



Moldovan Environmental Governance Academy

**PLAYING FOR IMPACT**

# Implementing Organization



## Moldovan Environmental Governance Academy (MEGA):

Social entrepreneurial organization focused on delivering services of gamification with environmental and social value.

## MEGA Game: The Game with Impact:

The core product of MEGA; a web platform with elements of gamification that connects individuals with Green Tech companies & environmental organizations.



# Problem Addressed

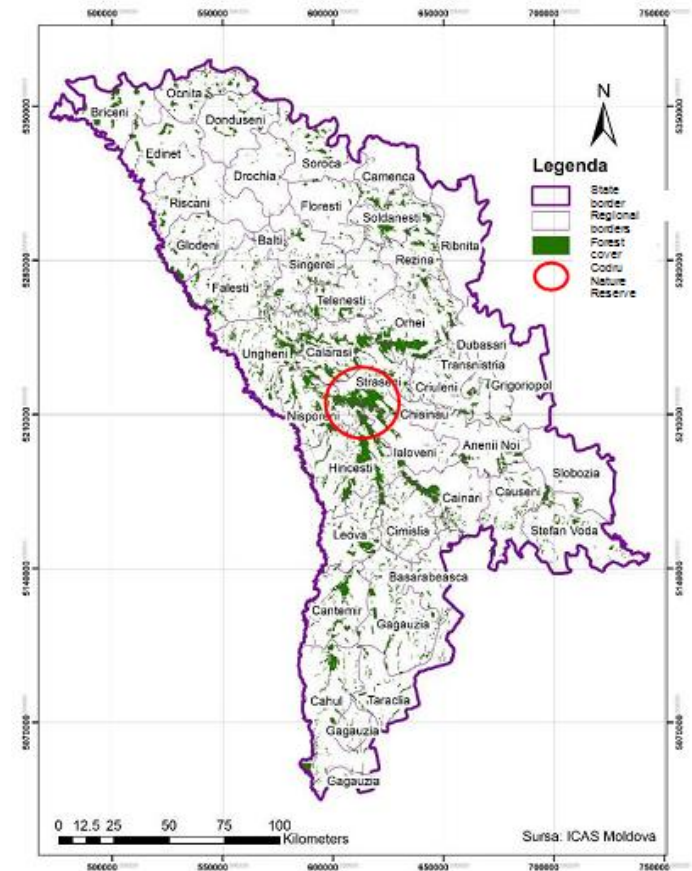
## Problem:

Degradation of the Codru forest and other forest ecosystems in the Republic of Moldova and their biodiversity.

## Targeted cause:

Lack of awareness about indirect use and non-use values of forest ecosystems for society and their undervaluation in land use planning and policy making.

Remaining forest cover in Moldova (~11%) ->



# Study Area



## Codru Nature Reserve:

- Oldest protected area in Moldova
- Located in Straseneni, Hincesti, and Ialoveni
- Administered by state agency Moldsilva
- Covers 5175.8 ha of the Codru forest



## Codru forest:

- Dominantly oak forest
- 1 000 protected species of plants
- 8 000 protected species of insects
- Habitat of 2 targeted endangered species



# Targeted Endangered Species



Small-flowered black hawthorn  
(*Crataegus pentagyna*)



Stag beetle  
(*Lucanus cervus*)

# Threats to the Codru Forest



Prioritization of direct use resources of the forest ecosystem



State-level corruption



Insufficient financial resources and rangers



Illegal logging and deforestation



Illegal collection of endangered plant species



Poaching and biodiversity loss



Disturbance by human interventions



Waste pollution



# Goal and Objectives

## Goal:

Estimate and present the indirect use and non-use economic values of ecosystem services and biodiversity conservation in the Codru Nature Reserve and the Codru forest in the Republic of Moldova.

## Objectives:



1. Estimate economic valuation data for ecosystem services


















2. Prepare and present the results to key stakeholders



3. Organize educational and nature conservation activities



# Methodology

	Scenario 0	Scenario 1	Scenario 2
Total territory of the Codru Nature Reserve	 5175 ha	 5425 ha (+250 ha)	 5300 ha (+125 ha)
Number of species of plants conserved	 1000 species	 1100 species (+100 species)	 1050 species (+50 species)
Number of species of insects conserved	 8000 species	 8500 species (+500 species)	 9000 species (+1000 species)
Presence of hawthorn and stag beetle (representatives observed during a visit)	 2 representatives	 6 representatives	 4 representatives
Price to visit the Codru Nature Reserve and forest, MDL/pers.	 0 MDL	 90 MDL	 120 MDL

Example of a choice set from the CM survey offered to respondents

## Stated preference (SP) methodology:

- Based on interviews and surveys
- Asks respondents for willingness to pay for environmental good / service
- Can elicit non-use values of ecosystem services

## Choice modelling (CM) technique:

- One of the SP methods
- Offers respondents to choose the most preferred alternative scenario or status quo with changing characteristics of the good / service



# Surveying Methods

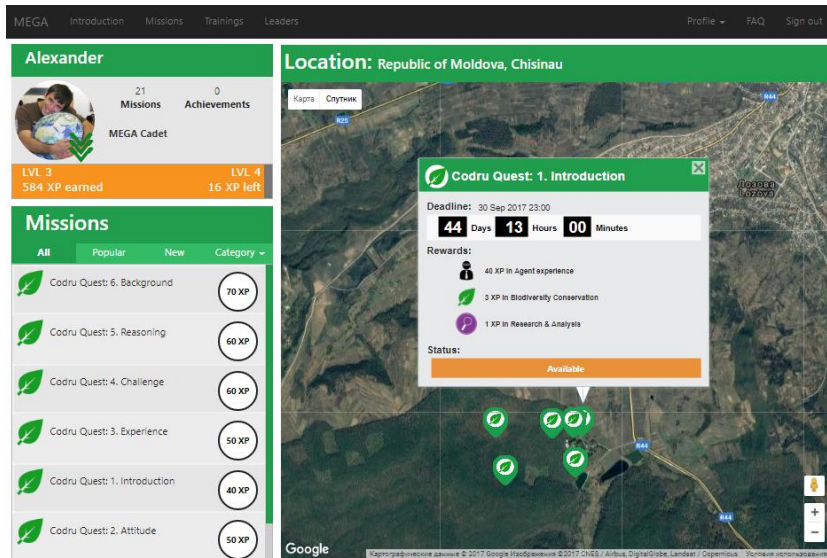


1. On-line survey delivered to 100 respondents from the capital city Chisinau

2. Computer-assisted personal interviews administered among 101 respondents from 9 villages

3. Experiment with using gamification for surveying 100 respondents via MEGA Game

# Surveying Methods



Screenshot from the MEGA Game platform showing the Codru Quest missions

## Gamification:

- Concept of applying game design and mechanics to a non-game context
- Aimed to increase motivation, engagement, and contribution of the target audience to a certain cause

## Gamification in surveying:

- Lottery with virtual currency and web shop
- On-line gamification as a quest with missions in MEGA Game

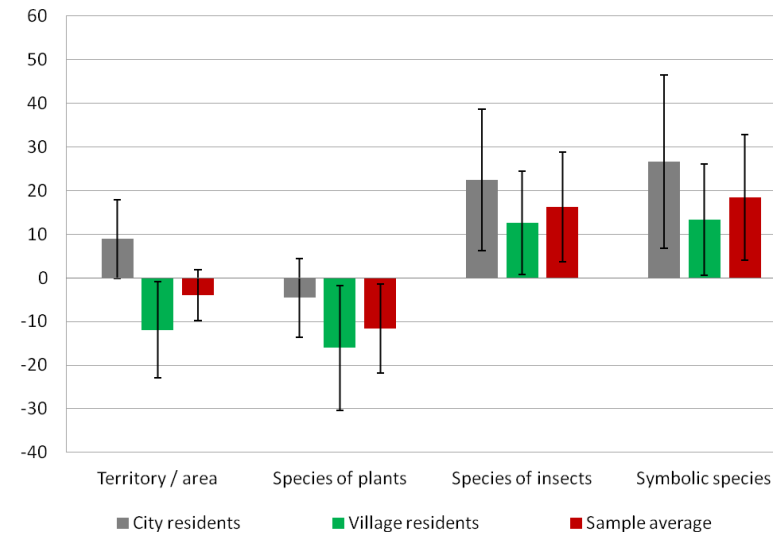
# Data Analysis

## Final population sample size:

- Among 201 responses, 94 had to be removed as non-valid
- Final sample size analyzed: 107 respondents

## Econometric model used:

- Mixed logit model
- Statistical model for examining discrete choices
- Estimates aggregated to 3 500 visitors to the Codru Nature Reserve per year



Estimated willingness-to-pay values  
from the mixed logit model

# Challenges and Constraints



Very small sample size and  
surveying challenges



Data analysis issues and lack of  
benefit transfer equation



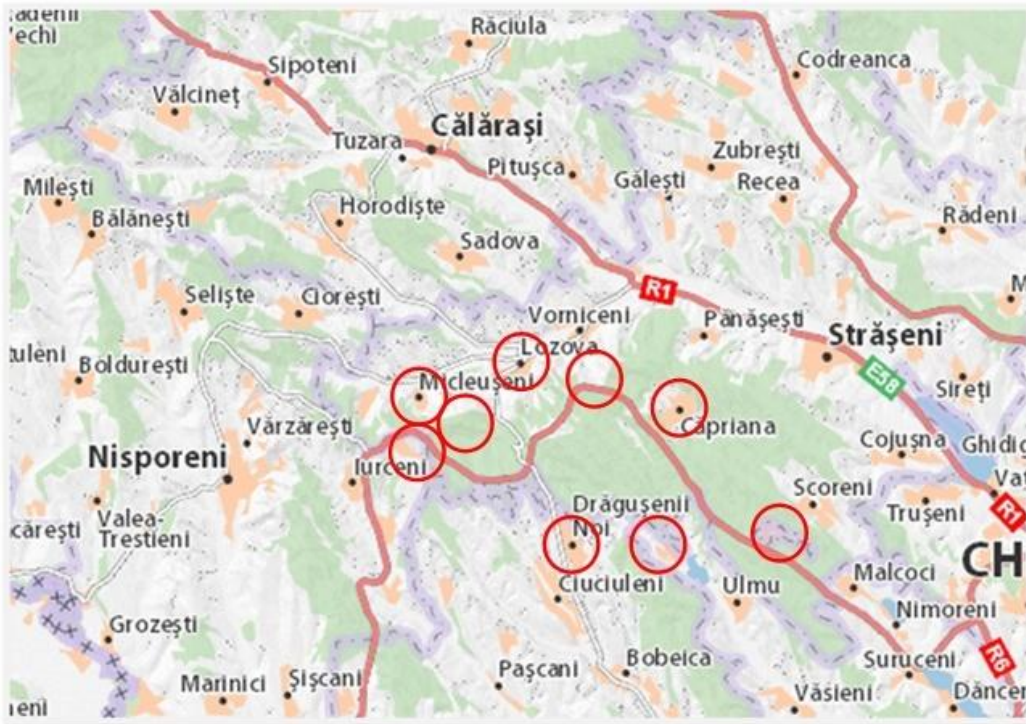
Time constraint of only  
10 months



Budget limitation of only  
8 000 EUR



# Population Sample



9 villages around the Codru forest, where the respondents come from

**Sample size:**

**201** respondents from:

- Chisinau
- Lozova
- Stejareni
- Capriana
- Micleușeni
- Huzun
- Horodca
- Bursuc
- Dragusenii Noi
- Condrita

# Respondents' Profile



Average age:  
20 – 30 years



Dominant gender:  
women



Prevailing education level:  
High school or Bachelor degree



Prevailing income level:  
3 000 MDL (140 EUR) per month

# Respondents' Use of the Forest

## Average distance to the Codru forest:

- 1 – 5 km

## Average frequency of visits:

- 1 – 5 visits per person per year

## Average duration of a visit:

- 2 – 3 hours

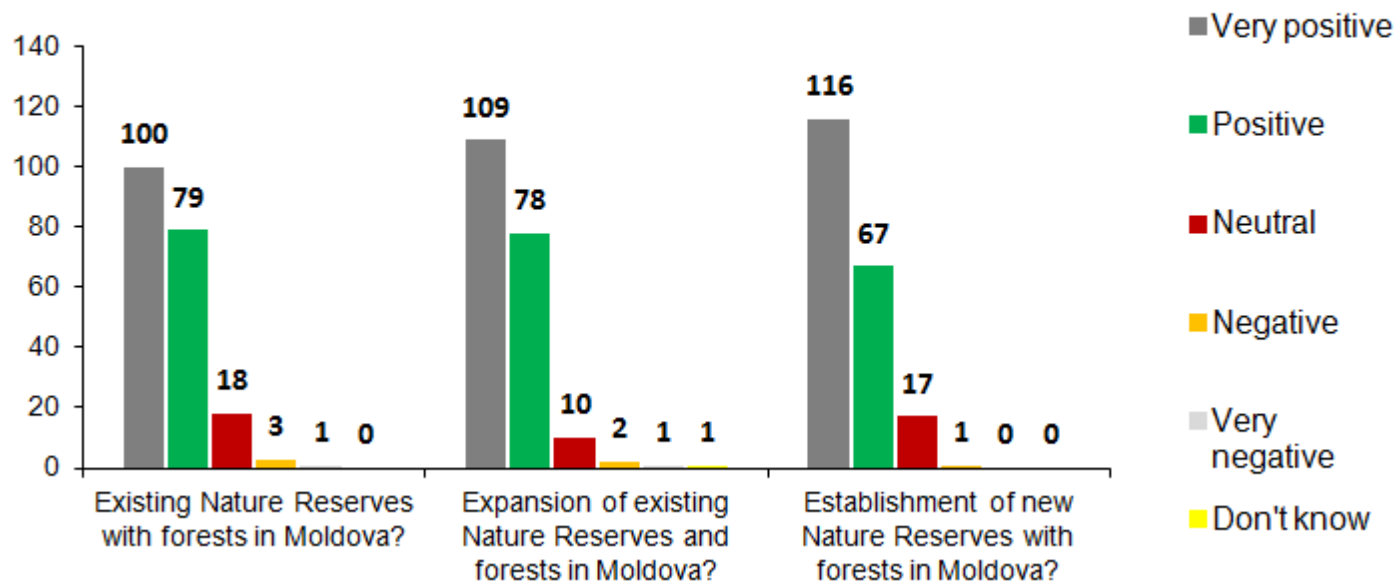
## Main uses of the Codru forest:

- Recreation (walking, picnics)
- Collection of non-timber products



# Respondents' Attitude

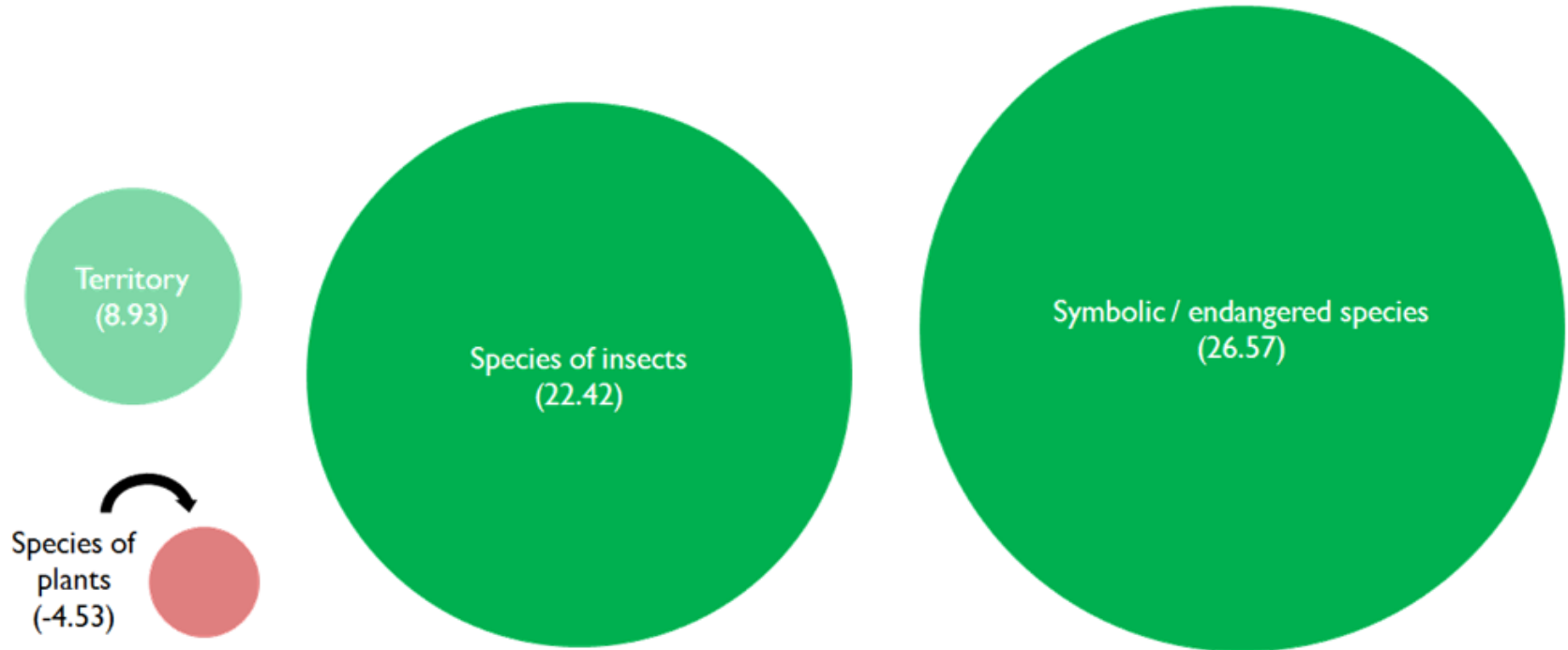
Summary of answers to the question "What is your attitude towards:"





# Values of Ecosystem Services

Mean willingness-to-pay of city residents, MDL



Legend: size – WTP magnitude, colour – sign (**positive** and **negative**), transparency – significance

# Values of Ecosystem Services

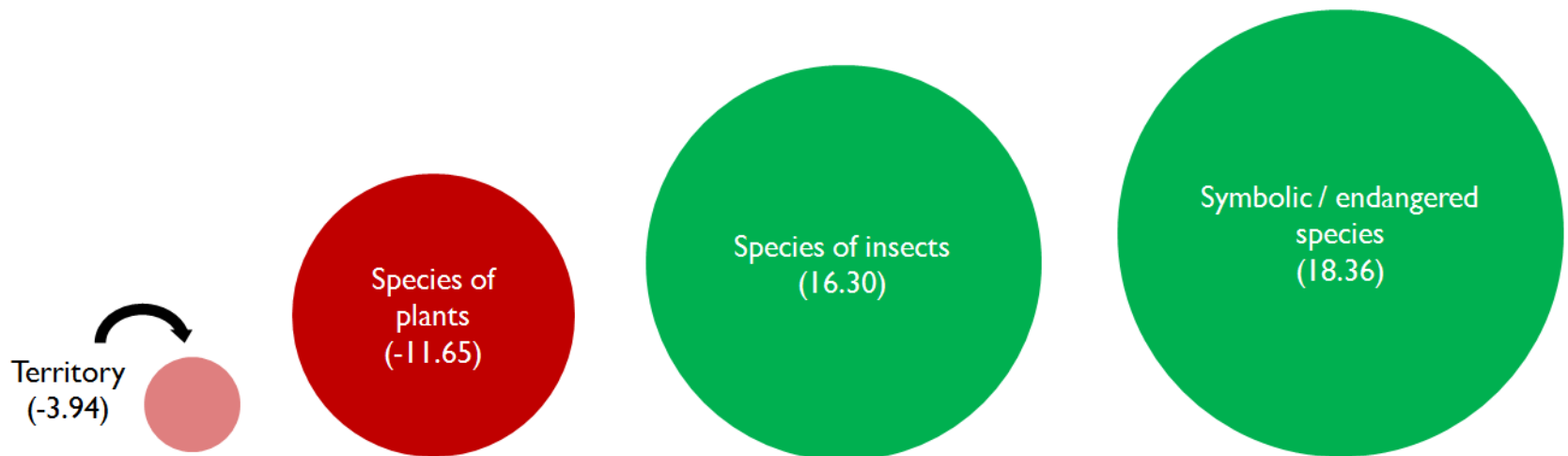
Mean willingness-to-pay of village residents, MDL



Legend: size – WTP magnitude, colour – sign (**positive** and **negative**), transparency – significance

# Values of Ecosystem Services

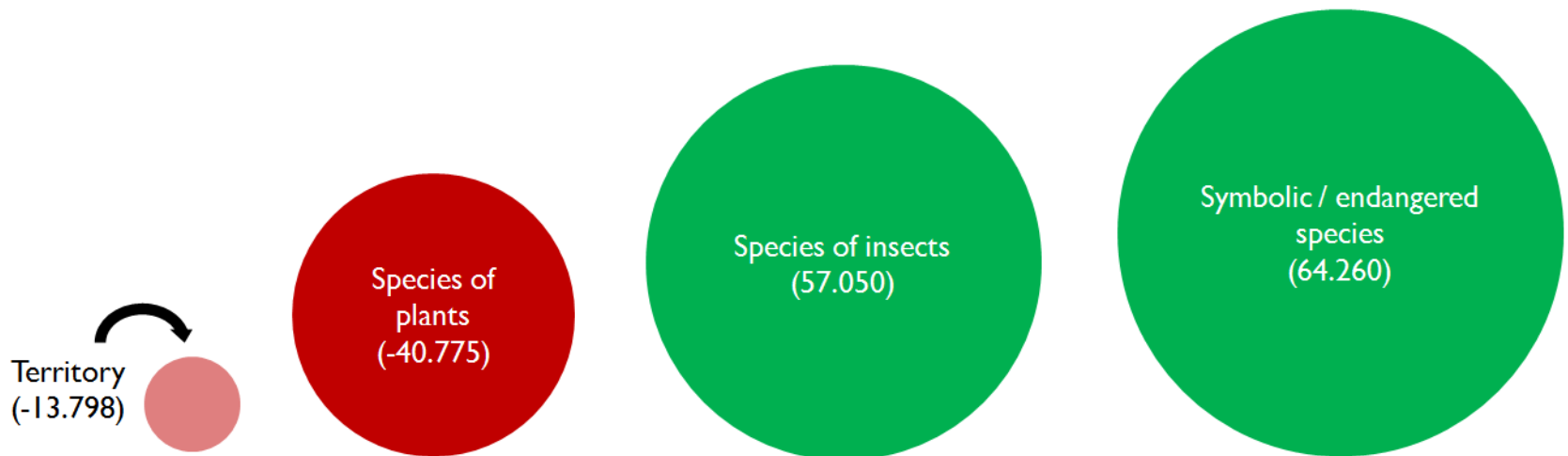
Mean willingness-to-pay of sample average, MDL



Legend: size – WTP magnitude, colour – sign (**positive** and **negative**), transparency – significance

# Values of Ecosystem Services

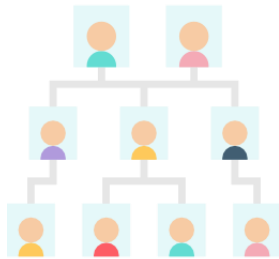
Mean willingness-to-pay of aggregated sample average, MDL



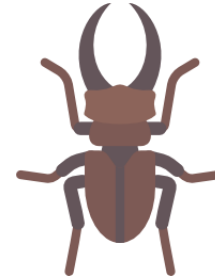
Legend: size – WTP magnitude, colour – sign (**positive** and **negative**), transparency – significance



# Reasons for Willingness-to-pay



Bequest value: preservation of nature for future generations



Loss aversion: preservation of endangered species



Existence value: pleasure of knowing that the forest exists



Use values: personal use of the forest for recreation

# Recommendations



**Local communities and citizens concerned about the Codru forest**

- Use the results to raise awareness and claim participation in decision-making regarding the forest



**Administration of the Codru Nature Reserve and other protected areas in Moldova**

- Account for values of ecosystem services in forest management plans
- Work together with local communities and frequent visitors
- Use WTP values to establish payment for ecosystem services scheme

# Recommendations



## Environmental organizations (NGOs)

- Include values of ecosystem services into raising awareness and educational initiatives
- Approach and collaborate with local communities in tree planting and nature conservation activities



## Ministry of Environment and policy makers

- Use WTP values as objective economic input to decision- and policy-making
- Consider attitudes and preferences of citizens and local communities in nature conservation

# Acknowledgements

## Partners and sponsors:

- [The Rufford Foundation](#)
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- [The German Federal Agency for Nature Conservation \(BfN\)](#)
- [Spark Research Labs](#)
- [The Codru Nature Reserve administration](#)

## Contributors:

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# On-line Resources

- [Official website of the Codru Quest](#)
- [On-line survey “The Codru Quest: Your Choice”](#)
- [Preliminary results “The Codru Quest. Phase I Results”](#)
- [Final dataset with the respondents’ answers and WTP data](#)
- [Final dataset with the respondents’ socio-economic data](#)
- [Final WTP data processed with the R software](#)
- [Methodological guidebook “The Codru Quest: Methodology”](#)
- [Final report with the results “The Codru Quest: Final Report”](#)

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