Cultural Services and Human Well-being

Dr Ibone Ametzaga Arregi
UNESCO Chair for Sustainable Development and Environmental Education

DOURO Sustainable Territorial Development and Healthy Lifestyles, June 20th 2016
Presentation guideline

• Introduction
• Ecosystem services
• Evaluation examples
• Conclusions
Frederick Law Olmsted Sr.
Landscape Architect, Author, Conservationist (1822–1903)

Cyrus II The Great,
of Persia 576 -530 B.C.

Yosemite National Park 1864
“I have seen persons of emotional temperament stand with tearful eyes, spellbound and dumb with awe, as they got their first view of the Valley from Inspiration Point, overwhelmed in the sudden presence of the unspeakable, stupendous grandeur.”

– Galen Clark, guardian of the Yosemite Grant
ECOSYSTEM SERVICES

- MICROCLIMA REGULATION
- CULTURAL
- RECREATIONAL
- WATER PURIFICATION
- GENETIC RESOURCES
- ILLNESS RISK REDUCTION
- SOIL FERTILITY
- FOOD AND RESOURCES
- FLOOD CONTROL
- KNOWLEDGE AND RESEARCH
Figure 1.2 Associations between health, other aspects of human well-being and ecosystem services (R 16 Figure 16.1)

The MA identifies five main aspects of human well-being. This diagram makes health the central aspect. Human health is affected directly and indirectly by changes in ecosystems but also is affected by changes to other aspects of well-being. Lack of aspects of human well-being (i.e. material minimum, good social relations, security, freedom and choice) all can have health impacts. Health also can influence these other aspects of human well-being.

The burden of disease from inadequate water, sanitation and hygiene totals 1.7 million deaths and the loss of more than 54 million healthy life years. Investments in safe drinking-water and improved sanitation show a close correspondence with improvements in human health and economic productivity. Every day each person requires 20-50 litres of water free of harmful chemical and microbial contaminants for drinking, cooking and hygiene. There remain substantial challenges to providing this basic service to large segments of the human population (C7).

Fresh water is a key resource for human health. It is used for growing food, drinking, washing, cooking and the dilution and recycling of wastes. Globally, the amount of fresh water available per person decreased from 16 800 m3 in 1950 to 6800 m3 in 2000, as a result of population growth.
Environmental changes and ecosystem impairment → Examples of health impacts

1. Direct health impacts
   - FLOODS, HEATWAVES, WATER SHORTAGE, LANDSLIDES
   - INCREASED EXPOSURE TO ULTRAVIOLET RADIATION, EXPOSURE TO POLLUTANTS

2. ‘Ecosystem-mediated’ health impacts
   - ALTERED INFECTIOUS DISEASES RISK, REDUCED FOOD YIELDS (MALNUTRITION, STUNTING), DEPLETION OF NATURAL MEDICINES, MENTAL HEALTH (PERSONAL, COMMUNITY), IMPACTS OF AESTHETIC / CULTURAL IMPOVERISHMENT

3. Indirect, deferred, and displaced health impacts
   - DIVERSE HEALTH CONSEQUENCES OF LIVELIHOOD LOSS, POPULATION DISPLACEMENT (INCLUDING SLUM DWELLING), CONFLICT, INAPPROPRIATE ADAPTATION AND MITIGATION

Ecosystems and Human Well-being: Health Synthesis
Provisioning services
- Regulating services
- Social/cultural services
- Supporting services

Energy and matter flow
- Water cycle
- Nitrogen cycle
- Carbon cycle

Ecosystem services parameters

Human health parameters

Ecosystem health parameters

Physical
- Mental
- Spiritual
- Emotional

Air quality
- Water Quality
- Moderate temperature
- Soil Structure
- Habitat and species diversity
Human well-being and poverty reduction
- BASIC MATERIAL FOR A GOOD LIFE
- HEALTH
- GOOD SOCIAL RELATIONS
- SECURITY
- FREEDOM OF CHOICE AND ACTION

Indirect drivers of change
- DEMOGRAPHIC
- ECONOMIC (e.g., globalization, trade, market, and policy framework)
- SOCIOPOLITICAL (e.g., governance, institutional and legal framework)
- SCIENCE AND TECHNOLOGY
- CULTURAL AND RELIGIOUS (e.g., beliefs, consumption choices)

Ecosystem services
- PROVISIONING (e.g., food, water, fiber, and fuel)
- REGULATING (e.g., climate regulation, water, and disease)
- CULTURAL (e.g., spiritual, aesthetic, recreation, and education)
- SUPPORTING (e.g., primary production, and soil formation)

Direct drivers of change
- CHANGES IN LOCAL LAND USE AND COVER
- SPECIES INTRODUCTION OR REMOVAL
- TECHNOLOGY ADAPTATION AND USE
- EXTERNAL INPUTS (e.g., fertilizer use, post control, and irrigation)
- HARVEST AND RESOURCE CONSUMPTION
- CLIMATE CHANGE
- NATURAL, PHYSICAL, AND BIOLOGICAL DRIVERS (e.g., evolution, volcanoes)

Source: Millennium Ecosystem Assessment
Biodiversity for Human well-being

Ecosystem Service Framework provides a space for coordination and dialogue between scientists, managers/politicians and Stakeholders

INTEGRATIVE, ADAPTATIVE MANAGEMENT ➔ RESILIENT LANDSCAPE
World Health Organization

• Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.
Physical well-being: walkable landscape

The literature reveals that the way the urban landscape and environment is designed and built is crucial for the level of physical activity in daily life, work and leisure time (Frumkin et al. 2004; Humpel et al. 2004a, b; McCormack et al. 2004; Powell 2005). Pikora et al. (2003, 2005) considered access to destinations, the presence of physical activity-promoting facilities, and the general functionality of urban districts (e.g. sidewalks, traffic regulation) as aspects of landscape that promote and enable physical activity. Further, constructional conditions are bicycle and walking paths for better walkability (Cervero and Duncan 2003; Craig et al. 2002; Frank and Engelke 2001; Li et al. 2005), land-use-mix, street connectivity, traffic safety (e.g. pedestrian zones), and an aesthetically appealing landscape (French et al. 2001; Humpel et al. 2004a, b; Leslie et al. 2005; Saelens et al. 2003; Titze et al. 2005). In terms of physical activity in leisure time, our review illustrates that location and infrastructure, e.g. of a park, safety aspects, and the absence of traffic, play an essential role (Ball et al. 2001; Booth et al. 2000; Neff et al. 2000). Addy et al. (2004) found that people gain additional motivation for regular physical activity when they trust their neighbours, when they perceive their neighbours as active, and when they have the opportunity to use nearby parks, playgrounds and sport fields.

As for social differentiation, studies have indicated that the preferences and needs related to places as well as the access to places for physical activity vary according to gender, age and ethnic background (Eyler et al. 1998; Kaspar and Bühler 2006; Lee et al. 2001; Payne et al. 2002; Wilbur et al. 2002). Authors have emphasised the importance of providing basic constructional conditions to make spaces for health-promoting physical activities as user friendly as possible (Giles-Corti and Donovan 2002; Wendel-Vos et al. 2004). However, recent studies have clearly shown that many city dwellers in socially deprived areas lack access to places for physical activity (Coen and Ross 2006; Gordon-Larsen et al. 2006; Popkin et al. 2005).

As many studies in our review have illustrated, forests play an important role when it comes to outdoor physical activity outside cities, including walking, hiking, kayaking, and fishing. People use forests for physical activity mainly to recreate and exercise (Baur and Gilgen 1999; Gasser and Kaufmann-Hayoz 2004; Lamprecht and Stamm 2002; Marti et al. 2002; Pretty et al. 2005a, b; Swiss Federal Office for the Environment 1999). In order to be perceived as an option for physical activity, rural green landscapes must be aesthetically appealing to their users (Pretty et al. 2005a, b).

Social well-being: landscape as a bonding structure

According to Armstrong (2000) and Leyden (2003), urban parks and other public places can enhance social integration if they facilitate social contacts, exchange, collective work, community building, empowerment, social networks and mutual trust. Also, socially integrative functions of landscape were found in studies with elderly people (Booth et al. 2000; Kweon et al. 1998; Milligan et al. 2004) and migrants (Rishbeth and Finney 2006; Seeland and Ballesteros 2004). As the literature suggests, urban landscape should provide a sufficient level of safety (e.g. park controls), attractiveness, walkability, should serve multiple...
CULTURAL ECOSYSTEM SERVICES

Non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experience (MA 2003)

Fig. 3. Number of publications investigating different subcategories of cultural ecosystem services. Publications could have no entries or multiple entries if, respectively, no or multiple subcategories were addressed.
Cultural services

• A tool to bridge gaps between academic disciplines and research communities
• Capitalizing social relevance of CS solve real-world problems
• Potential to foster new conceptual links between alternative logics relating to a variety of social and ecological issues
Study area
Different working scales

The Basque Country
7.229 km²
2.18 M Inhabitants
(302 Inhab/km²)

Bizkaia
2.216 Km²
1.151.113 Inhab.
(520 Inhab/km²)
111 towns

Urdaitbai
252 Km² (11,38%)
44.557 Inhab
(177 Inhab/Km²)
17 towns
Example:

Social perception, demand and mapping in Bilbao Metropolitan

- **Mapping of services**: recreation and aesthetic services

- **Social perception**: direct in-person questionnaires (545)

  Randomly selected population at different sites in the BMG

Specific groups of interest: e.g. teachers, university researchers and students, public-administration technicians and people from environmental associations
Socio-economic division

- Socio-economic study
- Land-uses
Results

1. Differences between the perception and demand

<table>
<thead>
<tr>
<th>Ecosystem services</th>
<th>Open question (%)</th>
<th>Photo-questionnaire</th>
<th>Demand (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean score</td>
<td>Standard error</td>
<td>%</td>
</tr>
<tr>
<td>Cultural services</td>
<td>79.2</td>
<td>1.218</td>
<td>97.6</td>
</tr>
<tr>
<td>Tourism and recreation</td>
<td>71.8</td>
<td>1.568</td>
<td>49.2</td>
</tr>
<tr>
<td>Aesthetic value</td>
<td>9.6</td>
<td>0.936</td>
<td>35</td>
</tr>
<tr>
<td>Existence value of biodiversity</td>
<td>9</td>
<td>2.356</td>
<td>71.6</td>
</tr>
<tr>
<td>Environmental education</td>
<td>2.2</td>
<td>1.362</td>
<td>46.4</td>
</tr>
<tr>
<td>Cultural heritage</td>
<td>2</td>
<td>0.826</td>
<td>32.6</td>
</tr>
<tr>
<td>Scientific value</td>
<td>0.2</td>
<td>0.260</td>
<td>12</td>
</tr>
<tr>
<td>Regulating services</td>
<td>31.4</td>
<td>1.393</td>
<td>90.6</td>
</tr>
<tr>
<td>Air purification</td>
<td>26.4</td>
<td>2.170</td>
<td>63.2</td>
</tr>
<tr>
<td>Climate regulation</td>
<td>0.8</td>
<td>1.372</td>
<td>44.8</td>
</tr>
<tr>
<td>Water regulation</td>
<td>0.4</td>
<td>1.276</td>
<td>42.2</td>
</tr>
<tr>
<td>Soil formation</td>
<td>0.2</td>
<td>0.754</td>
<td>29.4</td>
</tr>
<tr>
<td>Provisioning services</td>
<td>1.8</td>
<td>0.991</td>
<td>52.2</td>
</tr>
<tr>
<td>Food and material provision</td>
<td>1.6</td>
<td>0.870</td>
<td>30.2</td>
</tr>
<tr>
<td>Water provision</td>
<td>0.4</td>
<td>1.112</td>
<td>33.2</td>
</tr>
</tbody>
</table>

Casado et al., 2013. *Journal of Environmental Management* 129:33-43
2. Perception depending on: Socio-cultural and attitudinal factors and type of ecosystem.

Table 5
Percentages of people who demanded each ES, analysed through a chi-square test, by user group.

<table>
<thead>
<tr>
<th>Ecosystem services</th>
<th>People without an environmental attitude</th>
<th>Weekend trippers</th>
<th>Strollers and sportsmen/women</th>
<th>Nature users</th>
<th>Specialists</th>
<th>( \chi^2 ) (user groups)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural services</td>
<td>77.2</td>
<td>73.3</td>
<td>73.5</td>
<td>71.9</td>
<td>81.8</td>
<td>2.706</td>
</tr>
<tr>
<td>Existence value of biodiversity</td>
<td>47.4</td>
<td>39.8</td>
<td>46.1</td>
<td>50</td>
<td>51.9</td>
<td>4.374</td>
</tr>
<tr>
<td>Environmental education</td>
<td>26.3</td>
<td>29.9</td>
<td>30.9</td>
<td>34.4</td>
<td>50.6</td>
<td>13.171**</td>
</tr>
<tr>
<td>Tourism and recreation</td>
<td>29.8</td>
<td>21.7</td>
<td>22.1</td>
<td>21.9</td>
<td>11.7</td>
<td>6.810</td>
</tr>
<tr>
<td>Aesthetic value</td>
<td>15.8</td>
<td>13.6</td>
<td>23.9</td>
<td>9.4</td>
<td>12.9</td>
<td>7.838*</td>
</tr>
<tr>
<td>Cultural heritage</td>
<td>14.1</td>
<td>14.1</td>
<td>15.9</td>
<td>0</td>
<td>19.5</td>
<td>7.241</td>
</tr>
<tr>
<td>Scientific value</td>
<td>10.5</td>
<td>2.7</td>
<td>3.5</td>
<td>3.1</td>
<td>19.5</td>
<td>30.739***</td>
</tr>
<tr>
<td>Regulating services</td>
<td>52.6</td>
<td>38.5</td>
<td>41.6</td>
<td>46.9</td>
<td>62.3</td>
<td>15.086**</td>
</tr>
<tr>
<td>Climate regulation</td>
<td>17.5</td>
<td>20.4</td>
<td>17.7</td>
<td>31.3</td>
<td>36.4</td>
<td>12.725**</td>
</tr>
<tr>
<td>Air purification</td>
<td>35.1</td>
<td>17.6</td>
<td>23.9</td>
<td>25</td>
<td>32.5</td>
<td>11.834**</td>
</tr>
<tr>
<td>Water regulation</td>
<td>12.3</td>
<td>17.2</td>
<td>17.7</td>
<td>25</td>
<td>25.9</td>
<td>5.483</td>
</tr>
<tr>
<td>Soil formation</td>
<td>14.1</td>
<td>8.6</td>
<td>12.4</td>
<td>25</td>
<td>32.5</td>
<td>28.991***</td>
</tr>
<tr>
<td>Provisioning services</td>
<td>26.3</td>
<td>24.4</td>
<td>23.9</td>
<td>15.6</td>
<td>29.9</td>
<td>2.642</td>
</tr>
<tr>
<td>Water provision</td>
<td>24.6</td>
<td>12.7</td>
<td>11.5</td>
<td>12.5</td>
<td>15.6</td>
<td>6.318</td>
</tr>
<tr>
<td>Food and material provision</td>
<td>12.3</td>
<td>15.8</td>
<td>15.9</td>
<td>6.3</td>
<td>18.2</td>
<td>3.013</td>
</tr>
</tbody>
</table>

*Significance level at 10%, **Significance level at 5% and ***Significance level at 1%.
3. Interviewees in favor of improvements to peri-urban rural areas

4. Authorities to highlight the role of the BMG ecosystems: regulating services and historic and cultural values to improve people’s awareness of the ecosystems’ capacity to provide benefits to society.
Methodologies development to evaluate recreational demand

- Recreation supply
  - Recreational potential
  - Accessibility

- Social demand: photo-questionnaires (629)

Peña et al. 2015. Ecosystem Services 13:108-118
Table 2
Mean perceived value of the environmental units (mean ± standard error) and results of Turkey’s test: means with the same letter are not significantly different at \( P < 0.05 \). ANOVA was significant at \( P \leq 0.0001 \).

<table>
<thead>
<tr>
<th>Environmental units</th>
<th>Perceived value</th>
<th>Environmental units</th>
<th>Perceived value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rivers</td>
<td>5.68 ± 0.03 a</td>
<td>Villages</td>
<td>4.37 ± 0.05 gi</td>
</tr>
<tr>
<td>Rocky areas</td>
<td>5.49 ± 0.03 ab</td>
<td>Orchards</td>
<td>4.36 ± 0.05 gi</td>
</tr>
<tr>
<td>Montane grasslands</td>
<td>5.42 ± 0.03 b</td>
<td>Vineyards</td>
<td>4.31 ± 0.05 hi</td>
</tr>
<tr>
<td>Natural forests</td>
<td>5.39 ± 0.04 b</td>
<td>Mediterranean shrubs</td>
<td>4.18 ± 0.05 ij</td>
</tr>
<tr>
<td>Reservoirs</td>
<td>5.34 ± 0.04 bc</td>
<td>Peatlands</td>
<td>4.07 ± 0.05 j</td>
</tr>
<tr>
<td>Beaches</td>
<td>5.14 ± 0.04 cd</td>
<td>Crops</td>
<td>3.93 ± 0.05 jk</td>
</tr>
<tr>
<td>Cliff</td>
<td>5.11 ± 0.04 cde</td>
<td>Parks</td>
<td>3.72 ± 0.05 kl</td>
</tr>
<tr>
<td>Water bodies</td>
<td>4.98 ± 0.04 df</td>
<td>Coniferous plantations</td>
<td>3.70 ± 0.06 l</td>
</tr>
<tr>
<td>Cantabrian evergreen-oak forests</td>
<td>4.97 ± 0.04 df</td>
<td>Eucalyptus plantations</td>
<td>2.79 ± 0.06 m</td>
</tr>
<tr>
<td>Heaths</td>
<td>4.90 ± 0.04 ef</td>
<td>Cities</td>
<td>2.39 ± 0.04 n</td>
</tr>
<tr>
<td>Salt marshes</td>
<td>4.76 ± 0.04 fg</td>
<td>Abandoned quarries</td>
<td>2.04 ± 0.05 o</td>
</tr>
<tr>
<td>Atlantic shrubs (no heaths)</td>
<td>4.43 ± 0.05 g</td>
<td>Active quarries</td>
<td>1.51 ± 0.04 p</td>
</tr>
<tr>
<td>Grasslands</td>
<td>4.42 ± 0.05 gh</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 3.** Example of photos used in the photo-questionnaire.
Results

1. People’s aesthetic preferences is a reasonable proxy and visual survey efficient method

2. People’s aesthetic based on land use management and degree of naturalness: trade-offs

3. Public demand: agroecosystems (low recreation potential)

Peña et al. 2015. Ecosystem Services 13:108-118
A multiple ecosystem services landscape index (MESLI Index)

The contribution of the rural municipalities to the provision of ecosystem services is not considered, even though they are fundamental for human well-being

**Aims:**

- Define an integrative environmental index of landscape multifunctionality based on the ES provided by the landscape
- Consider the provision of ecosystem services
What we need for management

• The indicators to evaluate the state of the ecosystem services

• The indicators to develop a system of economic compensation or other positive social measures for the provision of ecosystem services at municipality level

• Pilot study

Rodríguez-Loinaz et al., 2014. Journal of Environmental Management 147:152-163
Figura 1. Esperanza de vida al nacimiento en zonas básicas de salud CAPV, 2006-2010

Tabla 1. Ranking de las 10 zonas básicas de salud con mayor y menor esperanza de vida CAPV 2006-2010
Anxiety and depression symptoms

Figura 2. Prevalencia de síntomas de ansiedad y depresión
Osasun mentalaren bilakaera, 2002-2013
Evolución de la salud mental, 2002-2013
Antsietate eta depresioaren sintomen prebalentzia*
Prevalencia de síntomas de ansiedad y depresión*

Fuente: Encuesta de Salud. Dpto. de Salud. Gobierno Vasco
Thank you very much
Eskerrik asko

Ecosystems provide goods and services that sustain all life on this planet, including human life. If damaged, we cannot fully restore them, no matter how much money we spend.

“In nature nothing exists alone.”
Rachel Carson, Silent Spring (1962)

“Organisms have figure out the way of doing the amazing things they do while taking care of the place that is going to take care of their offspring”
Janine Benyus

Further information:
www.ehu.es/cdsea