

# A Transactional Environmental Support System for Europe

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# 14 partners, 10 countries

1	<b>Aristotle University of Thessaloniki (Greece) Coordination</b>
2	<b>Bournemouth University (United Kingdom)</b>
3	<b>NERC Centre for Ecology &amp; Hydrology (United Kingdom)</b>
4	<b>Anatrack Ltd (United Kingdom)</b>
5	<b>Ordenamento e Gestão de Recursos Naturais (Portugal)</b>
6	<b>Tero Ltd (Greece)</b>
7	<b>European Sustainable Use Specialist Group of IUCN (Belgium)</b>
8	<b>Federation of Associations for Hunting and Conservation of the EU</b>
9	<b>Pro-Biodiversity Service (Poland)</b>
10	<b>Centre for Cartography of Fauna and Flora (Slovenia)</b>
11	<b>Szent Istvan University (Hungary)</b>
12	<b>Tallinn University of Technology (Estonia)</b>
13	<b>Danube Delta National Institute for R&amp;D (Romania)</b>
14	<b>WWF Turkey (Turkey)</b>

# History

- 2002 Report for Council of Europe in Kiev high level conference proposes integrating complex knowledge for livelihoods & biodiversity.**
- 2003 Technology Transfer review in CEH finds 40 potential software contributions for DESIRE (Decision Support in Rural Economies).**
- 2004 FP6 bid: Governance and Ecosystem Management for Conservation of Biodiversity ([www.gemconbio.eu](http://www.gemconbio.eu)) (*highest mark in round*)**
- 2007 DESIRE concept revised as successful bid Transactional Environmental SupportSystem**

**Supporting**

*Primarily public good,  
regulated and public funded.*

**Regulating**

*Biodiversity needed?*

**Provisioning**

*Extensively private goods, can  
become livestock & intensive  
crops that impact biodiversity.*

**Cultural**

*However, payment for wild  
resources can increase the  
benefits of biodiversity and  
promote de-intensification.*

# Why lose biodiversity?

## Understanding of causes is growing.

For 30 declining bird species in UK, Prof. Ian Newton (2004, *Ibis* 146:579-600) identifies:

(i) weed control, (ii) early ploughing, (iii) grassland management, (iv) intensified stocking, (v) hedgerow loss & (vi) predation.

All can be addressed, in many cases by de-intensification measures that have low cost

**BUT: How to manage cost & complexity ?**

# a De-Intensification Option

If income from use of land in euros/hectare is  
I from *Intensive* production, but  
C from *Conservative* cropping enables  
U from sustainable *Use* of wild resources  
 (e.g. from fees for access, parking, licences,  
 subscriptions, taxes on equipment and tourism)

Then suitable management can give  $C+U \geq I$ ,  
 especially if leveraged by agri-environment  
 payments, such that  $C+U+S \gg I$

(NB: EU Common Agriculture gave  $C+U \ll I+S$ )

# ... but how to pay?

Voluntary (e.g. NGO membership, eco-labels)

State (taxation e.g. EU reformed CAP)

- long-term sustainable?
- in developing countries?

Private (e.g. sustainable use of flora & fauna)

- conserves large areas in Africa
- but can it conserve much land in Europe?
- is it worth much in Europe anyway?



# Convention on Biological Diversity

**Art. 10: Protect & encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements.**

**Art. 11: Adopt economically and socially sound measures that act as incentives for conservation and sustainable use of components of biological diversity. (BUT: is this worth anything...?)**





**SPEND: Hunting**

**Angling**

**Watching**

**USA**

**\$21 billion**

**\$36 billion**

**\$39 billion**

**US government survey of wildlife-related activity:  
82 million adults (30% population) spend \$108 billion**

**European**

**Union**

**€16  
billion**

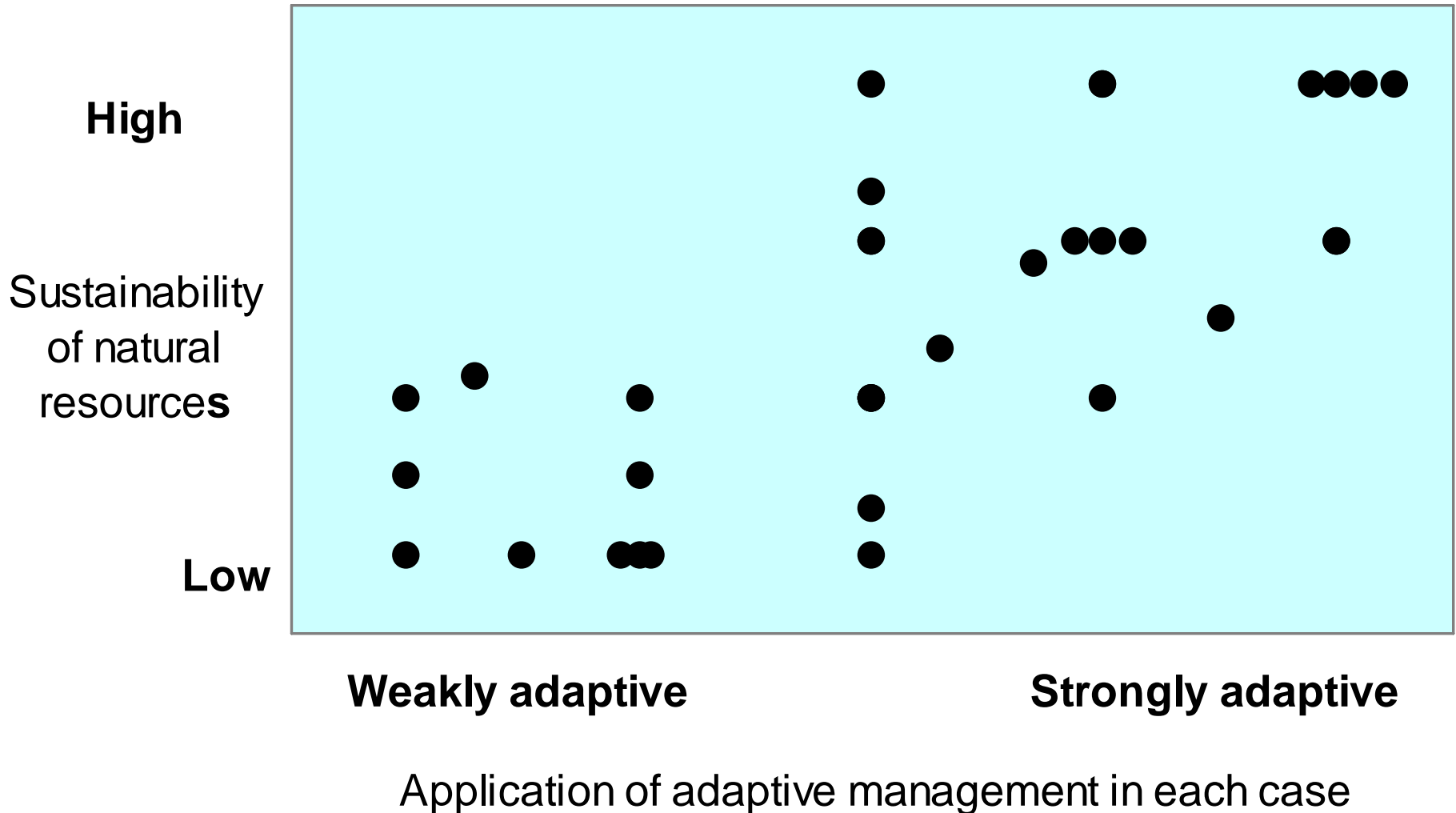
**€19  
billion**

**€8  
billion**

**GEMCONBIO survey of hunting, angling, watching:  
34 million adults (7% population) spend >€40 billion.**

# Importance of Adaptive Management

Resource use was most sustainable where frequent monitoring enabled strongly adaptive management



Theme 6: Environment (Including Climate Change).

ENV.2007.4.2.1.1. Methodologies for scaling down to the regional and local level the analysis of policy impacts on multifunctional land uses and economic activity

Strategic Objective: To design a decision support system related to environment and land use that will enable policy makers to integrate knowledge from the regional and local level into the decision making process, while also encouraging local people to maintain & restore biodiversity & ecosystem services.

Strategic Environmental Assessment (SEA). Sustainability (Impact) Assessment (SIA) and Environmental Impact Assessment (EIA) tend to be project-based, using expert assessors.

## Constrained by:

- what government + experts can handle,
- (e.g. few and above a size threshold)
- availability of baseline data & monitoring
- and what else?

Daily decisions that change land-use at local level, which sum to change the environment, follow policy rules & subsidy, but also other remote drivers (e.g. markets, climate) and depend on local conditions and knowledge.

# Which affects more land?

**Formal, top-down** EIA regulated activities (e.g. extracting minerals, building roads, building)?

**Informal, local** changing cultivation patterns (e.g. crop type, extent, spraying, harvest timing)?

**Who decides in each case? Government? Organisations? Individual land managers?**

- Who has most local knowledge?
- Whose decisions have most potential for land diversity, hence biodiversity?
- Who had most ability to map in detail?



# Different needs for formal and informal decision-making

Improving formal environmental assessment & decisions (analysis of EIA & SEA practises best for biodiversity & ecosystem services), including feedback for adaptive governance.

Innovating a system for guidance and nudge-potential<sup>1</sup> of the much more frequent and pervasive informal decisions on what to grow, when to mow, etc.

<sup>1</sup>Thaler, R.H. & Sunstein, C.R. 2008. Nudge – Improving decisions about health, wealth & happiness. Penguin.

We seek to complement formal assessment (EIA/SEA) with an internet-based (automated) system that:

- (a) delivers model-based context-adaptive expert guidance to guide local land users, to optimise environmental services and incomes, in exchange for
- (b) information on their decisions, and monitored results, that summate to guide central policy.

- 1. What does central policy and planning have?  
Capability to produce complex knowledge.**

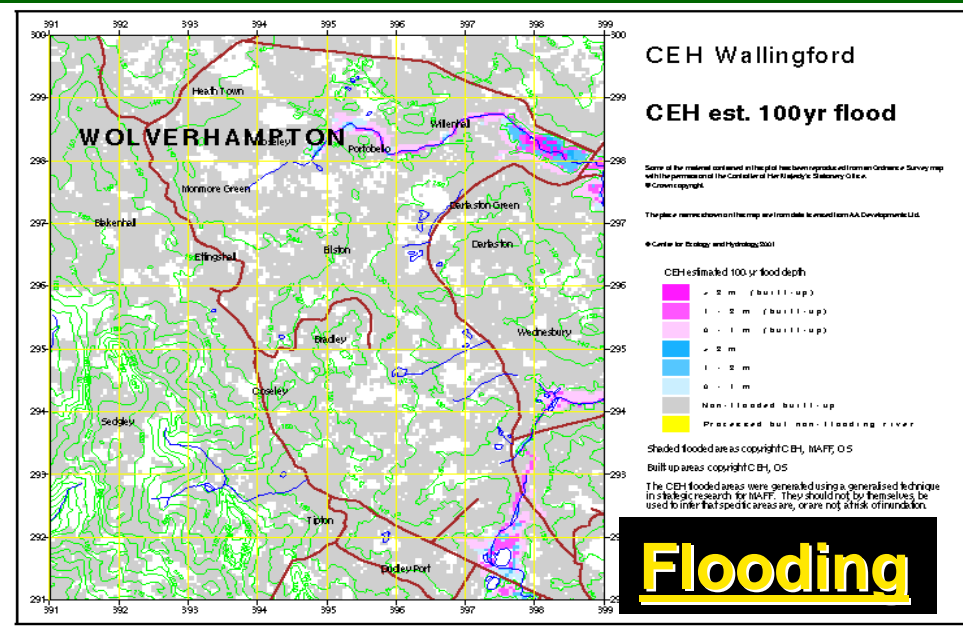
A prototype demonstrator that provided Complex Knowledge to help planners apply environment data and understanding in the planning process.



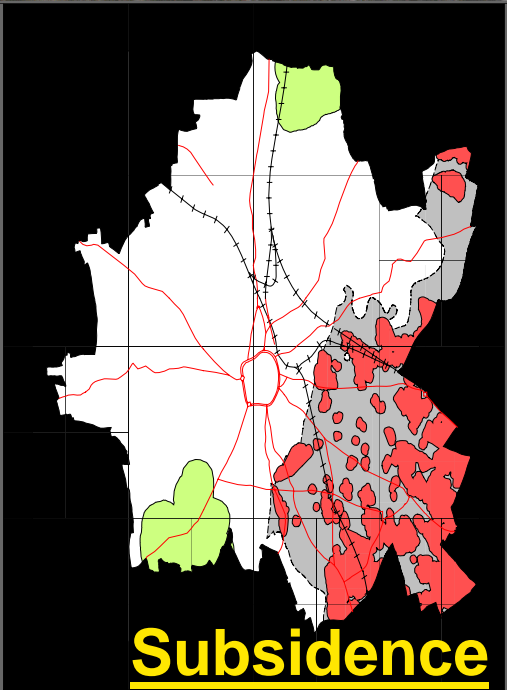




## Managing Waste



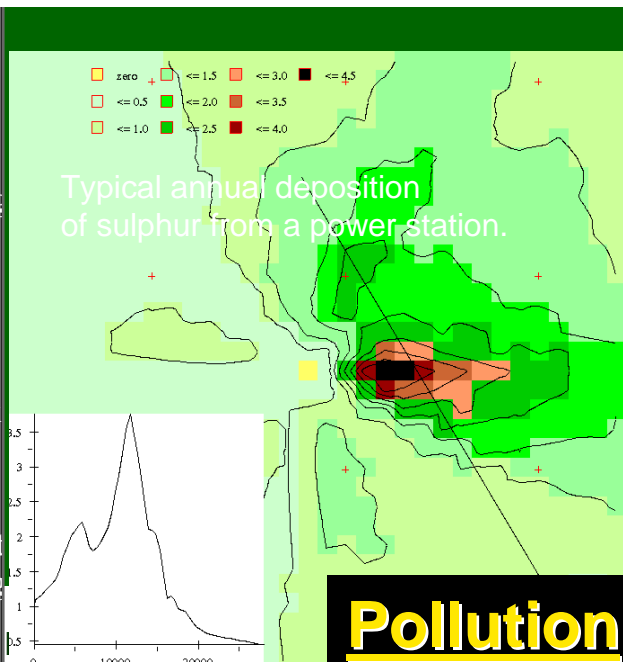
## Flooding



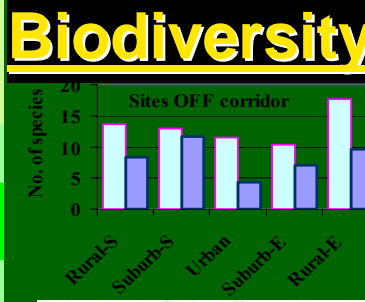
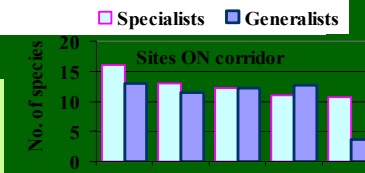
## Subsidence

### UNDERMINING

- Exposed coalfield. Risk of subsidence over former workings
- Exposed coalfield. Areas of potential subsidence over undocumented workings
- Possible minor subsidence relating to modern deep mining



## Pollution



## Biodiversity



- 1. What does central policy and planning have?  
Capability to produce complex knowledge.**
- 2. What does central policy and planning need?  
Local knowledge and local actions.**
- 3. What do local users of wild resources have?  
Local knowledge & capabilities (skill, cash, time).**
- 4. What do local users of wild resources need?  
Complex knowledge to guide their actions.**

# Exchanging decision-support for local knowledge and actions

<u>SCALE</u>	<u>QUESTION</u>	<u>OPERATION MODE</u>
<b>Field</b> individual	Is it too early for the Nymphalis butterfly larvae to cut these nettles in our amenity area now ?	<i>Map on communication device with GPS-auto-location capability.</i>
<b>Farm</b> individual	If I use my land like this in future, what happens to my income, game bags and nitrate run-offs?	<i>Submission of farm plan: optimising game, fishing and farm income.</i>
<b>Parish</b> community	How do we route this path to optimise views while minimising erosion and wildlife disturbance?	<i>Conservation headland: walking (pay-parking), horse-riding (licence).</i>
<b>Higher government</b>	If trends in land-use continue for 20 years, how can we still meet planned biodiversity targets?	<i>Can subsidy payments ameliorate directly or leverage SUWR benefit?</i>

# Abstract

A Transactional Environmental Support System, for aiding wise local actions centrally, could help recreational activities leverage de-intensification with enhanced income and stakeholder cohesion.

Requirements of Convention on Biological Diversity, for local empowerment and enlightenment, would be met by better monitoring and adaptive management but also continuous formal bio-socio-economic assessment from emergent indicators.

# GANTT-like TESS work-packages

0

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12

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24

## **WP2**

### Central

Survey  
design

Info flow  
workshop  
& report

## **WP3**

### Local

Survey  
design

Info flow  
workshop  
& report

## **WP5**

### Cases

Local  
mapping &  
projects &  
report

Pan-Euro  
local &  
central  
surveys  
databased  
& reported

## **WP6**

### Policy + Internet

Survey &  
biodiversity  
database,  
analysed,  
policy  
document

TESS  
internet  
design &  
report

## **WP4**

### Models

Audit of  
models

Gap  
analysis

Database  
complete,  
reported

# CONCLUSIONS

- Europe is losing biodiversity and ability to provide ecosystem services.
- Environmental Assessment regulations give some protection but not for most of the myriad decisions of individuals that change land use.
- TESS aims to collate & automate local delivery of all ways to leverage biodiversity enhancement, to (i) predict impacts of small-scale actions on incomes & biodiversity, (ii) support decisions & monitor results so that (iii) central assessors can adapt governance (regulatory & fiscal incentives).



- **Planning since 2002**
- **Local, where impacts are mostly unregulated**
- **Integrating research modelling rapidly**
- **Exchanging maps for decision support**
- **Livelihoods as well as environment (win-win)**
- **Social participation and adaptive governance**
- **Self-funding long-term through adding value**
- **Car analogy links to GMES, INSPIRE, SEIS**



**Thank you  
for listening**