dummy variable k, equal to 1 if farmer implements the

measure, 0 otherwise. We assume that u may be decomposed in two parts: a deterministic part $v(k, y; s)$ and a stochastic component e_k:

$$u(k, y; s) = v(k, y; s) + e_k \,, k=0,1. \quad (1)$$

Each respondent is offered a money sum t, which takes different values according to a predefinite scale, to carry out the measure. We assume that the respondent will accept the sum only if participation's utility exceeds the utility of forgoing:

$$v(1, (y - t); s) + e_1 \geq v(0, y; s) + e_0 \,. \quad (2)$$

If $\eta = e_0 - e_1$ e $\Delta v = v(1, (y - t); s) - v(0, y; s)$, yes-answer's probability has the following expression:

$$P_1 = \Pr(\eta \leq \Delta v) = F_\eta(\Delta v) \quad (3)$$

where $F_\eta(\cdot)$ is η cumulative distribution function. Model will depend on the distribution assumed for $F_\eta(\cdot)$. If both errors e_0 ed e_1 are distributed indipendently Normal, $F_\eta(\cdot)$ will be a Normal distribution and probability function estimation would be carried out through a *probit* model. If errors are distributed bivariate Normal with correlation parameter ρ, we would estimate a bivariate *probit* model.

In implementing discrete choice models, price vector choice is critical. Following the indications in Cooper (1993), Alberini and Carson (1993), Scarpa and Bateman (2000), we set the prices vectors on the basis of the prices' empirical distributions that we derived from an open ended pre-test (see table 2).

Let Δv be a linear function of both money offer t_i and socio-economic characteristics x_i:

$$\Delta v = \alpha + \beta t_i + \underline{\gamma}' \underline{x}_i \,; \quad (4)$$

a loglikelihood maximisation process ensures the correct and minimum variance estimation of population parameters α, β and $\underline{\gamma}$. Based on the estimated parameters, we can calculate WTA distribution percentiles. Note that, in case of a Normal distribution, due to its simmetry around zero, mean and median correspond. By definition, median is the value of t such that $Pr(yes|t) = 0.5$, that is the value of t_i such that

$$t = (-\alpha - \underline{\gamma}' \underline{x}) / \beta \,. \quad (8)$$

3. Measures proposed

Wildlife and environmental measures originally proposed were: game crops (GC), crops residues maintenance (CR); management of set-aside fields for wildlife; management and restoration of abandoned fields. Each survey asked about the willingness to carry out two of the previous measures. The proposed measures have different degree of complexity, requiring different farmers' involvement. GC and CR have to be considered more simple and immediate than the others.

The present analysis concentrates on GC and CR, which are less complex and require a lower farmer's engagement than the other two. GC and CR can be adopted for the same type of cultivation (crops), allowing us to confront results.

GC consists in not harvesting until the end of February 3,000 m^2 strips of cereals or sunflowers (corresponding to one "biolca" or "tornatura", unit of measurement of farmland, in Parma and Ravenna respectively), at least 50 meters apart one from each other. CR consists in maintaining cereals and sunflowers stubbles until November, avoiding ploughing, burning and using herbicides. Residues' cut is allowed after August 15th.

Gelöscht: interviewee
Gelöscht: Interviewee
Gelöscht: Le misure agro-faunistiche e ambientali proposte
Gelöscht: the
Gelöscht: cereals or sunflowers
Gelöscht: m^2
Gelöscht: dals

4. Surveys' definition, distribution and gathering

The study has been carried out in three phases. First, we involved the three major farmers associations (Coldiretti, CIA, Unione Agricoltori), which showed interest for the study and guaranteed the necessary support for the survey's administration. Secondly, questionnaires were attached to the associations' newsletters. This choice was deemed to be the most effective way to contact a high number of farmers in a friendly way in a short period of time: we supposed to reach almost every farmer in both provinces. Total number of surveys potentially to be filled was around 19.000, half of which (9.500) spendable for this analysis. Farmers were asked to fill in the survey and to hand it to the local association's representative, who eventually could help with the filling.

The questionnaire had three sections:

Section 1: socio-economic and technical questions, on farm and farmer. Information gathered in this section regarded farm's location and extension, crop mix and cultivations' type, outsourcing, set-aside land, wildlife damages experienced. We also asked information on age, education, part-time or full-time working condition, farmer's family members. Finally, we asked information on past experience with wildlife and environmental measures, and on the presence of a hunting permit in the family.

Section 2: WTA questions. This section was different for each survey, because it offered different money sums and had a different questions' order. Each measure was described, and a money contribution per land unit (biolca or tornatura, around 3,000 m^2) was offered. Answer was dichotomic: participation (yes) or non participation (no). If no, we asked the reasons for it. If yes, we asked the area that would be involved in the program.

Section 3: two open ended questions allowing additional comments.

For each measure we set 8 contribution levels to be offered as payment for the participation (see table 2), trying to cover most of the target population's WTA levels. Consequently, for GC and CR we used 8 x 8 = 64 different price combinations. We collected the filled questionnaires and completed the database between February and April 2001.

4. 1. A low response's rate

Valid surveys were 135 for GC and 130 for CR. These are low numbers, compared to the number of surveys attached to the newsletters. The low answer's rate is probably due to the following reasons:

- BSE problem exploded in Italy during the research period. Farmers associations, pushed by this emergency, could not dedicate time and energies to the study. In this way, we lost their expected intervention needed to motivate and support farmers.
- Part of the newsletters could not have been opened or read by farmers. This is not a statistical problem, as long as the distribution of interest's variables among farmers who did not read the newsletter is the same as the one among the farmers who opened the newsletter.
- Part of the farmers were not interested to wildlife and environmental measures. This would induce a distorsion in results, while a portion of negative answers would remain out of the survey, and the estimated answer curve would be shifted with respect to the true answer curve.

To investigate in depth the reasons for the low response rate, and to assure ourselves about the estimates' statistical significance, we proceeded with an ex-post telephone survey. We called 100 farmers randomly chosen from the farms' list, and we asked them whether they had noticed the survey's presence in the newsletter. If yes, and if they had not filled it, we asked to explain the reasons. About 90% of respondents did not notice the survey's presence. The remaining 10% did not fill it in because they were not interested. Therefore our data, that

Formatiert: Nummerierung und Aufzählungszeichen

Gelöscht: 9500

Gelöscht: ??????????

Gelöscht: m^2

Formatiert: Nummerierung und Aufzählungszeichen

Gelöscht: *Un ridotto tasso di risposta*

Gelöscht: the

Gelöscht: m

Gelöscht: l

Gelöscht: Gran part ? (si può?)

Gelöscht: of interviewees

show an alternance of positive and negative answers, represent only 90% of population, while the remaining 10% consists only of farmers who are not willing to carry out the proposed measures. This implies a 10% downwards shift of the response curve, to account for those who did not fill in the survey because contrary to the measures.

5. Estimated models

Formatiert: Nummerierung und Aufzählungszeichen

Since sample design randomizes the measure to be submitted to the respondent, valid surveys may contain only GC or CR or both. The estimation procedure followed three phases:

Gelöscht: interviewee

Phase 1 (table 3a) – We used questionnaires which contained both measures (n=50) and estimated a bivariate probit model for the participation's choice regarding GC and CR (model *biv*), using as regressors only the constant and the money offer. We assumed that choices are not independent, and tested a zero correlation hypothesis between disturbances.

Phase 2 (table 3b) – We used questionnaires which contained at least one of the two measures (n=135 for GC, n=130 for CR) and estimated two models:

- probit model for GC choice (model GC), using constant and money offer;
- probit model for RC choice (model RC), using constant and money offer.

Results of both models are not directly comparable with phase 1 results, because they are based on different data, and because they assume zero correlation. Phase 2 is justified not only by the need to increase data numerosity, using also single observations on GC and CR, but also by the positive result of the zero correlation hypothesis test of phase 1.

Phase 3 (table 3c) – We expanded both GC and CR models, which contained only constant and money offer, to estimate the effect of selected socio-economic characteristics on choice probability (models GC' and CR').

6. Results

Formatiert: Nummerierung und Aufzählungszeichen

6. 1. Phase 1 results

Bivariate *biv* model shows all significant parameters, except the money offer for game crops (gc_bid). While WTA to leave residues on farmland depends greatly on money offer (cr_bid coefficient is equal to 0.00355 and it is 95.1% statistically significant), WTA for GC does not seem related to contribution. In fact, probability of II grade error is 24.7%, that is greater than 10%, level adopted following a popular procedure.

Likelihood test to verify zero correlation between choices is $LR = 2\left[L\left(\hat{\theta}\right) - L\left(\hat{\theta}_0\right)\right]$, asintotically distributed χ^2 with one degree of freedom. The log-likelihood value of correlated model $L\left(\hat{\theta}\right)$ is the one shown in table 3a (-57.095). The log-likelihood value of uncorrelated model $L\left(\hat{\theta}_0\right)$ was estimated apart, as sum of loglikelihood for both GC and CR models separately estimated, which were –31.405 and –26.972 (not shown in the results' table). Since *LR*= 2 (-57.095+31.405+26.972) = 2.564, lower than the reject treshold equal to 2.70, we conclude that correlation is statistically not different from zero, and we proceed with separate models.

6. 2. Phase 2 results

Formatiert: Nummerierung und Aufzählungszeichen

Both GC and CR models show significant coefficients, for constant and money offers. Figures 1 and 2 show probability function curves, that is the acceptance probability for different contribution levels. It is useful to recall that function shape derives from the fact that we assumed the Normal distribution for disturbances. Moreover, figures 1 and 2 are based on GC and CR estimated models, but the probability functions are adjusted to keep into consideration that data represent only 90% of population. Basically, we multiplied the probability functions by 0.9, shifting down the probability function.

Median WTA for GC is equal to 1,472,685 Lt. (760.58 €), while CR median is equal to 434,467 Lt. (224.38 €). Offering around 1,050,000 Lt. (542.28 €) for each 3,000 m^2 in GC, and 350,000 Lt. (180.76 €) in CR, on average 30% of farmers would accept to carry out measures on their land. Offering 800,000 Lt. (413.17 €) in GC and 300,000 Lt. (154.94 €) in CR, instead, acceptance probability decreases to 20%.

6. 3. Phase 3 results

One of our goals was to verify the effect that some socio-economic variables may have on willingness to carry out measures. Therefore, using phase 2 data, we included in the probability function some variables which may be important for participation's decision.
Results are mixed. For game crops money offer coefficient remains significant, while constant does not; acceptance probability depends positively on mon_acol (mountain or hill location), mai_danni (no past wildlife damage) and no_ct (no outsourcing). For crops residues maintenance decision, constant and money offer seem significant; moreover, participation probability increases with education level (edu). Other characteristics do not have a significant impact on acceptance probability.

Conclusions

The present study allows some considerations on two different aspects: the methodology applied and the socio-economic results.
Low response is a major shortcoming of this study. Newsletters' reading rate is surprisingly low, certainly lower than the level expected by farmers organizations. We proved here, through an *ex-post* telephone survey, that it is due to the administration vehicle (newsletters). The telephone survey, carried out to investigate the reasons of the failure, revealed that only 10% of the farmers were aware of the questionnaire and could be interviewed. While, on one hand, CVM confirms to be a valuable tool to analyse complex policy situations, on the other hand the administration method, the vehicle, was not effective. Therefore, we strongly suggest not do adopt it for future investigations.If a low budget constraint forces the researcher to use newsletters as administration vehicle, it seems necessary to limit the geographical area and to simplify as much as possible the questionnaire.
Despite the low response rate, parametric model evaluations of farmers' willingness to participate in wildlife and environmental measures were possible. Some interesting aspects emerge. Firstly, a hypothesis test shows that WTA for GC and for CR are not statistically related. Secondly, in both cases willingness to carry out the interventions depends strongly on public support as well as on other socio-economic variables, like farm location in hilly and mountainous areas, past wildlife damage, non use of outsourcing, education level. All the covariates present the expected sign and have reasonable magnitude.
The probit probability functions in figures 1 and 2 show farmers' portion that would likely choose to participate, for each offered value. The probability function can play an important role in agri-environmental policy design, helping policy maker to locate a fixed budget among farmers in a most efficient way. In fact, the knowledge of the farmers' response curve can support the design of differentiated intervention among farmers which could be implemented through a real auction mechanism. In this way a higher surface given a fixed budget could be involved in these programs.
We can compare our GC WTA function with the actual payment offered by the EU, and defined at regional level (CR has never been offered in neither provinces).

Gelöscht: ,
Gelöscht: m^2
Formatiert: Nummerierung und Aufzählungszeichen
Gelöscht: the
Formatiert: Nummerierung und Aufzählungszeichen
Gelöscht: the
Gelöscht: of the failure
Gelöscht: and w
Gelöscht: realize
Gelöscht: s

For Emilia-Romagna, GC contribution varies between 1,150,000 Lt. (593.93 €) and 2,300,000 Lt. (1187.85 €) per ha, that is between 345,000 Lt. (178.18 €) and 690,000 Lt. (356.36 €) per *biolca/tornatura*, depending on crop's type. According to our model, farmers' quota that would be willing to participate at that contribution is between 7% and 15%. On the same study area, between 1997 and 1999, a regional survey (Genghini and Bazzani, 1999) showed that less than 1% of farmers were involved in wildlife habitat improvement programs. This result takes us to conclude that there still might be an increase in farmers' involvement.
Further research should be undertaken in this field to verify the previous result and to test the regional effect linked to the adoption of the EU agriculture policy in Italy.

Table 1: The study area.

	Parma	Ravenna	Total
Population	399,990	350,646	750,636
plane	61.4%	95.5%	77.33%
hills	30.32%	4.5%	18.26%
mountain	8.28%	0%	4.41%
Area (km^2)	3,449	1,859	5,308
plane	25.03%	82.6%	45.19%
hills	31.49%	17.4%	26.56%
mountain	43.48%	0%	28.25%
Nr. towns	47	18	65
plane	16	15	31
hills	16	3	19
mountain	15	0	15

Table 2: Money offers.

Offer in Lt and €	
1 GC*	CR*
170,000 Lt. 87.8 €	70,000 Lt. 36.15 €
300,000 Lt. 154.94 €	130,000 Lt. 67.14 €
430,000 Lt. 222.08 €	190,000 Lt. 98.13 €
570,000 Lt. 294.38 €	260,000 Lt. 134.28 €
700,000 Lt. 361.52 €	320,000 Lt. 165.27 €
830,000 Lt. 428.66 €	380,000 Lt. 196.25 €
970,000 Lt. 500.96 €	450,000 Lt. 232.41 €
1,100,000 Lt. 568.1 €	510,000 Lt. 263.39 €

* contribution offered per biolca or tornatura (3000 m^2)

Table 3a: Phase 1 results

	Coefficient	St. err.	P-value
	biv model		
gc_constant	-0.95935	0.52942	0.070*
gc_bid	0.00082	0.00071	0.247
cr_constant	-1.51036	0.51071	0.003*
cr_bid	0.00355	0.00180	0.049*
rho	0.40918	0.24711	0.098*
Log-lik	-57.095		
N	50		

Table 3b: Phase 2 results

	Coefficient	St. err.	P-value
	GC model		
gc_constant	-1.89778	0.55696	0.001*
gc_bid	0.00138	0.00073	0.057*
Log-lik	-78.338		
N	135		
	CR model		
cr_constant	-2.66555	0.54519	1.01E-6*
cr_bid	0.00646	0.00156	3.34E-5*
Log-lik	-73.0512		
N	130		

Figure 2 - WTA for GC

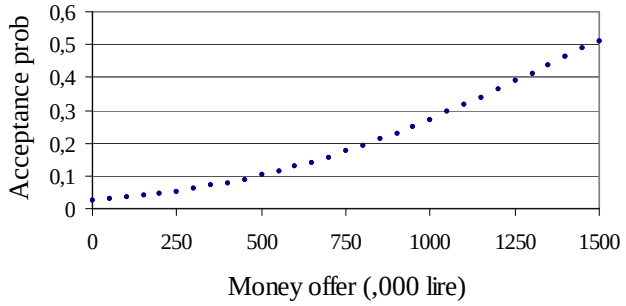
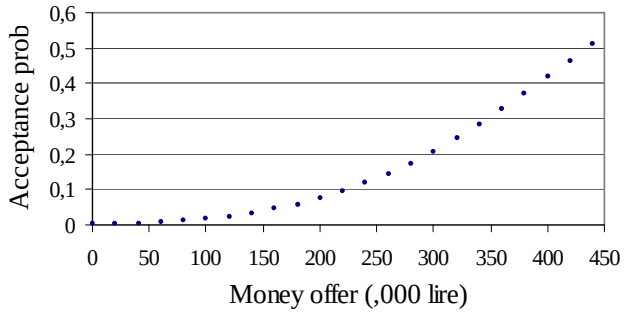


Figure 3 - WTA for CR



References

AA VV. 1995. *How hunting and fishing can contribute to nature conservation and rural development*. Proceedings. Council of Europe: Strasbourg.

ALBERINI A, CARSON RT. 1993. *Choice of thresholds for efficient binary discrete choice estimation, Part 1*. RFF Quality of Environment Division Discussion Paper QE93-14. Resources For the Future: Washington, DC.

BISHOP RC, HEBERLEIN T. 1979. Measuring values of extra-market goods: are indirect measures biased? *American Journal of Agricultural Economics* 61: 926-930.

BISHOP RC, ROMANO D. 1998. *Environmental resource valuation; applications of the contingent valuation method in Italy*. Kluwer Academic Publisher: New York.

BOYLE JJ, WELSH MP, BISHOP RC. 1988. Validation of empirical measures of welfare change: Comment and extension. *Land Economics* 64: 94-98.

COOPER JC. 1993. Optimal bid selection for dichotomous choice contingent valuation surveys. *Journal of Environmental Economics and Management* 24(1):25-40.

COOPER JC, HANEMANN MW. 1995. *Referendum contingent valuation: how many bounds are enough?*. Working Paper, Economic and Social Department, FAO, Rome, Italy.

DIXON J. 1994. The potential role of agricultural policy for achieving nature conservation on farmland. Proceedings. *Third European Forum on Nature Conservation and Pastoralism in Europe*. Edited by Bignal EM, MacCracken DI, Curtis DJ. Joint Nature Conservation Committee: Paisley UK.

GENGHINI M. 1994 *I miglioramenti ambientali a fini faunistici*. Istituto Nazionale per la Fauna Selvatica, Documenti Tecnici, 16:1-95.

GENGHINI M, BAZZANI GM. 1999. Economic measures to improve wildlife habitats: an evaluation of the Italian experience. Proceedings. *Second International Wildlife Management Congress*. Godöllo (Budapest).

GREEN D, JACOWITZ KE, KAHNEMANN D, MCFADDEN D. 1998. Referendum contingent valuation, anchoring, and willingness to pay for public goods. *Resources and Energy Economics* 20(2): 85-116.

HANEMANN WM. 1984. Welfare evaluations in contingent valuation experiments with discrete responses data - Reply. *American Journal of Agricultural Economics* 66(3): 332-341.

Gelöscht: ¶

HANEMANN WM. 1994. Valuing the environment through contingent valuation. *Journal Economic Perspect* 8: 19-43.
MARKOWSKA A, ZYLICZ T. 1999. Costing an international public good: the case of the baltic sea. Ecological Economics 30 (2): 301-316.
MCCONNELL KE. 1990. Models for referendum data: the structure of discrete choice models for contingent valuation. *Journal of Environmental Economics and Management* 18: 689-708.
MCFADDEN D. 1976. Quantal choice analysis: a survey. *Annals of Economic of Social Measurement* 5: 363-90.
MITCHELL RC, CARSON RT. 1989. *Using surveys to value goods. The contingent valuation method*. Resources for the Future: Washington (DC).
NIEWIJK RK. 1994. Misleading quantification: the contingent valuation method of the environmental quality. *Regulation* 1: 60-71.
OECD. 2001. *Multifunctionality – Towards an analytical framework*. Paris (F).
ONWUJEKWE OE, SHU EN, OKONKWO PO. 1999. Willingness to pay for the maintenance of equity in a local ivermectin distribution scheme in Toro, Northern Nigeria. *Public Health* 113 (4): 193-194.
PORTEY PR. 1994. The contingent valuation debate: why economists should care. *Journal of Economic Perspectives* 8(4): 3-18.
ROMANO D, CARBONE F. 1993. La valutazione economica dei benefici ambientali: un confronto fra approcci non di mercato. *Rivista di Economia Agraria* 48 (1): 19-62.
SCARPA R, BATEMAN I. 2000. Efficiency gains afforded by improved bid design versus follow-up valuation questions in discrete choice CV studies, *Land Economics* 76(2): 299-311.
WILSON GA. 1997. Factors influencing farmer participation in the environmentally sensitive areas scheme. *Journal of Environmental Management* 50(1):67-93.