MONETARY VALUATION OF NATURAL CAPITAL AND PAYING FOR ECOSYSTEM SERVICES

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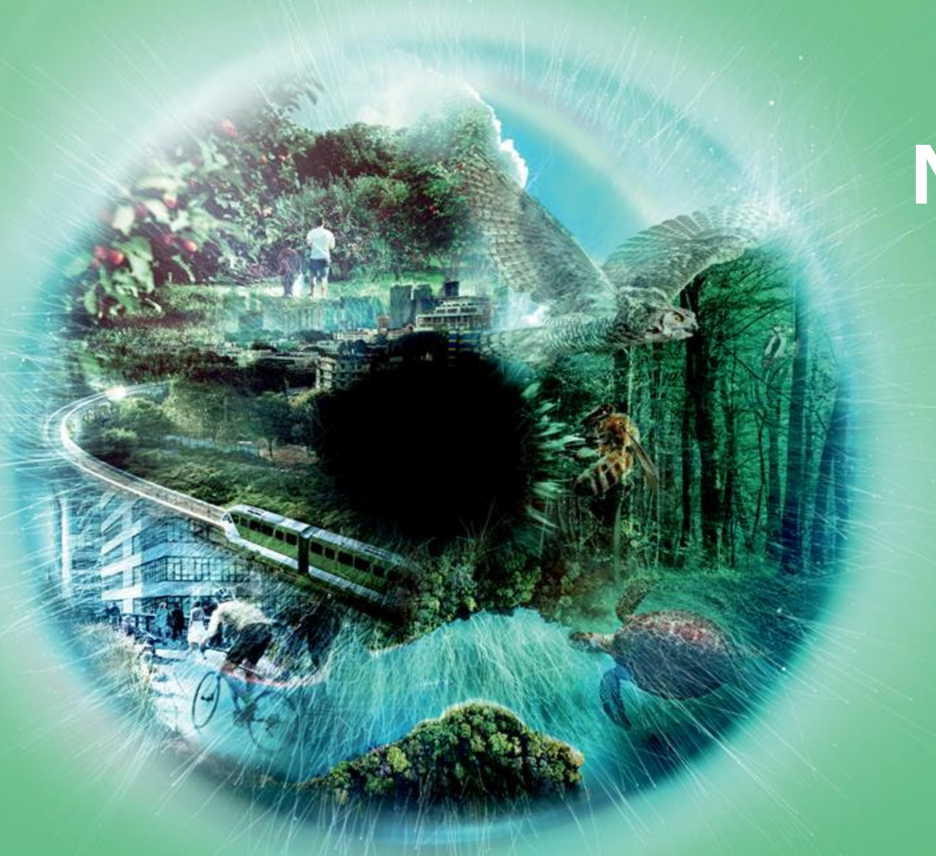

A NEW BEGINNING
FOR PEOPLE AND NATURE

#EUGreenWeek

19–22 OCTOBER 2020

European Commission

MONETARY VALUATION OF NATURAL CAPITAL AND PAYING FOR ECOSYSTEM SERVICES

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- **Environmental Valuation**

- **Payments for Ecosystem Services**

Do we want to value the environment?

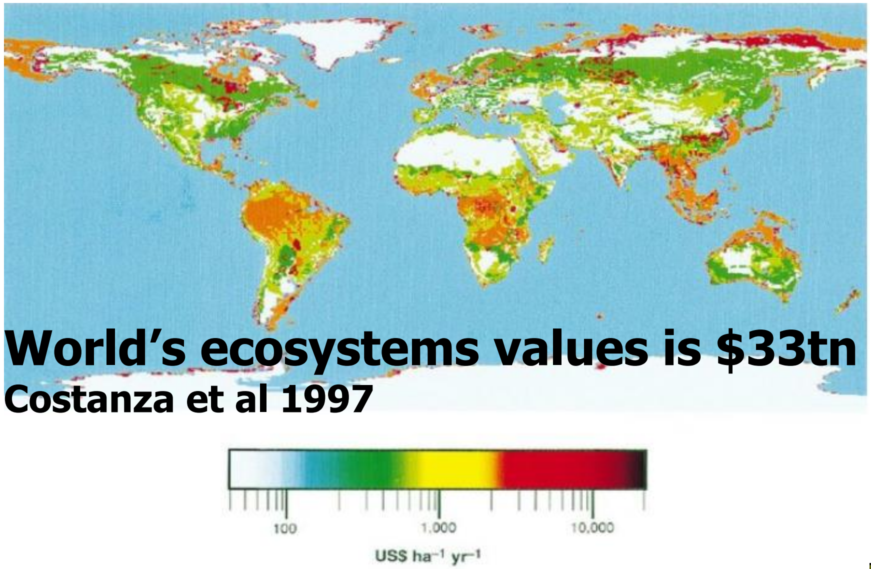
DEEP HORIZON OIL SPILL

4.9 million barrels discharged

In 2015 the court ruled that BP should pay a fine of $18.7 billions

We want to value the environment for..

Awareness raising



World's ecosystems values is $33tn
Costanza et al 1997

...US $577b in annual global crops are at risk from pollinator loss (recent media release)

We want to value the environment for…

answering policy questions

Which areas are at risk?

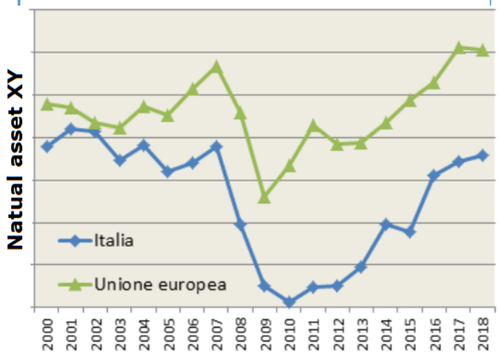
Are these projects worth it?

Who gains?
Who loses?

Compensation?

Trend

+



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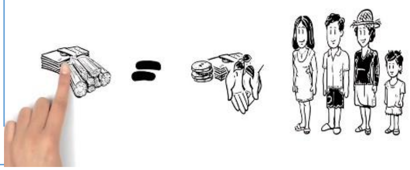
Net benefits?

Most efficient?

Incentives?



Sanction?

Accounting

Priority setting

Instrument design

Economic liability

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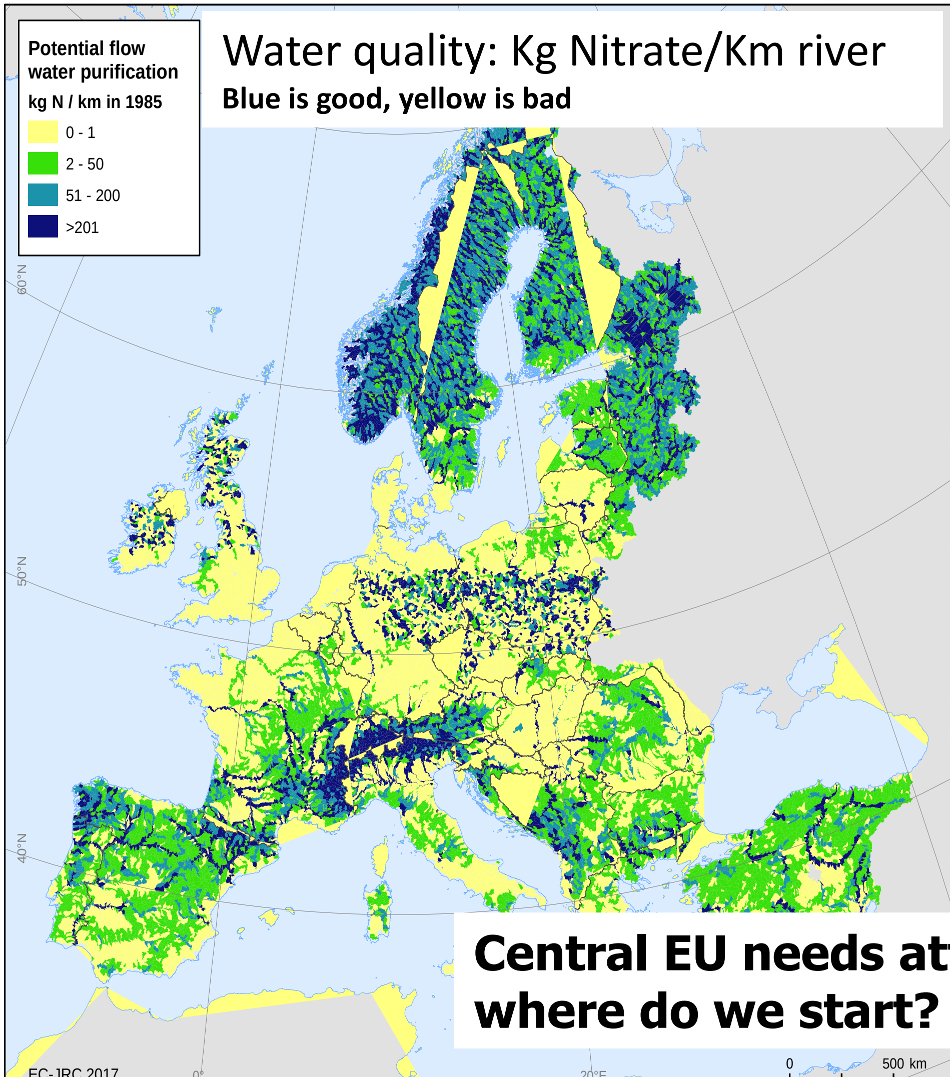
Ecosystem services: biophysical accounts

Water quality: Kg Nitrate/Km river

Blue is good, yellow is bad



Nature-based recreation:

Change in number of visits

Green is good, Pink is bad

Central EU needs attention
where do we start? Water? Recreation?

Ecosystems provide Market goods

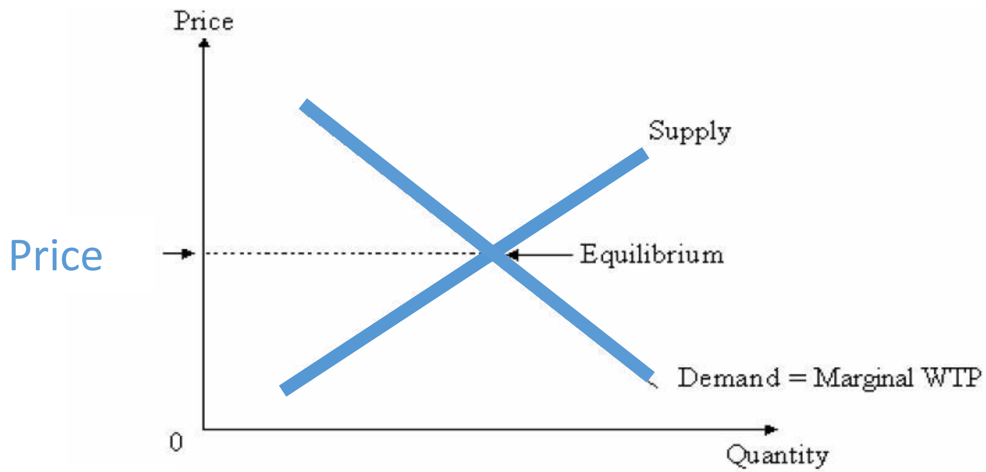
Market is one of the many varieties of systems, institutions, [...] whereby parties engage in exchanges

Market price reflects the interaction of demand and supply (see Figure 3). The equil market price is equal to the marginal value of an item (i.e. price is equal to the value of t unit consumed).

Are market prices proxy **of natural resources** values?

Water/Diamonts

Figure 3: The determination of market price



Ecosystems provide

Non-Market goods

Any good or service which provides/enhances individual welfare can be considered a market (no-market) good or service.

Min

RIVALITY

Public goods:
- Landscape
- Pandemic prevention

Club goods:
- Natural area
- Parks

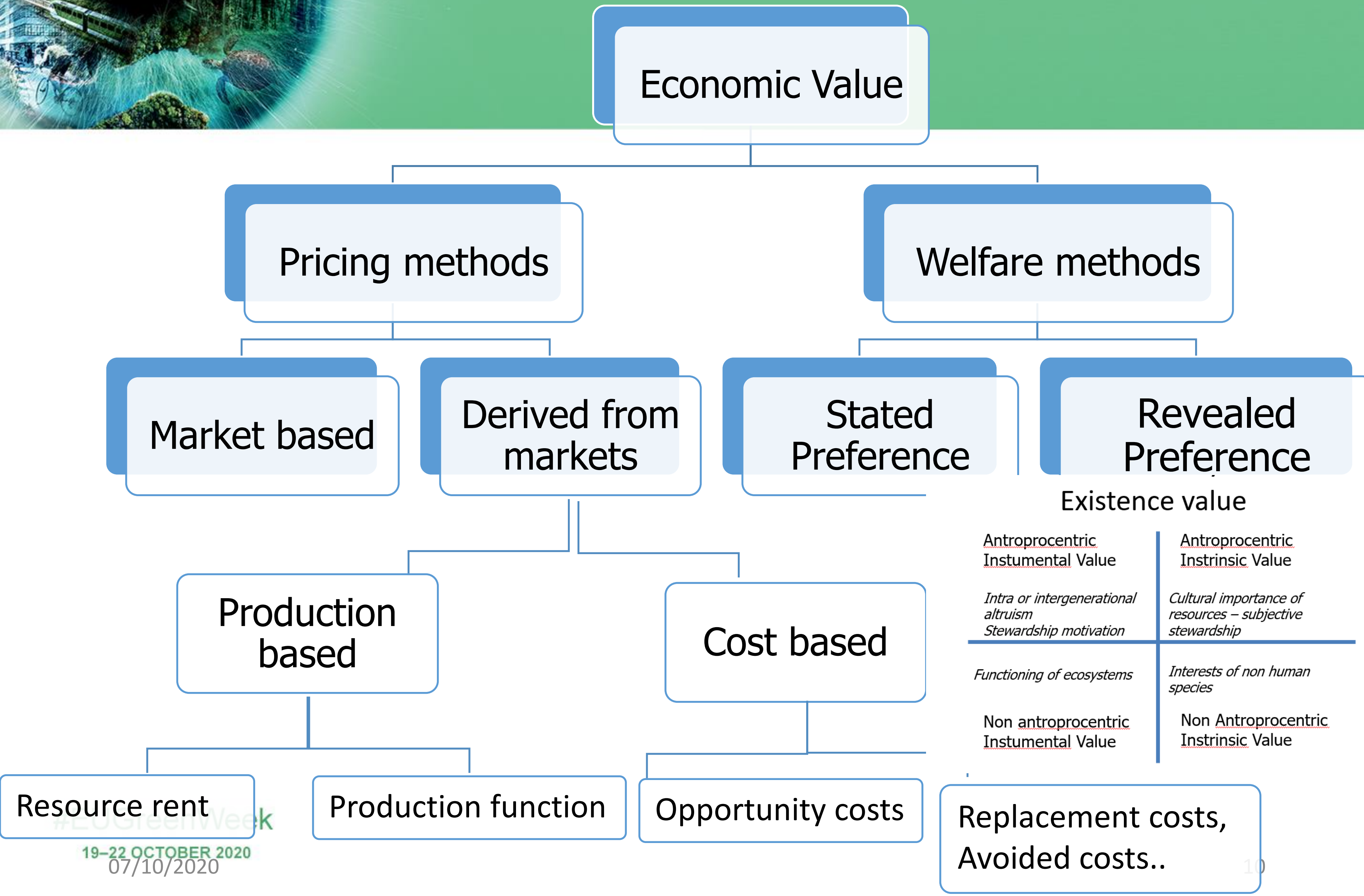
Common goods:
- Fish stock

Market goods:
- Timber

Max

Min EXCLUDABILITY Max

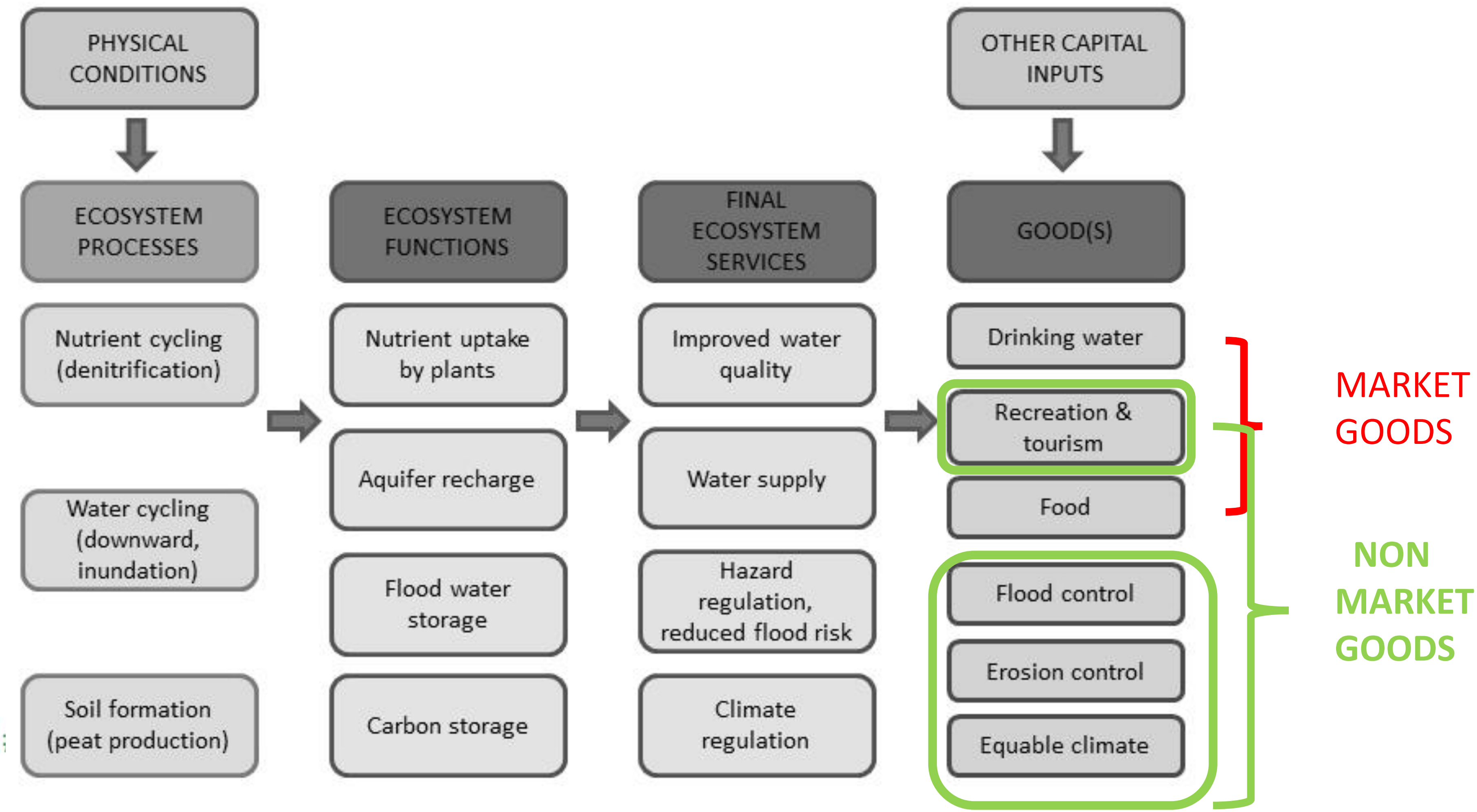
Economic Valuation methods



MARKETS AND VALUES

- There is a mismatch between **markets** and **values**
- Markets can be set up so that at least some values are transformed into monetary terms
- Payments for Ecosystem Services (**PES**)

ECOSYSTEM SERVICES



PAYMENTS FOR ECOYSTEM SERVICES

“ **Voluntary transactions** where a well-defined Ecosystem Service (or an action likely to secure that service) is being ‘bought’ by a **buyer** from a **provider** ”

Wunder (2005)

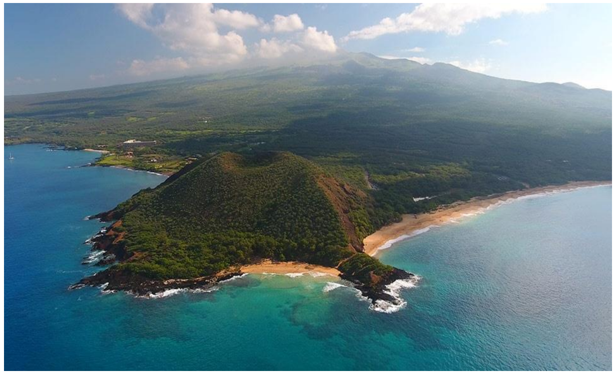
PES CHARACTERISTICS

- One or more ecosystem services
- One or more beneficiaries (the buyers)
- One or more providers (the seller)
- A **payment scheme** (and a monitoring approach)

EXAMPLES

- Vittel (North of France)

- Marine Protected Area (Maui)



VITTEL

THE ISSUE

- Increasing **nitrate concentrations** in the water posed a threat to the production of Vittel natural mineral water and to the thermal tourism
- The pollution is coming mainly from the intensive dairy farming in the area

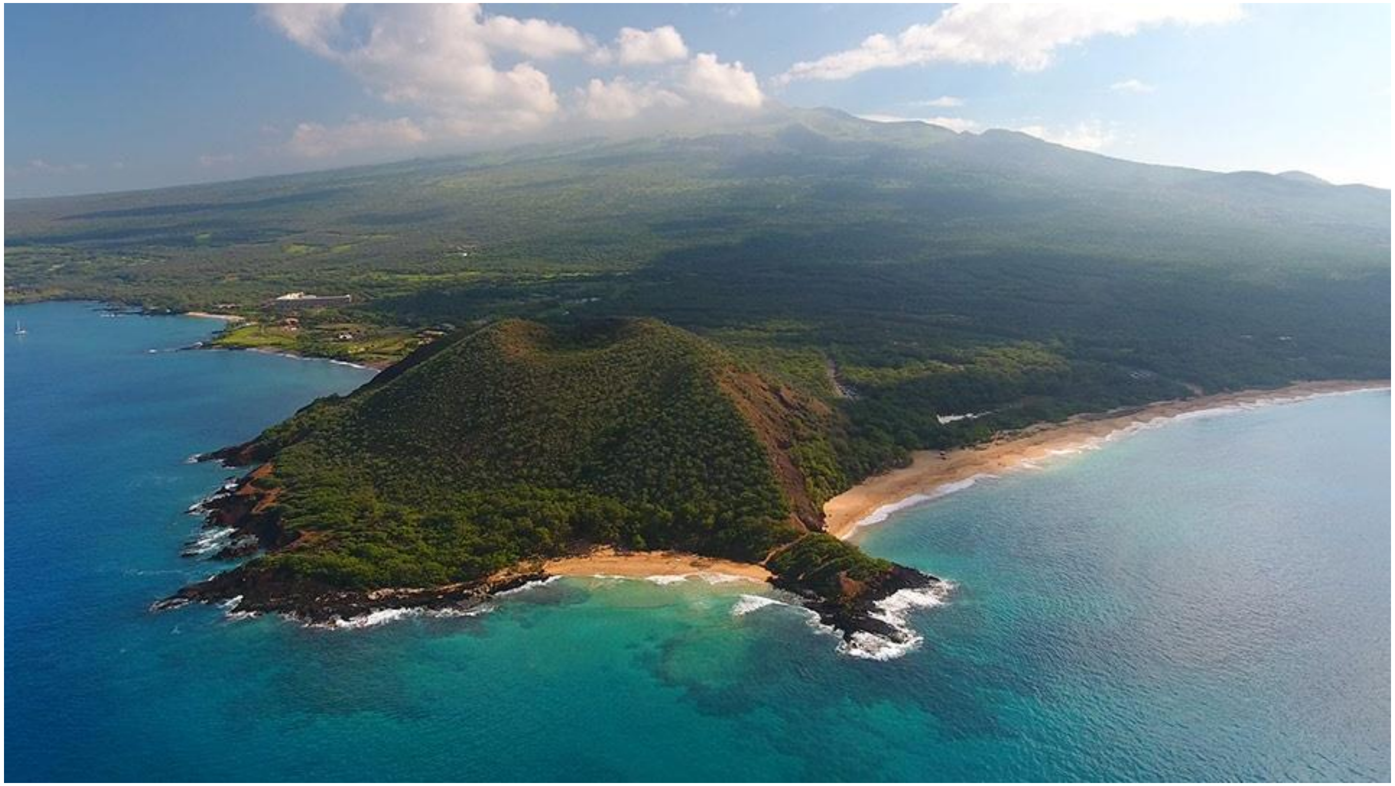
PES CHARACTERISTICS

- **The buyer**: Nestlé Waters
- **The sellers**: local farmers
- **The service**: pristine water
- **The payment scheme**: direct payments to change farming practices

LESSONS LEARNED

- PES may require many years to be introduced
- The buyer is **not paying for the service itself**, but for practices that are likely to produce the service
- **Transaction** and **monitoring** costs can be significant
- **Long term agreements** are necessary

MAUI



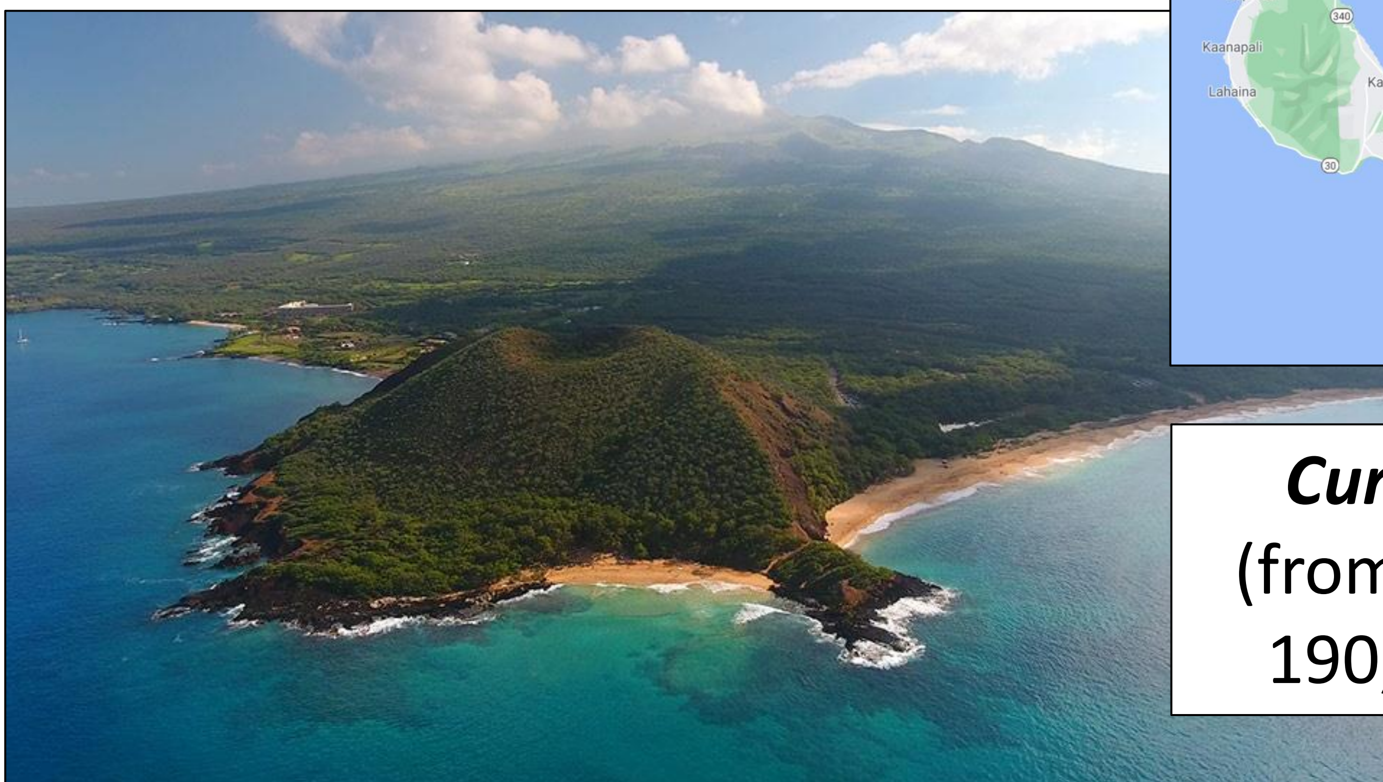
THE ISSUE

- Climate change, overfishing, land based pollution are depleting **coastal coral reef ecosystems**

- These ecosystems have huge **recreation values** for both residents and tourists

CURRENT SITUATION

- Case study: Makena Beach Park



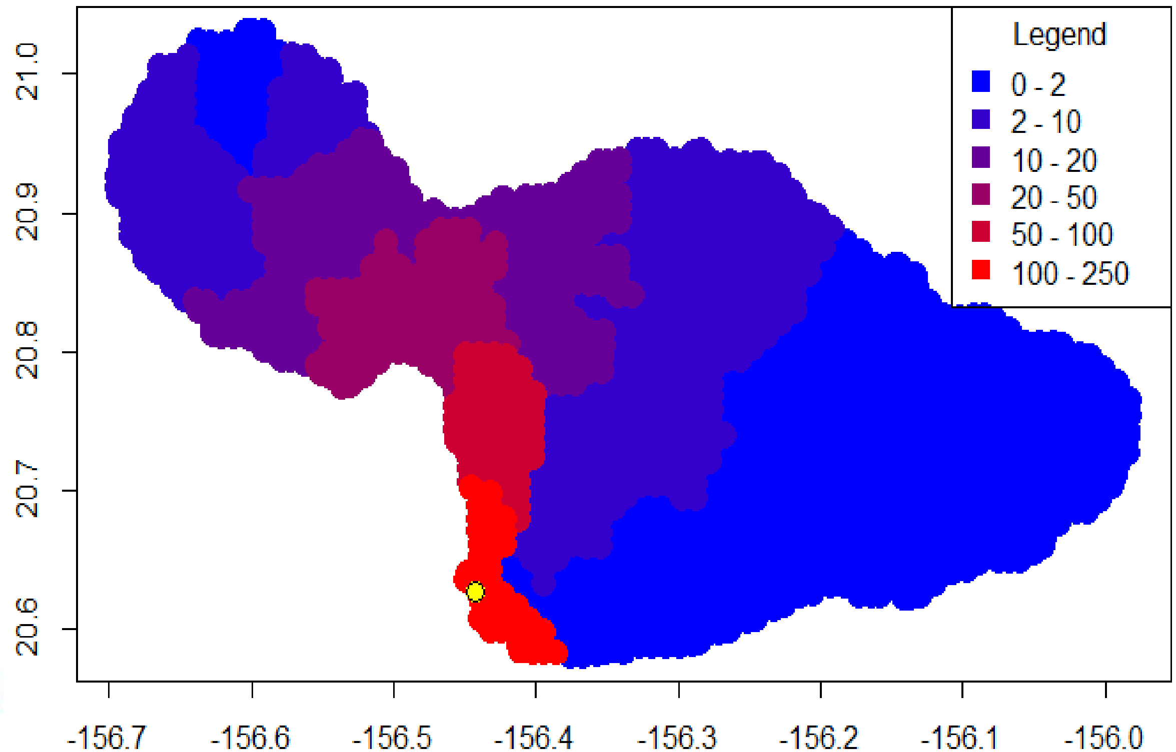
Current visits
(from residents):
190,000 / year

PES CHARACTERISTICS

- **The buyer**: residents (and tourists)
- **The sellers**: the State
- **The service**: recreation in pristine ecosystems (swimming, snorkeling, diving, etc.)
- **The payment scheme**: entrance fee

ECOLOGICAL IMPROVEMENT

- 20% increse in coral cover and fish biomass

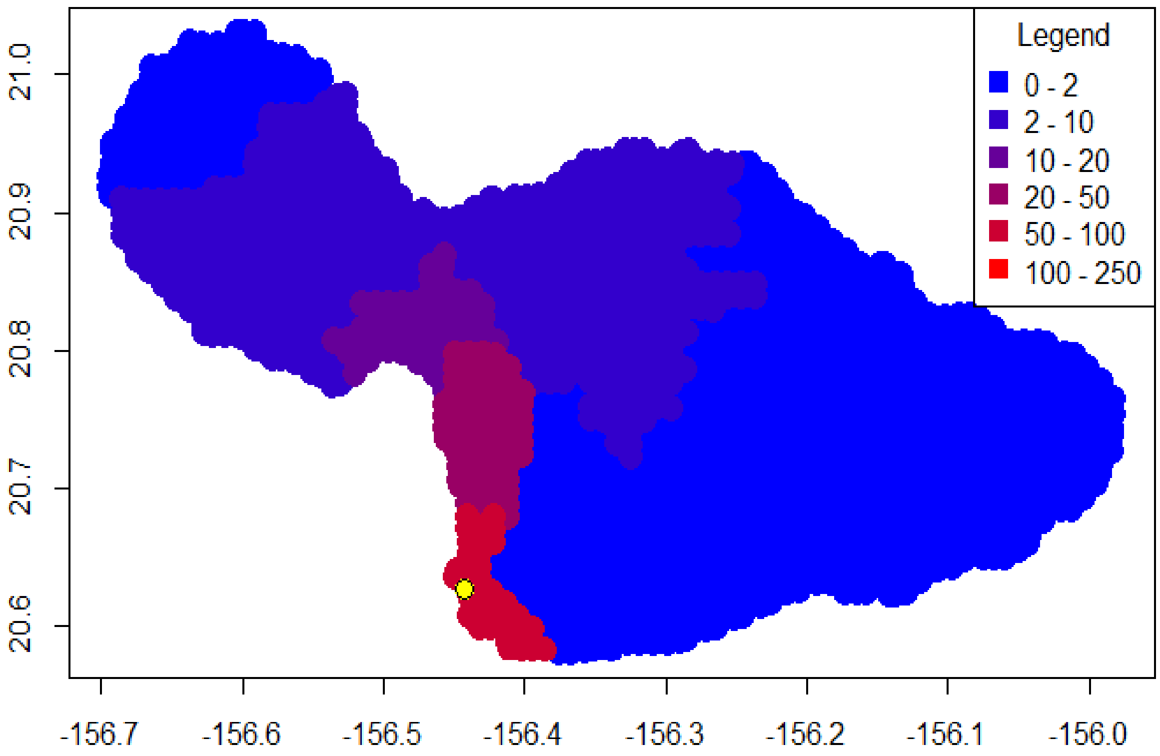


Additional visits:
185,000 / year

Welfare gain:
$2.4 million / year

ECOLOGICAL IMPROVEMENT + 5$ ENTRANCE FEE

- 20% increse in coral cover and fish biomass



Additional visits: 70,000 / year

Welfare gain: $1 million / year

Revenues: $1.4 million / year

CONCLUSIONS

- The environment signficantly contributes to human **wellbeing**, with both market and non-market good and services

- **Economics** can provide crucial insights for environmental policy

- PESs are very compelling **policy instruments** to protect the environment and improve wellbeing

LITERATURE AND CONTACTS

ECOSYSTEM HEALTH AND SUSTAINABILITY
2019, VOL. 5, NO. 1, 237–241
https://doi.org/10.1080/20964129.2019.1682470

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Natural capital accounting perspectives: a pragmatic way forward

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Ecosystem Services 40 (2019) 101044

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How ecosystem services are changing: an accounting application at the EU level

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ABSTRACT

Ecosystem services accounts are a useful tool that provides relevant information on the role of ecosystems in delivering services, and the society benefiting from them. This paper presents the accounting workflow for ecosystem services at the European Union level adopted by the Knowledge Innovation Project on an Integrated system for Natural Capital and ecosystem services Accounting (KIP INCA) - a European Commission initiative. The workflow includes: 1) biophysical assessment of ecosystem services; 2) monetary valuation; and 3) compilation of accounting tables. Supply and use tables are presented for six ecosystem services assessed so far. The supply table shows woodland and forest, followed by wetlands, as the ecosystem types with the highest monetary value per unit area. Analyses of changes between 2000 and 2012 show an overall increase of the monetary value of ecosystem services, mainly due to an increase in demand for them. We also discuss advantages and disadvantages of adopting a fast-track approach, based on official statistics, in comparison to an accounting strategy based on spatial models. We propose a novel workflow for ecosystem services accounts, focused on assessment of the actual flow of ecosystem services, making a significant contribution to further development of the technical recommendations for ecosystem services accounts.

Environ Resource Econ (2011) 48:177–218
DOI 10.1007/s10640-010-9418-x

Economic Analysis for Ecosystem Service Assessments

Ian J. Bateman · Georgina M. Mace ·
Carlo Fezzi · Giles Atkinson · Kerry Turner

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Abstract
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LETTERS
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The environmental impact of climate change adaptation on land use and water quality

Carlo Fezzi[1,2]*, Amii R. Harwood[2], Andrew A. Lovett[2] and Ian J. Bateman[2]

Encouraging adaptation is an essential aspect of the policy response to climate change[1]. Adaptation seeks to reduce the harmful consequences and harness any beneficial opportunities arising from the changing climate. However, given that human activities are the main cause of environmental transformations worldwide[2], it follows that adaptation itself also has the potential to generate further pressures, creating new threats for both local and global ecosystems. From this perspective, policies designed to encourage adaptation may conflict with regulation aimed at preserving or enhancing environmental quality. This aspect of adaptation has received relatively little consideration in either policy design or academic debate. To highlight this issue, we analyse the trade-offs between two fundamental ecosystem services that will be impacted by climate change: provisioning services derived from agriculture and regulating services in the form of freshwater quality. Results indicate that climate adaptation in the farming sector will generate fundamental changes in river water quality. In some areas, policies that encourage adaptation are expected to be in conflict with existing regulations aimed at improving freshwater ecosystems. These findings illustrate the importance of anticipating the wider impacts of human adaptation to climate change when designing environmental policies.

On a global scale, agriculture is the economic sector that is likely to bear the greatest financial impact as a result of climate change[3]. Farmers are expected to adapt by switching activities to those that are most profitable given the new conditions they will face. As agriculture is one of the main drivers of freshwater quality[2,4], these changes in farmland use have the potential to substantially alter water ecosystems. For example, agricultural

Table 1 | Water-quality models.

	Nitrate	Phosphate
Intercept	46.48*	0.389*
	(2.57)	(0.056)
$share_{urban}$	−4.24	0.897*
	(20.08)	(0.137)
$share_{rough}$	−40.23*	−0.485†
	(7.43)	(0.246)
$share_{grass}$	−37.94*	−0.311‡
	(9.47)	(0.132)
$share_{wood}$	−34.64*	−0.589†
	(9.31)	(0.339)
$D_{livestock}$*$share_{grass}$	10.38‡	-
	(4.93)	
D_{pop}*$share_{urban}$	0.18	-
	(0.53)	
precipitation	−0.62‡	-
	(0.92)	
σ	7.47*	0.231*
	(0.39)	(0.011)
Log-likelihood	−286.26	−439.60
Pseudo R^2 (McFadden)	0.28	0.10

Interval regression model estimated with Gaussian residuals on 214 monitoring points located on independent river catchments. Coefficients need to be interpreted using the share of arable land as the baseline category. Standard errors of the coefficients are shown in parentheses, σ is the estimated standard deviation of the error term. $D_{livestock}$ is the livestock density (number of cattle per hectare of grassland); D_{pop} is the population intensity (defined as the number of people per hectare). Significance levels: * = 0.01, ‡ = 0.05, † = 0.10.

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