



Promoting research excellence in nature-based solutions for innovation, sustainable economic growth and human well-being in Malta.

Non-material ecosystem benefits
of Protected Areas
as a bridge to
future challenges
in
Sustainable development



Images: Guru Technologies, 2019; © iStockPhoto / Dena Steiner, 2018; IUCN, 2019

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Il-Majjistral NP

Photo: © Il-Majjistral (2011-2020)



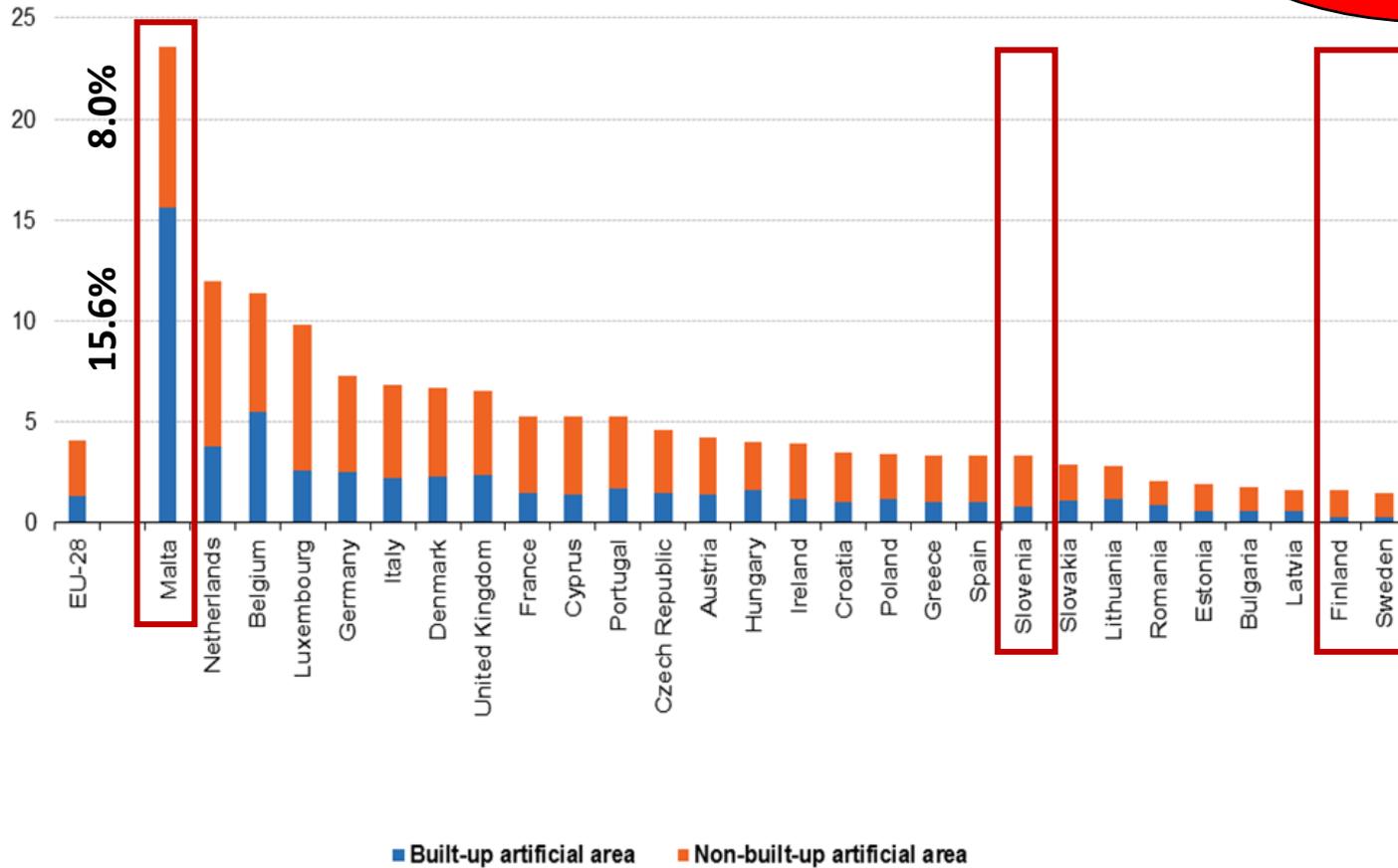
Il-Majjistral NP



1,548.3/km²
(Eurostat, 2020)

Photo: @sb.farhad.81

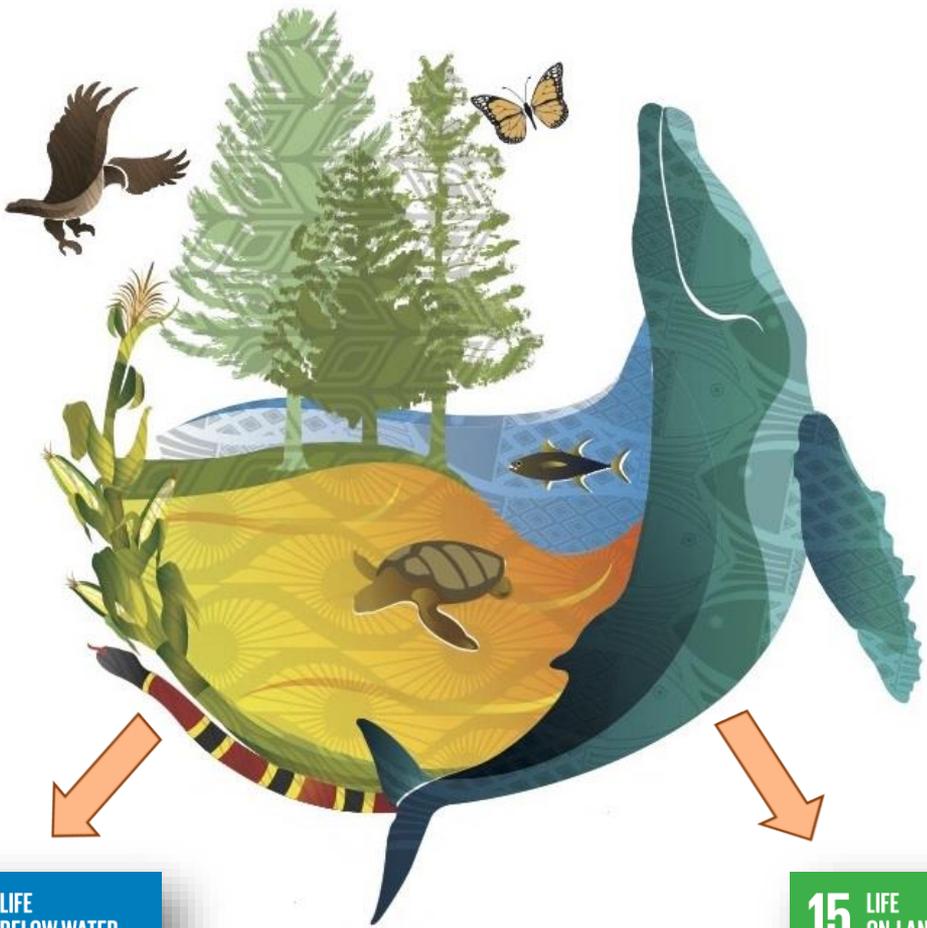
Photo: © Il-Majjistral (2011-2020)



PA's helping to meet the SDGs



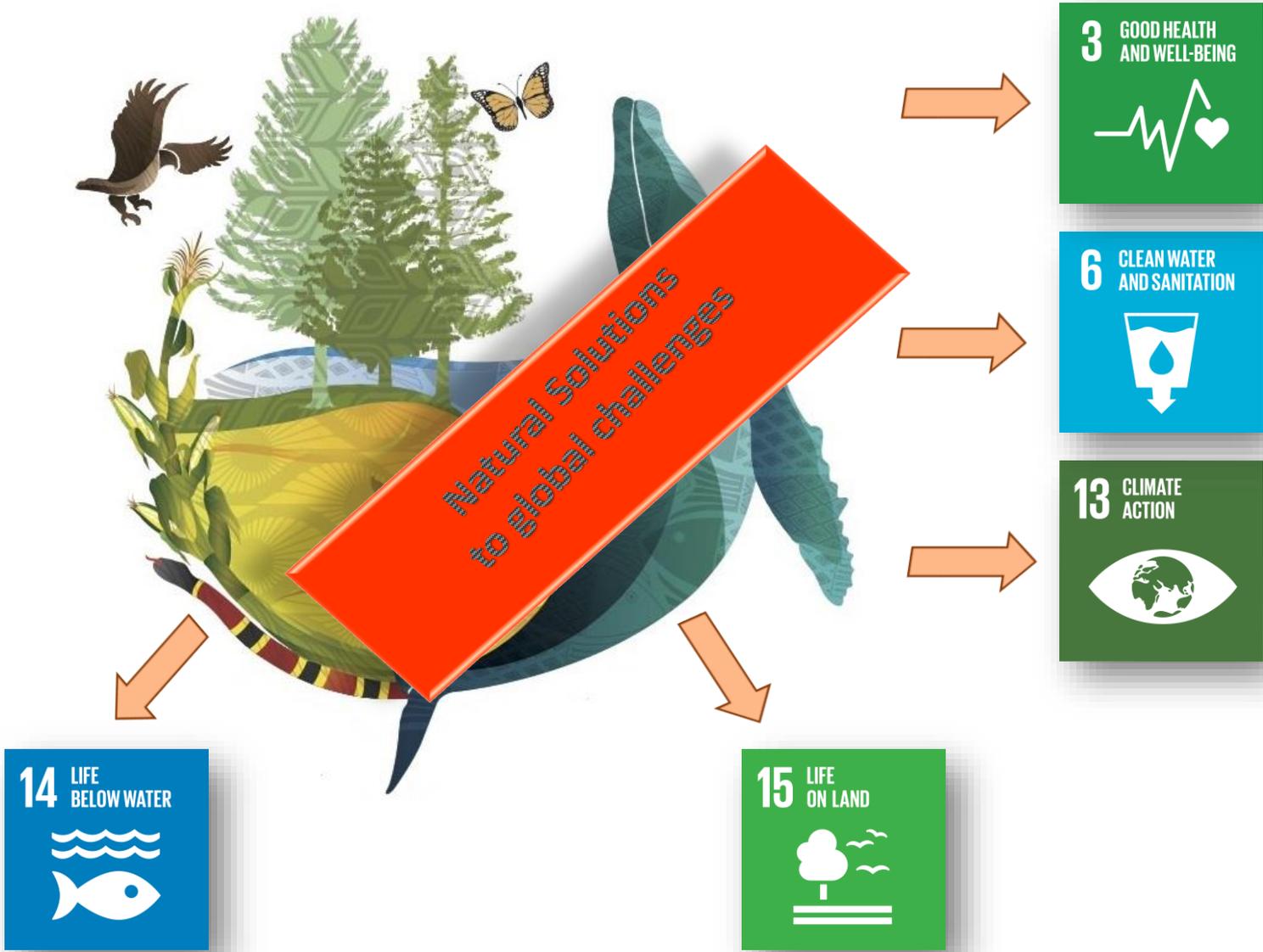
PA's & SDGs



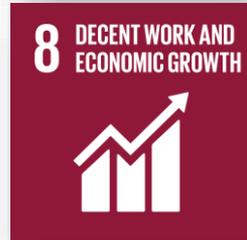
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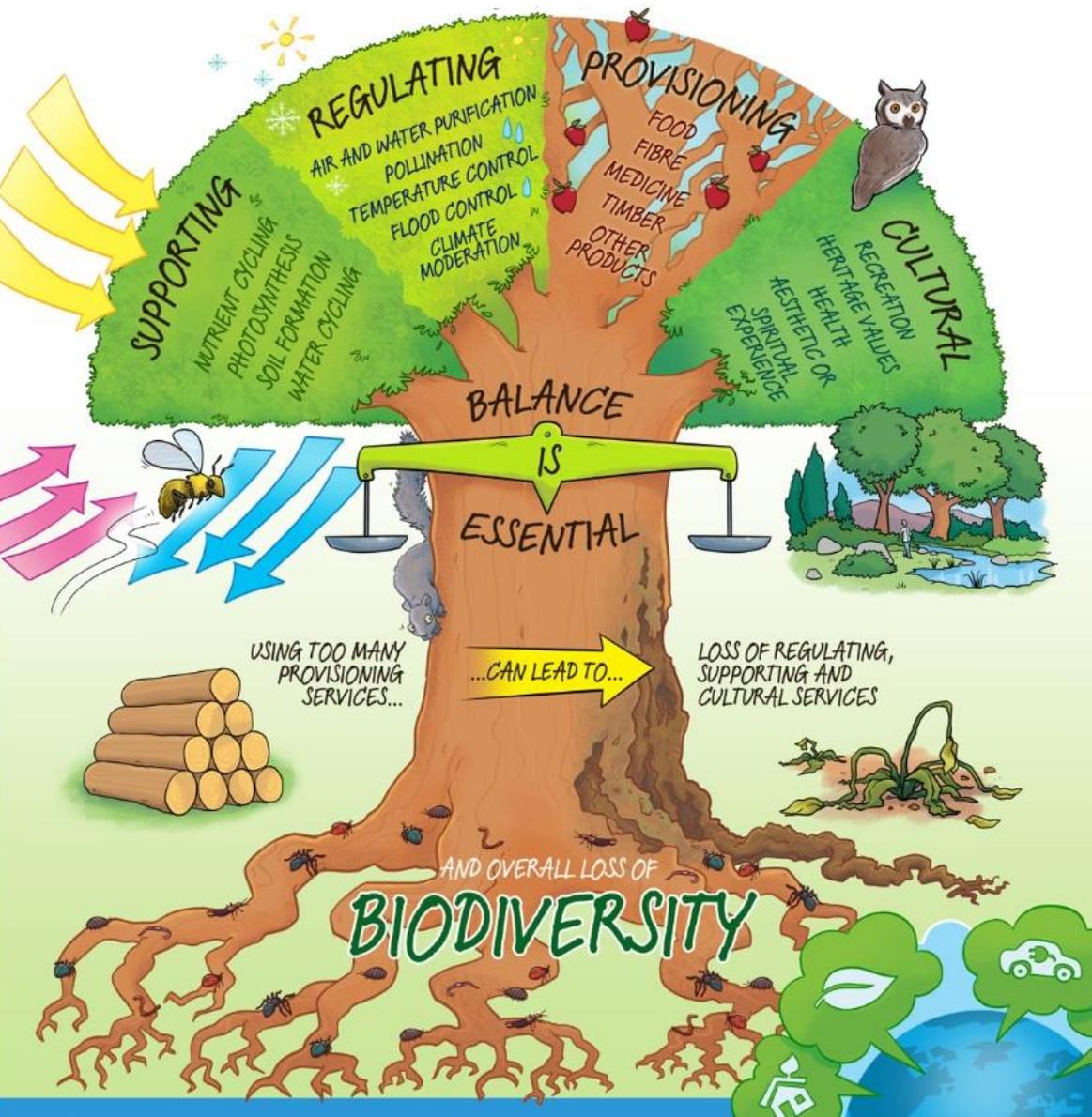
PAAs & SDGs



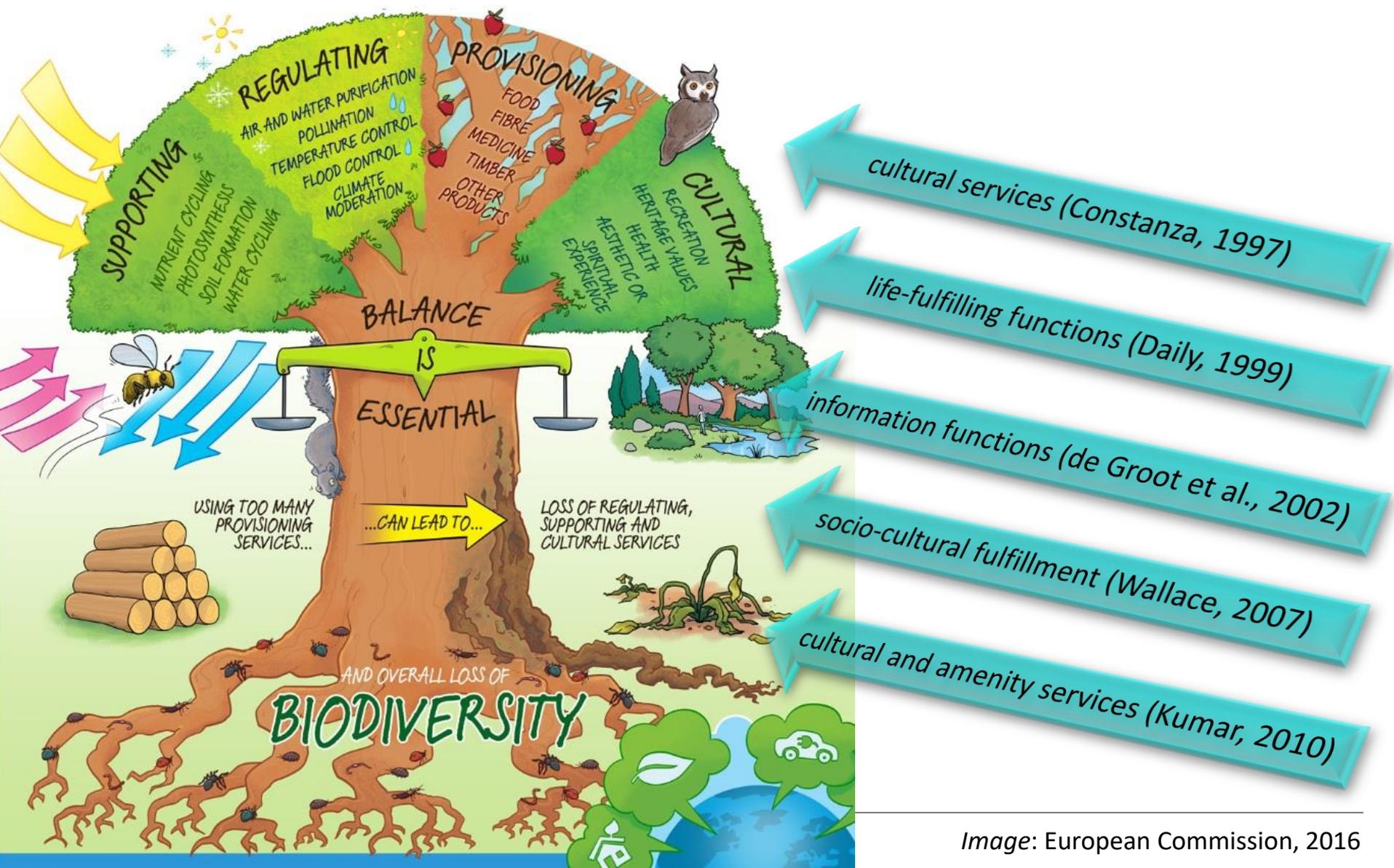
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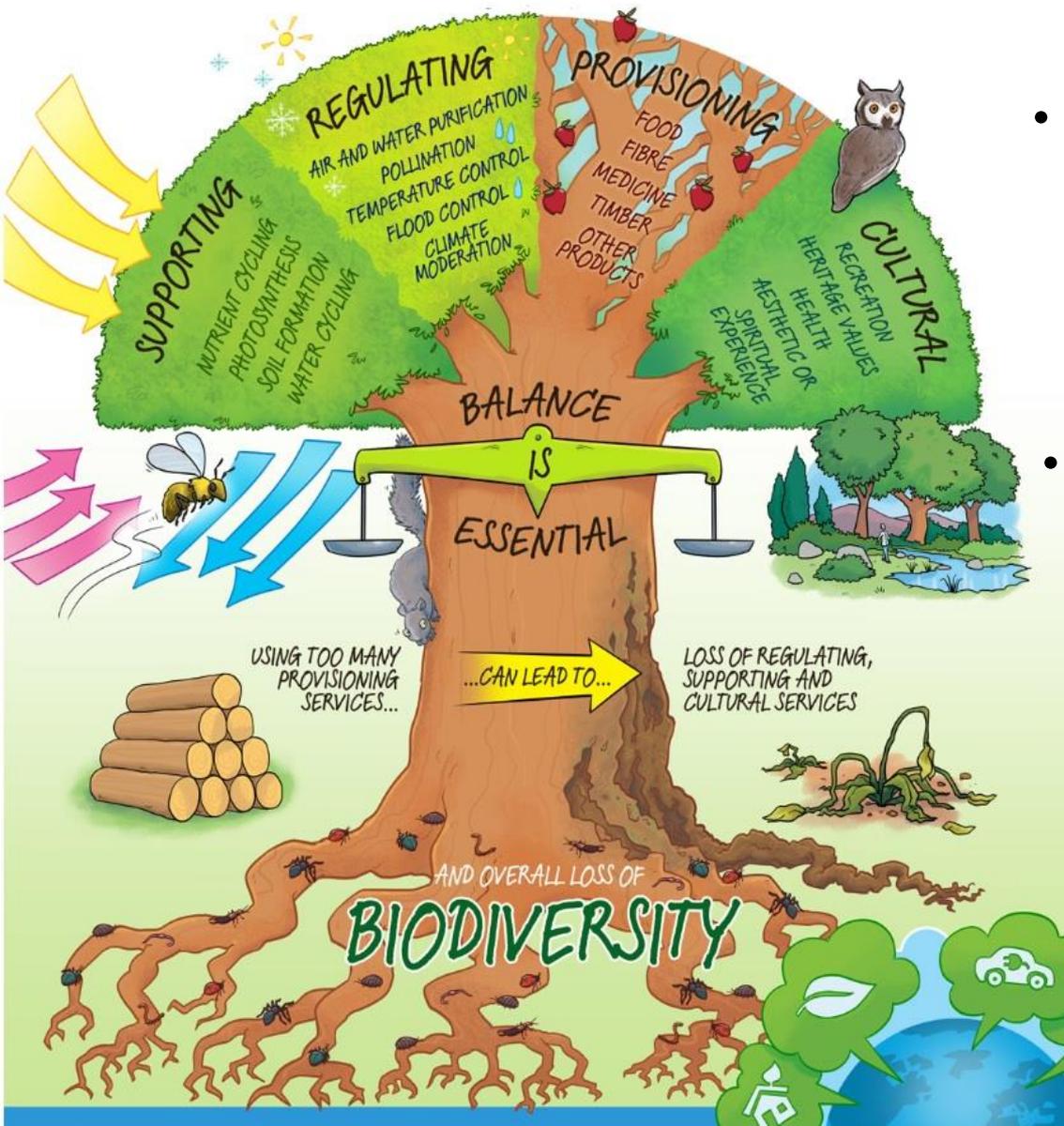
PAs in Today's World: Their Value & Benefits for the Welfare of Humanity



PA's in Today's World: Their Value & Benefits for the Welfare of Humanity

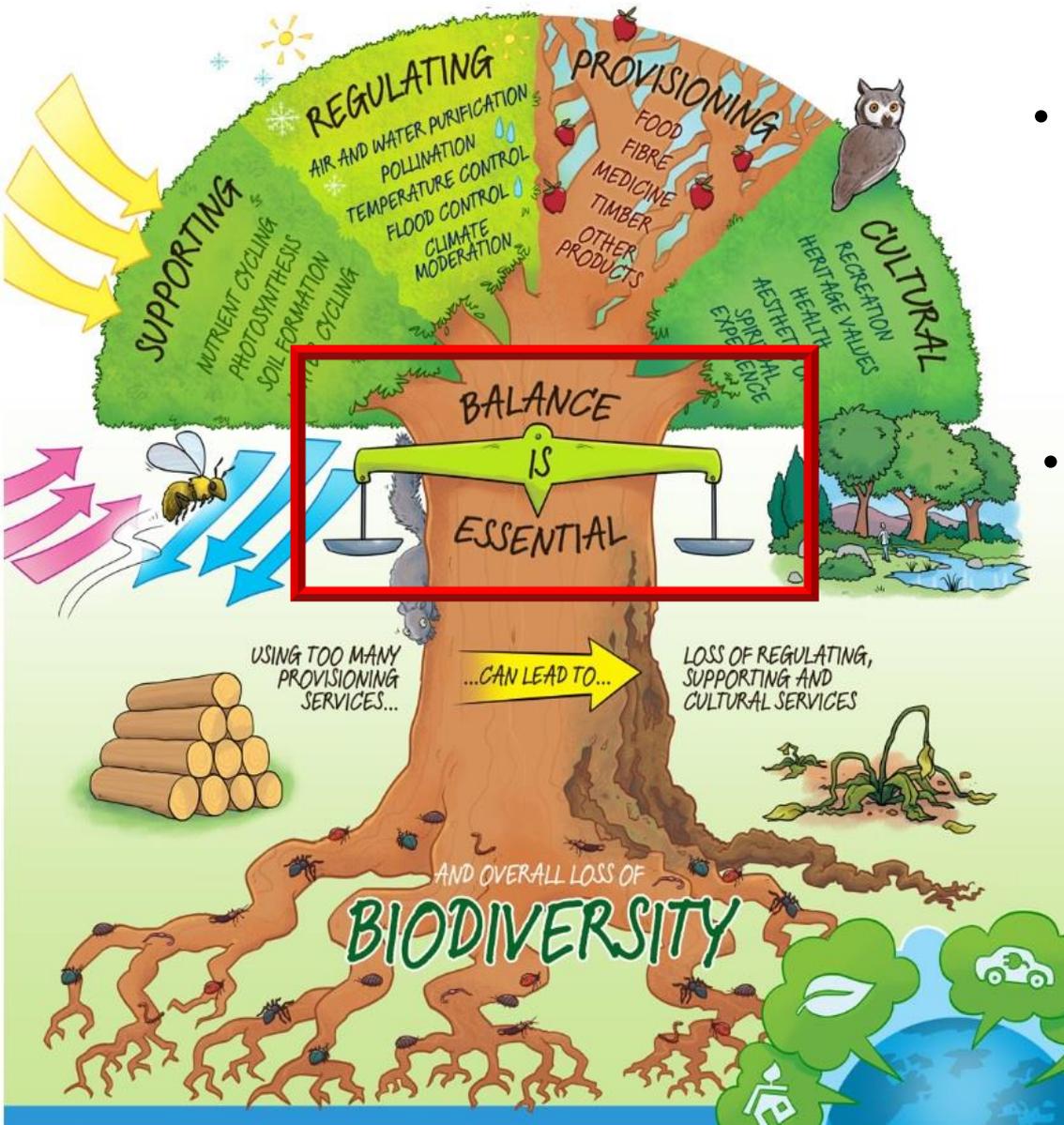


PAs in Today's World: Their Value & Benefits for the Welfare of Humanity



- CES tend to **lack adequate integration and quantification in management plans.**
- The demand for CES in **industrialised countries is expected to increase**, since more emphasis will be placed on **recreational activities** and this shift will be backed by **higher spending on this segment.**

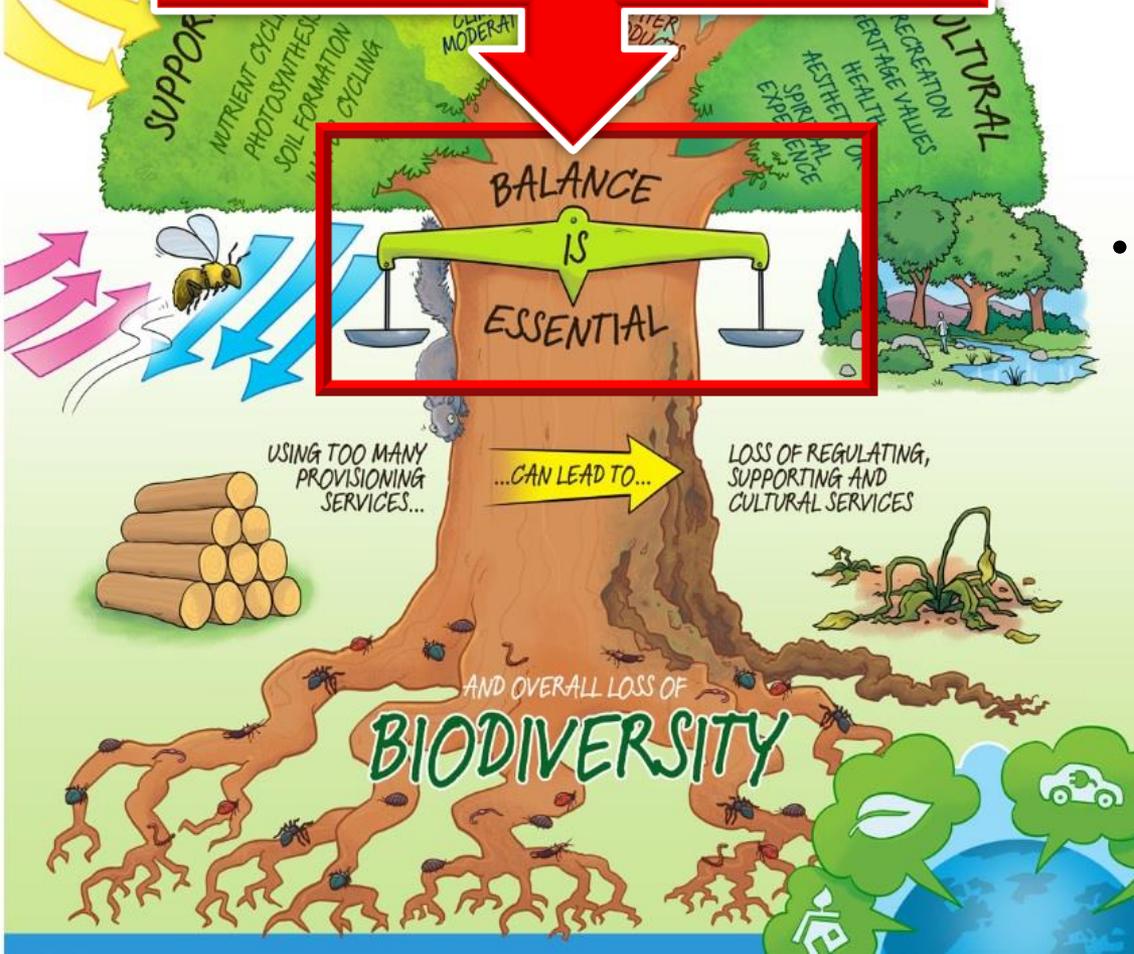
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PAs in Today's World: Their Value & Benefits for the Welfare of Humanity

the societal-focussed ES approach
&
the traditional view of conservation



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Nature-based experiences:

How nature's ecosystem services contribute to wellbeing?

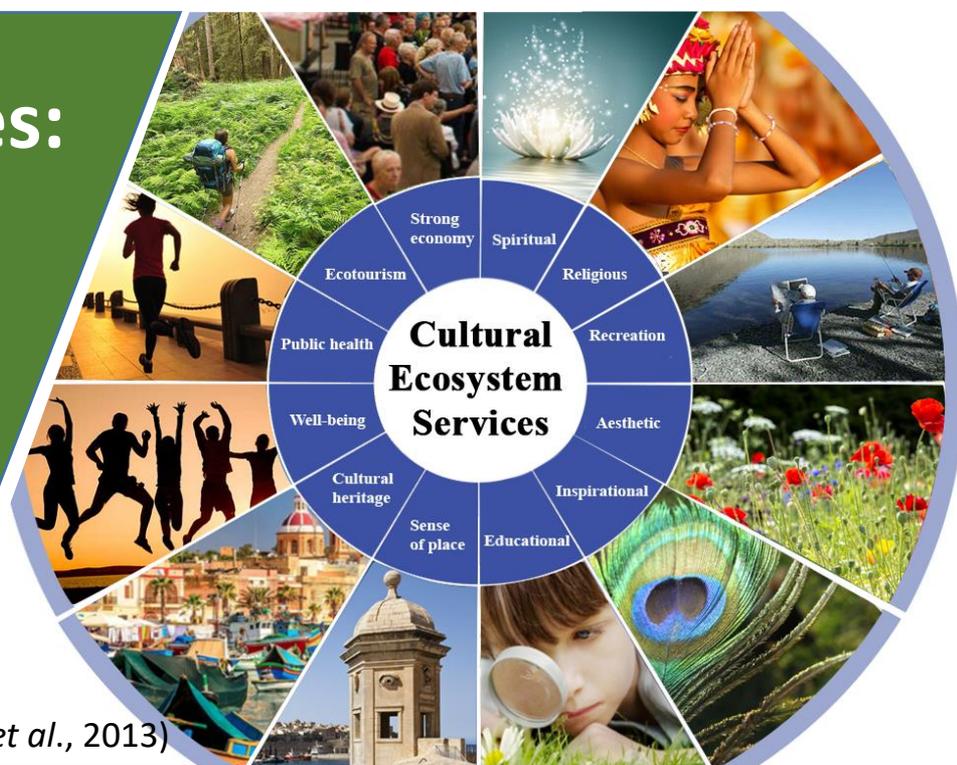


Table 1. Benefits to human wellbeing from CES (Plieninger *et al.*, 2013)

Image: Author's own draft

Domains of benefits to human well-being	Explanation and examples
Spiritual services	Spiritual services are obtained from environmental settings of spiritual, religious, or other forms of exceptional personal meaning (e.g. Mount Fuji, Japan)
Educational values	Educational values are fostered by widening the knowledge about plant and animal species (e.g. bird watching)
Inspiration	Inspiration is raised by environmental settings, which stimulate new thoughts, ideas or creative expressions (e.g. landscape painting)
Esthetic values	Esthetic values are gained by environmental settings of particular beauty (e.g. sunset over the desert)
Sense of place	Sense of place is achieved by environmental settings that foster a sense of authentic human attachment (e.g. walking along the Camino de Santiago)
Cultural heritage values	Cultural heritage values are enhanced by environmental settings that are relevant to local history and culture (Missouri River, North Dakota, US)
Recreation and ecotourism	Recreation and ecotourism are promoted by environmental settings that are used for recreational activities (e.g. hiking, snorkeling and diving, picking berries)

Quantifying the benefits of nature for our health & wellbeing

**We won't protect
what we don't
VALUE!**



Quantifying the benefits of nature for our health & wellbeing

We won't protect
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There are *two key ways* in which the environment affects human health:

**through
its quality
and
its accessibility**



Evidence quantifying the health & wellbeing benefits of nature

recreational walking increased by **17.6 minutes EACH WEEK** for each type of **ADDITIONAL RECREATIONAL DESTINATION** (Giles-Corti *et al.*, 2016)

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an increase in **streetscape greenery** is associated with **better perceived health**, fewer acute health-related complaints **and a BETTER MENTAL HEALTH status** (De Vries *et al.*, 2016)

Quantifying the Maltese context



- **elevated levels of air pollution** (an annual mean PM2.5 of $12\mu\text{g}/\text{m}^3$) most likely **contributing to 220 premature deaths annually** (Fleri-Soler, Cassar-Maempel, 2018);
- **the highest rate of obesity amongst adult males** and **the third highest rate amongst females**, when compared to EU member states (Health Promotion and Disease Prevention Directorate Parliamentary Secretariat for Health, 2014);

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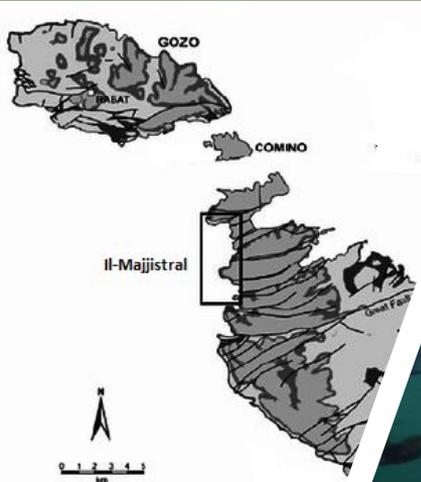


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• **increasing trend in suicide mortality**, especially males, suicide mortality rate: 7.2 per 100,000 (Malta Voluntary National Review on the implementation of the 2030 Agenda, Malta 2018).




Il-Majjistral
PARK TA' NATURA U STORJA

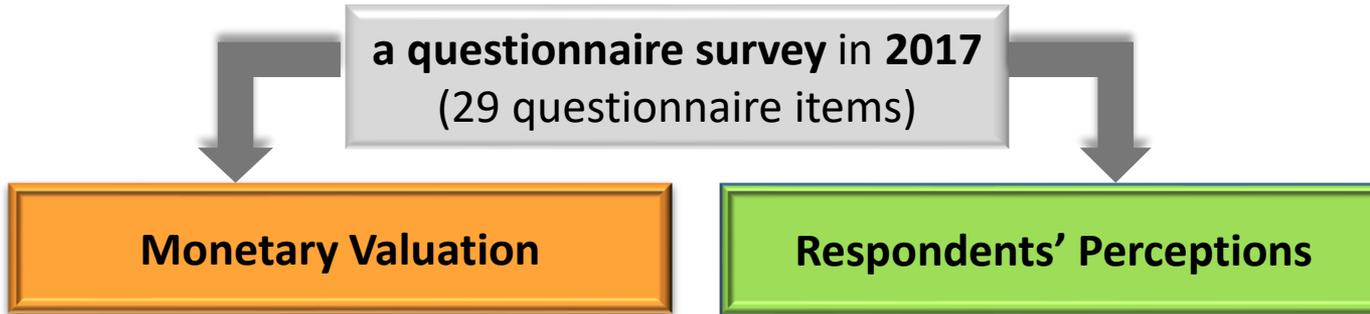


Case study:
Il-Majjistral National Park

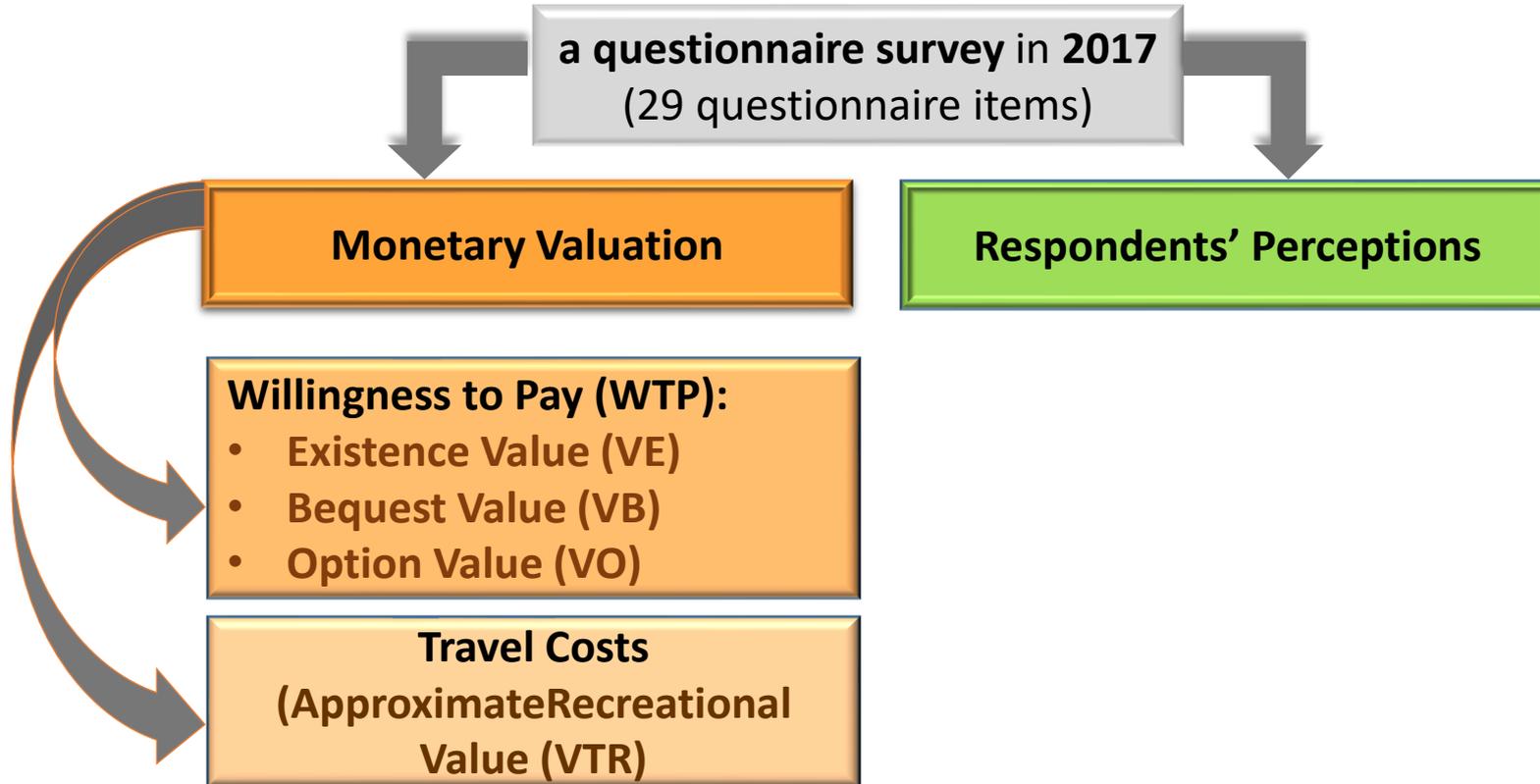
Main objective:
Valuation of selected CES

Map: Devoto et. al., 2012; Photos and Image: © Il-Majjistral (2011-2020)

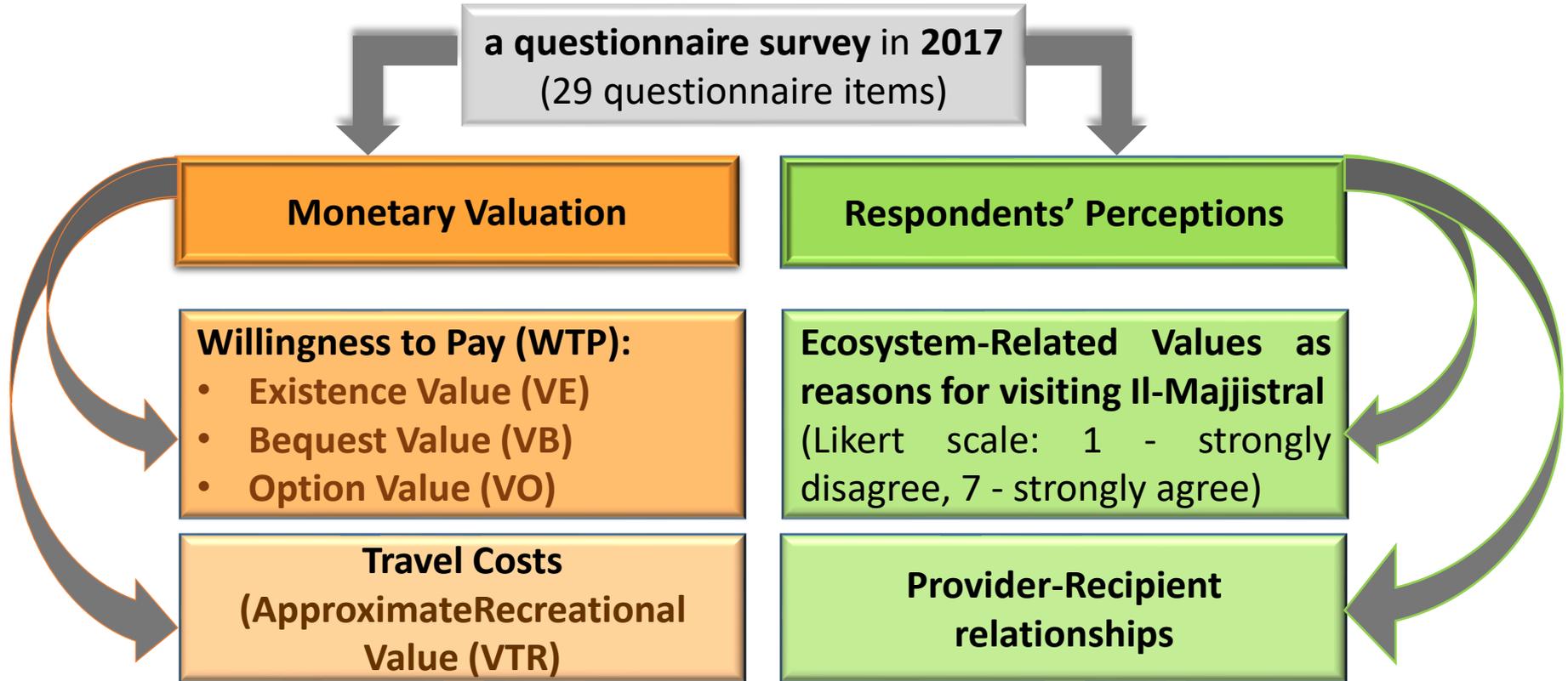
Materials and Methods



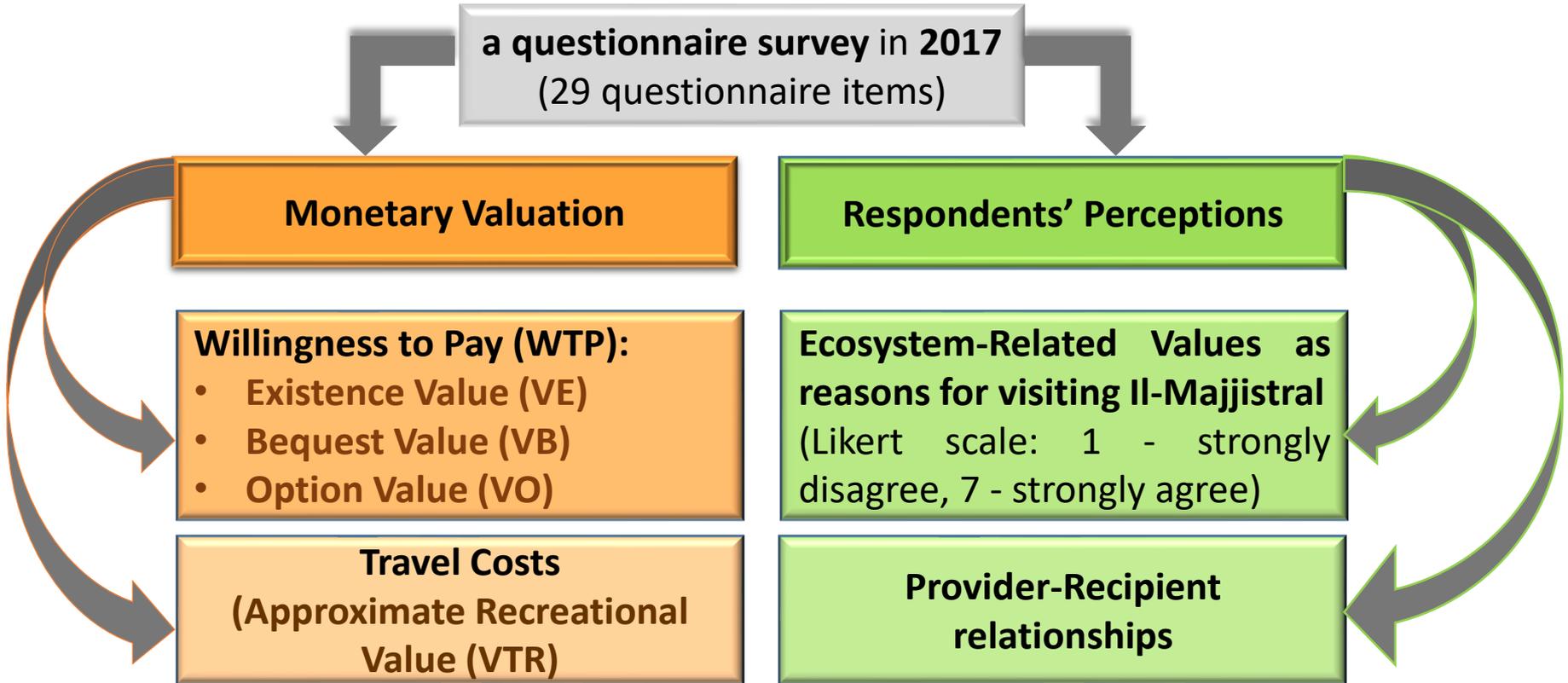
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1,218 respondents

statistical methods: descriptive statistics, frequency analysis, comparative analysis [non-parametric statistical methods of the Mann-Whitney U test and the Kruskal-Wallis H test, ANOVA - LSD test ($\alpha = 0.05$, resp. 0.01)]

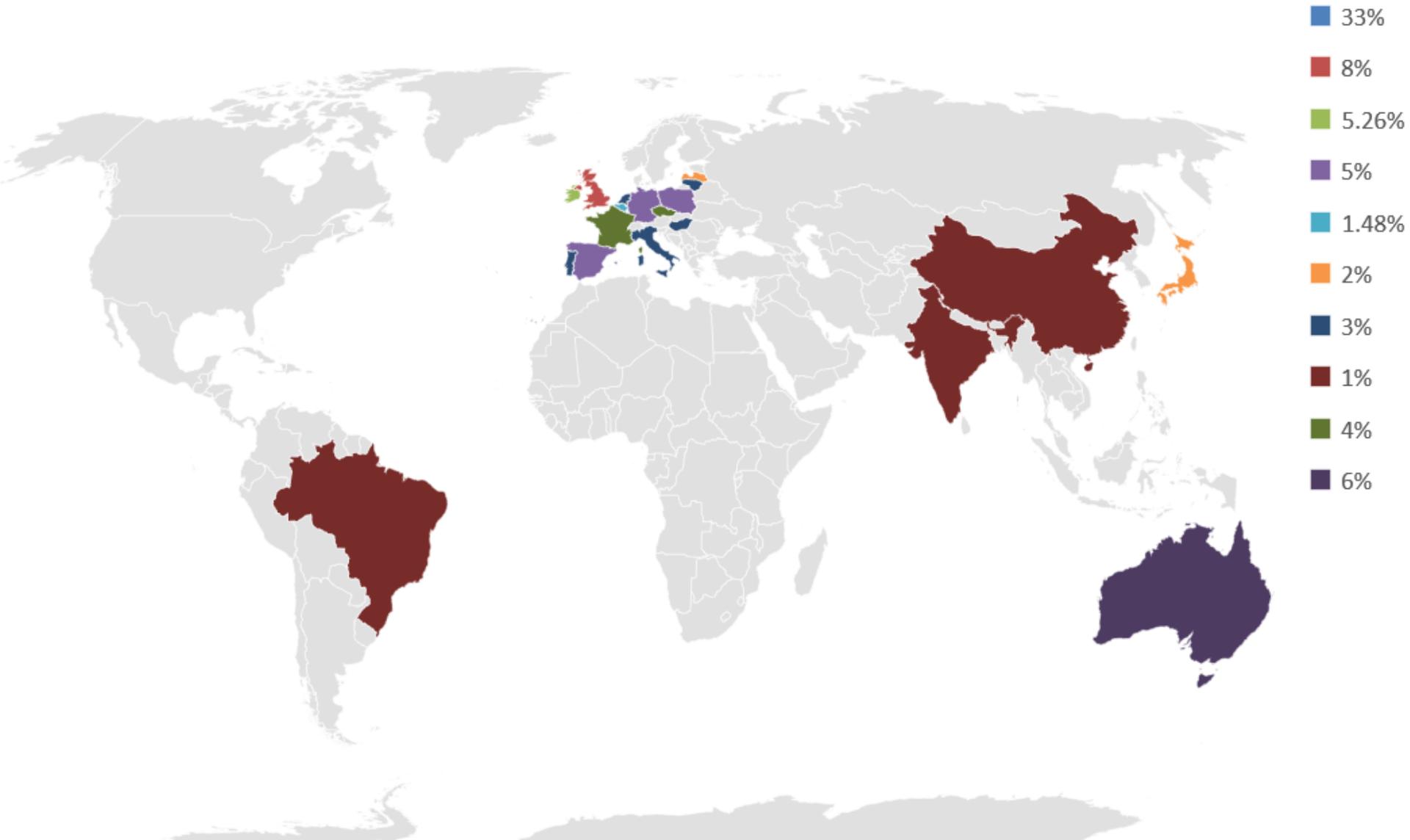
Demographic and socio-economic data results

Table 2. Available demographic and socio-economic statistics of respondents

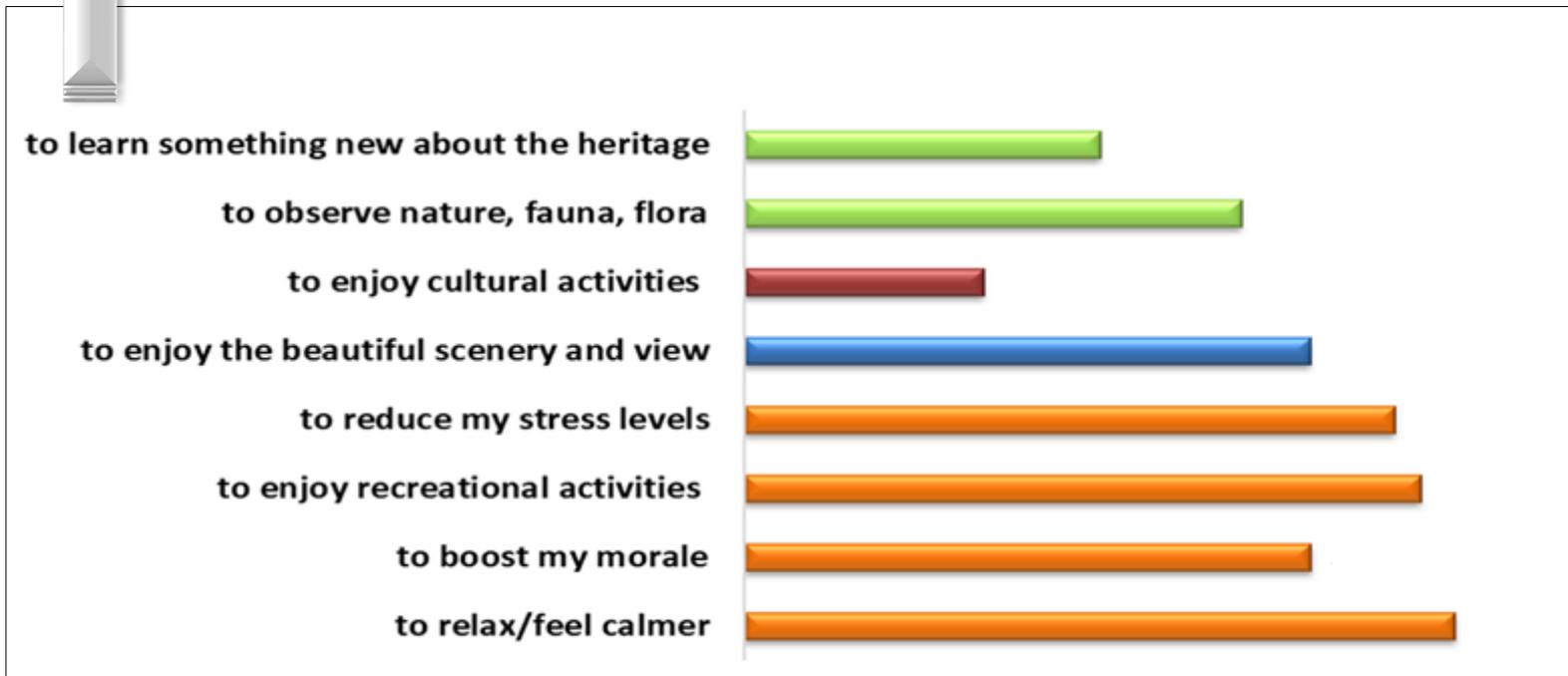
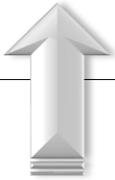
the highest educational attainment	
Primary	8 %
Secondary	30 %
Vocational education	18 %
Higher education	44 %
current profession	
Student	33 %
Civil servant	17 %
Entrepreneur	9 %
Labourer	15 %
On Parental Leave	7 %
Unemployed	1 %
Pensioner	14 %
Other	4 %
household income	
< 1 000 €	85
1 001 € - 1 500 €	158
1 501 € - 2 000 €	305
2001 – 3000 €	573
> 3001 €	97

Demographic data results

Nationality of respondents



Reasons for visiting Il-Majjistral: respondents' preferences



Physical-emotional interaction Aesthetic interaction Intellectual interaction

Non-material values articulated by respondents:

“...the whole experience is a feast for the senses ...”

“...just being here makes me feel relaxed and refreshed ...”

“...there is a sense of relaxation and of freedom ... I am able to leave behind the noise and the crowds ...”

“...I enjoy the experience of sightseeing ...”

“...it gives me a feeling of security - I feel positive ...”



Non-material values articulated by respondents:

- Social relationship:

“...through trekking I have been lucky to meet a lot of interesting people, and some of them have now become my friends for life ...”

“...We just like to be together and watch the view - things like the shining blue sea and the setting sun. Being together in the middle of nature is a much different experience from going out and dining somewhere in the city.”

“...For me, this is what it is all about. I simply enjoy going for walks and chatting with the people I meet ...”



Assessing the impact of respondent status on the responses in the questionnaire survey

- **The influence of residence** (city, suburbs) on the differences in respondents' answers was set to null (H0) and alternative (H1) hypothesis:
H0: Respondents' residence (city, suburbs) does not have a statistically significant impact on their responses to the questionnaire survey.
H1: Respondents' residence (city, suburbs) has a statistically significant impact on their responses to the questionnaire survey.

Respondents' residence (city, suburbs) **had a statistically significant impact on respondents' answers** (at the significance level $\alpha = 0.05$).

Table 3. Differences generated by respondents' place of residence
(only items with a statistically significant difference are listed)

Item

1. I came to enjoy nice scenery and view
 2. I came to observe nature, fauna, flora
 4. Staying in this area boots my morale
 7. I came here to relax / calm down
 8. I came here to reduce my stress levels
 11. I am visiting green infrastructure sites at least twice a month in my free time
-

Differences generated by respondents' place of residence

Respondents' residence	Interactions		
	Physical-emotional	Intellectual	Aesthetic
Urban areas	X		X
Rural areas		X	X

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Urbanisation across the world today:

- more than **half of the world's population** (more than 4 billion) now **live in urban areas** (Richie, Roser, 2019);
- it's **projected** that more **than 2/3 of the world population** (close to 7 billion people) will live in urban areas **by 2050** (Richie, Roser, 2019).

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Willingness to Pay

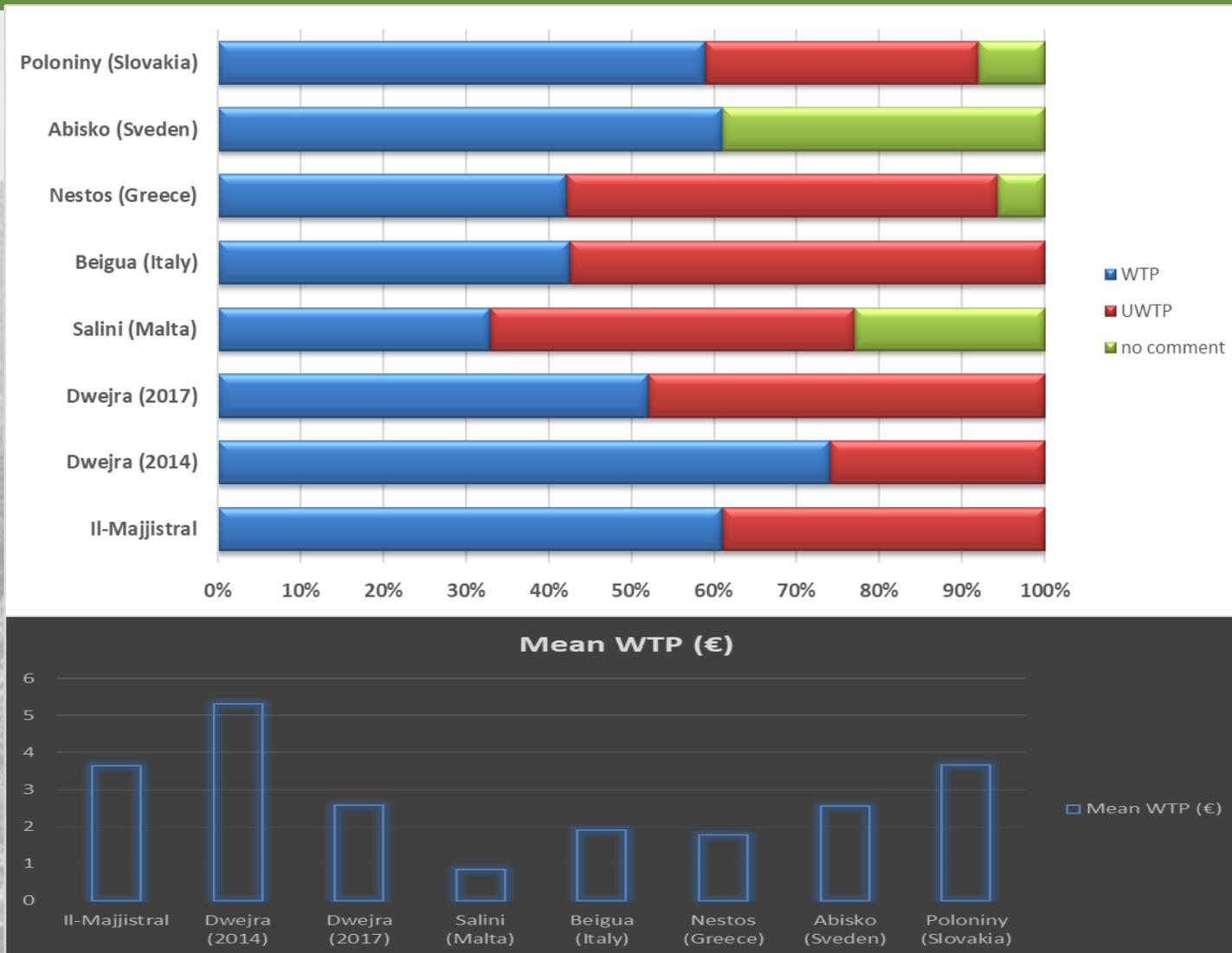


Figure 4 – 5. Comparison of the overall WTP in the Il-Majjistral with other PAs in Europe

(Source: Tomaškinová, Tomaškin, Theuma, 2019; Tomaškinová, Tomaškin, 2018; Tomaškinová, Tomaškin, Soporská, 2018; Parascandalo, 2010; Marzetti *et al.*, 2016; Nikodinovska *et al.*, 2015; Považan, Getzner, Švajda, 2015; Photo: © Il-Majjistral (2011-2020))

Assessing the impact of respondents' status on their responses

- To assess **the impact of respondents' education on WTP an entrance fee**, we set a null (H0) and alternative (H1) hypothesis:

H0: Education of respondents does not have a statistically significant effect on their WTP an entrance fee.

H1: Education of respondents has a statistically significant impact on their WTP an entrance fee.

Respondents' education had a statistically significant effect on their WTP an entrance fee (at the significance level $\alpha = 0.05$).

- ✓ Respondents with a higher education were willing to pay the entrance fee.
- ✓ The relationship between the WTP for the park's use and the education level was a significant positive one, indicating that when education levels increased, WTP the park entrance fee tended to increase.

Assessing the impact of respondents' status on their responses

- To assess **the impact of respondents' income on WTP entrance fee**, we set a null (H0) and alternative (H1) hypothesis:

H0: The monthly income of respondents does not have a statistically significant effect on their WTP entrance fee.

H1: The monthly income of respondents has a statistically significant impact on their WTP entrance fee.

The monthly income of respondents had a statistically significant effect on their WTP an entrance fee (at the significance level $\alpha = 0.05$).

- ✓ The correlation between WTP for the park's use and income level was a significant negative one, indicating that, when income levels increased, WTP tended to decrease.
- ✓ One would have expected persons that have more disposable income to be more WTP for the use of the park; however, this was not proven to be the case. This unexpected tendency has been explained through the item in the questionnaire where respondents stated their reasons for unwillingness to pay entry fees to Il-Majjistral NP.

Unwillingness to Pay

Table 4. Reasons for unwillingness to pay entry fees in NP Il-Majjistral
(1 – strongly agree; 5 – strongly disagree)

Answers	Total average score
"I would like to take advantage of the diverse opportunities for recreation in the PA without any restrictions, which I believe would be created by an entry fee."	2
"My income is too low to contribute."	4
„Nature protection is in the public interest and should not be dependent on individual contributions."	1
"I'm already paying too many fees."	2
"I would donate money for other area development and nature conservation programmes."	4
"The territory and its protection are not worth enough for me to be willing to contribute."	5

Non-use Values

- **Existence Value (VE)**

$$VE = NP * WTPm * SE$$

- **Bequest Value (VB)**

$$VB = NP * WTPm * SP$$

- **Option value (VO)**

$$VO = NP * WTPm * SO$$

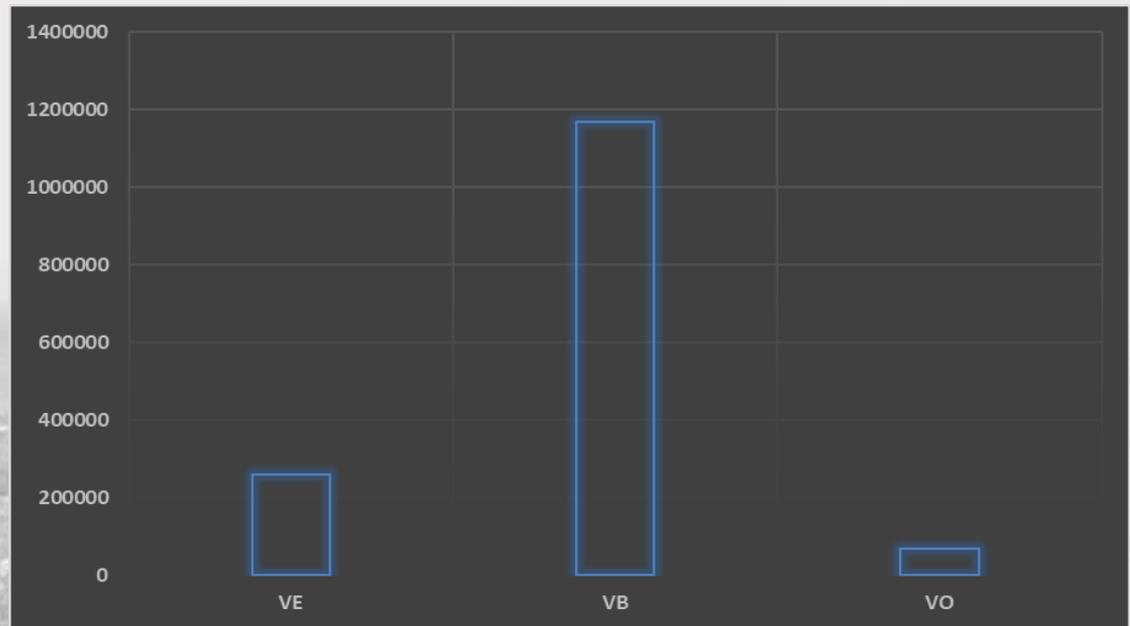


Figure 6. Comparison of non-use values in NP II-Majjistral

NP: population of the country over 14 years of age; WTPm: average value of WTP per person; SE, SP, SO: share of respondents who consider the motive as a priority.

Non-use Values

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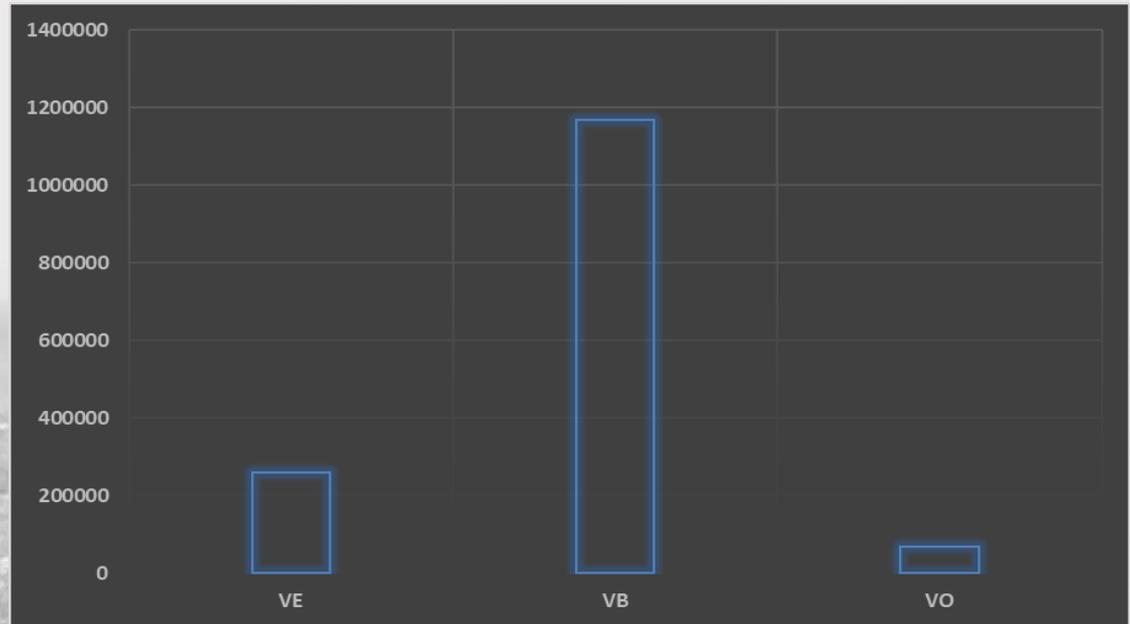


Figure 6. Comparison of non-use values in NP II-Majjistrál

- **Total non-use values of NP II-Majjistrál**

Approximately €1 500 000 per annum (2017)

NP: population of the country over 14 years of age; WTPm: average value of WTP per person; SE, SP, SO: share of respondents who consider the motive as a priority.

Approximate Recreational/Tourism Value (VTR)

The background of the slide features a large, bright sun in the center, creating a silhouette effect on the people in the foreground. The sun is a large, glowing circle, and the people are dark shapes against the bright light. The overall scene is a sunset or sunrise, with a warm, orange glow.
$$\text{VRT} = S_m * \text{DM} * \text{NV}$$

Approximately €1 160 000 / €4,500 /1 ha

(taking into account costs directly link to visit only)

S_m (€): mean value of respondents' expenditures (person/day); DM : average length of respondents' stay in the PA or its surroundings; NV : average number of visitors in the territory annually

Immediate/material benefit versus non-material benefit



- a relatively **wide gap €38**
between
**the value visitors attribute
to the park (WTP)**
and
**what they actually spent
during their visit**

This is quite ironic considering that respondents attributed to the **ENVIRONMENT a very high impact on their quality of life (87%)**.

Future SD platform in the context of CES

to consolidate the link
between CES, landscape
and tourism

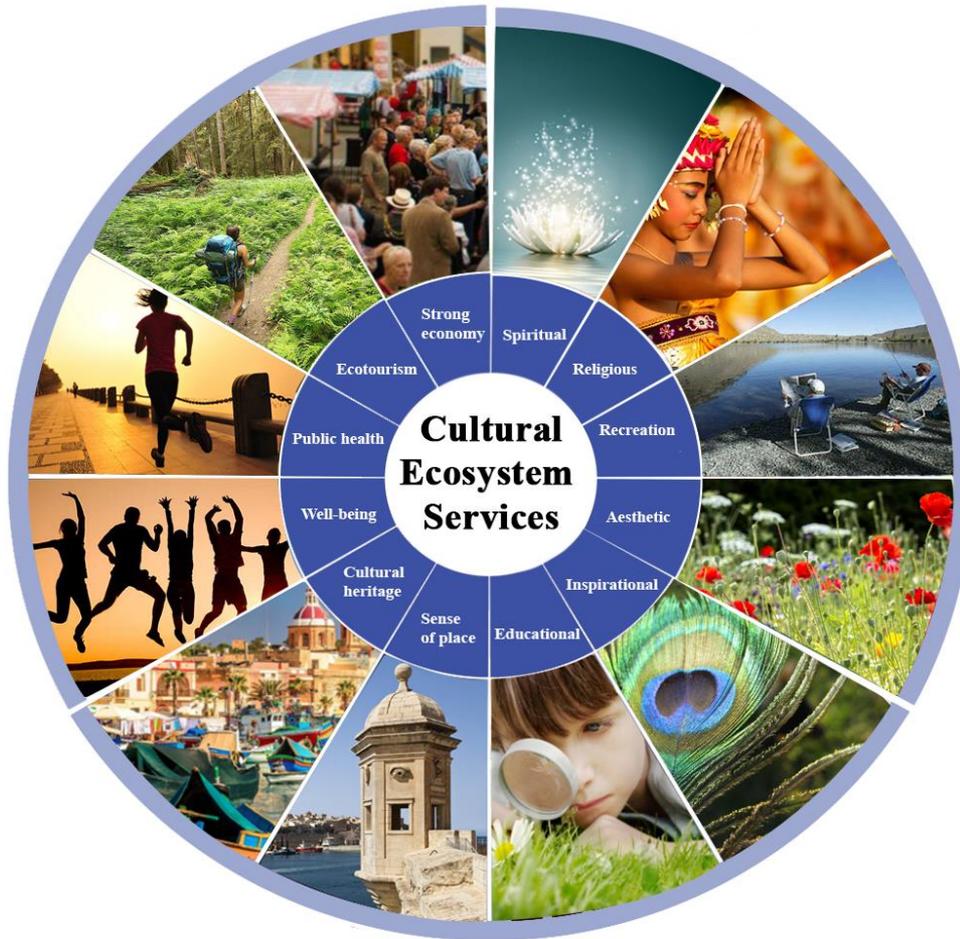


Image: Author's own draft

Future SD platform in the context of CES

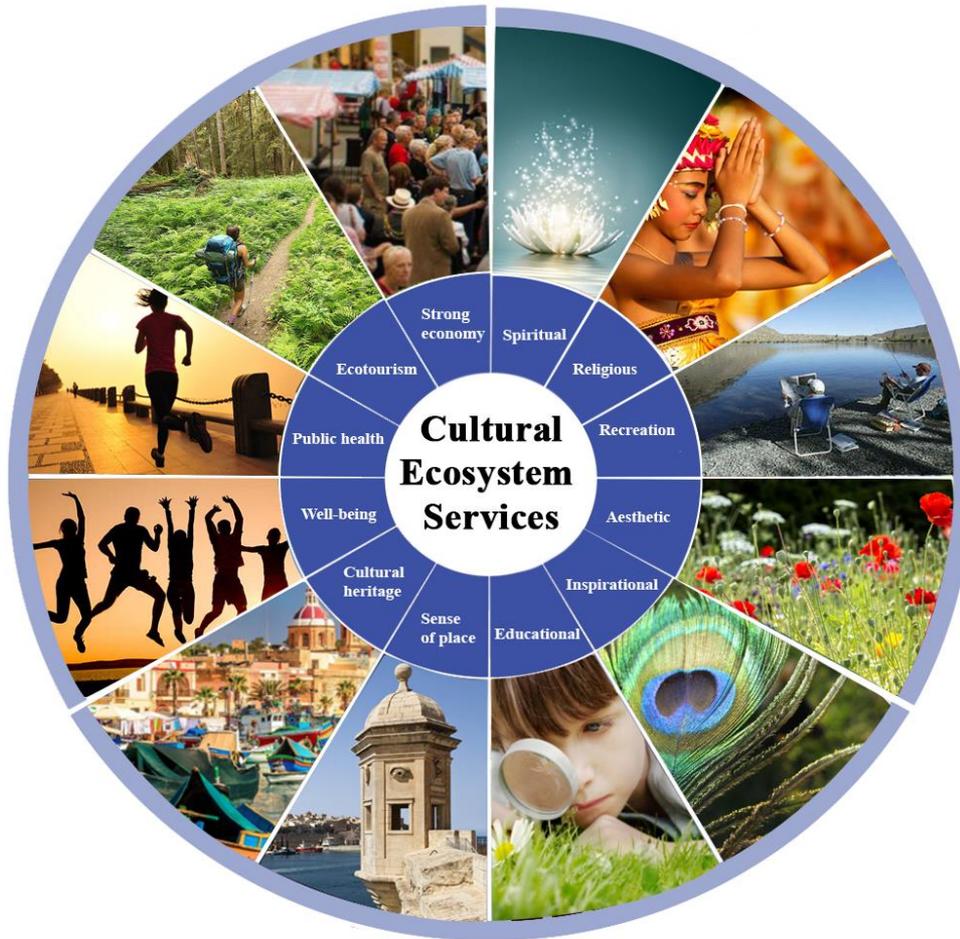


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between CES, landscape
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to promote better
understanding of CES

Image: Author's own draft

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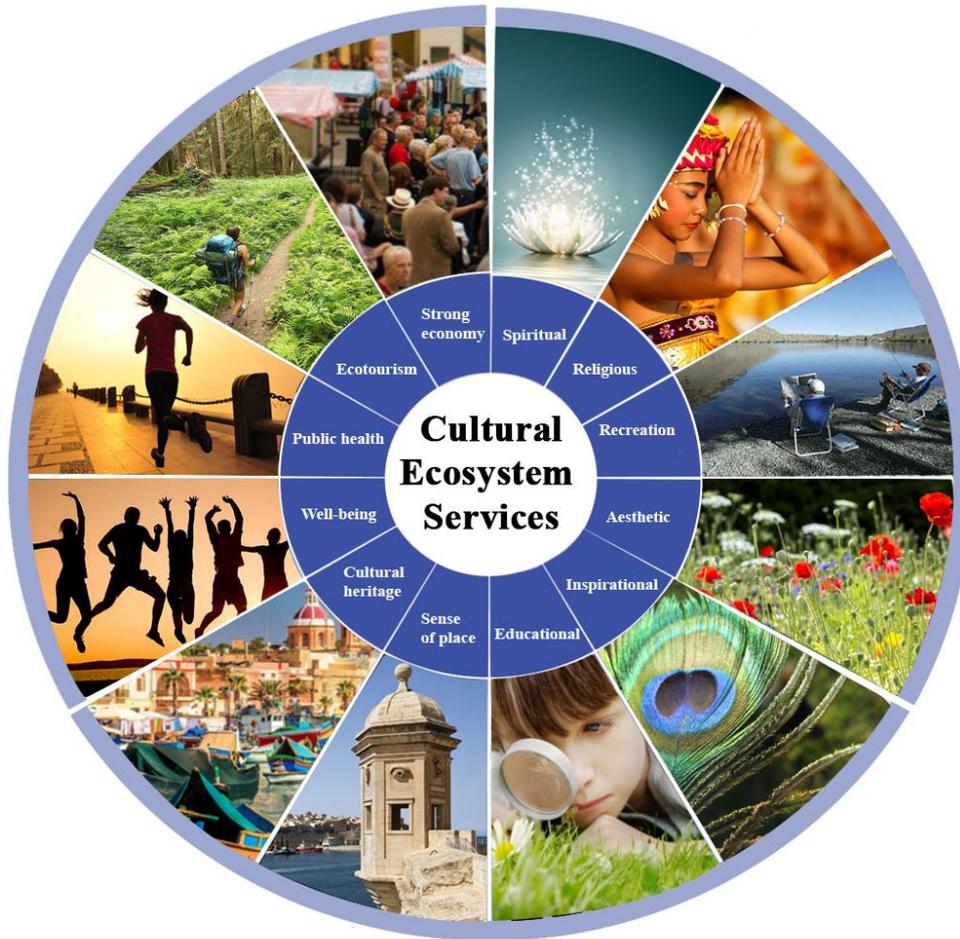
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ensuring maximum
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Image: Author's own draft

Future SD platform in the context of CES



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Figure: Author's own draft

Future SD platform in the context of CES



Image: Author's own draft

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Nature-based activities in Il-Majjistral: Evidence of non-material benefits



THANK YOU FOR YOUR ATTENTION



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