



Evaluación de los Servicios de los Ecosistemas de Euskadi

Percepción social de los servicios de los ecosistemas



PERCEPCIÓN DE LA POBLACIÓN SOBRE LOS SE

1. ¿Perciben los usuarios de la infraestructura verde urbana los SE que suministra más allá de sus funciones recreativas y paisajísticas?
2. Y si es así, ¿son valorados de forma equiparable a la función ecológica que realizan?

Encuesta:

1. Indicar los beneficios que les suministra la infraestructura verde urbana en la que se encontraban
2. Valorar los beneficios del 1-5 (0-10)
3. Mostrar los SE que ofrece dicha infraestructura verde
4. Valorar el suministro de SE del 1-5 (0-10)
5. Análisis de los datos: comparación entre ambos valores y entre características de los encuestados

Naturaleza, Sope del bienestar
Servicio de la Conservación de la Naturaleza

5. ¿Cuántas veces viene al año a esta zona?.....

6. ¿Cuál es el motivo principal por el que visita esta zona? (máx. 5)

- Interacción paisajística
- Actividades ganaderas
- Actividad Forestal
- El interés por la naturaleza conservación
- Pesca, paseo al día, etc.
- Disfrute del paisaje
- Descanso (relajarse/ desconectar)
- Dar un paseo
- Hacer ejercicio
- Tradiciones/Patrimonio cultural
- Rutinas/dietas
- Otros, ¿cuál?.....

7. ¿Sabe qué son los servicios de los ecosistemas?

- Sí
- No

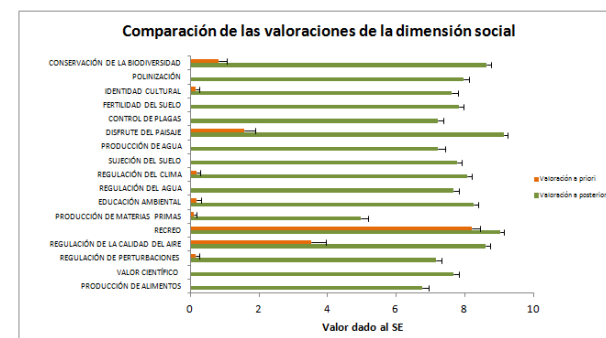
La Naturaleza proporciona beneficios para el bienestar humano de manera directa o indirecta, como, por ejemplo, la obtención de productos agrícolas o pesqueros para nuestra alimentación, la obtención de madera para mobiliario o papel, contribuyen a mantener el aire limpio, o beneficios relacionados con el ocio y el disfrute, entre otros.

8. ¿Pienso que las infraestructuras verdes que forman la zona del Anillo Verde de Bilbao generan algún beneficio a la sociedad?

- No
- Poca
- Bastante
- Mucho

SERVICIOS PROPORCIONADOS POR EL HEDERAL DE SABIRURRA D

RECREO Y TURISMO Impulsar el desarrollo de los que aportan bienestar, bienestar, bienestar, bienestar, bienestar.	CONSERVACIÓN DE LA BIODIVERSIDAD Proporcionar a los usuarios un espacio abierto, libre de pesticidas, libre de...
REGULACIÓN CLIMÁTICA Mitigación del calentamiento global, enfriamiento, sombra y efecto de isla de calor urbana.	PRODUCCIÓN Generar recursos naturales, alimentos, materias primas.
POLINIZACIÓN Mantenimiento de cultivos y de biodiversidad.	REGULACIÓN DE ENTORNO Contribuyen al mantenimiento de la fertilidad del suelo.
CONTROL BIOLÓGICO Prevención de plagas y enfermedades.	VALOR CIENTÍFICO Investigación en ecología, biodiversidad, que pueden aportar a la gestión del medio.
REGULACIÓN DE PERTURBACIONES NATURALES Conservación de los ecosistemas y de los recursos naturales.	REGULACIÓN DEL SUELO Evitar la erosión y la pérdida del suelo.
REGULACIÓN DEL CICLO DEL AGUA Retención de agua y regulación del ciclo del agua.	REGULACIÓN METEOROLÓGICA Amortiguar las temperaturas extremas, el viento y la humedad, proporcionar sombra.
VALOR ESTÉTICO Contribuye al disfrute de paisajes, bienestar, bienestar para la sociedad.	EDUCACIÓN AMBIENTAL Ampliar los conocimientos y sensibilización ambiental, centros de formación ambiental.
REGULACIÓN HISTÓRICA Contribuyen a la identidad del lugar, control de la expansión, el uso histórico de la zona y el mantenimiento del lugar.	

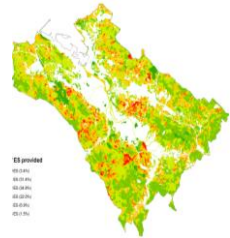




PERCEPCIÓN DE LA POBLACIÓN SOBRE LOS SE

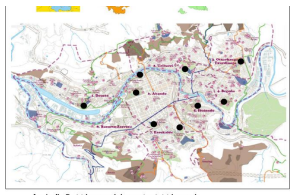
Zonas de estudio

Cinturón verde del Bilbao Metropolitano (2010): 545 encuestas



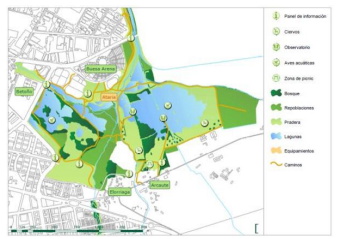
Parques urbanos de Bilbao (2014)

126 encuestas



Humedal de Salburua (Anillo verde de Vitoria/Gasteiz(2014)):

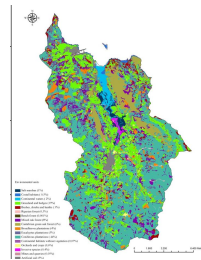
219 encuestas



Anillo verde de Bilbao (2015): 111 encuestas



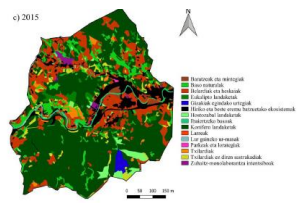
Reserva de la Biosfera de Urdaibai (2015)



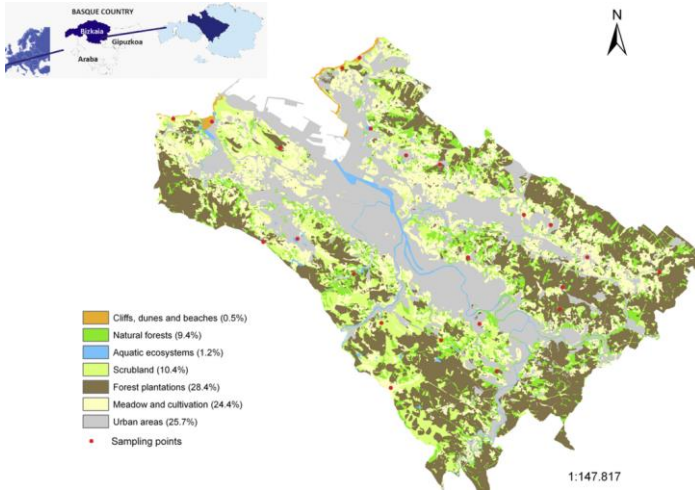
Anillo verde de Vitoria/Gasteiz (2015): 110 encuestas



Zalla (Bizkaia) (2018): 100 encuestas



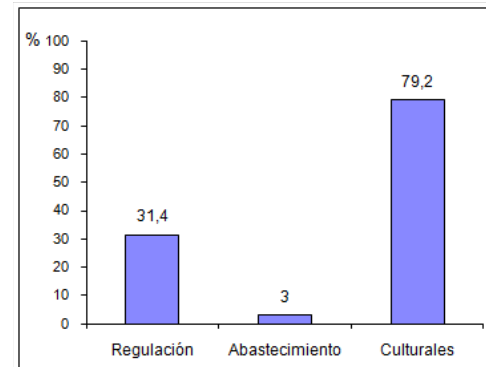
Cinturón verde del Bilbao Metropolitano (2010): 545 encuestas



Superficie: 406 km²

Habitantes: 893.298 (77 % de Bizkaia)

Habitantes por km²: 2.200



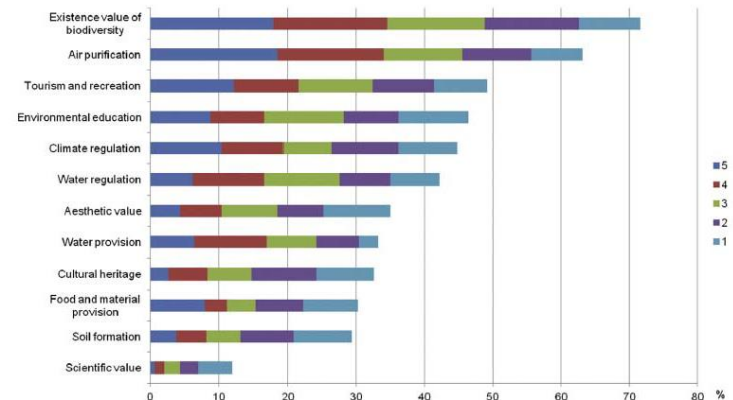
Entrevistas a visitantes y agentes

- Percepción sobre los SE
- Comportamiento ambiental
- Disponibilidad a pagar

Purificación del aire

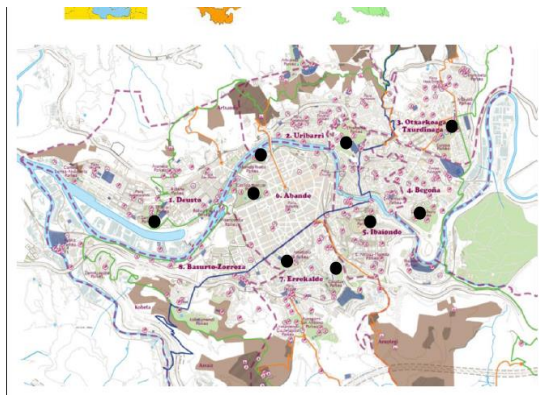
Conservación de la biodiversidad

Recreo



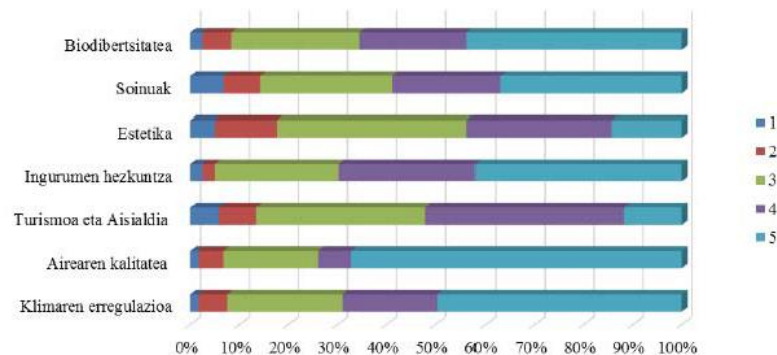
PERCEPCIÓN DE LA POBLACIÓN SOBRE LOS SE

Parques urbanos de Bilbao (2014): 126 encuestas



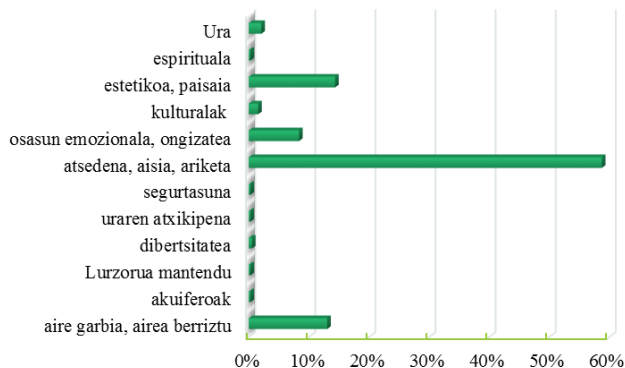
1-go irudia. Ikertutako arearen kokapena eta aztertutako guneak.

Parkeak	Inkesta kopuruak
Doña Kasilda	10
Sarriko	11
Abando - Ibarra	15
Ametzola	10
Eskurtze	15
Larreagaburu	14
Miribilla	14
Etxebarria	18
Europa	17
Guztira	126



Purificación del aire
Regulación climática

Anillo verde de Bilbao (2015): 111 encuestas



Recreo
Disfrute estético del paisaje
Purificación del aire





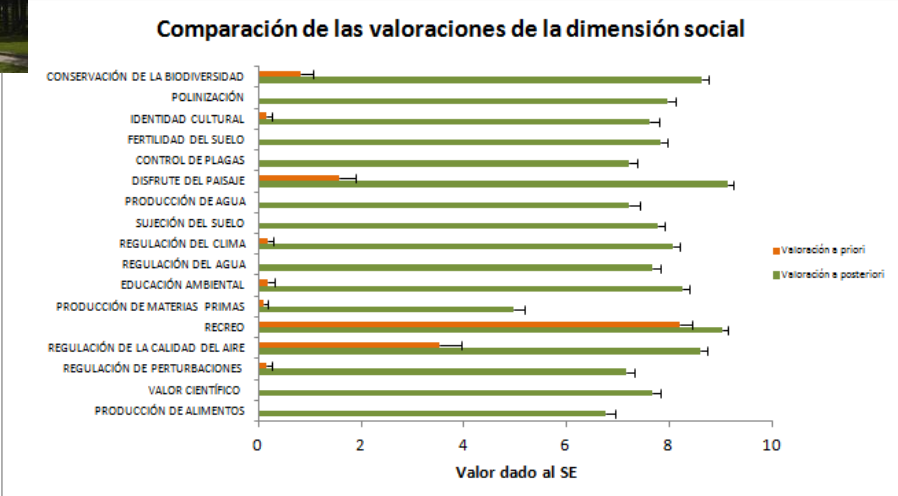
PERCEPCIÓN DE LA POBLACIÓN SOBRE LOS SE

Anillo verde de Vitoria/Gasteiz (2015): 110 encuestas



Recreo
Calidad del aire
Disfrute estético del paisaje
Conservación de la biodiversidad

Importancia que adquiere luego la Educación Ambiental



Humedal de Salburua (2014): 219 encuestas



Superficie: 206 ha

Año creación: 1994

Humedal Ramsar de Importancia Internacional.

LIC, Red Europea Natura 2000.

Importancia ecológica del humedal:
Control de inundaciones: casco urbano

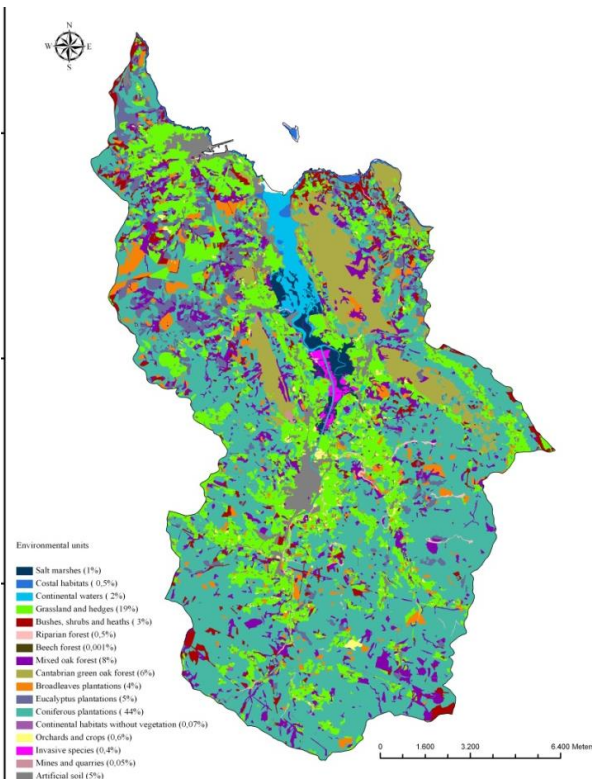
Las mujeres, los jóvenes y los que tienen estudios universitarios valoran de media más todos los SE

Servicios de los ecosistemas	Antes de ser informados				Después de ser informados					
	Importancia			% de encuestados	Importancia			Valoración media (1-100)	Valoración media (repartir 100 pts)	% de encuestados
	Alta	Media	Baja		Alta	Media	Baja			
<i>Regulación climática local</i>				0%	90%	9%	1%	77,8 ± 1,1	17,7 ± 4,3	14%
<i>Regulación climática global</i>				0%	82%	17%	1%	80,0 ± 1,0	26,2 ± 3,1	22%
<i>Regulación de la calidad del aire</i>	75%	24%	1%	30%	77%	21%	2%	77,7 ± 1,1	23,1 ± 3,6	18%
<i>Regulación hídrica</i>				0%	82%	17%	1%	75,7 ± 1,1	24,2 ± 4,1	16%
<i>Control de la erosión</i>				0%	77%	22%	1%	76,6 ± 1,1	18,3 ± 4,2	14%
<i>Fertilidad del suelo</i>				0%	81%	19%	0%	76,4 ± 1,0	6,5 ± 0,2	8%
<i>Regulación de perturbaciones naturales</i>	100%	0%	0%	0,5%	76%	23%	1%	75,6 ± 1,1	14,1 ± 2,3	13%
<i>Control biológico</i>				0%	91%	8%	1%	75,4 ± 1,1	17,8 ± 3,0	15%
<i>Polinización</i>				0%	81%	18%	1%	78,3 ± 1,1	22,3 ± 4,5	13%
<i>Actividades recreativas y ecoturismo</i>	74%	25%	1%	53%	86%	14%	0%	85,1 ± 1,0	46,2 ± 3,2	51%
<i>Conocimiento científico</i>				0%	91%	9%	0%	77,8 ± 1,1	22,9 ± 2,9	20%
<i>Educación ambiental</i>	73%	20%	7%	7%	79%	20%	1%	83,0 ± 1,1	38,9 ± 3,2	40%
<i>Disfrute estético del paisaje</i>	61%	39%	0%	16%	76%	23%	1%	84,6 ± 1,0	35,6 ± 3,6	29%
<i>Conservación de la biodiversidad</i>	74%	25%	1%	39%	93%	4%	3%	85,7 ± 1,0	42,1 ± 3,3	43%

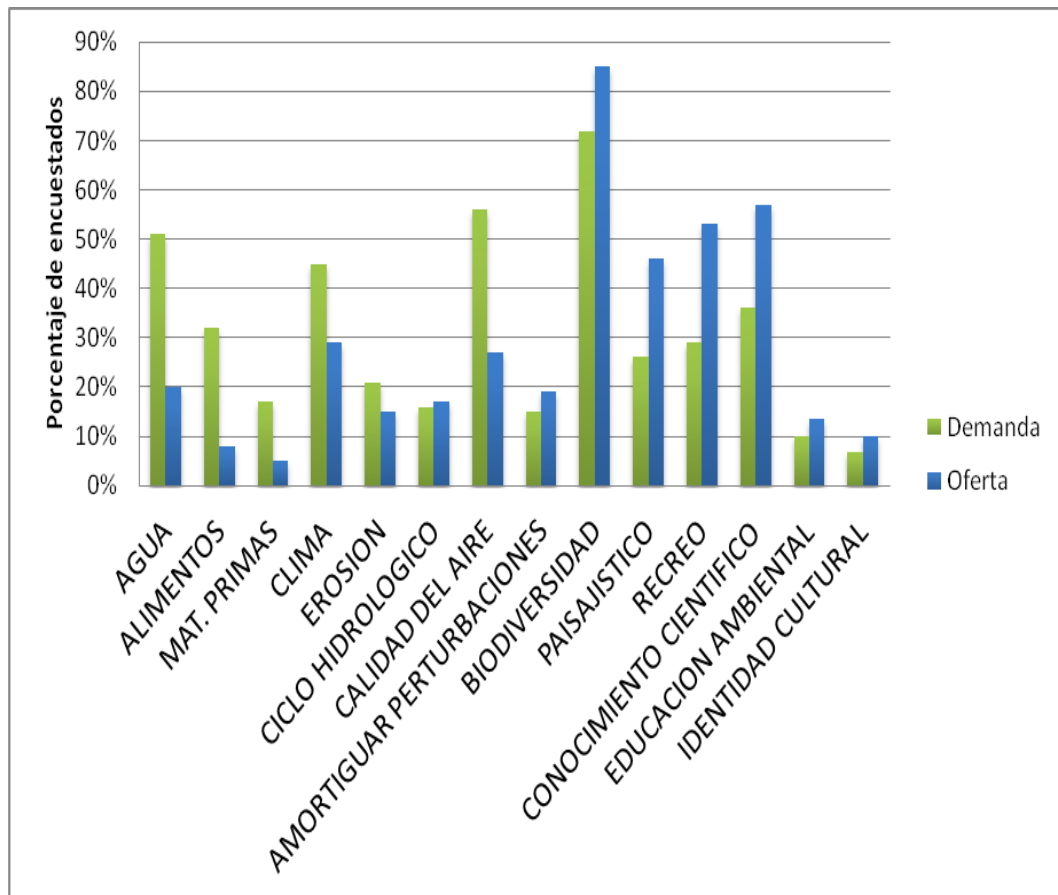


PERCEPCIÓN DE LA POBLACIÓN SOBRE LOS SE

Reserva de la Biosfera de Urdaibai (2015)



Biodiversidad
 Conocimiento científico

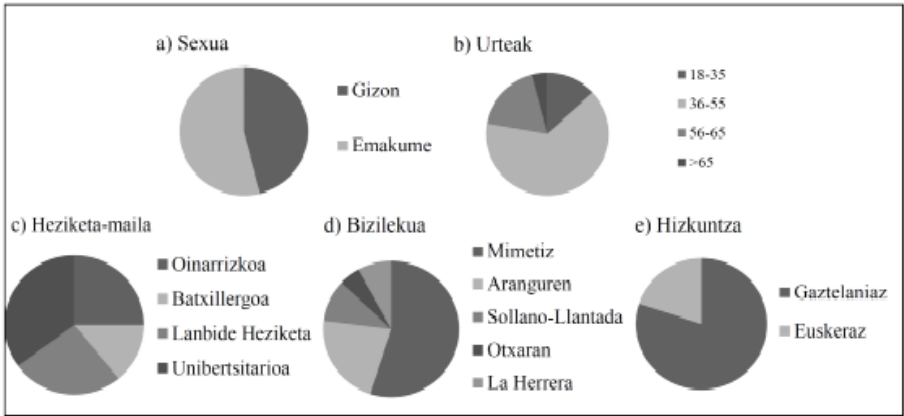
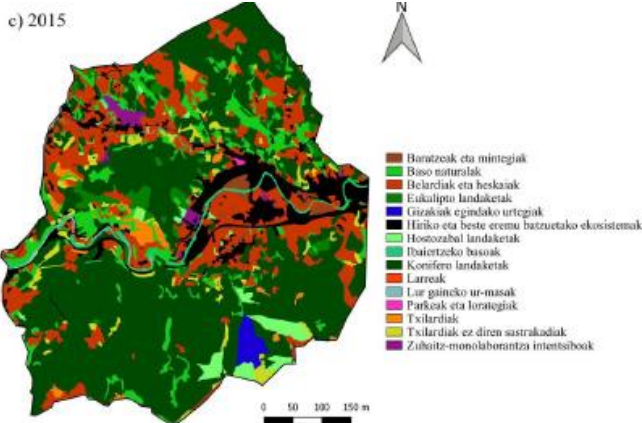




PERCEPCIÓN DE LA POBLACIÓN SOBRE LOS SE

Zalla (Bizkaia): 100 encuestas

c) 2015



Zerbitzuen balorazioa



Se valoran mejor los SE que se ofrecían antes (1945) en Zalla que los de ahora (2015)

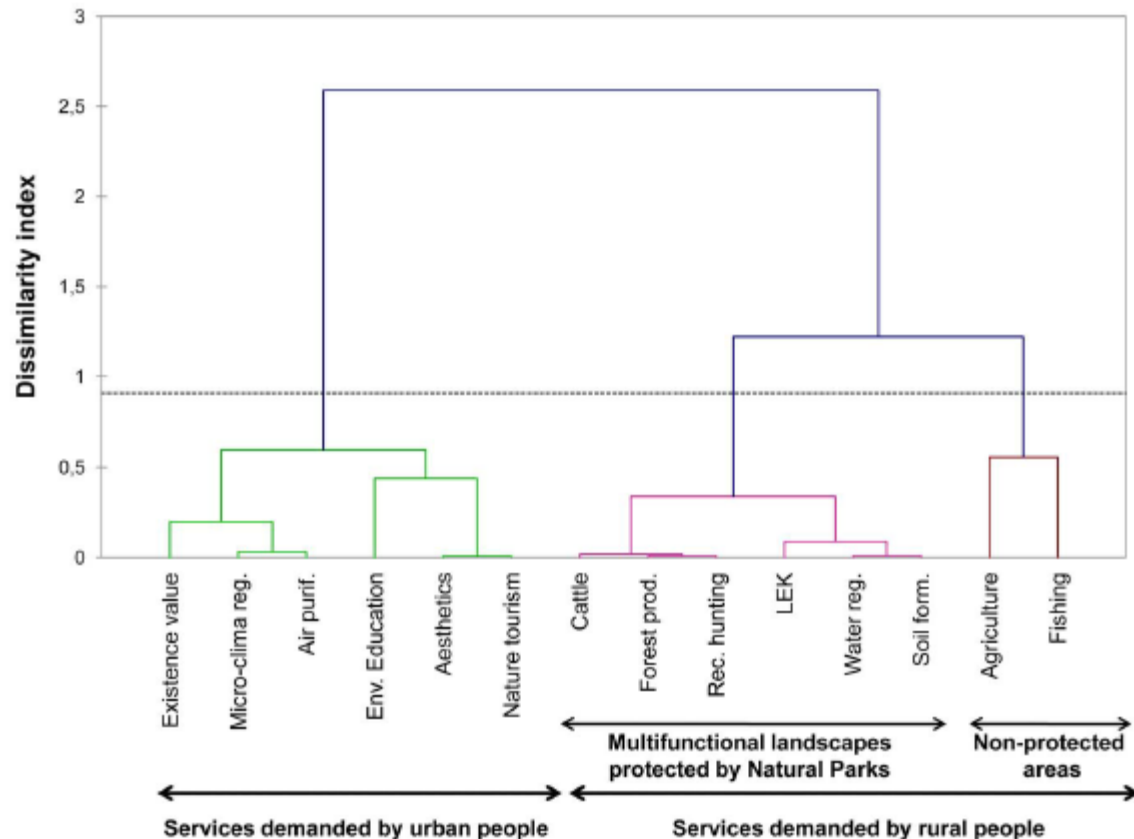
Las mujeres valoran mejor los SE que los hombres



PERCEPCIÓN DE LA POBLACIÓN SOBRE LOS SE

[Martín-López, B., Iniesta-Arandia, I., García-Llorente, M., Palomo, I., Casado-Arzuaga, I., García del Amo, D., Gómez-Baggethun, E., Oteros-Rozas, E., Palacios-Agundez, I., Willaarts, B., González, J.A., Santos-Martín, F., Onaindia, M., López-Santiago, C.A., Montes, C. 2012. Uncovering Ecosystem Service Bundles through Social Preferences. PLoS ONE 7\(6\): e3897](#)

Se compararon 8 casos de estudio en toda España, sobre que SE elegía la gente y que características tenían esas personas

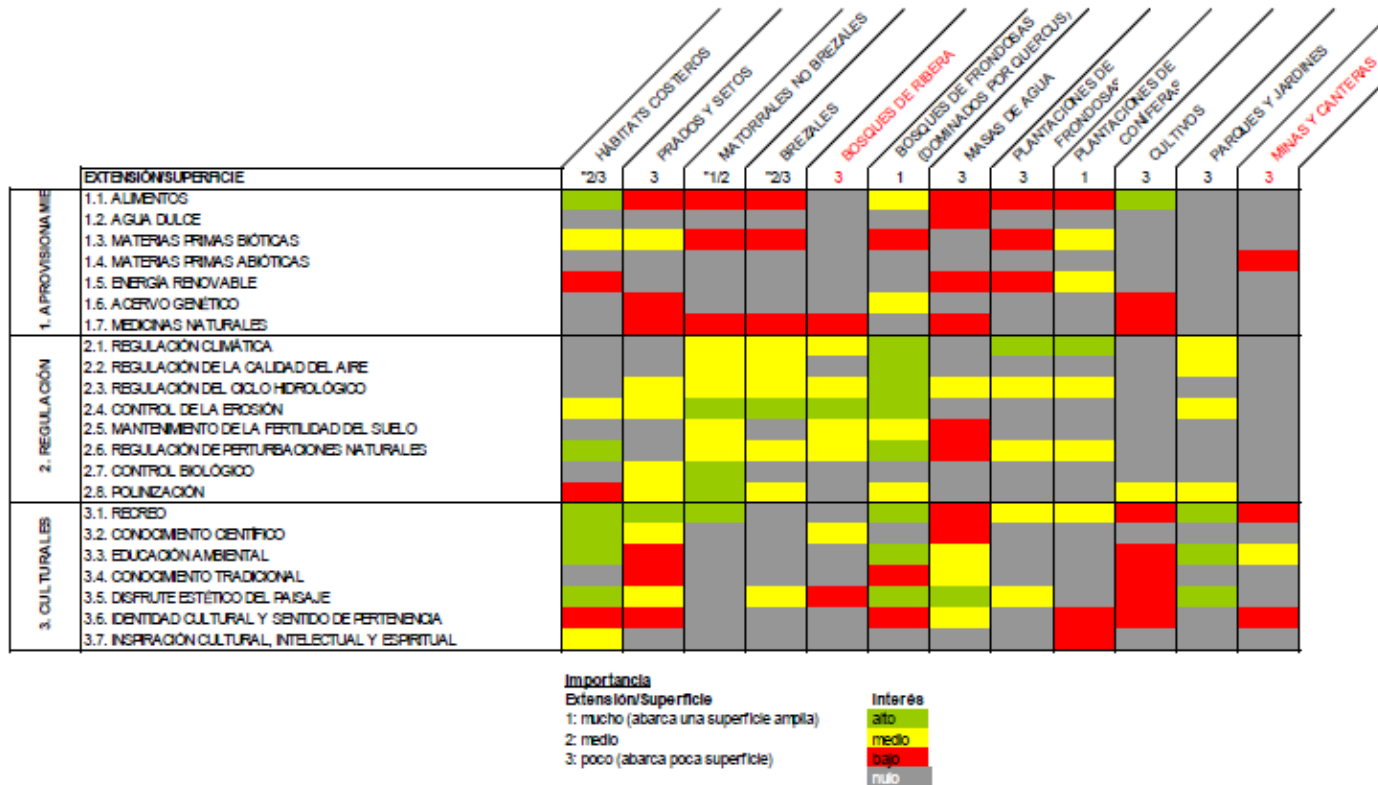




PERCEPCIÓN DE LOS TÉCNICOS DE LA ADMINISTRACIÓN SOBRE LOS SE

Técnicos del Parque rural “Monte Ulia” (Donostia) (2017)

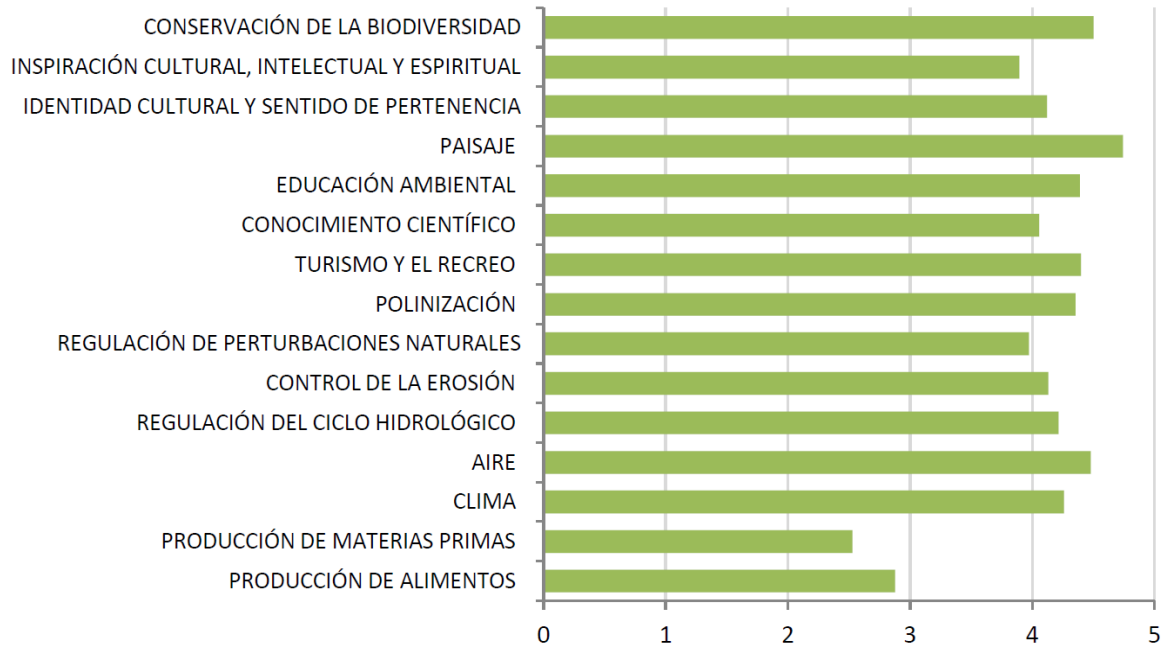
1) Valoración de la importancia de los SE por 4 agentes con un profundo conocimiento del área derivado de sus actividades profesionales y personales y comparación con la cartografía de SE





PERCEPCIÓN DE LOS TÉCNICOS DE LA ADMINISTRACIÓN SOBRE LOS SE

2) Encuesta: valoración de los SE



Disfrute estético del paisaje

Lo valoran mejor las mujeres y los que visitan más a menudo el área

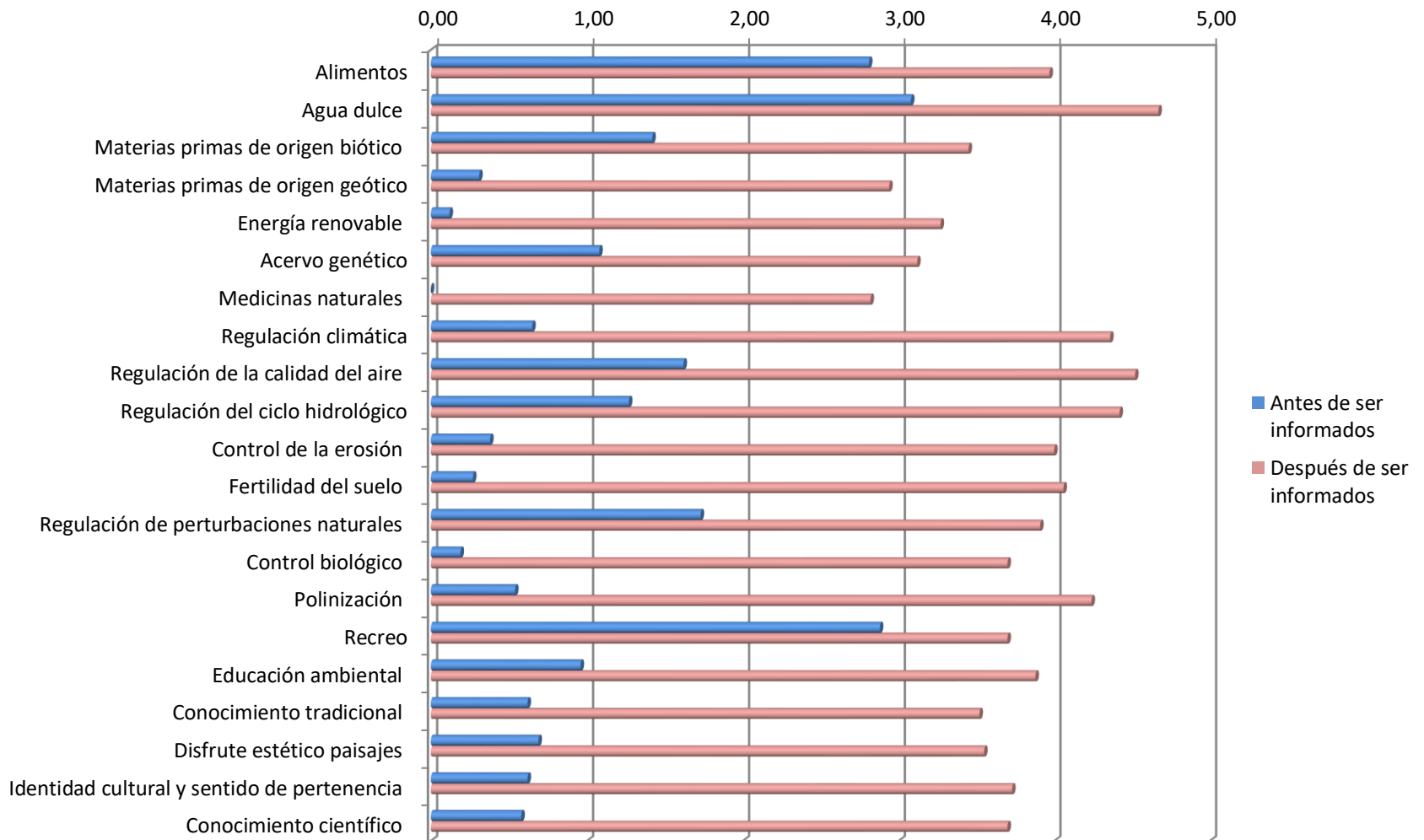
	BIODIVERSIDAD	APROVISIONAMIENTO	REGULACION	CULTURAL
Sexo	0,036*	0,000***	0,002**	0,004**
Edad	0,029	0,023	0,311	0,757
Municipio de residencia	0,219	0,205	0,482	0,645
Pertenencia a una asociación	0,977	0,015*	0,323	0,071
Beneficio para la sociedad	0,290	0,098	0,804	0,726
Conocimiento de los SE	0,474	0,277	0,409	0,113
Visitado alguna vez Uliá	0,740	0,089	0,592	0,622
Frecuencia de visita a Uliá	0,127	0,018*	0,005**	0,001***
Lugar donde se ha rellenado la encuesta	0,028*	0,001***	0,263	0,004**



PERCEPCIÓN DE LOS TÉCNICOS DE LA ADMINISTRACIÓN SOBRE LOS SE

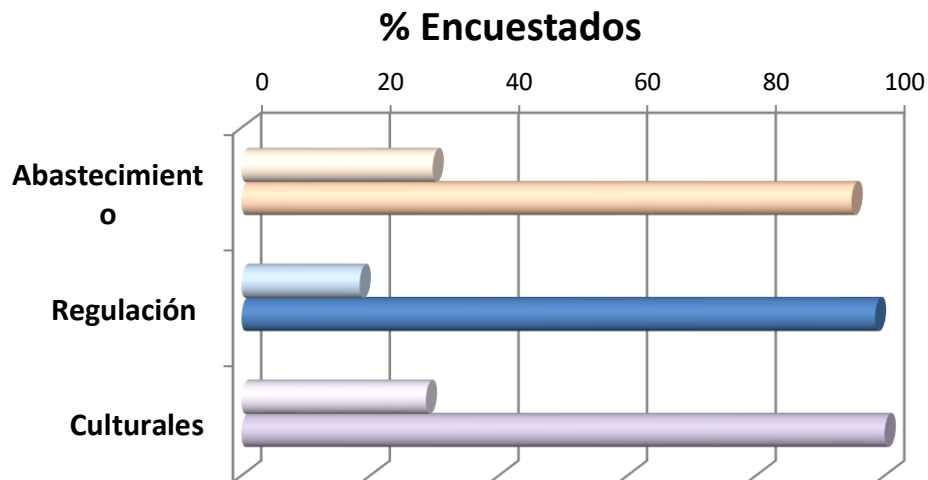
Técnicos asistentes a un curso del IVAP sobre Servicios de los ecosistemas

1. Identificación y valoración de SE antes de recibir información sobre SE
2. Identificación y valoración de SE después de recibir información sobre SE

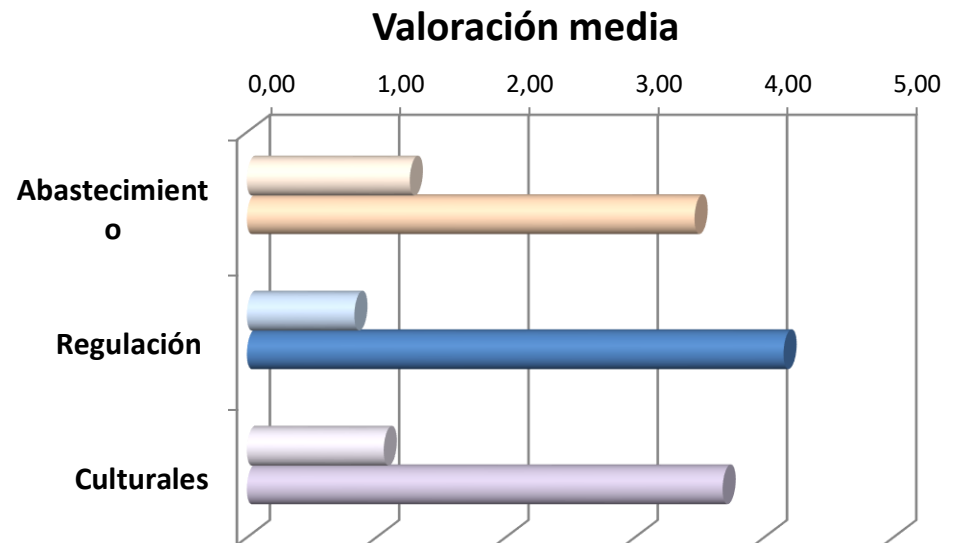




PERCEPCIÓN DE LOS TÉCNICOS DE LA ADMINISTRACIÓN SOBRE LOS SE



Los encuestados antes de ser informados identifican y valoran por igual los SE culturales y de abastecimiento. Sin embargo, cuando reciben la información los SE de regulación adquieren mayor importancia.





PERCEPCIÓN DE LOS TÉCNICOS DE LA ADMINISTRACIÓN SOBRE LOS SE

Técnicos del Departamento de Sostenibilidad y Medio Natural de la DFB

10 técnicos

- Matriz DAFO sobre la integración de SE en la ordenación territorial
- Se les pidió que valorarán del 1-5 los SE que proporcionan algunos ecosistemas

Debilidades

Poca priorización
Lenguaje poco accesible
Falta de instrumentos prácticos
Poca utilización de las TICs

Amenazas

Recortes presupuestarios
Falta de confianza en su funcionamiento
No tener en cuenta el valor intrínseco de los SE
Impulsores de cambio: contaminación

Fortalezas

Respaldo de organismos internacionales
Sinergias con otras administraci. y actores sociales
Visión integral del territorio
Plataformas ciudadanas

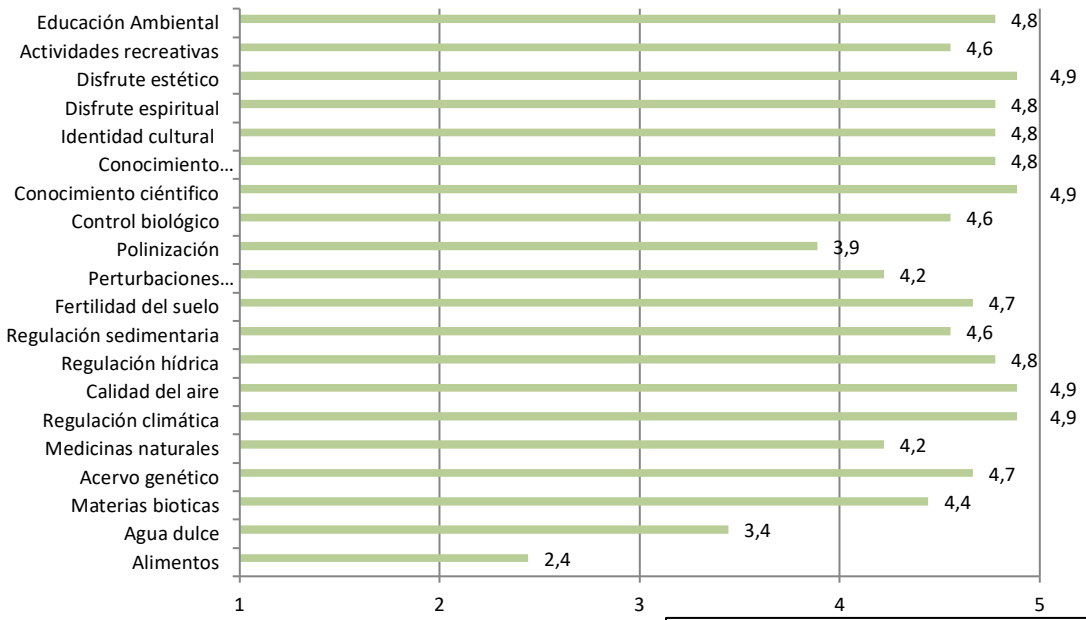
Oportunidades

Universalidad
Concepto accesible para la sociedad
Normativa europea
Sostenibilidad de recursos



PERCEPCIÓN DE LOS TÉCNICOS DE LA ADMINISTRACIÓN SOBRE LOS SE

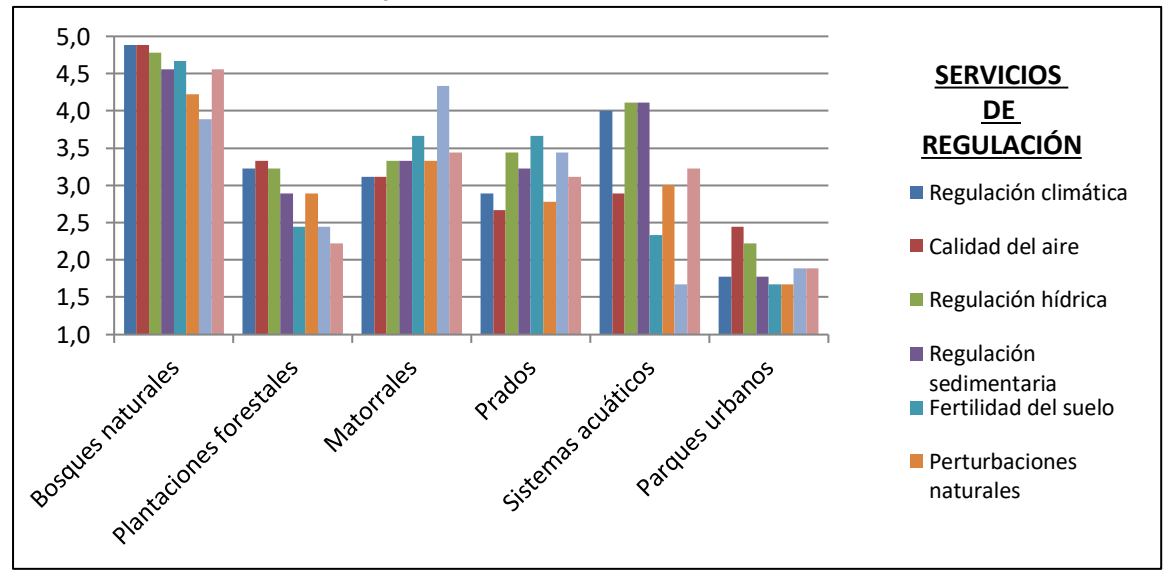
BOSQUES NATURALES



Análisis de las valoraciones

- Por ecosistema
- Por tipo de SE

Bosques naturales y ecosistemas acuáticos ofrecen mayor cantidad de SE





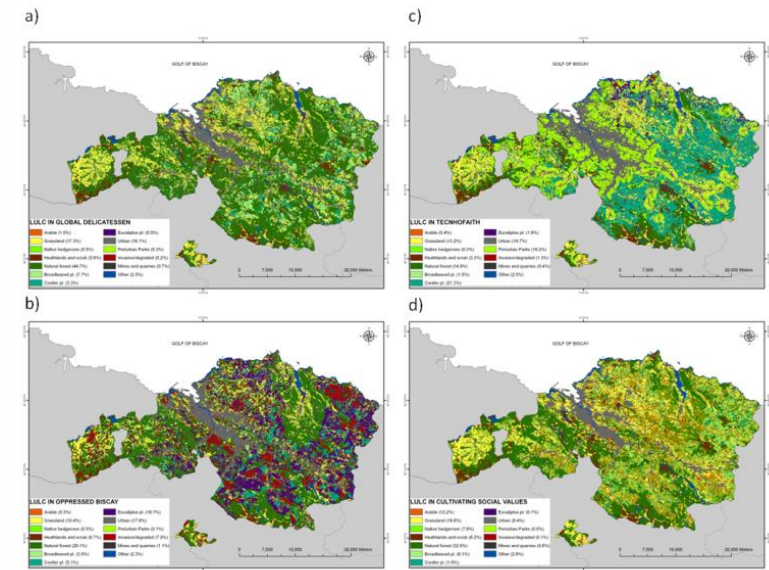
PERCEPCIÓN DE LOS TÉCNICOS DE LA ADMINISTRACIÓN SOBRE LOS SE

Técnicos invitados a un proceso participativo dentro del proyecto para generar escenarios para evaluar las consecuencias de las decisiones

Encuestas estructuradas: 285 stakeholders

2 Workshops: 66 stakeholders.

Discutir los impulsores claves de cambio y definir estrategias de gestión





CONOCER LA PERCEPCIÓN SOBRE LOS SE

[Spyra, M., Kleemann, J., Ipek Cetin, N., Vázquez Navarrete, C.J., Albert, C., Palacios-Agundez, I., Ametzaga-Arregi, I., La Rosa, D., Rozas-Vásquez, D., Adem Esmail, B., Picchi, P., Geneletti, D., König, H.J., Koo, H., Kopperoinen, L., Fürst, C. 2018. The ecosystem services concept: a new Esperanto to facilitate participatory planning processes? *Landscape Ecology*, 1-21. DOI 10.1007/s10980-018-0745-6](#)

Se analizaron 11 casos para ver cómo se había utilizado el concepto de servicio de los ecosistemas en los procesos de participación realizados, y para identificar en los casos de éxito las lecciones aprendidas. Finalmente se dan una serie de recomendaciones para su futura aplicación en procesos participativos.

	Järvenpää City	Tabasco Region	Northern Ghana I	Omeri Watershed	Basque County	Czech-Polish borderland	Schouwen-Duiveland Island	Northern Ghana II	Fuhrberg Watershed	La Araucanía Region	Schalsee Reserves	
Actors involved in the planning process	Stakeholder(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Researcher(s)/ expert(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Citizens	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Total number of actors ¹⁾	333	210	31	562	37	78	33	95	30	14	12
Governance approach	Top-down	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Bottom-up	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Obstacles in the planning process	Economic related issues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Data	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Organizational Incompetence	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Motivation of actors	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Understanding of scientific concept	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Others	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Planning scale of the analyzed case studies	Type of planning scales											
	Policy planning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Spatial planning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Management planning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Spatial scales											
	Macro scale	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Meso scale	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Micro scale	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Temporal scales											
	Strategic (long-term ~50-100 years)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tactical (mid-term ~10-30 years)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Operational (short-term ~1-5 years)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Methodology applied to put the ES concept into practice	Assessment methods											
	Qualitative	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Quantitative	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Participatory methods used											
	Focus group discussions, workshops	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Surveys	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Participatory mapping	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Training	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Others	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Documents and/or acts prepared as process outcomes											
Report	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Data oriented outcomes ²⁾	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Capacity building acts ³⁾	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Inputs for spatial plans ⁴⁾	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
ES models ⁵⁾	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Financial mechanisms proposed to implement												
International funds / EU funds	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
National funds	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Local public funds	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

¹⁾ This number shows the total amount of actors that were involved in implementation of particular case study ²⁾ Data oriented outcomes contains metadata, databases etc. ³⁾ Capacity building acts contains training courses, academic exchange etc. ⁴⁾ Inputs for spatial plans contains scenario workshop, maps of protection zones, regional planning guidelines, development strategies, landscape design strategies. ⁵⁾ ES models contains assessment models as stand-alone tools.



CONOCER LA PERCEPCIÓN SOBRE LOS SE

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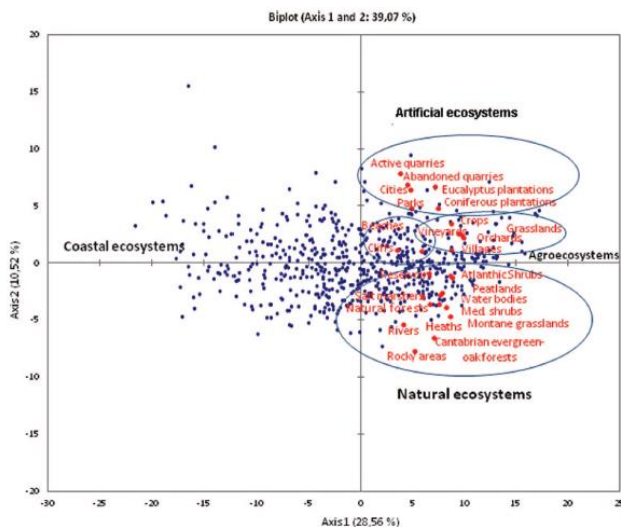


Fig. 4. Distribution of social perceived mean value of the environmental units.



○ Opción 1

○ Opción 2



○ Opción 1

○ Opción 2



○ Opción 1

○ Opción 2

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

Table 2

Mean perceived value of the environmental units (mean \pm 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 $P \leq 0, 0001$.

Environmental units	Perceived value	Environmental units	Perceived value
Rivers	5.68 \pm 0.03 a	Villages	4.37 \pm 0.05 gi
Rocky areas	5.49 \pm 0.03 ab	Orchards	4.36 \pm 0.05 gi
Montane grasslands	5.42 \pm 0.03 b	Vineyards	4.31 \pm 0.05 hi
Natural forests	5.39 \pm 0.04 b	Mediterranean shrubs	4.18 \pm 0.05 ij
Reservoirs	5.34 \pm 0.04 bc	Peatlands	4.07 \pm 0.05 j
Beaches	5.14 \pm 0.04 cd	Crops	3.93 \pm 0.05 jk
Cliff	5.11 \pm 0.04 cde	Parks	3.72 \pm 0.05 kl
Water bodies	4.98 \pm 0.04 df	Coniferous plantations	3.70 \pm 0.06 l
Cantabrian evergreen-oak forests	4.97 \pm 0.04 df	Eucalyptus plantations	2.79 \pm 0.06 m
Heaths	4.90 \pm 0.04 ef	Cities	2.29 \pm 0.04 n
Salt marshes	4.76 \pm 0.04 fg	Abandoned quarries	2.04 \pm 0.05 o
Atlantic shrubs (no heaths)	4.43 \pm 0.05 g	Active quarries	1.51 \pm 0.04 p
Grasslands	4.42 \pm 0.05 gh		

ENCUESTAS

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Table 1
Plausibility and coherency of the major land cover changes in each scenario.

Major land cover changes	% of the total change	Plausibility	Coherency
Oppressed Biscay scenario			
1. From coniferous plantation, grassland, heathlands and scrub and eucalyptus plantation to natural forest	35.64	It is a plausible change because natural forests are the potential natural vegetation of these land cover types (Basque Government, 2006) and natural succession usually proceeds towards woodland (Prach et al., 2014). In addition, plantations in the study area provide optimal conditions for regenerating native forests although some management actions must be undertaken to bring about regeneration (Onaindia et al., 2013a).	Following a productivity crisis and land abandonment, the primary sector declines in favour of growth in tourism dependent on protected and relatively wild natural areas. Therefore, in protected public areas native forest regeneration is expected.
2. From Coniferous plantation to Eucalyptus plantation	28.29	This results from a forestry management decision that many land owners have already taken in order to maximize profit.	In this scenario differing tendencies are shown with regard to landscape planning and forest management. While in publicly protected areas natural forests regeneration is encouraged, the private sector prioritizes more intensive high rate growth plantations for energy production.
3. From various cover types to urban	16.44	This is a plausible anthropogenic conversion that has historically occurred in the region, having had a significant impact over the last 50 years.	In this authoritarian scenario, where rich people live in heavily protected houses with gardens outside the cities, an increase in urban areas, especially around the development of new large-scale transport infrastructure, is expected.
4. From grassland, heathlands and scrub, arable land and other cover types to invasive species or degraded land	13.84	With land abandonment, widespread use of invasive species and transgenic organisms, and various unsustainable activities having severe environmental impacts, many land cover types are likely to become degraded.	The heterogeneous landscape of this scenario includes heavily damaged areas and abandoned rural areas. In addition, expansion of areas dominated by invasive species and genetically-modified plants present a challenge to an already impoverished native biodiversity. All of this results in the conversion of many cover types to invasive species or degraded land.
5. From grassland to heathlands and scrub	4.78	Due to land abandonment, many grasslands became scrubland and heathlands by natural succession. After land abandonment, natural succession has been seen to follow a broadly predictable pathway (Prevosto et al., 2011).	It is coherent with this scenario where land abandonment is expected.
6. From a variety of cover types to mines and quarries	1.02	The territory is rich in limestone, much of which has not been yet exploited due to high negative trade-offs with other uses.	Linked to unsustainable consumption of resources and the development of large-scale infrastructure projects in this scenario, a dramatic increase in the number of quarries is expected in this authoritarian scenario, which is not influenced much by social or environmental issues.
Global delicatessen scenario			
1. From coniferous plantations (50% of changes in cover), exotic forest plantations, heathlands and scrubland, grassland and other cover types, to natural forests	69.49	This is a plausible change because all of these cover types may convert to natural forest, which is the potential natural vegetation of these areas (Basque Government, 2006). 40 years will allow time for at least the early stages of native forest regeneration, especially with active management (Onaindia et al., 2013a).	It is coherent with the scenario because growth of natural forests is promoted in order to encourage ecotourism, which is as an important economic activity in the scenario.
2. From rapid growth and fast turnover plantations, to slow turnover broadleaved deciduous plantations	12.71	This conversion in forestry from rapidly growing to slower growing but higher quality species is a plausible change, although it currently occurs only occasionally, as it is not widely promoted.	In this scenario, in order to increase landscape quality, forestry is reoriented towards higher quality, mainly native, species and more sustainable management.
3. From coniferous plantations to heathlands and scrub	1.74	After clear-cutting a coniferous plantation, heathlands and scrublands predominate in the early stages of succession, unless interventions are put in place to prevent this.	Not all forest plantations are expected to be clear-cut at the same time and interventions to prevent the development of heathland or scrub is not expected at all locations.
4. From various cover types to urban	14.41	This is a plausible anthropogenic change that historically has often occurred in the region, having had a dramatic impact over the last 50 years.	In this scenario, where the global market is a key driver of change and consumption patterns are not sustainable, an increase in urban areas due to infrastructure development is expected.
Technofaith scenario			
1. From forest plantations, grasslands, heathlands and scrub, natural forests and other cover types to Periurban parks	53.87	When urban population increases, there is likely to be a greater demand for periurban parks with more and more man-made features and infrastructure to service them.	Population density in urban areas increases in this scenario and outlying areas are converted to large periurban parks. Many rural areas are therefore converted into locations for leisure activities for city dwellers.
2. From various cover types to urban	29.79	With an increase in urban population and higher levels of demand, for housing land, service industries etc. the urban area is likely to increase.	This scenario is the most urban and most disconnected from the natural world. In this consumption-driven and highly technological society urban areas are expected to increase.

Table 1 (Continued)

Major land cover changes	% of the total change	Plausibility	Coherency
3. From coniferous plantations to natural forest	12.06	Pine plantations in the study area provide optimal conditions for regenerating native forests (Onaindia et al., 2013a).	Even though this scenario is the most urban and most disconnected from the natural world, and its ecosystems are highly modified, some natural forest recovery occurs, such as in riverine woodland.
4. From heathlands and scrub to invasive or degraded land	3.48	The generalized use of genetically modified organisms in the region would bring about a change from heathlands and scrub to land dominated by invasive species or degraded land.	In this scenario the use of genetically modified organisms is common, and there are high levels of biological pollution.
Cultivating social values scenario			
1. From exotic forest plantations (mainly pine) to natural forest	41.96	Plantations in the study area provide optimal conditions for regenerating native forests because within approximately 20 years they are able to foster the regeneration of most species of native trees and ferns as well as some herb species typical of native woodland (Onaindia et al., 2013a), although some management initiatives must be undertaken to encourage this regeneration.	In this scenario management is undertaken to preserve, improve and regenerate natural ecosystems and recovery of natural forests is actively promoted
2. From rapid growth and fast turnover plantations (e.g. <i>Pinus radiata</i>), as well as from heathlands and scrubland, to arable land with native hedgerows surrounding it	41.91	In the 1950s, industrialization in the region initiated a crisis in the agricultural areas that resulted in farm abandonment and the spread of rapid growth and fast turnover plantations in many places suitable for agriculture.	Under this scenario there is an aim to reduce dependency of ES from outside the region, and increase self sufficiency and sustainability. It promotes mosaic landscapes and diversified, organic and sustainable arable land. Furthermore, the ecological and economic value of some ES can be maintained and enhanced on arable farm land by adopting sustainable practices such as organic farming (Sandhu et al., 2010). In addition, hedgerows of native species are an important element of multi-functional landscapes that contribute to the maintenance of biodiversity and ES, providing resources of economic and social interest (Otero and Onaindia, 2009; Morandin and Kremen, 2013).
3. From fast growing exotic tree species to broadleaved native plantations	13.52	This conversion in forestry from rapidly growing to slower growing but higher quality species is a plausible change, although it currently occurs only occasionally, as it is not widely promoted.	In this scenario, a more diversified and sustainable forestry sector is encouraged, with a tendency towards slower growing, mainly native, species, where timber quality is higher.
4. From other land cover types such as grassland, arable land, heathland and scrub to natural forests (especially riparian)	2.24	Natural succession usually proceeds towards woodland (Prach et al., 2014), which in this scenario is expected to be encouraged by active management to encourage regeneration of native forest.	In this scenarios key ecosystems such as riverine woodland are regenerated, because conservation of healthy riparian habitats is crucial for maintaining many important ecological functions (Naiman et al., 2005), including many services provided to society (Hruby, 2009).

CONOCER LA PERCEPCIÓN SOBRE LOS SE

Palacios-Agundez, I., Fernández de Manuel, B., Rodríguez-Loinaz, G., Peña, L., Ametzaga-Arregi, I., G. Alday, J., Casado-Arzuaga, I., Madariaga, I., Arana, X., Onaindia, M. 2014. Integrating stakeholders' demands and scientific knowledge on ecosystem services in landscape planning. Landscape Ecology 29: 1423-1433.

Table 1 Summary of the main results obtained in the participatory process

Questionnaire results (% of respondents)	Participants' perception on forest systems and their services	Most relevant drivers of change	Sustainable target scenario description	Management proposals
34.29 % explicitly mentioned forest aspects on their open answers	Natural forests have a higher potential to provide ES to society than exotic plantations	Governance and institutional coherence	Proactive work is performed from the local to the global scale and vice versa	Coherence between policy and actions is needed: governments at different scales have an important role to play
Highest potential for successful intervention among drivers of change	Currently some important ecosystem services, such as the aesthetic value of landscape diversification, are not sufficiently reinforced	Land and urban planning	Landscape multi-functionality is key in this scenario: biodiversity and carbon storage are enhanced	Strategic landscape planning and management is needed
Indirect driver: primary sector development (88.57 % assigned the highest value)	The applied forest management type is relevant for the quality and quantity of ES	Primary sector development	Local sustainable productivity is promoted	New financial mechanism and incentives should be created
Direct driver: forest management (85.71 % assigned the highest value)	Current lack of profitability: new business options (e.g., diversification of species)	Forest management	Sustainable forest management is reinforced, and the quality and variety of forest are improved	Changes in forest management and landscape planning should be promoted in an integrative and proactive way
		Ecosystems degradation	Autochthonous ecosystems and their functionality are conserved and recovered	Public lands are used to recover natural forest ecosystems
		Innovation and science	Society uses scientific knowledge to protect ecosystem functionality	Research and traditional knowledge recovery are essential
		Participatory policy making model	Education, local participation and knowledge society	Public awareness on the importance of Landscape multi-functionality should be reinforced
				Promotion of environmental education from early stages
				Scientific and local knowledge should be spread to society through educational campaigns

Number of participants: questionnaire on drivers of change = 35, workshop = 55, total (counting each individual just ones) = 66