“Socio-economic correlates of stated willingness to change habits for natural resource protection in Albania”

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SOCIO-ECONOMIC CORRELATES OF STATED WILLINGNESS TO CHANGE HABITS FOR NATURAL RESOURCE PROTECTION IN ALBANIA

Abstract

Natural resource protection is vital for sustainable development in Albania, where land, water, forests, and biodiversity support rural livelihoods, agriculture, tourism, and local welfare. The purpose of this study is to analyze socio-demographic and economic correlates of individuals' stated willingness to change habits for natural resource protection in Albania. Primary data were collected through a structured and anonymous questionnaire completed by 250 voluntary respondents between December 2025 and February 2026. An audit of the archived raw dataset against the questionnaire showed that Item 15 contained three response categories: Yes, Not sure, and No. For the Binary Logit analysis, an affirmative response was coded WTC = 1, whereas Not sure and No were coded WTC = 0; 77.2% of respondents gave an affirmative response. Age, education, income, and information were re-specified categorically, sparse adjacent categories were combined where necessary to avoid complete separation, and robust standard errors were used. The re-estimated model is jointly significant (LR = 34.76, $p < 0.001$; McFadden $R^2 = 0.129$) and shows acceptable calibration (Hosmer-Lemeshow $p = 0.449$). Frequency of natural-resource use is positively associated with willingness to contribute ($p < 0.001$). Income categories are jointly associated with willingness to contribute ($p = 0.023$), but the pattern is not monotonic; gender, age, education, and information are not jointly significant. Probit and nonlinear-age sensitivity checks do not restore the previously reported negative age or information associations. The findings are interpreted as exploratory associations with stated pro-environmental intention, not as monetary willingness to pay or causal relationships.

Keywords willingness, behavior, conservation, awareness, income, Albania

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INTRODUCTION

Natural resources are fundamental to economic activity, environmental quality, and social well-being. Their protection has become increasingly important in countries where economic development, urbanization, land-use change, and ecosystem pressure may undermine long-term sustainability. Public participation is therefore not only a complementary element of environmental governance, but also a practical condition for conservation policies that depend on social acceptance and financial support.

In Albania, land, forests, water resources, and biodiversity are closely linked to rural livelihoods, agriculture, tourism, and local development. Nevertheless, environmental degradation, institutional limitations, and uneven public engagement continue to constrain sustainable management. Although environmental protection is increasingly recognized as a policy priority, evidence remains limited on the socio-economic factors associated with citizens' willingness to support conservation through changes in everyday behavior.

This paper addresses the limited empirical evidence on how socio-demographic and economic characteristics relate to individuals' stated willingness to change habits to support natural resource protection in Albania. This behavioral intention is relevant because conservation policies often depend on citizens' readiness to reduce resource use, recycle, save energy, or adopt other pro-environmental practices. The study therefore examines willingness to contribute through behavioral change and does not estimate the monetary value assigned to environmental goods.

For clarity, this revision uses the abbreviation WTC (willingness to contribute through behavioral change). The term WTP is reserved for studies that elicit a financial amount or a yes/no response to a stated monetary bid. This distinction aligns the empirical construct with the questionnaire actually administered.

1. LITERATURE REVIEW AND HYPOTHESES

Natural resources form the ecological and economic basis of human development because they provide water, land, forests, energy, biodiversity, and ecosystem services that sustain production and well-being. Previous research emphasizes the close relationship between human welfare and ecosystem services and argues that resource management must integrate ecological, economic, and social dimensions (Millennium Ecosystem Assessment, 2005; Chapin et al., 2009; Brown et al., 2022). Recent evidence further shows that natural resources are exposed to growing pressures from land-use change, deforestation, soil degradation, pollution, and climate change (Amer et al., 2024; Armenteras et al., 2023; Huo & Peng, 2023; Mason et al., 2025).

The literature also emphasizes that natural resource protection is shaped by broader environmental, institutional, and spatial pressures. Kapur (2016) links natural resource management with wider environmental issues, while Zhou et al. (2024) highlight the role of green finance, environmental benefits, financial technology, and resource management in advancing sustainability. Recent evidence also shows that environmental awareness may influence well-being and attitudes toward nature (Harries et al., 2025). In urban and territorial contexts, climate change, biodiversity loss, and planning pressures increase the relevance of nature-based solutions and sustainable spatial strategies (Hardman & Samangooei, 2025; Megyesi et al., 2024; Groven et al., 2025).

Other studies focus on climate risks, resource depletion, and governance challenges. Green finance and environmental performance are discussed by Bakry et al. (2023) and Omri et al. (2025), while C. Nguyen and B. Nguyen (2025) examine the relevance of natural threats for natural resource rents. Forest and land-use studies further show that stakeholder participation, governance networks, and social-ecological interactions are essential for conservation under climate and biodiversity pressures (Brodrechtova et al., 2024; Isaac et al., 2025; Magidimisha-Chipungu, 2025; Perera et al., 2024).

Local perceptions and stakeholder priorities are important for natural resource protection because they influence the legitimacy of conservation measures and the acceptance of environmental policy instruments (Koju et al., 2023; Masao et al., 2022; Mărgărint et al., 2021). In this view, natural resource conservation is not only a technical or ecological matter but also a social and economic issue tied to public support, trust, and household-level decisions.

Monetary willingness to pay (WTP) and non-monetary willingness to contribute are conceptually distinct. A genuine contingent valuation study requires a clearly specified environmental improvement, a credible payment vehicle, and an elicitation format containing a bid or monetary amount (Arrow et al., 1993; Mitchell & Carson, 1989; Bateman et al., 2002; Carson, 2000). Albanian research in AL-Prespa has used explicit payment scenarios and entrance-fee or pollution-control bids to estimate WTP (Grazhdani, 2015). Similarly, research in Kosovo measured visitors' WTP for the sustainable management of Germia Forest Park (Doli et al., 2021), while a cross-border study covering Kosovo, Montenegro, and Albania used stated

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monetary contributions for national-park conservation (Doli et al., 2024). These regional studies demonstrate that WTP requires an explicit financial question. Because the questionnaire used in the present study includes no payment vehicle or bid design, we define the outcome instead as willingness to contribute to protection through behavioral change.

Previous empirical studies suggest that the correlates of environmental support may differ across monetary and behavioral outcomes. Income is generally expected to facilitate pro-environmental action because higher-income households face fewer resource constraints; regional WTP studies also report a positive role for income (Grazhdani, 2015; Doli et al., 2021). Education is expected to have a positive association because it can improve understanding of ecological risks and policy alternatives. However, education associations are not always statistically significant once income, attitudes, and other characteristics are controlled for.

Age is expected to have a negative association with willingness to contribute because younger respondents may have greater exposure to climate and sustainability education and a longer time horizon for environmental risks. Evidence from the Kosovo-Montenegro-Albania border region likewise indicates that monetary willingness to support protected areas declines with age (Doli et al., 2024).

Findings for gender are mixed; differences may reflect social roles, risk perceptions, and environmental concern rather than a stable universal association. Gender is therefore included as a non-directional explanatory factor.

Information and direct use of natural resources may also shape behavioral intention. Information can strengthen problem awareness and perceived responsibility, as suggested by theories of planned and environmentally significant behavior (Ajzen, 1991; Stern, 2000). Nevertheless, the information-behavior relationship can be weakened by limited trust, perceived inefficacy, or practical barriers (Kollmuss & Agyeman, 2002). Frequent users of water, land, or forests may be more aware of environmental change and therefore more willing to contribute. However, dependence on resource-intensive practices may also reduce willingness to change. These competing mechanisms justify empirical testing.

Research on pro-environmental behavioral intention further shows that intention is shaped by attitudes, perceived behavioral control, moral norms, social influences, contextual opportunities, and practical barriers. Meta-analytic and review evidence also cautions that stated intentions and environmental concern do not automatically translate into observed behavior (Bamberg & Möser, 2007; Steg & Vlek, 2009; Gifford & Nilsson, 2014; Lange & Dewitte, 2019). This evidence supports interpreting the dependent construct in the present study as stated pro-environmental behavioral intention rather than as monetary willingness to pay.

Complementary strands of the literature connect environmental engagement with collective action, local knowledge, financing mechanisms, and established environmental-economics frameworks. Pretty (2003) and Benyei et al. (2022) emphasize social capital and local knowledge in resource governance, while Appio et al. (2025) illustrate how environmental consciousness can shape support in financing contexts. Standard environmental-economics and valuation guidance (Loomis, 2000; Whitehead, 2006; Perman et al., 2011; Tietenberg & Lewis, 2018) further reinforces the need to match the empirical outcome to the measurement instrument used.

The aim of this study is to analyze socio-demographic and economic correlates of individuals' stated willingness to change habits for natural resource protection in Albania. The hypotheses are as follows:

H1: Gender has a significant association with willingness to contribute through behavioral change.

H2: Age has a negative association with willingness to contribute through behavioral change.

H3: Education has a positive association with willingness to contribute through behavioral change.

H4: Income has a positive association with willingness to contribute through behavioral change.

H5: Information level has a positive association with willingness to contribute through behavioral change.

H6: Frequency of natural resource use has a positive association with willingness to contribute through behavioral change.

2. METHOD

The study applies a quantitative, cross-sectional design based on primary survey data collected between December 2025 and February 2026. In response to the review, the archived raw dataset was audited against the questionnaire before re-estimation. Category labels were normalized for spelling and capitalization only; substantive response categories were not redefined except where adjacent sparse categories had to be combined for stable maximum-likelihood estimation. The statistical analysis was then regenerated directly from the audited records.

The archived analytical file contains 250 completed questionnaires. Because no complete national sampling frame, probability weights, or documented multistage probability design was used, the sample is treated as a voluntary non-probability sample. The retained file does not contain respondent-level region, urban/rural residence, or recruitment-channel identifiers, and the study records available for this revision do not provide a recruitment-flow log of the numbers approached or excluded. Consequently, north/central/south counts, urban/rural counts, recruitment-channel totals, and an approach/completion/exclusion flow cannot be reconstructed reliably from the archived data. The observed sample is concentrated among women, respondents aged 18–25, and university-educated participants; this composition further limits population-level generalization.

Participation was voluntary and anonymous. The questionnaire did not collect names, personal identification numbers, addresses, or other direct identifiers. Respondents were informed of the academic purpose of the survey and that results would be reported in aggregate. The study was conducted independently as a voluntary, anonymous, non-interventional community-based survey. No formal institutional ethics approval or exemption was obtained.

The study was conducted independently as a non-interventional, community-based survey and was not part of an institutional research project. No formal ethics approval or exemption was obtained from an institutional ethics committee. Participation was entirely voluntary and anonymous. Before completing the questionnaire, respondents were informed of the study's academic purpose, the voluntary nature of their participation, and that the collected information would be used exclusively for research purposes. Informed consent was obtained from all participants. No names, direct personal identifiers, sensitive personal data, biological samples, or experimental interventions were involved in the study.

The raw dataset contains 250 records and 17 questionnaire items in addition to the respondent number. The audit identified several inconsistencies between the earlier manuscript tables and the raw categories. The corrected frequencies are: gender, 68.8% female and 31.2% male; age, 59.6% aged 18–25, 14.8% aged 26–35, 8.8% aged 36–45, 10.4% aged 46–60, and 6.4% over 60; education, 1.6% primary, 23.6% secondary, 72.0% university, and 2.8% postgraduate; income, 4.0% at 40,000–50,000 ALL, 7.6% at 50,000–70,000 ALL, 26.4% at 70,000–100,000 ALL, and 62.0% above 100,000 ALL. Information responses were 8.4% little knowledge, 63.2% some knowledge, and 28.4% very informed.

Item 15 asked whether respondents were willing to change some of their habits in order to protect natural resources. The raw responses were Yes (193; 77.2%), Not sure (50; 20.0%), and No (7; 2.8%). For the main binary model, Yes was coded WTC = 1 and both non-affirmative categories (Not sure and No) were coded WTC = 0. This coding is stated explicitly because the earlier manuscript incorrectly treated the item as a two-option question. A sensitivity model that excluded the 50 Not sure responses was not used as the primary model because only seven No responses remained, producing severe separation and unstable conventional maximum-likelihood estimates.

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Table 1. Audited response options and analytical coding

Variable	Exact response options in audited data	Descriptive coding	Regression specification/ reference
WTC	Yes; Not sure; No	Yes = 1; Not sure/No = 0	Binary outcome
Gender	Female; Male	Male = 0; Female = 1	Female indicator; ref: Male
Age	18-25; 26-35; 36-45; 46-60; > 60	1-5 ordered score for descriptives	Category indicators; ref: 18-25
Education	Primary; Secondary; University; Postgraduate	1-4 ordered score for descriptives	Primary+Secondary; University (ref); Postgraduate
Monthly income	40-50k; 50-70k; 70-100k; > 100k ALL	1-4 category score only for descriptives	≤ 70k; 70-100k; >100k (ref); never treated as a continuous amount
Information	Little knowledge; Some knowledge; Very informed	1 = Little; 2 = Some; 3 = Very informed	Category indicators; ref: Some knowledge
Use of NR	Never; Rarely; Monthly; Weekly; Daily	1 = Never … 5 = Daily	Ordered score 1-5; categorical sensitivity check also estimated

Table 2. Respondent profile in the survey sample

Characteristic	Category	Share (%)	N
Gender	Female	68.8	172
	Male	31.2	78
Age	18–25	59.6	149
	26–35	14.8	37
	36–45	8.8	22
	46–60	10.4	26
	Over 60	6.4	16
Education	Primary	1.6	4
	Secondary	23.6	59
	University	72.0	180
	Postgraduate	2.8	7
Household size	3 members	6.0	15
	4 members	28.0	70
	5 members	38.8	97
	More than 5 members	27.2	68
Monthly income (ALL)	40,000–50,000	4.0	10
	50,000–70,000	7.6	19
	70,000–100,000	26.4	66
	Above 100,000	62.0	155

Table 1 summarizes the questionnaire response options and their analytical coding. Table 2 presents the demographic and socioeconomic profile of the 250 survey respondents.

Table 2 was generated directly from the audited raw dataset. The strong concentration of the sample among younger, female, and university-educated respondents is a feature of the non-probability sample and should be considered when interpreting the results. Exact category counts (N) are reported alongside percentages in Table 2.

$$\ln\left[\frac{P(WTC=1)}{1-P(WTC=1)}\right]=\beta_0+\beta_1 Female+\Sigma\beta Agek+\Sigma\beta Education_k+\Sigma\beta Income_k+\Sigma\beta Information_k+\beta UseNR. \quad (1)$$

Age, education, income, and information are modeled through category indicators rather than a single linear score. The reference groups are age 18–25, university education, monthly income above 100,000 ALL, and some knowledge. Because the primary-education category (n = 4) and the 40,000–50,000 ALL income category (n = 10) contained no non-affirmative WTC responses, adjacent substantively ordered categories were combined to avoid complete separation: primary with secondary education, and the two income groups at or below 70,000 ALL. The open-ended income category above 100,000 ALL is treated only as a category and is not assigned an arbitrary continuous amount. UseNR is coded from 1 = never to 5 = daily in the main model; a fully categorical specification is used as a sensitivity check. Inference uses heteroskedasticity-robust (HC0) standard

errors. Odds ratios with 95% confidence intervals and average marginal effects (AMEs) are reported. Overall factor significance is assessed with likelihood-ratio tests; multicollinearity is evaluated with VIF and tolerance; calibration is assessed with the Hosmer–Lemeshow test. Nonlinear age terms, a probit model, and a categorical UseNR model are used as sensitivity checks (Wooldridge, 2010).

3. RESULTS

All descriptive statistics, correlations, and binary-response estimates reported below were regenerated from the audited dataset using the coding stated in the Method section.

The corrected profile confirms that 59.6% of respondents are aged 18–25, 68.8% are female, 72.0% have university education, and 62.0% report household income above 100,000 ALL. These proportions describe the analyzed sample and are not population estimates for Albania.

Figure 1 presents respondents' reported knowledge about natural resource protection. Figure 2 summarizes perceptions of the impact of daily activities on natural resources, while Figure 3 displays the three response categories for stated willingness to change habits.

The audited responses show that 63.2% reported some knowledge about natural-resource conservation, 28.4% were very informed, and 8.4% reported little knowledge. For perceived impact, 75.6% selected the moderate/very-high categories and 24.4% selected lower-impact categories. Item 15 produced three raw categories: 77.2% Yes, 20.0% Not sure, and 2.8% No. For the binary regression only, Yes is the affirmative outcome (WTC = 1) and Not sure/No are combined as WTC = 0. The

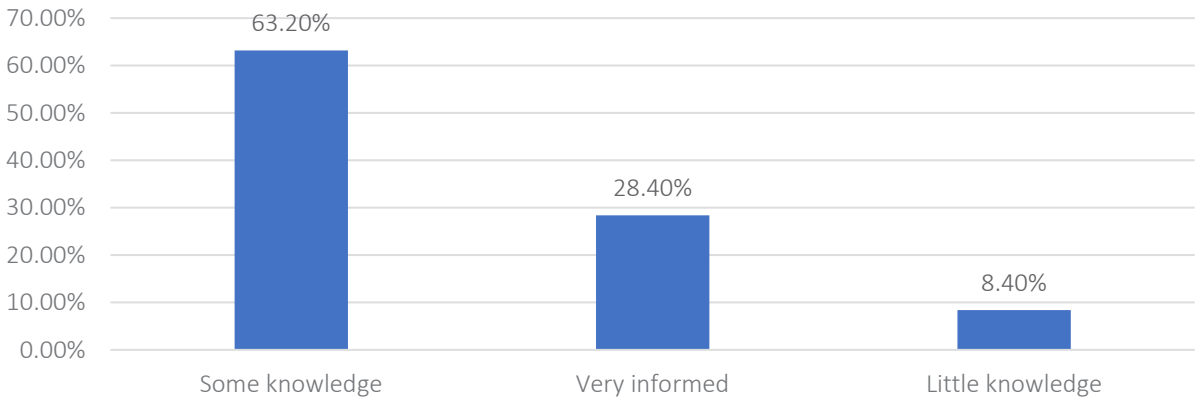


Figure 1. Respondents' self-reported information about natural resource protection

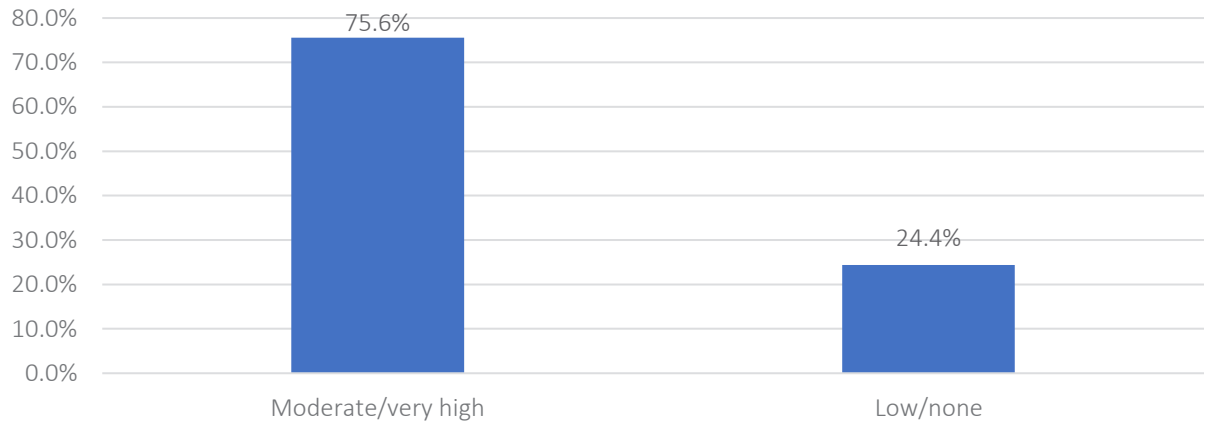


Figure 2. Perceived impact of daily activities on natural resources

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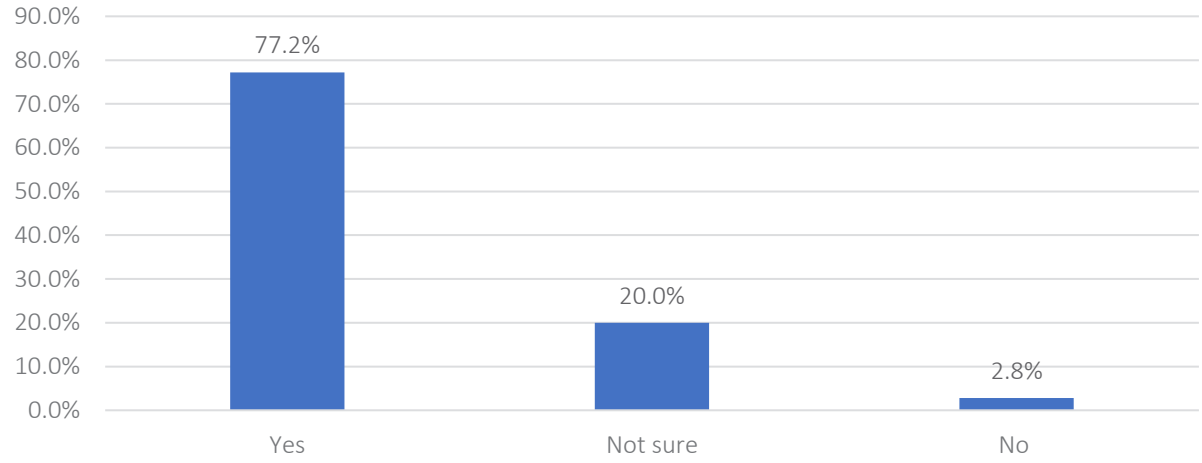


Figure 3. Raw responses to stated willingness to change habits for natural resource protection

resulting 77.2% reflects stated behavioral intention and should not be interpreted as willingness to make a financial payment. Table 3 provides descriptive statistics for the audited analytical variables.

The audited WTC mean is 0.772, corresponding to 193 affirmative responses among 250 respondents. Because the outcome is binary, a Binary Logit model is used to estimate associations with the probability of an affirmative response.

Table 4 reports the re-estimated model with robust inference. The reference groups for the categorical predictors are 18–25 years, university education, income above 100,000 ALL, and some knowledge. Likelihood-ratio tests for the factors show: gender $p = 0.984$, age $p = 0.447$, education $p = 0.113$, income $p = 0.023$, information $p = 0.167$, and UseNR $p < 0.001$. Thus, the previously reported negative age and information coefficients are not robust to corrected categorical coding. Income is jointly associated with WTC, but the category pattern is not monotonic and therefore does not support a simple positive income gradient. The postgraduate coefficient is individually negative, but that category contains only seven respondents and should be interpreted cautiously. Frequency of natural-resource use shows the clearest positive association.

The likelihood-ratio test indicates that the re-specified predictors are jointly informative ($p < 0.001$). McFadden $R2 = 0.129$ indicates modest explanatory power, which is consistent with an exploratory behavioral-intention model and does not imply causal explanation (Table 5).

Table 3. Descriptive statistics

Variable	Mean	Median	Min	Max	Std. dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Sum	Sum Sq. Dev.	Observations
WTC (Y)	0.772	1	0	1	0.420	–1.304	2.699	71.112	< 0.001	193	44.004	250
Female	0.688	1	0	1	0.464	–0.816	1.656	46.185	< 0.001	172	53.664	250
Age score	1.892	1	1	5	1.293	1.215	3.107	60.813	< 0.001	473	416.084	250
Education score	2.760	3	1	4	0.521	–0.912	4.162	47.195	< 0.001	690	67.600	250
Income category score	3.464	4	1	4	0.802	–1.506	4.654	119.940	< 0.001	866	160.176	250
Information score	2.200	2	1	3	0.574	–0.026	2.728	0.905	0.636	550	82.000	250
Use of NR score	4.576	5	1	5	0.907	–2.178	6.871	343.442	< 0.001	1144	205.056	250

Note: Ordered scores in Table 3 are used only to summarize category distributions. Age, education, income, and information are entered as categorical indicators in the main regression. The income score is not interpreted as a monetary amount.

Table 4. Binary logit model

Variable	Coefficient	Robust SE	p-value	Odds ratio (95% CI)	AME
Female (ref: Male)	–0.008	0.406	0.985	0.992 (0.448–2.199)	–0.001
Age 26–35	0.946	0.615	0.124	2.575 (0.772–8.592)	0.121
Age 36–45	0.337	0.577	0.559	1.401 (0.452–4.340)	0.047
Age 46–60	–0.215	0.619	0.729	0.807 (0.240–2.714)	–0.033
Age > 60	0.101	0.578	0.861	1.106 (0.357–3.433)	0.015
Primary/secondary education	–0.699	0.499	0.161	0.497 (0.187–1.322)	–0.113
Postgraduate education	–1.816	0.739	0.014	0.163 (0.038–0.693)	–0.351
Income ≤ 70,000 ALL	0.964	0.698	0.167	2.623 (0.669–10.293)	0.120
Income 70,000-100,000 ALL	–0.720	0.354	0.042	0.487 (0.243–0.973)	–0.116
Little knowledge	1.046	0.627	0.095	2.848 (0.834–9.723)	0.126
Very informed	–0.376	0.397	0.345	0.687 (0.315–1.497)	–0.058
Use of NR score (1-5)	0.880	0.227	< 0.001	2.412 (1.546–3.761)	0.132
Constant	–2.442	1.066	0.022	0.087 (0.011–0.702)	–

Table 5. Model statistics

Indicator	Value
McFadden R^2	0.129
Log likelihood	–116.833
LR statistic	34.759
Prob (LR statistic)	0.0005***

Table 6. Hosmer-Lemeshow goodness-of-fit test

Quantile of Risk	Dep = 0 Actual	Dep = 0 Expected	Dep = 1 Actual	Dep = 1 Expected	Observations	H-L Value
1	18	15.472	7	9.528	25	1.084
2	6	9.147	19	15.853	25	1.708
3	4	6.795	21	18.205	25	1.579
4	7	5.928	18	19.072	25	0.254
5	6	5.050	19	19.950	25	0.224
6	5	4.238	20	20.762	25	0.165
7	4	3.464	21	21.536	25	0.096
8	5	3.104	20	21.896	25	1.323
9	2	2.611	23	22.389	25	0.160
10	0	1.192	25	23.808	25	1.252

After recoding and model respecification, the Hosmer–Lemeshow statistic is 7.845 with 8 degrees of freedom (p = 0.449). The null hypothesis of adequate calibration is not rejected. Table 6 also corrects the earlier reporting error: each risk decile contains its actual N = 25 observations rather than N = 250.

Table 7 reports Spearman correlations using the audited ordinal category codes. The previously re-

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Table 7. Correlation matrix

Variable	WTC	Female	Age	Education	Income	Information	Use of NR
WTC	1.000	–0.037	–0.060	0.006	0.034	–0.022	0.276
Female	–0.037	1.000	0.063	0.046	–0.126	–0.110	0.033
Age	–0.060	0.063	1.000	–0.340	0.099	–0.131	0.023
Education	0.006	0.046	–0.340	1.000	0.170	0.178	0.056
Income	0.034	–0.126	0.099	0.170	1.000	–0.093	–0.075
Information	–0.022	–0.110	–0.131	0.178	–0.093	1.000	0.187
Use of NR	0.276	0.033	0.023	0.056	–0.075	0.187	1.000

ported education–WTC correlation of 0.320 is not reproduced: the audited Spearman correlation is ρ = 0.006 (p = 0.925). This confirms that the earlier apparent bivariate education relationship resulted from inconsistent coding rather than from a relationship that disappeared only after multivariable adjustment.

Table 8. Multicollinearity diagnostics for the re-specified model

Predictor	VIF	Tolerance
Female	1.198	0.835
Age 26–35	1.400	0.715
Age 36–45	1.281	0.781
Age 46–60	1.272	0.786
Age >60	1.290	0.775
Primary/secondary education	1.558	0.642
Postgraduate education	1.209	0.827
Income ≤ 70,000 ALL	1.248	0.802
Income 70,000-100,000 ALL	1.169	0.855
Little knowledge	1.241	0.806
Very informed	1.207	0.829
Use of NR score	1.120	0.893

VIF values range from 1.12 to 1.56, and tolerance values range from 0.642 to 0.893, indicating no problematic multicollinearity in the re-specified model (Table 8).

Nested education checks also change after the audit. Education is not significant in an education-only categorical model (LR p = 0.384), remains non-significant after adding income (LR p = 0.468), and is not jointly significant in the full model (LR p = 0.113). A nonlinear-age sensitivity specification using an ordered age score and its squared term provides no evidence of curvature (age^2 p = 0.246). A probit model produces the same main conclusion that age and information are not significant, while frequency of natural-resource use remains strongly associated with WTC. A fully categorical UseNR sensitivity model likewise shows lower odds for less-frequent users relative to daily users.

Hypothesis testing based on the full model indicates that H1 (gender; LR p = 0.984), H2 (age; LR p = 0.447), H3 (education; LR p = 0.113), and H5 (information; LR p = 0.167) are not supported. H4 is not supported in its hypothesized positive direction: income categories are jointly significant (LR p = 0.023), but the association is non-monotonic. H6 is supported, as natural-resource-use frequency has a positive coefficient (β = 0.880; p < 0.001). These tests concern associations with stated intention and do not establish causality.

4. DISCUSSION

The re-analysis materially changes the interpretation of the study. After the raw categories are reconciled with the questionnaire and age, education, income, and information are modeled categorically, frequency of natural-resource use is the most consistent positive correlate of stated willingness to change habits. This result is compatible with the idea that repeated interaction with natural resources can increase the salience of environmental conditions and the perceived relevance of conservation. It should nevertheless be interpreted as an association, not as evidence that frequent use causes pro-environmental intention.

Following verification of the coding against the archived questionnaire and raw dataset by the co-author responsible for statistical validation, *H1* is not supported because gender is not associated with WTC. *H2* is not supported because age is not jointly significant and there is no monotonic negative pattern. *H3* is not supported because education is not jointly significant. *H4* is not supported in its directional form: income categories are jointly significant, but the pattern is non-monotonic rather than consistently positive. *H5* is not supported because information is not jointly significant and the previously reported negative co-

efficient is not robust. *H6* is supported because more frequent natural-resource use is positively associated with WTC in the main and sensitivity specifications.

Income is jointly associated with WTC, but the relationship is not a simple positive gradient. Respondents in the 70,000–100,000 ALL category have lower odds than those above 100,000 ALL, while the combined ≤ 70,000 ALL group is not significantly different from the reference group. This non-monotonic pattern does not support *H4* as originally formulated. It also demonstrates why the open-ended category above 100,000 ALL should not be converted into an arbitrary continuous amount. Monetary WTP studies in Albania and neighboring settings have sometimes found positive income associations (Grazhdani, 2015; Doli et al., 2021), but those studies use explicit payment outcomes and are not directly comparable with the present behavioral-intention measure.

The earlier negative age and information coefficients do not survive the coding audit. Age is not jointly significant, the nonlinear age term is not significant, and no stable monotonic age pattern is evident. Information is also not jointly significant once its actual three categories are represented by indicators. In particular, the prior conclusion that greater information was negatively associated with willingness should be withdrawn. This finding is consistent with the broader literature showing that environmental knowledge alone does not guarantee action and that contextual barriers, perceived efficacy, norms, and opportunities matter (Kollmuss & Agyeman, 2002; Bamberg & Möser, 2007; Steg & Vlek, 2009).

Education is not significantly associated with WTC as a factor after the audit, and the earlier positive bivariate relationship is not reproduced. The individually negative postgraduate coefficient is based on only seven respondents and should not be generalized. Gender is likewise not significant. These results reinforce the need to avoid causal or deterministic language and to recognize that socio-demographic variables often show heterogeneous associations with pro-environmental concern and behavior across settings (Gifford & Nilsson, 2014).

The dependent construct is also subject to measurement limitations. WTC is based on a single self-reported item and measures intention rather than observed behavioral change. Respondents may provide socially desirable answers, especially for normatively valued environmental behavior, and the item does not specify which habit, its cost, difficulty, timing, or expected environmental benefit. Reviews of pro-environmental measurement emphasize the importance of distinguishing intentions, self-reports, and actual behavior (Lange & Dewitte, 2019). The results are therefore best viewed as exploratory evidence on stated readiness to change habits rather than as a direct measure of realized conservation behavior.

The study contributes by documenting how an explicit audit and categorical respecification alter the substantive conclusions. It does not estimate the monetary value of environmental goods and cannot be used to set a fee, tax, or conservation payment. A future contingent valuation study would require a defined environmental program, a credible payment vehicle, bid amounts, and appropriate treatment of protest or uncertain responses (Mitchell & Carson, 1989; Carson, 2000; Bateman et al., 2002). Future behavioral research should also use multi-item intention measures, observed or repeated behaviors where possible, probability-based sampling, and recorded geographic and recruitment information.

CONCLUSION

This study examined socio-demographic and economic associations with stated willingness to change habits for natural resource protection in a voluntary Albanian survey sample. The data audit established that Item 15 contained three response categories, not two: 77.2% answered Yes, 20.0% Not sure, and 2.8% No. For the Binary Logit analysis, Yes was coded as an affirmative response and the two non-affirmative categories were combined. Re-estimation with categorical specifications shows that natural-resource use frequency is positively associated with willingness to contribute, while income categories

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are jointly associated but do not follow a monotonic positive gradient. Gender, age, education, and information are not jointly significant. The previously reported negative age and information associations are therefore withdrawn.

The policy relevance of the findings lies in behavioral engagement rather than monetary valuation. Conservation strategies may benefit from making environmentally preferable actions practical and visible, particularly for groups with different patterns of resource use. Because information alone is not significantly associated with willingness to contribute in the audited model, communication initiatives should be combined with feasible behavioral options, feedback, and supportive local conditions rather than assuming that awareness by itself will generate action. No conclusion about appropriate environmental fees can be drawn from this survey.

Several limitations remain. The non-probability sample is not nationally representative and is strongly concentrated among young, female, and university-educated respondents. Region, urban/rural residence, recruitment channel, and the numbers approached or excluded are not retained in the archived analytical file, so these distributions and recruitment-flow indicators cannot be reconstructed. Willingness to contribute is a single, unspecified self-reported behavioral-intention item and may be affected by social desirability; it does not measure actual behavior. Sparse cells required combining adjacent education and income categories for stable conventional maximum-likelihood estimation. The cross-sectional design precludes causal inference. These limitations should be addressed in future studies through probability-based or well-documented quota sampling, complete recruitment logs, multi-item behavioral-intention measures, observed behavior where feasible, and prespecified categorical coding.

AUTHOR CONTRIBUTIONS

Conceptualization: Silvana Nakuci.
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Funding acquisition: Alban Jaupi.
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Methodology: Silvana Nakuci.
Project administration: Alban Jaupi.
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Software: Alerta Basha.
Supervision: Alban Jaupi.
Validation: Alerta Basha.
Visualization: Silvana Nakuci.
Writing – original draft: Silvana Nakuci.
Writing – review & editing: Silvana Nakuci, Alban Jaupi, Alerta Basha.

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DATA AVAILABILITY

All relevant materials are available from the corresponding author upon reasonable request.

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APPENDIX A

The following items reproduce the questionnaire content represented in the audited raw dataset. Response labels are translated into English and spelling/capitalization variants in the raw file were normalized without changing substantive categories. Item 15 is the sole item used to construct WTC and contains three response options. No item asks for a financial payment or monetary contribution.

Table A1. Questionnaire items

Characteristic	Item
Gender	Female Male
Age	18–25 26–35 36–45 46–60 Over 60
Education	Primary Secondary University Postgraduate
Number of household members	2 3 4 5 More than 5
Monthly household income	40,000 ALL 40,000–50,000 ALL 50,000–70,000 ALL 70,000–100,000 ALL Above 100,000 ALL
How often do you use natural resources (e.g., water, forests, land) in your daily life?	Never Rarely Monthly Weekly Daily
How informed are you about the importance of conserving natural resources?	Very informed Some knowledge Little knowledge Not informed at all
The response options "2 members," "40,000 ALL," and "Not informed at all" received zero responses and therefore do not appear as observed categories in the analytical dataset.	
To what extent do you think your daily activities affect the use of natural resources?	Not at all Very little Little Moderate Very high
Have you ever taken measures to reduce your environmental impact (e.g., recycling, saving energy, or using renewable resources)?	Yes, very often Yes, occasionally Not very often Never
In the archived dataset, the responses to Item 9 were retained in aggregated Yes/No form.	
How often do you use natural resources for recreational purposes, such as nature walks, fishing, or camping?	Never Rarely Occasionally Very often
Which natural resources do you consider most at risk in your area?	Water Forests Agricultural land Air Minerals
Do you think the use of natural resources is sustainable in your community?	Yes No

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Table A1 (cont.). Questionnaire items

Characteristic	Item
What measures do you think should be taken to protect natural resources?	Education and awareness Stricter laws/regulations Better management practices Clean technologies
Who do you think has the greatest responsibility for protecting natural resources?	Local residents Municipality Environmental organizations Central government
Are you willing to change some of your habits in order to protect natural resources? Main-model coding: Yes = 1; No/Not sure = 0	Yes No Not sure
In your opinion, what are the main future challenges related to the use and management of natural resources?	Climate change Pollution/environmental degradation Unequal distribution of resources Lack of investment in technology
To what extent do natural resources affect your quality of life?	Little Moderate Very much