

FACCE-MACSUR

## D T4.1: Curriculum for training course on policy impact assessment

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### Related milestones

- M T4.1: Training course on policy impact assessment announcement
- M T4.2: Training course on policy impact assessment finalised

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<b>Instrument:</b>	Joint Programming Initiative
<b>Topic:</b>	Agriculture, Food Security, and Climate Change
<b>Project:</b>	Modelling European Agriculture with Climate Change for Food Security (FACCE-MACSUR)
<b>Start date of project:</b>	1 June 2012
<b>Duration:</b>	36 months
<b>Theme, Work Package:</b>	TradeM 4
<b>Deliverable reference num.:</b>	D-T4.1
<b>Deliverable lead partner:</b>	ZALF
<b>Due date of deliverable:</b>	month 18
<b>Submission date:</b>	2014-06-30

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**Abstract/Executive summary**

A one-week MACSUR training course on policy impact assessment was held in March 2014 at Haifa University in Israel. The course was organised by ZALF (Hannes König, Katharina Helming) and Haifa University (Ofira Ayalon, Edan Benami, Ruslana Palatnik), targeting at the participation of Post-Docs and PhD students associated to the MACSUR consortium. The Framework for Participatory Impact Assessment (FoPIA) was used as the main method for the course to support structuring the policy impact assessment. The Israeli MACSUR case study of the Ramat Menashe Biosphere was used the test case of assessing alternative policy options and sustainability trade-offs.

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## Announcement of training course

*MACSUR FACCE-JPI - Theme Trade, cooperation between WP-T3 and WP-T4*

### **International Workshop**

**Sustainability assessment of land use scenarios:  
what needs to be considered and how can it be done?**

**23/3/2014- 26/3/2014**

**University of Haifa, Israel**

**Jacobs Building, room 506**

#### **The workshop will incorporate two main parts:**

1. **Theoretical part:** understand formalized processes of decision making as well as decision makers needs for evidence.
2. **Practical part:** provide training on integrated modeling/assessments. For this purpose the Framework for Participatory Impact Assessment (FoPIA) will be introduced to provide an integrated and well-established method that guides experts and/or decision makers through a policy impact assessment while emphasizing: (i) the development of scenarios, (ii) the analysis of the regional sustainability context, (iii) assessment of possible policy impacts and sustainability trade-offs. The case study will deal with the biosphere reserve of Ramat Menashe.

#### **Organization (NRERC, Haifa University, Israel and ZALF, Germany):**

- Dr. Ruslana Rachel Palatnik NRERC - Natural Resource and Environmental Research Center, University of Haifa, Israel; Department of Economics and Management, The Max Stern Academic College Of Emek Yezreel, Israel
- Prof. Ofira Ayalon NRERC- Natural Resource and Environmental Research Center, University of Haifa, Israel
- Dr. Katharina Helming Leibniz Centre for Agricultural Landscape Research (ZALF)
- Dr. Hannes J. König Leibniz Centre for Agricultural Landscape Research (ZALF)

Target group: this course is open to all MACSUR partners, and in particular to graduated students, PhDs and Post-Docs. The participation in the workshop is free of charge, for foreign students few scholarships are available.

## Program:

### Day 1: Sunday 23 March

#### Theory & Case study: “Impact assessment of alternative land use scenarios in the Ramat Menashe Biosphere reserve, Israel”

Morning (9:30 – 12:30)

- Introduction: Who we are? Target of the seminar (Katharina & Hannes)
- Theory on Impact Assessment & Sustainable Development (Katharina)

*short break*

- The FoPIA method (Hannes)
- Group exercise I.: tour de table students intro themselves and allocate themselves to land use functions (LUFs)

*Lunch break*

Afternoon (13:15 – 16:30)

- 13:30 Introduction of the case study: key characteristics, land use activities, background about the Biosphere reserve, UNESCO implementation plan (etc.)
- 14:30 Group exercise II.: students allocate to LUF and to sector ministries (departments); work out in parallel groups key issues for each LUF for case study; afterwards presentation in front of plenary

*short break*

- 15:30 Roadmap for fieldtrip: DPSIR scheme and key questions to Drivers, Stakeholders and Pressures, Impact Themes (Hannes)
- 16:00 Preparations/ logistics for the field trip (Ofira)

**Day 2: Monday 24 March**

**Excursion**

- Field visit to the biosphere reserve of Ramat Menashe Biosphere (selected sites)

*Guiding questions for the field trip:*

- ⇒ What are key land use drivers (i.e. influencing factors of change) in the region?
- ⇒ Who are main actors (stakeholders) of land use and how is their influence on future land use?
- ⇒ What are likely FUTURE land use scenarios for Ramat Menashe Biosphere?

Hour	Place	Content	Status
08:30	University of Haifa	Bus Departure	
09:00	Fish Farm - Hazorea	Aqua agriculture farm, water uses, R&D	coordinated
10:00	Transfer to - firing range		
10:20	A3 core	Biosphere core, pasture and dairy farming issues, The rehabilitation of Taninim River, Sarcopoterium spinosum	to coordinate (IDF, Simcha Naor, Yinon Nevo, Ben Rozenberg)
11:30	Transfer to- Menashe Heights		
12:00	Observation on Hagit Sight, High way 6	Power Station, Gas Station plan, High way 6.	to coordinate with Nir Sahar and the Citizens Operation
12:45	Ein Mecholelim	Rehabilitation Project, Adopt Sight Project, Core	coordinated
13:30	Mevo Carmel wastewater treatment plant	Prototype plan for sewage and water treatment, water plan for agriculture	
14:15	Hut	Discussion	coordinated
15:30	Return to University of Haifa		

## Day 3: Tuesday 25 March

**Morning (9:30 - 13:00)**

**Hands-on exercise: using the FoPIA method**

“Stakeholder-based Impact assessment” (Hannes & Katharina)

- **Elaboration of land use scenarios**

Guiding question: “What are the three main land use options in Ramat Menashe Biosphere in the future?”

- **Analyzing the sustainability context** of Ramat Menashe Biosphere

Guiding question: “What are the key economic, social and environmental sustainability preferences of local stakeholders on land use in Ramat Menashe Biosphere?”

**Afternoon (13:45 - 16:30)**

- **Scenario impact assessment** (individual impact scoring)
- Joint discussion of scenario impact results (group discussion)
- **Explorative trade-off analysis** between economic, social and environmental sustainability dimensions
- **Recommendations** for sustainability-oriented policy making

*short break*

- **Preparation** for the examination
- Feedback round

## Day 4: Wednesday 26 March

**Time 9:00-10:30**

**Examination (2-Credit Points)**

Written exam

- Multiple choice (50%)
- Written text (50%)

**Method: FoPIA assessment approach**

For the MACSUR training course, the integrated FoPIA assessment approach was used. FoPIA provides a structured sequence of methods for conducting sustainability assessments of alternative land use policies (Helming et al. 2011; König et al. 2010; Morris et al. 2011). FoPIA consists of two basic assessment directions: firstly, a discursive examination of causal relationships and attributions of changes between human activities and sustainability targets, and secondly, the exploration of scenario impacts and possible trade-offs on defined sustainability targets at the regional level. The implementation structure of FoPIA follows three main steps: (i) scenario development, (ii) specification of the sustainability context, and (iii) scenario impact assessment and is illustrated in Figure 1.

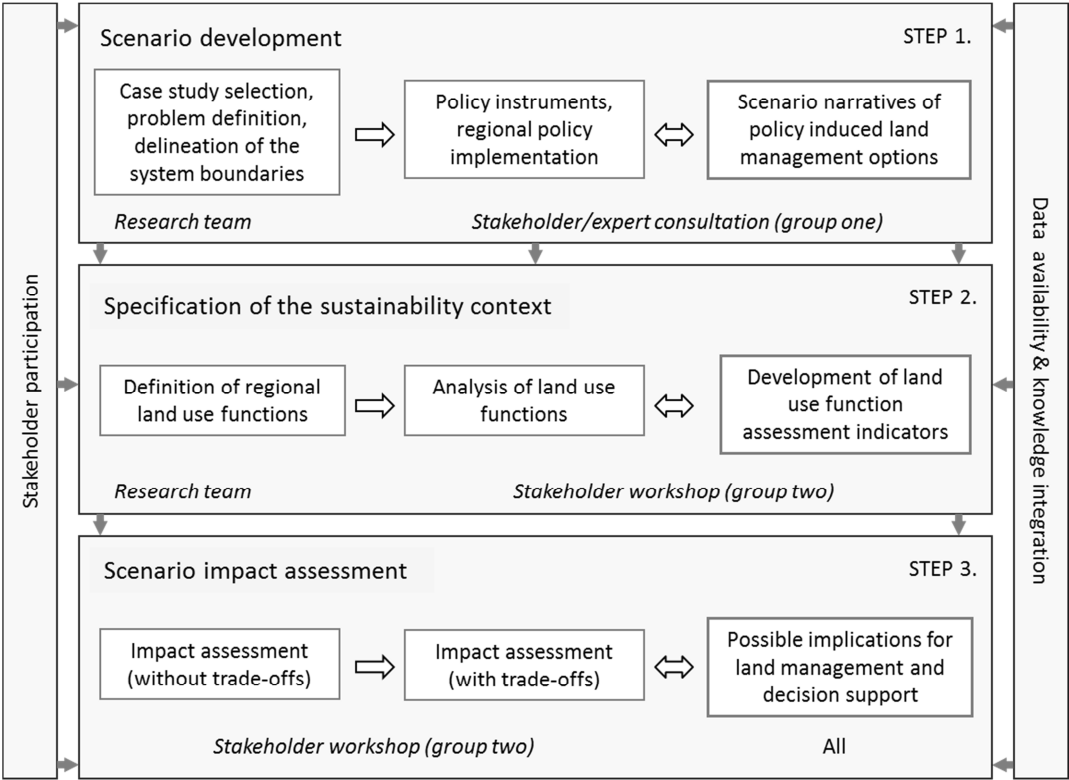


Figure 1. Sustainability assessment structure of the Framework for Participatory Impact Assessment (FoPIA).

A detailed description of the FoPIA method can be found under: <http://www.springerprofessional.de/participatory-impact-assessment-of-soil-and-water-conservation-scenarios-in-oum-zessar-watershed-tunisia/3501318.html> (König et al. 2012)

**List of participants** (not available in published version)

<u>Name</u>	<u>Background</u>	<u>Contact details</u>



## Course evaluation by participants

<b><u>Part 1- the course and its content and contribution</u></b>													AVG
Its objectives were clearly stated	5	5	4	4	4	4	5	4	5	5	5	5	4,583
The reading and background information contributed to my understanding of the course subjects	5	4	5	5	3	4	5	4	5	3	3	5	4,250
Provided me with plenty of knowledge on the subject	5	5	4	5	4	3	5	4	5	5	5	5	4,583
Promoted my interest in the course subject	5	5	5	4	4	3	5	4	5	5	5	5	4,583
Will assist me in my future career	irrelevant	4	4	5	3	3	5	4	2	4	4	5	3,909
Helped me to think interdisciplinary	5	5	4	3	4	4	5	5	4	4	5	5	4,417
<b><u>Part 2 - The instructors</u></b>													
Presented the material in a clear and interesting way	5	5	5	5	5	4	5	4	5	4	5	5	4,750
Responded to questions, comments and criticism	5	5	5	5	5	5	5	4	5	5	5	5	4,917
Contributed to my knowledge and understanding	5	5	5	4	5	4	5	4	5	5	5	5	4,750
Were cordial and respectful	5	5	5	5	5	5	5	4	5	5	5	5	4,917

Comments														
1)Excellent instructions, very interesting, fun and knowledge, more courses like this in the future.														
2) Instructions clear and helpful, trip gave practical understanding														
3) The 3 <sup>rd</sup> day was more difficult to perceive and understand how to implement. Needs more clarification. First 2 days were better and clearer- overall very important and well organized														
4) need for more data to better understand the issues														
5) fascinating course.														
6) the fact that the course was in English was a bit difficult,														
7) Very well planned, very interesting. Field trip- well planned and interesting built gradually from simple to complicate. Very efficient and good use of time, instructors were willing to learn from the students as much as the students were willing to learn from the professionals. Excellent size of group, deep and meaningful discussions														
8) Hebrew translation was lacking														
9) well done, more reading materials should have been provided														
10) very interesting, and well introduced, excellent case study and the field trip was of great joy. Wish we had more courses like this														
11) since I'm very familiar with the dilemma, I could not be objective and view different topics.														

## References

- Helming, K., Diehl, K., Kuhlman, T., Jansson, T., Verburg, P. H., Bakker, M., Pérez-Soba, M., Jones, L., Verkerk, P. J., Tabbush, P., Morris, J. B., Drillet, Z., Farrington, J., LeMouél, P., Zagame, P., Stuczynski, T., Siebielec, G., Sieber, S., Wiggering, H., 2011. Ex ante impact assessment of policies affecting Land use, Part B: Application of the analytical Framework. *Ecology and Society* 16.
- König, H. J., Sghaier, M., Schuler, J., Abdeladhim, M., Helming, K., Tonneau, J. P., Ounalli, N., Imbernon, J., Morris, J., Wiggering, H., 2012. Participatory Impact Assessment of Soil and Water Conservation Scenarios in Oum Zessar Watershed, Tunisia. *Environmental Management* 50: 153-165.
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- Morris, J., Tassone, V., De Groot, R., Camilleri, M., Moncada, S., 2011. A Framework for Participatory Impact Assessment' (FoPIA): involving stakeholders in European policy-making, a case study of land use change in Malta. *Ecology and Society* 16.

## APPENDIX

- Sustainable Development and Impact Assessment of Land Use Theory and Background (.ppt/ Helming)
- The FoPIA approach - A participatory stakeholder method for sustainability impact assessment of land use scenarios (.ppt/ König)
- Scenario assessment results of the training course



Leibniz-Zentrum für  
Agrarlandschaftsforschung  
(ZALF) e.V.

Mitglied der



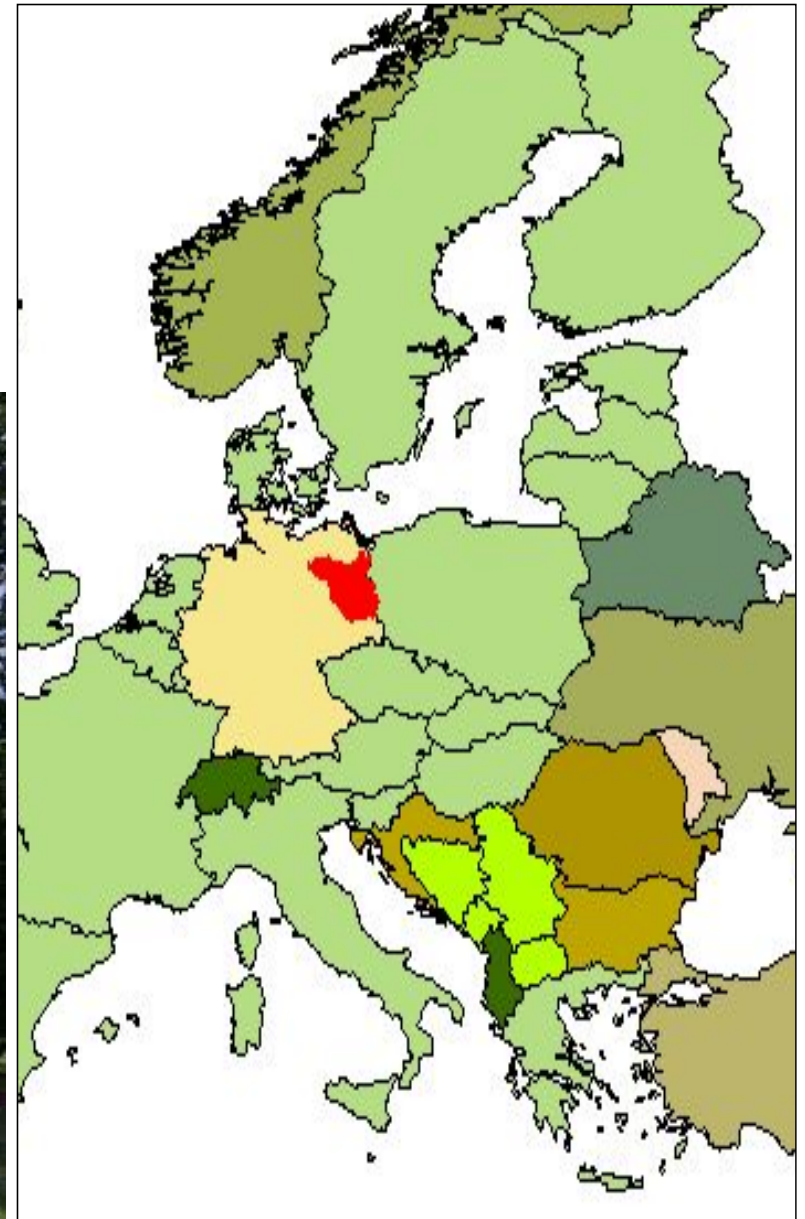
Leibniz Centre for Agricultural Landscape Research

# Sustainable Development and Impact Assessment of Land Use

## Theory and Background

Katharina Helming, ZALF

Haifa, 25.03.2014





## Issues

- Food production
- Bioenergy
- Ecosystem services
- Rural livelihood
- Recreation
- Water, soil, air
- Biodiversity
- Rural-urban relations

## Disciplines

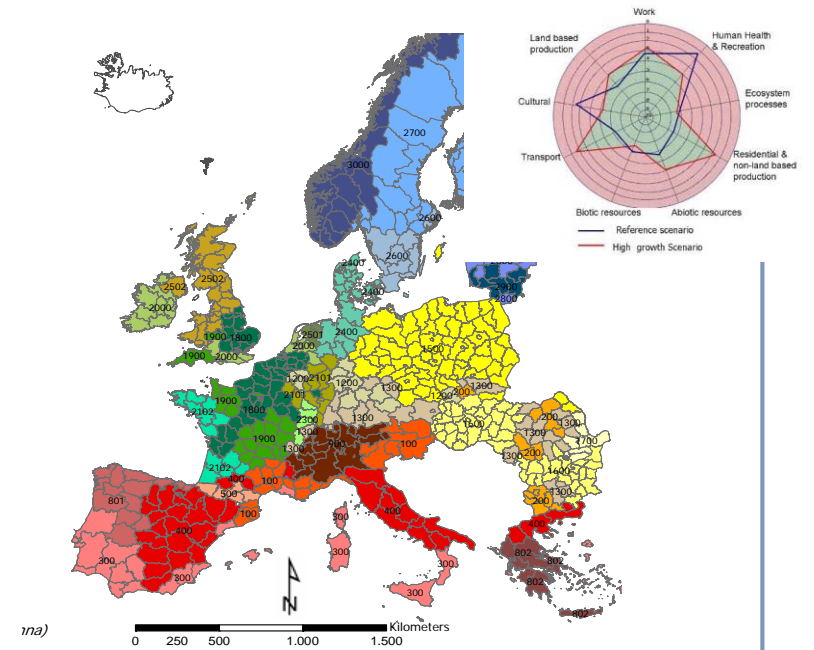
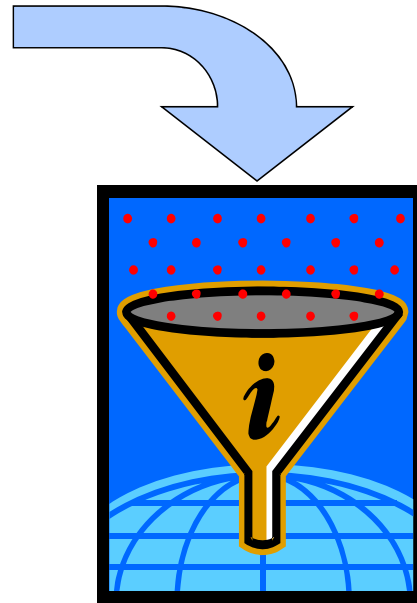
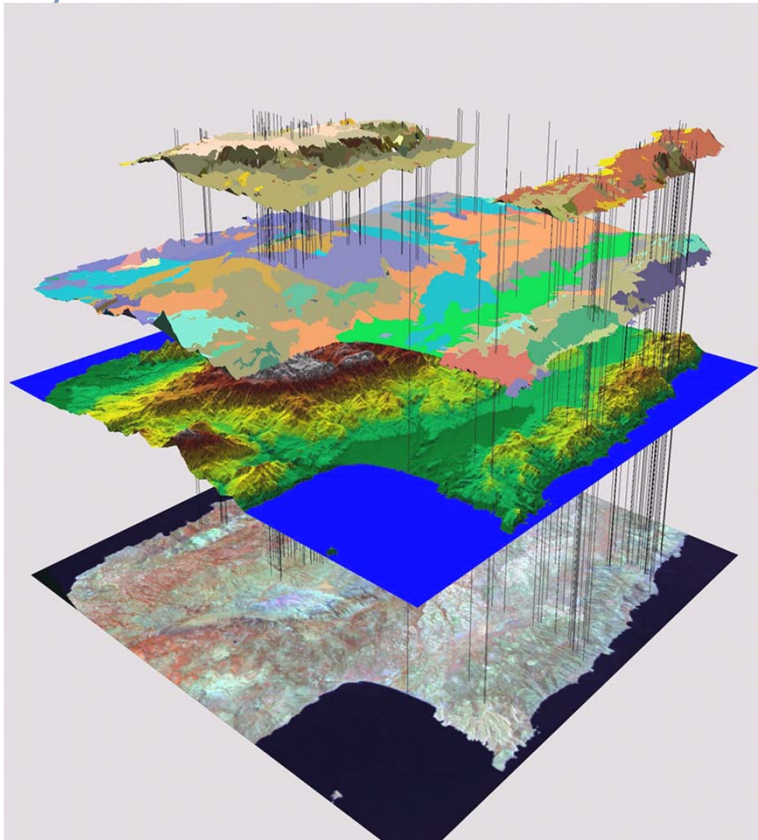
- Agriculture
- Soil Science
- Hydrology
- (Micro)biology
- Modelling
- Landscape
- Economy
- Sociology

## Integrating large spatial datasets

Spatial data

Models

Integrated assessments



# Modelling European Agriculture with Climate Change for Food Security



Modelling European Agriculture with Climate Change for Food Security  
— a FACCE JPI knowledge hub —



**European Project:**  
Scenarios  
Methods  
Models  
Data  
Case studies



## Content of morning session today

1. Multifunctional land use and sustainable development
2. Drivers of change - how will land use develop
3. Stakeholders - who is involved
4. Impact Assessment - scientific support to decision making
5. **Method** - Framework of Participatory Impact Assessment
6. **Exercise** - Embassadors of Land Use Functions

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# 1 Multifunctional land use and sustainable development



**Agriculture**



**Infrastructure**



**Energy**



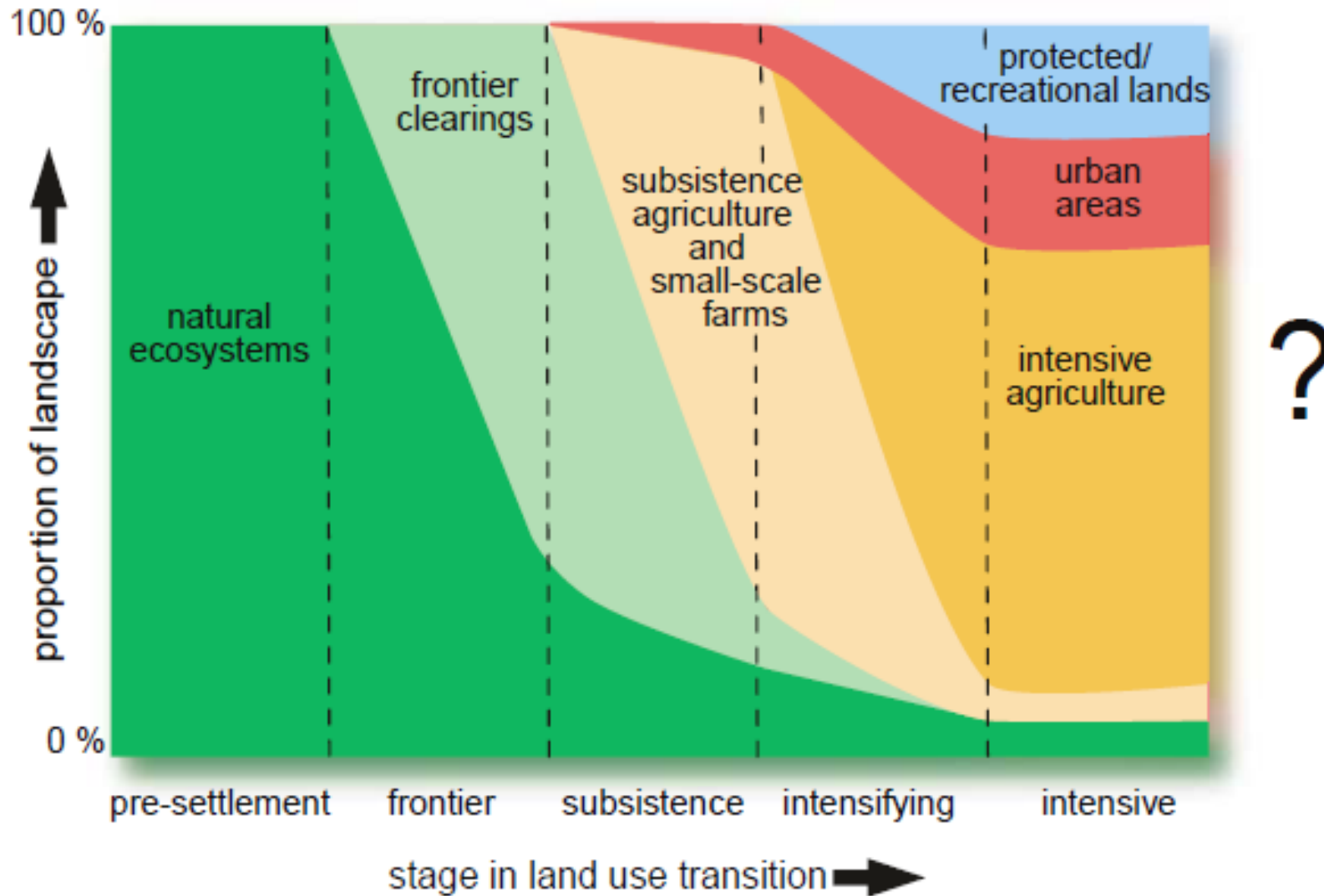
**Forestry**



**Nature  
Conservation**



**Urban**



## Food, fibre and energy production

**economic  
functions**



## Residential and non land based industry

**economic functions**



## Infrastructure

**economic  
functions**



## Provision of abiotic resources

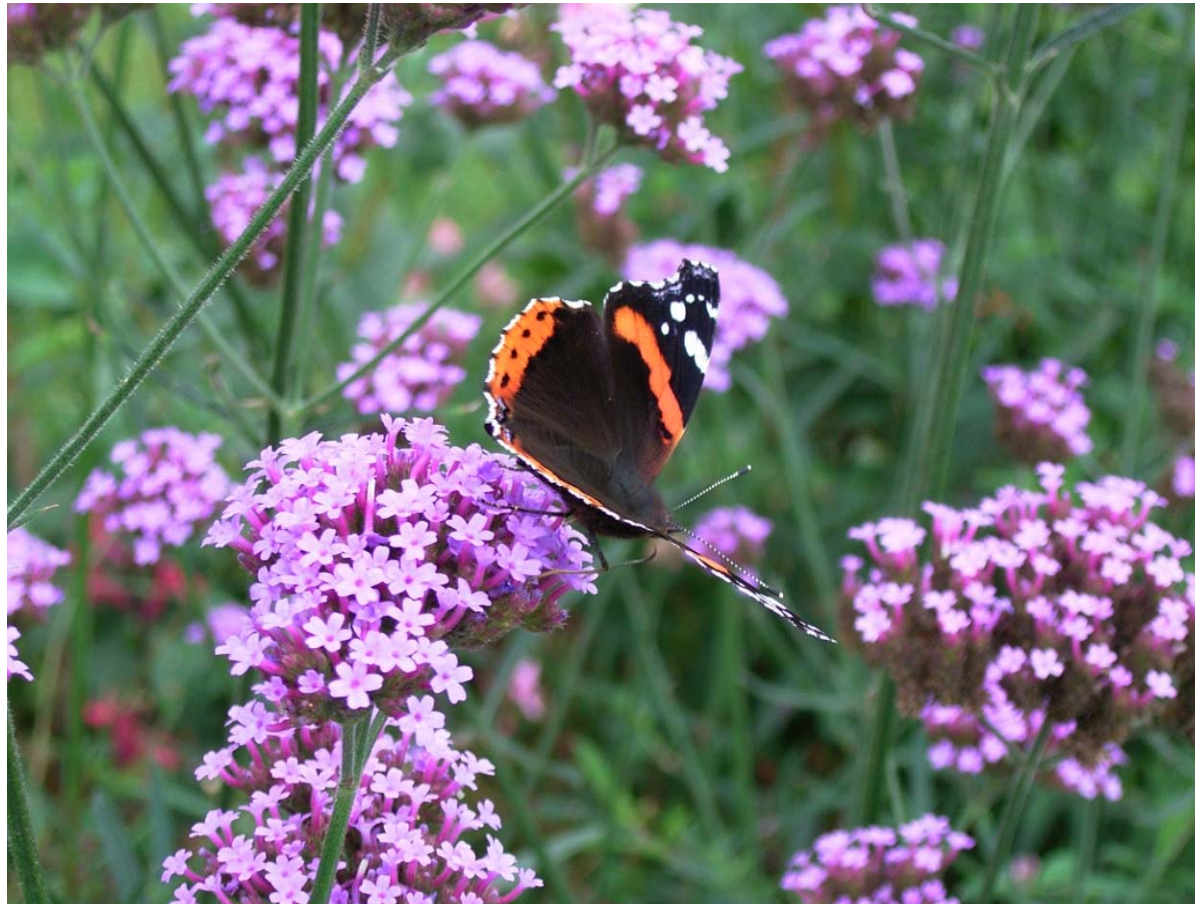
**environmental  
functions**





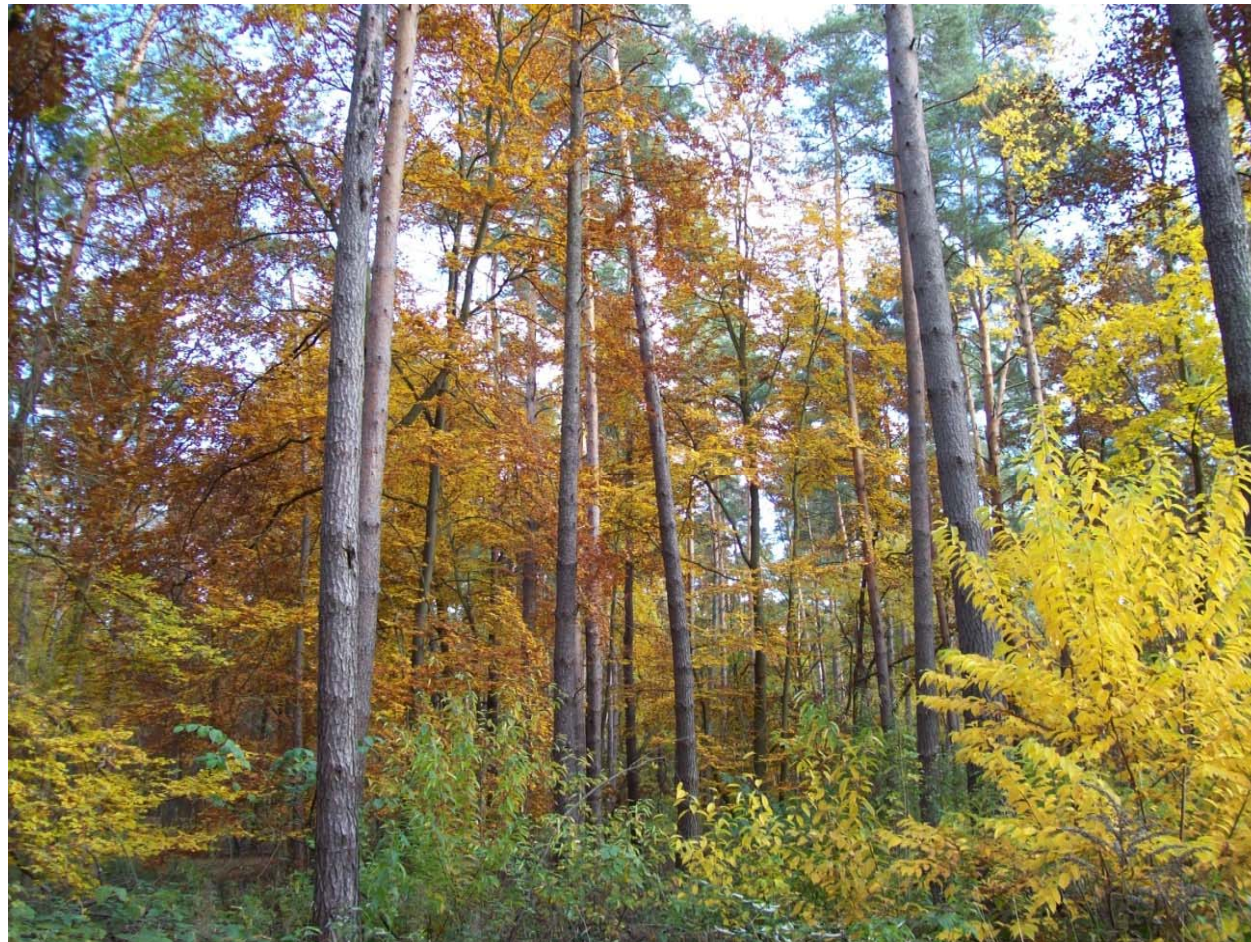
## Support and provision of habitat (biodiversity, gene pool)

**environmental  
functions**



## Maintenance of ecosystem processes

**environmental  
functions**



## Provision of jobs

**Social  
functions**



## Human health and recreation

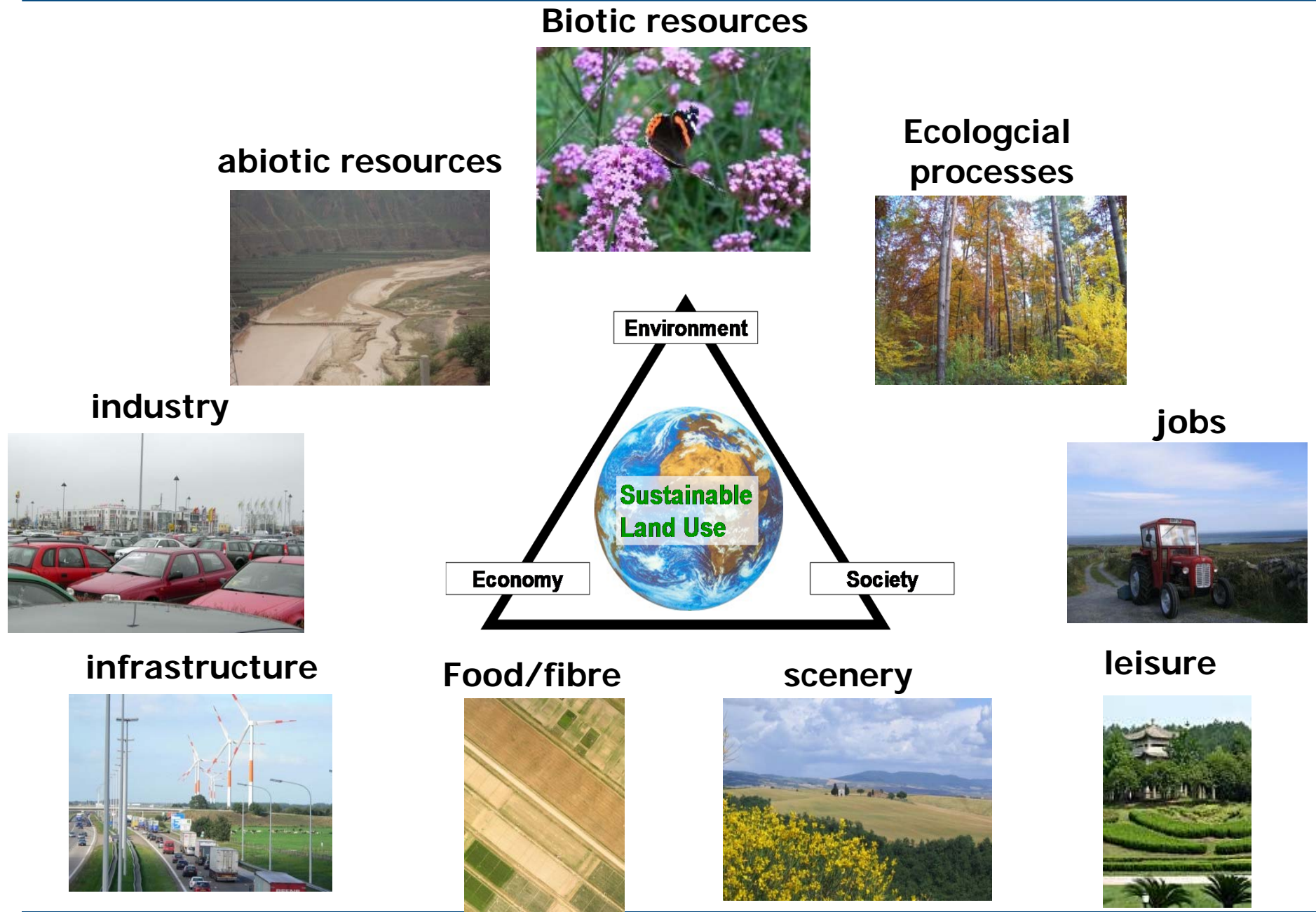
**Social  
functions**



## Cultural landscape identity (scenary and cultural heritage)

**Social  
functions**







## Land Use Types



Agriculture



Forestry



Nature Conservation



Transport Infrastructure



Energy



Tourism

**Multifunctional land use**

Provision of work

Human health & recreation

Cultural & aesthetic values

Industry & services

Land based production

Infrastructure

Abiotic resources

Biotic resources

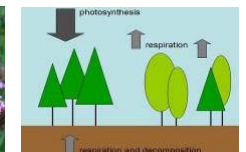
Ecosystem processes



Social

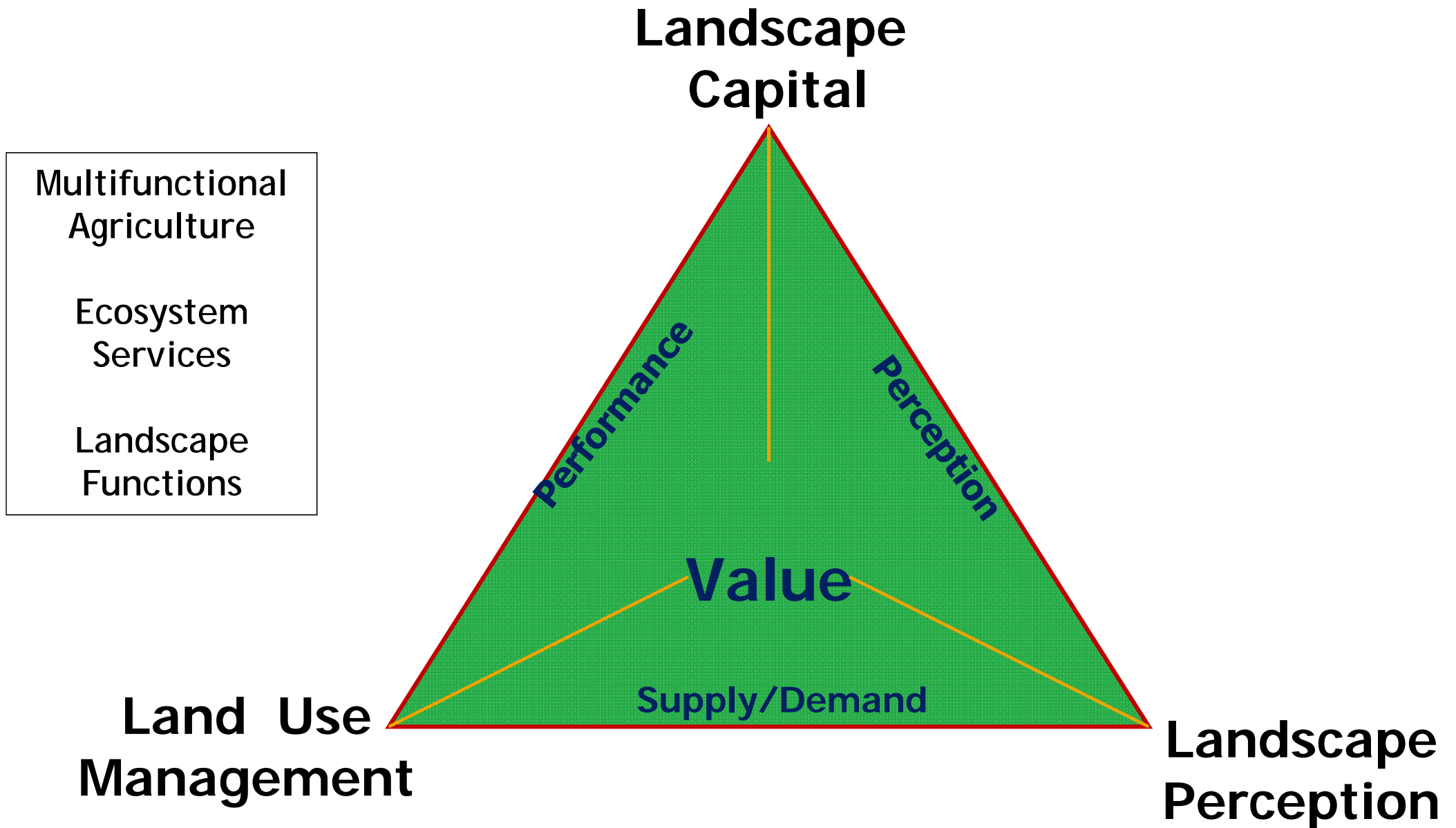


Economic



Environment

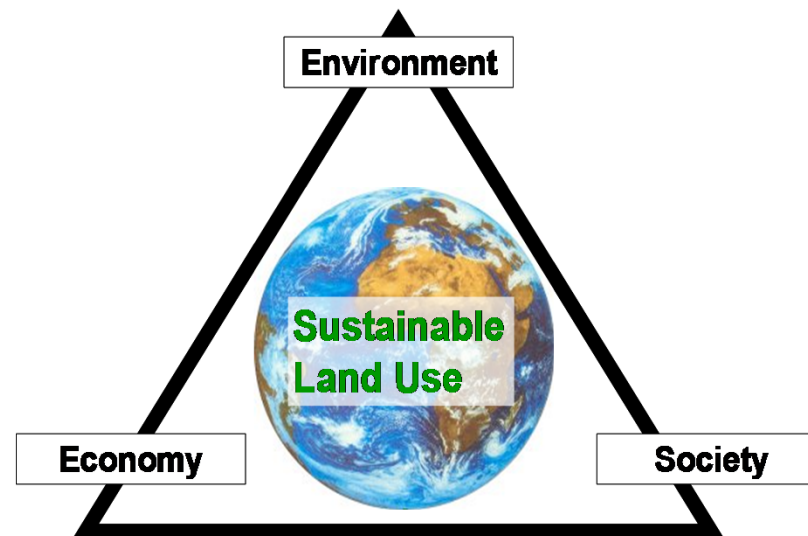
## Land Use Functions





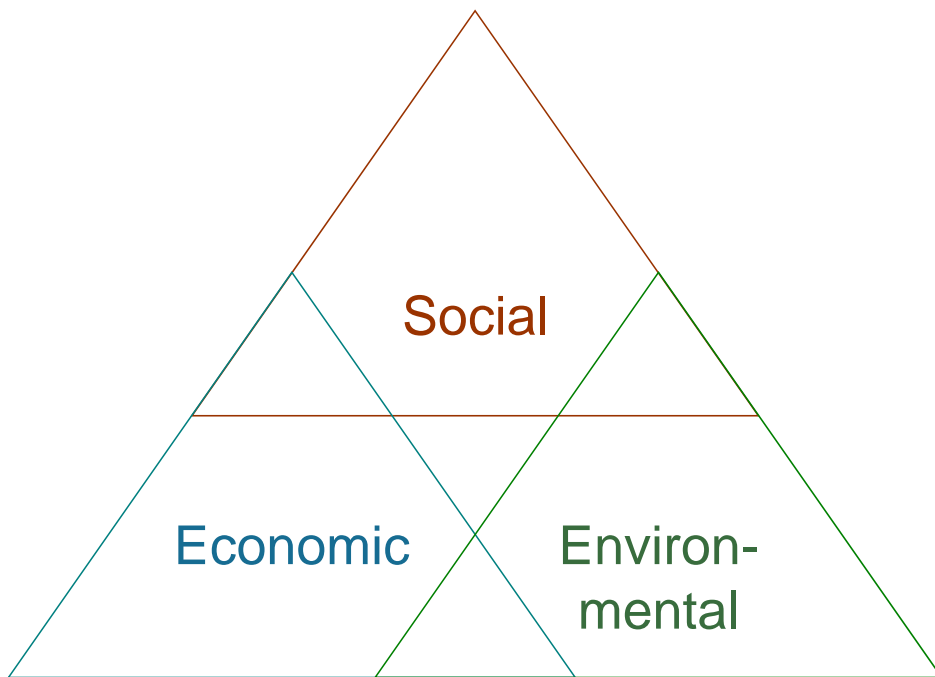
## 2

# Sustainable development and Decision making for land use



# Sustainable Development

Balance between **economic**, **social** and **ecological** targets



*“Sustainability refers to the social, economic and environmental well-being for today and tomorrow” (iisd 2010)*

## Sustainable Development and stakeholder views

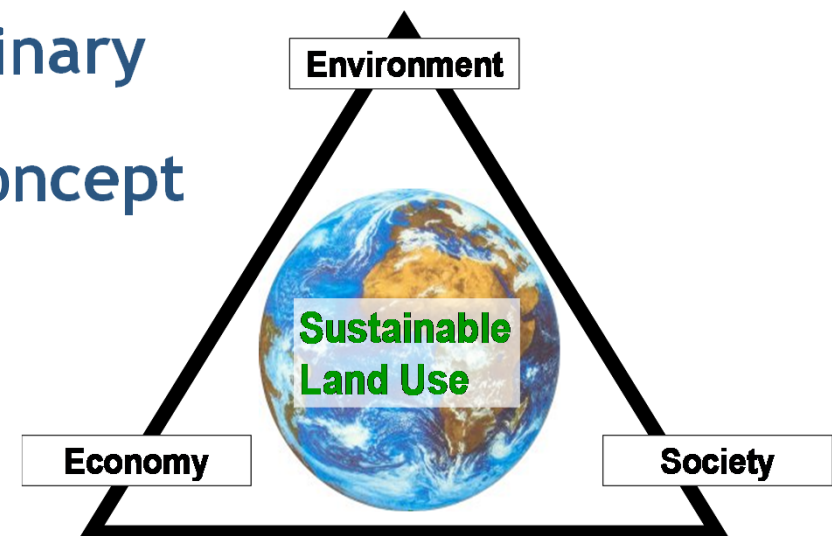


*The development trends of the sustainability concept  
(European Commission Secretariat General, 2004)*

Sustainable Development <b>was</b> mainly	Sustainable Development <b>is</b> mainly
Taking account of <b>environmental</b> protection and development	Balancing and integrating the three dimensions ( <b>economic, social and environmental</b> )
Expert led and the responsibility of Government	An opportunity for broad participation
A substantial concept	A procedural concept

Frederiksen, 2006

- Integration of 3 pillars: environment, economy, society
- Procedural concept, participation, negotiation, context dependent
- Respect different values and priorities of stakeholders involved
- Integrative, long-term, transdisciplinary
- May be operationalised with LUF concept



## 3

# Stakeholders and Decision Makers on Land Use



## Who has stakes - who decides about what

**Farmer/Forester****Industry****Land owner****Consumer****Policy maker**

## A matter of scales



Global: prices, demand, stocks, flows, trade, technologies

National: policies, subsidies, habits, demands, markets

Regional: plans, programs

Local: farmers, consumer preferences, conditions

---

# 4

## Future Drivers of Land Use Changes



## Demand:

World population 2050: 9,1 Billion Menschen  
Meat consumption  
+70 % food production  
Energy Scarcity

*"Buy land, they've stopped making it!"*

Mark Twain (1835-1910)

## Resources:

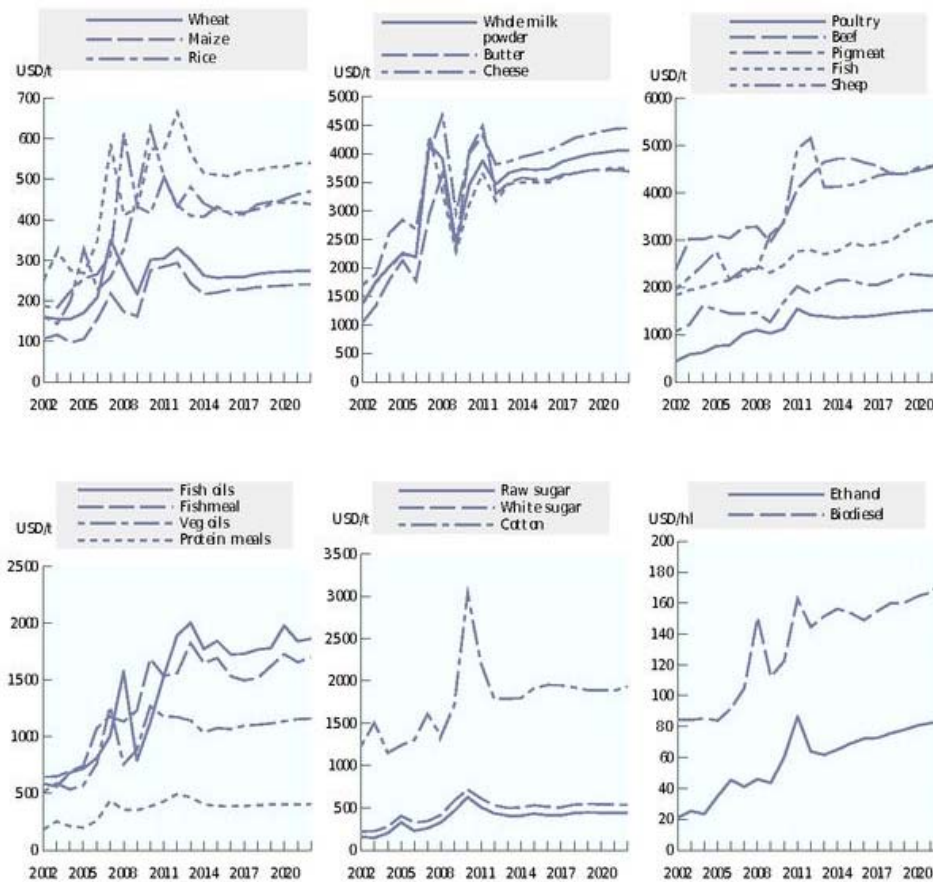
Climate Change  
Soil degradation  
Water scarcity  
Oil price

Property Rights:  
Landgrabbing  
Urbanisation  
Investment

## Technologies:

GMO  
Biotechnology  
Precision farming  
Organic Farming

## Price trends in agriculture



FAO 2013



# The Future: Driving Forces and Land Decisions



## Investments in Land

### The Online Public Database on Land Deals

The Land Matrix is a global and **independent land monitoring initiative** that promotes **transparency** and **accountability** in decisions over land and investment.

This website is our **Global Observatory** - an open tool for collecting and visualising information about large-scale land acquisitions.

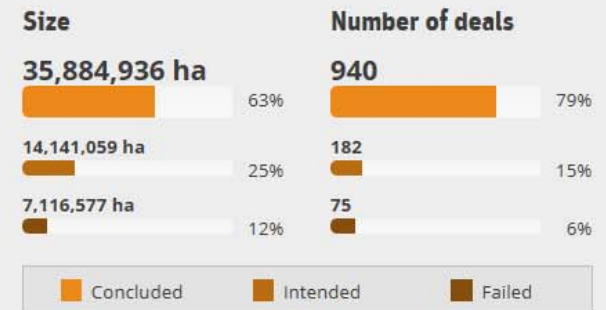
The data represented here is **constantly evolving**: to make this resource more accurate and comprehensive, we encourage your **participation**.

[Read more](#)

### Watch the video introduction



### We currently have information about:



GET THE IDEA

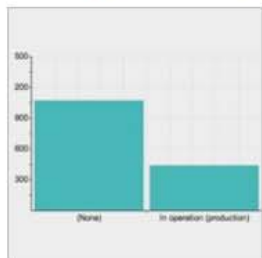


GET THE DETAIL

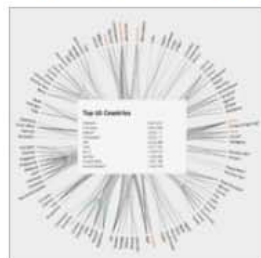


GET INVOLVED

Data is at the core of our project, but numbers alone can't tell a good story. These interactive visualizations are here to help you grasp the phenomenon of large-scale land acquisitions. Through them, we try to provide answers to questions such as how much land we're talking about, who's buying where, how much of the land is used for growing food, etc.



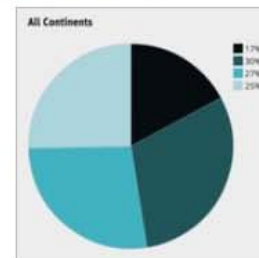
Dynamics overview



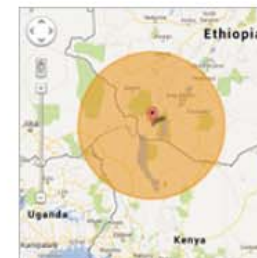
Web of transnational deals



Global map of investments



Agricultural drivers

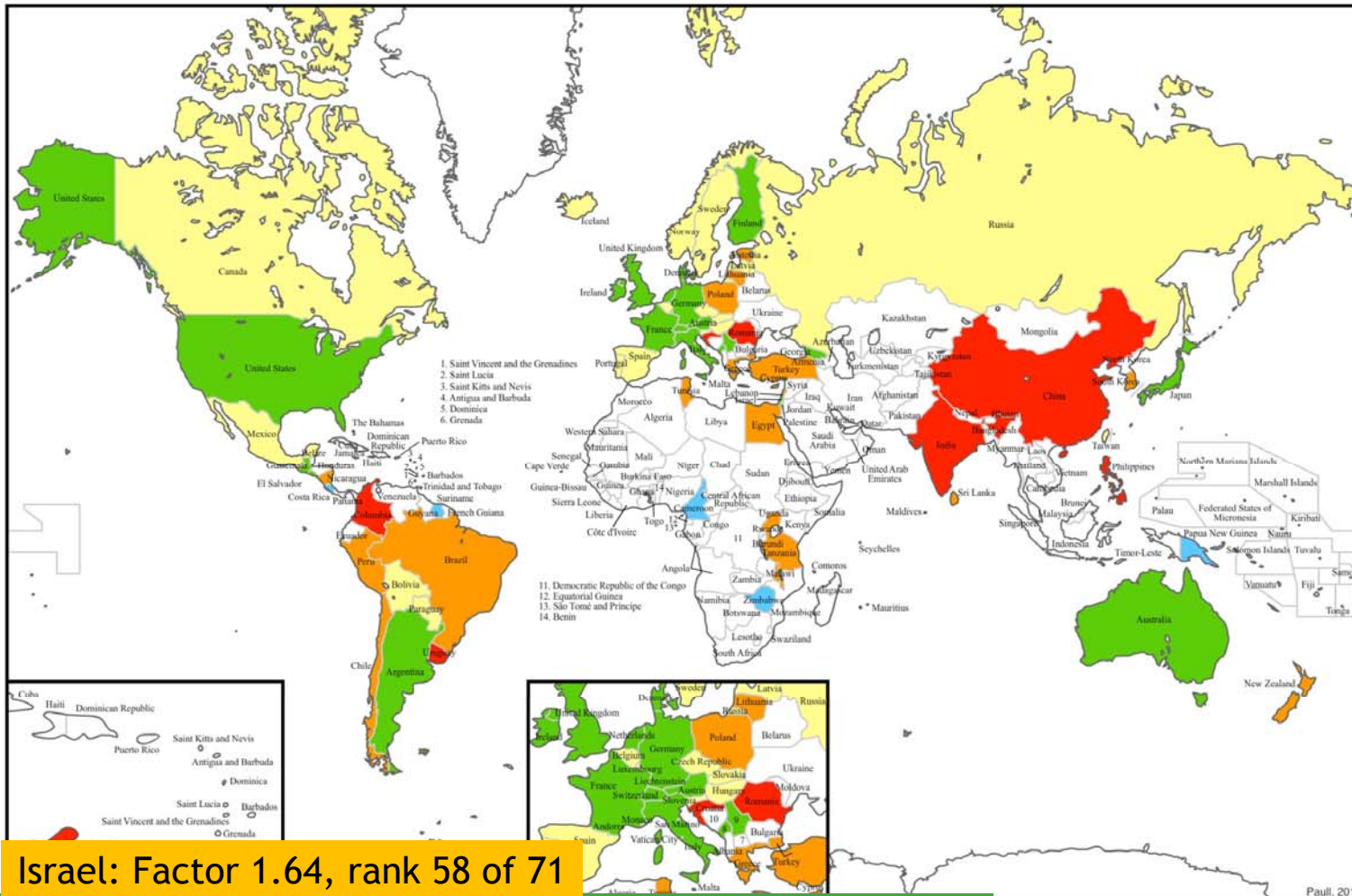


It's a big deal



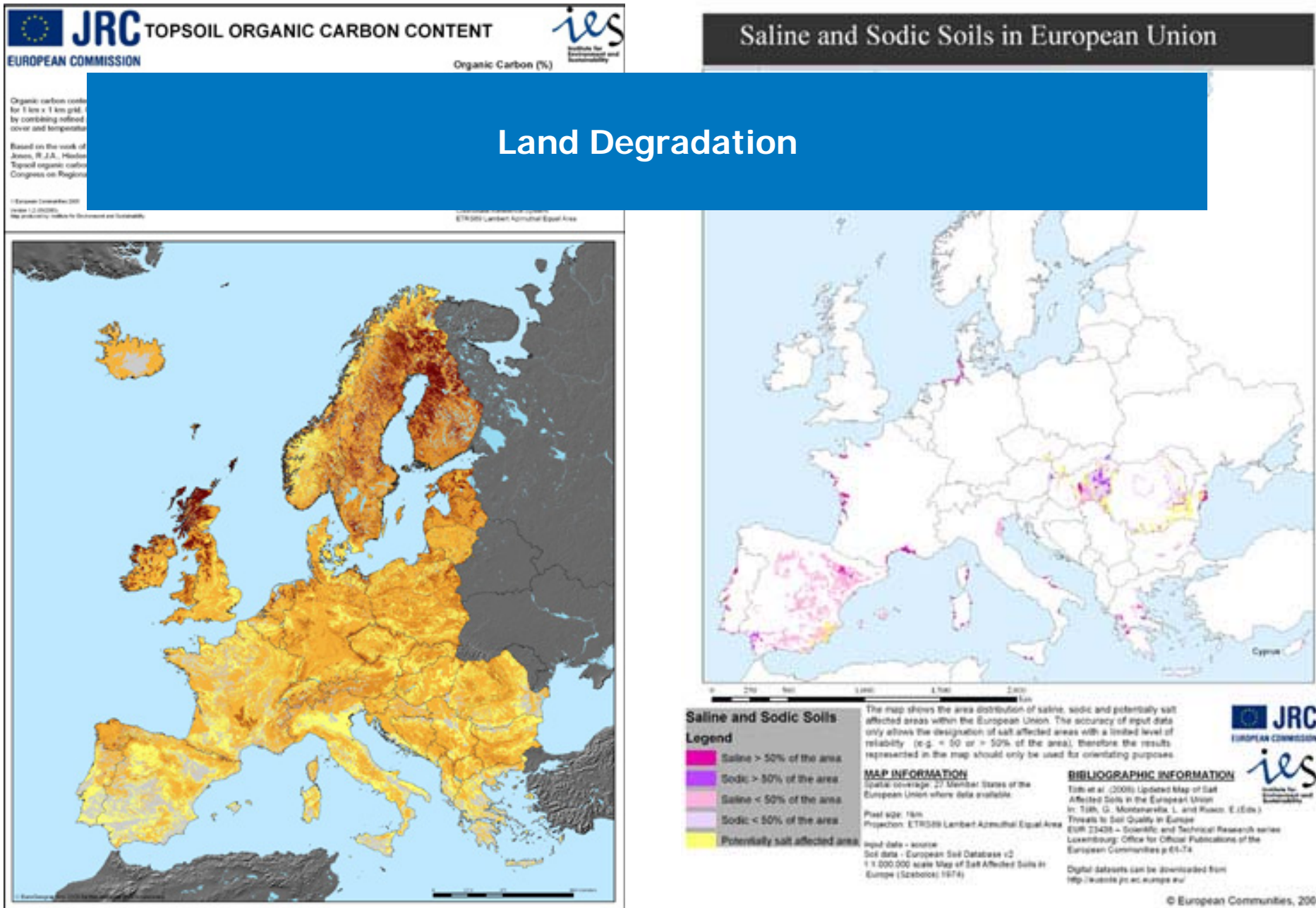
Compare the size

## Growth in Organic Agricultural Land 2001-2011



Israel: Factor 1.64, rank 58 of 71

John Paull, 2011,



## Integrating Challenges and Objectives:

**Economic:**

- Food security
- Price Stability
- Bio-energy and functional crops
- Employment and Income

**Environment:**

- GHG emissions, climate change
- Soil degradation
- Water/Air quality
- Habitats and Biodiversity

**Rural development:**

- Vitality of Rural Areas
- Diversity of European Agriculture

# 5

## Ex-ante Impact Assessment

scientific support to policy decision making

# Ex-ante Impact Assessment

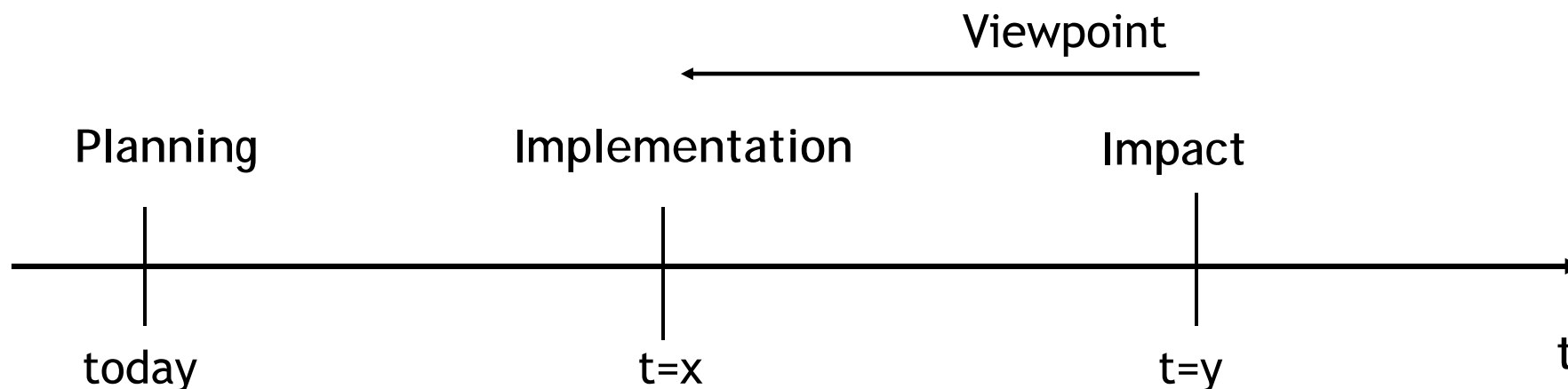
„The purpose of an (Impact) Assessment is to synthesize peer-reviewed scientific information in a form that is relevant for policy, but does not prescribe policy“

S.R. Carpenter  
Ecology & Society, 2008

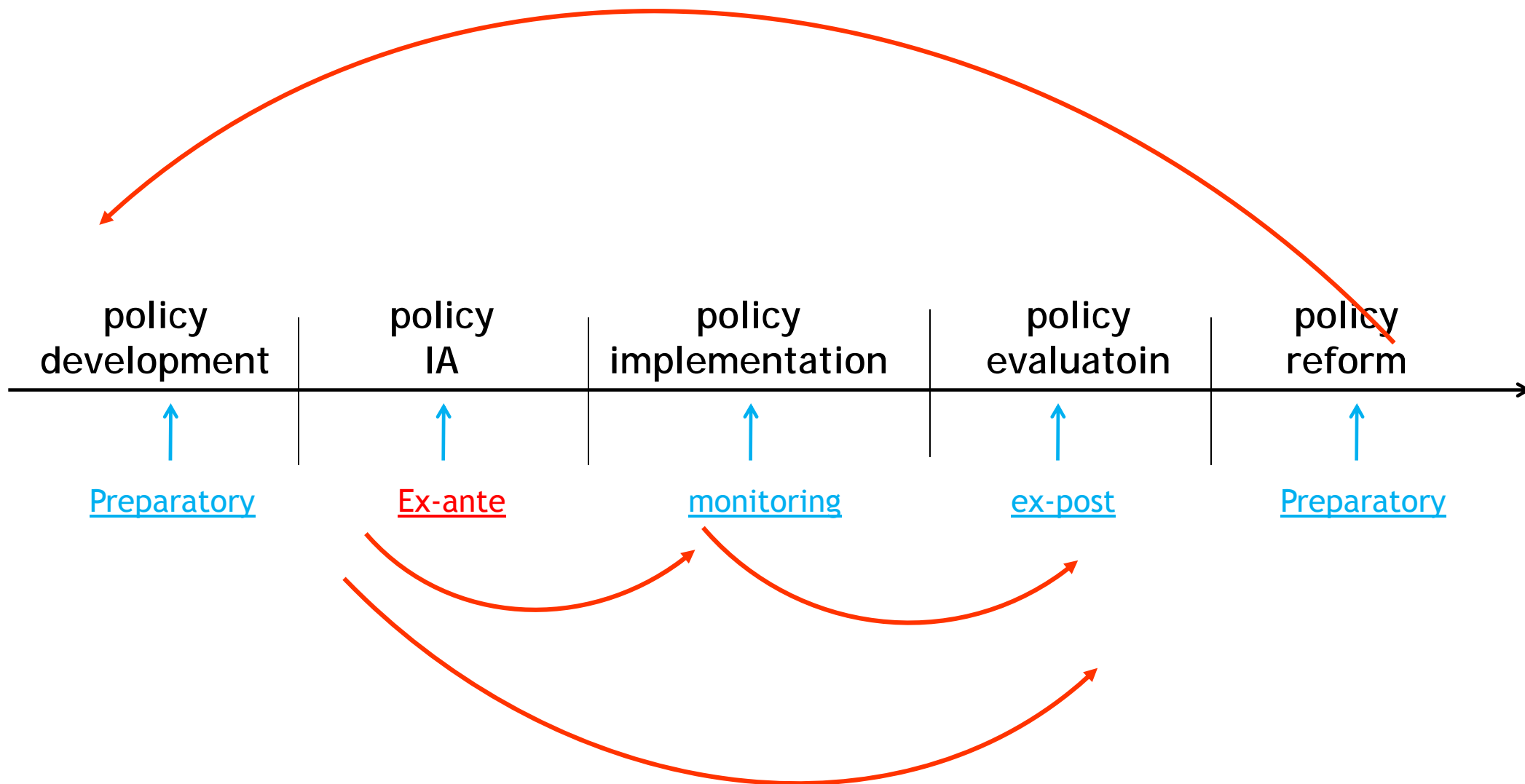
(scientific viewpoint)



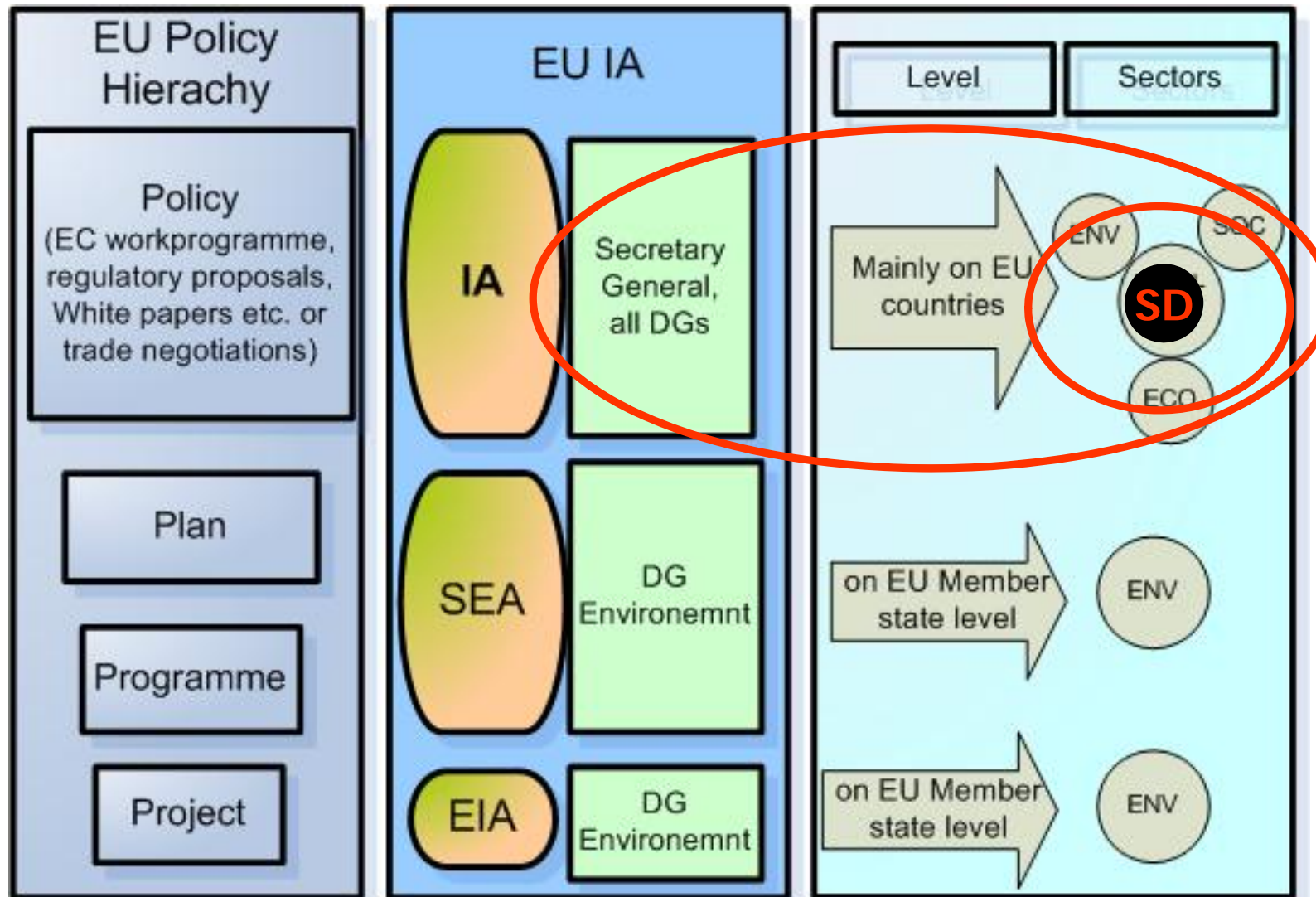
- What could be the effect of alternative policy options on environment, social and economic impact areas
  - How important are these effects



(policy viewpoint)



# Impact Assessment at the European Commission



Tscherning et al. (2008). Impact Assessment of Land Use Changes, Springer

## What will be the impacts?

- Identify opportunities and threats
  
- Consider all 3 aspects of sustainable development:
  - Economic impacts
  - Social impacts
  - Environmental impacts
  
- Provide evidence for decision makers



## Standardised procedure, mandatory for all policies

### Impact Assessment

#### 6 Steps

1. Identification of problem
2. Define objectives
3. Develop policy options
4. **Analyse impact of options**
5. Compare the options
6. Implementing the options (monitoring)

Impact Assessment Guidelines (EC, 2009)

### DPSIR

D  
rivers

P  
ressures

S  
tates

I  
mpacts

R  
esponses

EEA, 2003

### Issues

World economy, Demography,  
Technology, Demand Patterns

Trend and policy scenarios

**Land Use system**

Environment

**Indicators:** Economy

Society

Sustainable Development

Policy Implementation

# Criteria for indicator selection

- A clear representation of the indicandum (impact area)
- A clear proof of relevant cause - effect relations
- An optimal sensitivity of the representation
- Adequate spatio-temporal scales
- High transparency of the derivation strategy
- Validity of representativeness (official data)
- Comparability with indicator sets
- Optimal degree of aggregation
- Good fulfillment of statistical requirements

# Israel Ministry of Environmental Protection

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- [Energy & Economic Activity](#)
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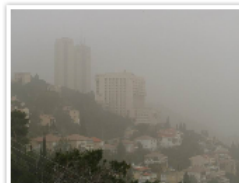
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- [Data](#) >

## Environmental Indicators

As the Israeli public has become more aware of the impact the state of the environment has on human health and quality of life, it has sought reliable and updated information, based on scientific and comparative data, on the state of environmental resources: land, air, water, sea and biodiversity. Management of these resources must be based on solid data that present an objective picture, by means of selected, clear indicators that include multi-annual data on different subjects that highlight trends and developments over time. The following indicators provide a comprehensive picture of the state of the environment in Israel and describe the quality of environmental resources, the processes of pollution, and the means of treating the wastes produced by human activity.

The Indicators data is updated as of 2008.



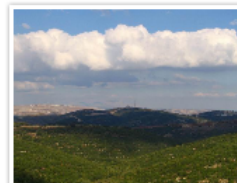
**Air Quality**  
The main sources of air pollution in Israel are human ...



**Biodiversity**  
Israel has a rich biodiversity which includes hundreds of thousands of species of plants, ...



**Energy & Economic Activity**  
Economic activity has a significant impact on the environment, whether in terms of energy and ...



**Land Use**  
Land cover relates to the totality of uses that cover the ...



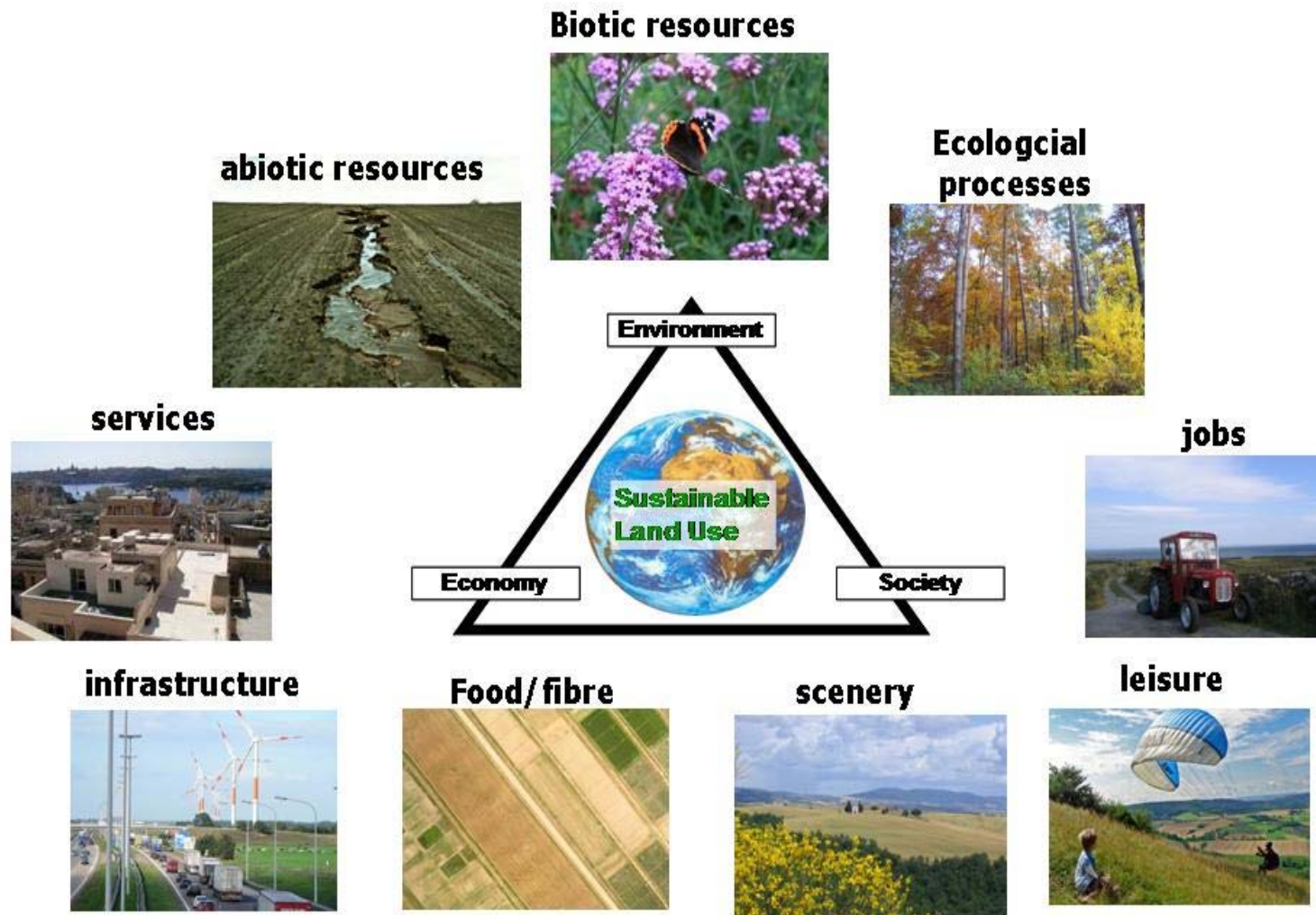
**Population**



**Seas**



**Water**








## The FoPIA approach

A participatory stakeholder method for sustainability impact assessment  
of land use scenarios

Hannes König

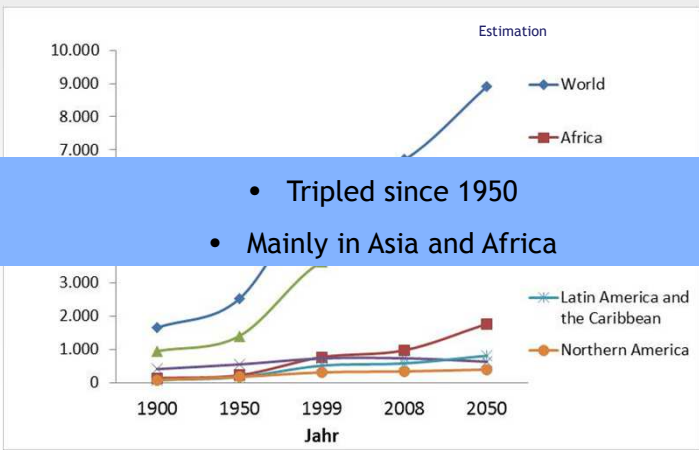
Haifa, 23. March 2014

## Intro: Consequences of land use changes


- Global land use changes highly dynamic, particularly in developing countries


- Tripled since 1950
- Mainly in Asia and Africa



Source: UN report 2004 data, own figure

Nr. 2






## Intro: Consequences of land use changes

- Global land use changes highly dynamic, particularly in developing countries
- Missing control mechanisms and few targeted land use policy measures
- Challenge: increasing demands for resources by a growing population, economic development, limited natural resources and climate changes

➔ Sustainable Development

zalf

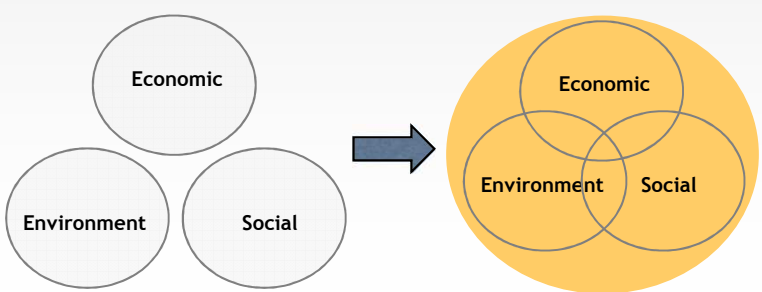
Nr. 3



## Intro: Sustainable Development

Sustainable Development

- A holistic and integrated view of economic, social and environmental issues (IISD 2010)



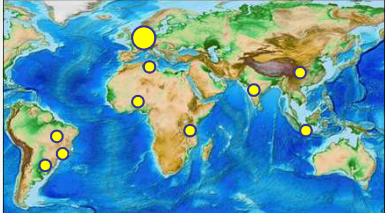
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Nr. 4


## Development background

Two EU Research Projects (FP6)

- SENSOR-TTC (2007 – 2009)
- LUPIS (2007 – 2011)



**Goal:** Development and transfer of research methods for impact assessment of land use policies in the EU and non-European countries

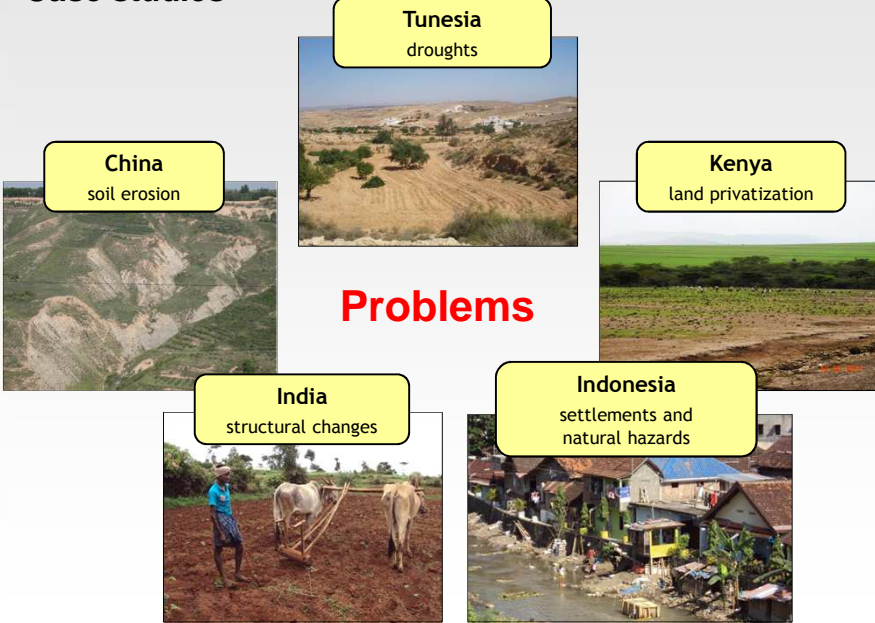



Nr. 5

## Case studies

**Problems**

- China**  
soil erosion
- Tunesia**  
droughts
- Kenya**  
land privatization
- India**  
structural changes
- Indonesia**  
settlements and natural hazards

Nr. 6

## FoPIA – A Framework for Participatory Impact Assessment

### What is FoPIA?

- “a structured set of sequenced research methods that, collectively, facilitate the involvement of national, regional and local stakeholders in assessments of land use policy impacts at the case study level” (Morris et al. 2011)

### Purpose

- Participatory exploration of possible impacts that policy induced land use changes might have
- To support the exchange of interdisciplinary stakeholder and expert groups



Nr. 7

## FoPIA – Workshop organization

### Preparation phase (approx. ½ year before):

- Context analysis (literature, interviews)
- Planning of the workshops
- Selection of actors (group size: 10-15)

### Workshop & field work(1-2 month):

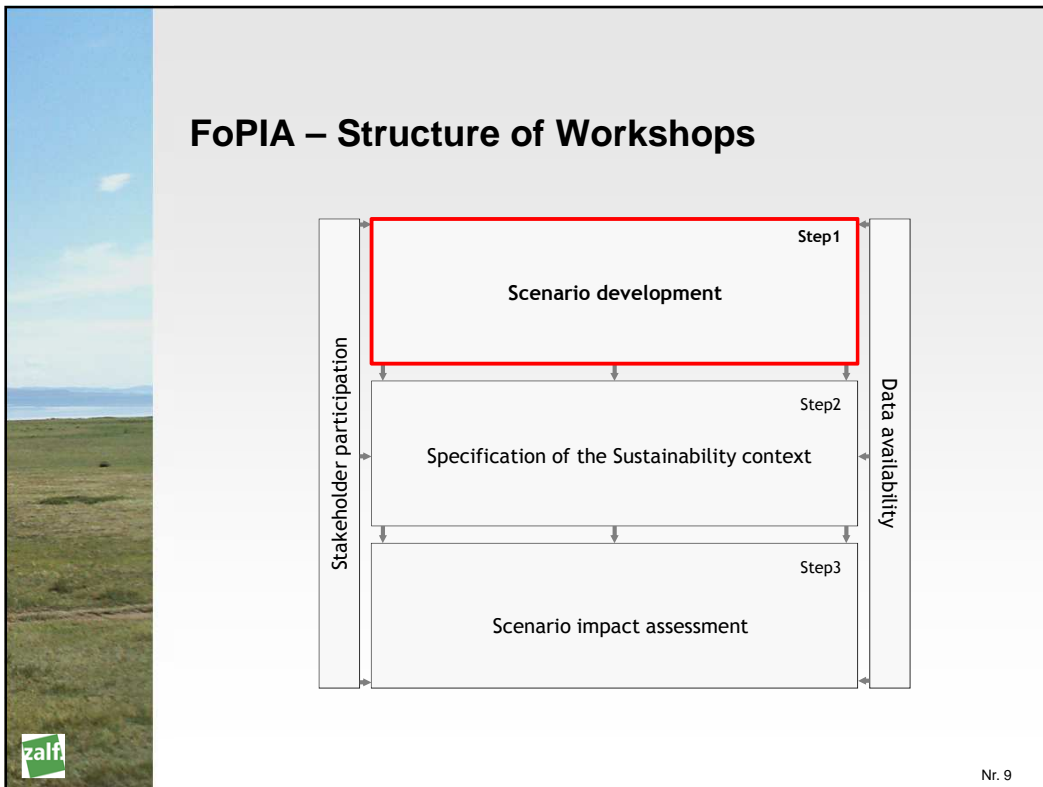
- Ground-check (regional impression)
- Stakeholder workshop (1-2 days)

### Analytical phase

- Analysis of workshop results (complementary use of secondary data)
- Final assessment of scenario impacts



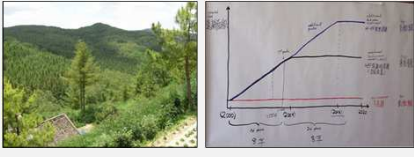
Nr. 8



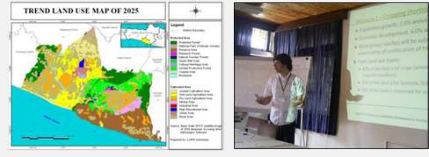
### Step 1: Scenario development

Definition Problem and Region → Selection of policy instruments, implementation

**China**  
**Afforestation policy**  
Goal: „Reduction of soil erosion“



**Indonesia**  
**Spatial planning policy**  
Goal: „Strategic land management“




Nr. 11

### Step 1: Scenario development


Definition Problem and Region → Selection of policy instruments, implementation → Land use scenarios

**China**  
**Afforestation scenarios**


No Policy  
(Reference)



Phase 1  
(Policy 1)




Phase 2  
(Policy 2)




Target year: 2020

**Indonesia**  
**Spatial planning scenarios**


Settlements  
(Reference)



Rice paddies  
(Policy 1)



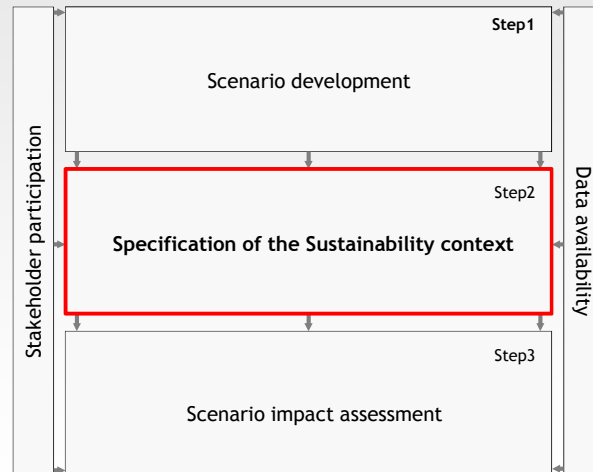
Forests  
(Policy 2)



Target year: 2025

Nr. 12

## FoPIA – Structure of Workshops



Nr. 13

## Step 2: Specification of the Sustainability context

Land Use Function  
(LUF) concept

### Land Use Functions (LUFs)

- “...describe the **goods and services** provided by the different land uses that summarize the most relevant economic, environmental and social issues of a region” (Pérez-Soba et al. 2008)

### Goal

- **Structuring** the land use problem
- Balances consideration of social, economic, and environmental **sustainability** dimensions (= Triple-Bottom-Line approach, see Pope et al. 2004)

Nr. 14

### Step 2: Specification of the Sustainability context

Land Use Function (LUF) concept

Example

„Provision of abiotic resources: the role of land in regulating the supply and quality of air, water and soils.”

Source: after Pérez-Soba et al. 2008

Nr. 15

### Step 2: Specification of the Sustainability context

Land Use Function (LUF) concept

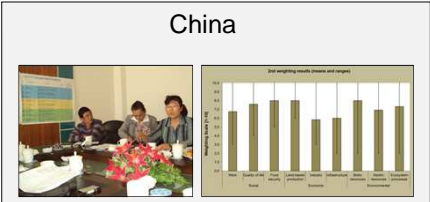
⇒

Weighing LUFs

**Weighing the LUFs**

- Scale: 1-10
- Discussing regional situation and priorities
- To consider local preferences in the impact assessment

**China**



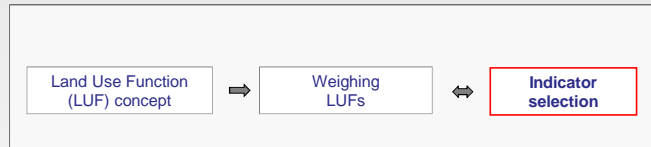
**Indonesia**



Nr. 16



## Step 2: Specification of the Sustainability context

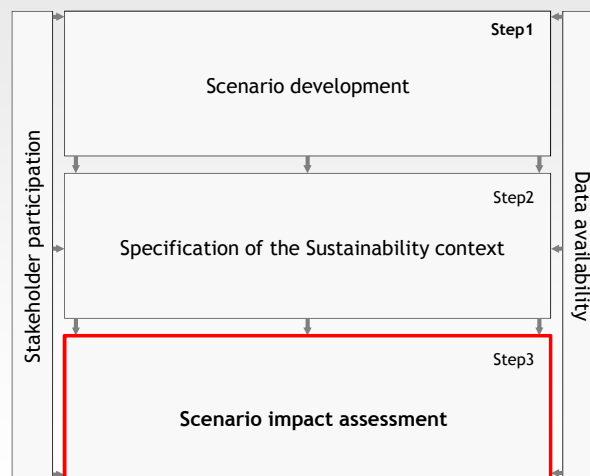


<i>Land use functions (LUFs)</i>	<i>LUF-indicator</i>
ECO 1: Land based production	Economic production from land [yield]
ECO 2: Non-land based production	Build-up area [m <sup>2</sup> ]
ECO 3: Infrastructure	Road density and quality [length and status]
SOC 1: Provision of work	Regional employment [%]
SOC 2: Quality of life	Net income per household [RMB]
SOC 3: Food security	Regional food availability [kg/capita]
ENV 1: Abiotic resources	Soil health/quality [status]
ENV 2: Biotic resources	Habitat and biodiversity [status]
ENV 3: Ecosystem processes	Vegetation cover [status]

ECO = Economic, SOC = Social, ENV = Environmental

Nr. 17

## FoPIA – Structure of Workshops



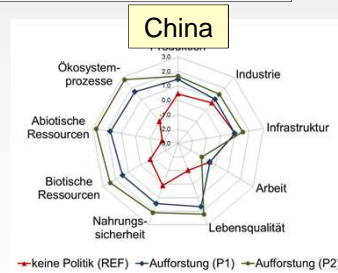
Nr. 18

### Step 3: Scenario impact assessment

Scenario assessment

#### Assessment

- written, two rounds
- Scale: -3 to +3
- Visualization
- Moderated discussion
- Documentation



Nr. 19

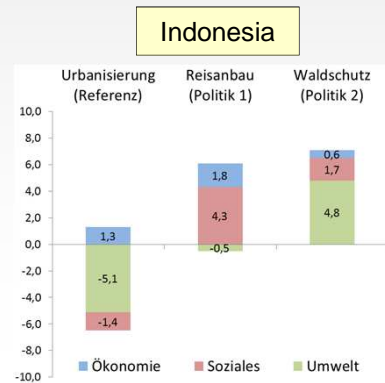


### Step 3: Scenario impact assessment

Scenario assessment → Trade-off analysis towards Sustainability

#### Weighted assessment

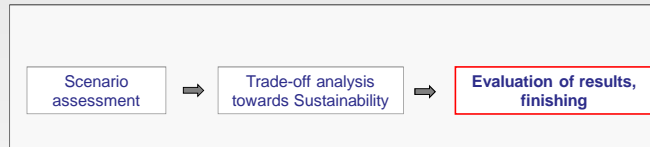
- Aggregated presentation of sustainability dimensions
- Identification of possible trade-offs



Nr. 20



### Step 3: Scenario impact assessment

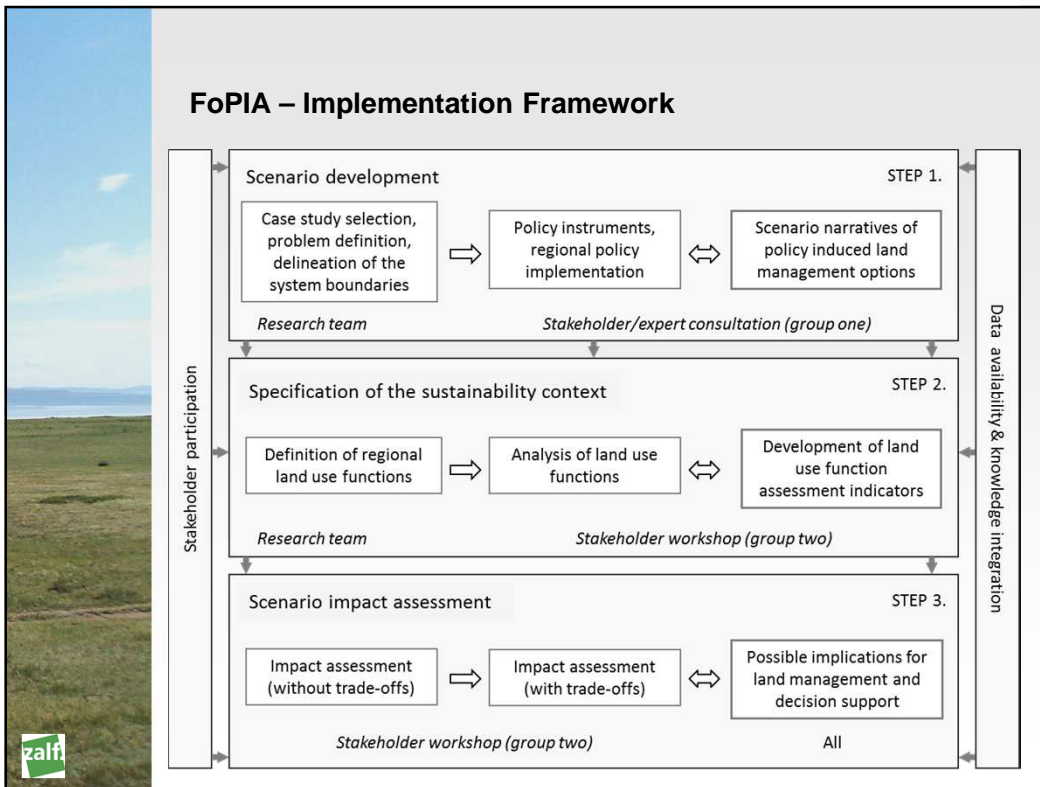


#### Evaluation and finishing

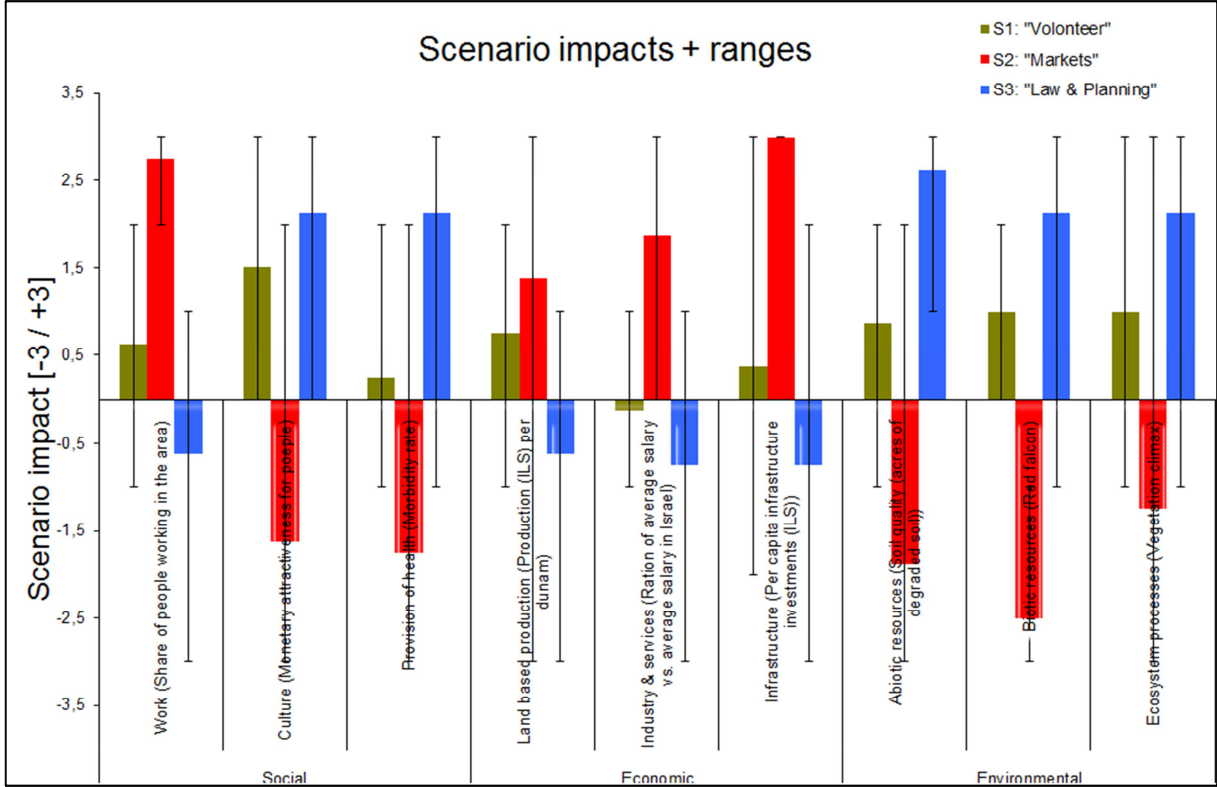
- Summary of assessment results
- Final discussion of possible actions
- Feedback evaluation by workshop participants



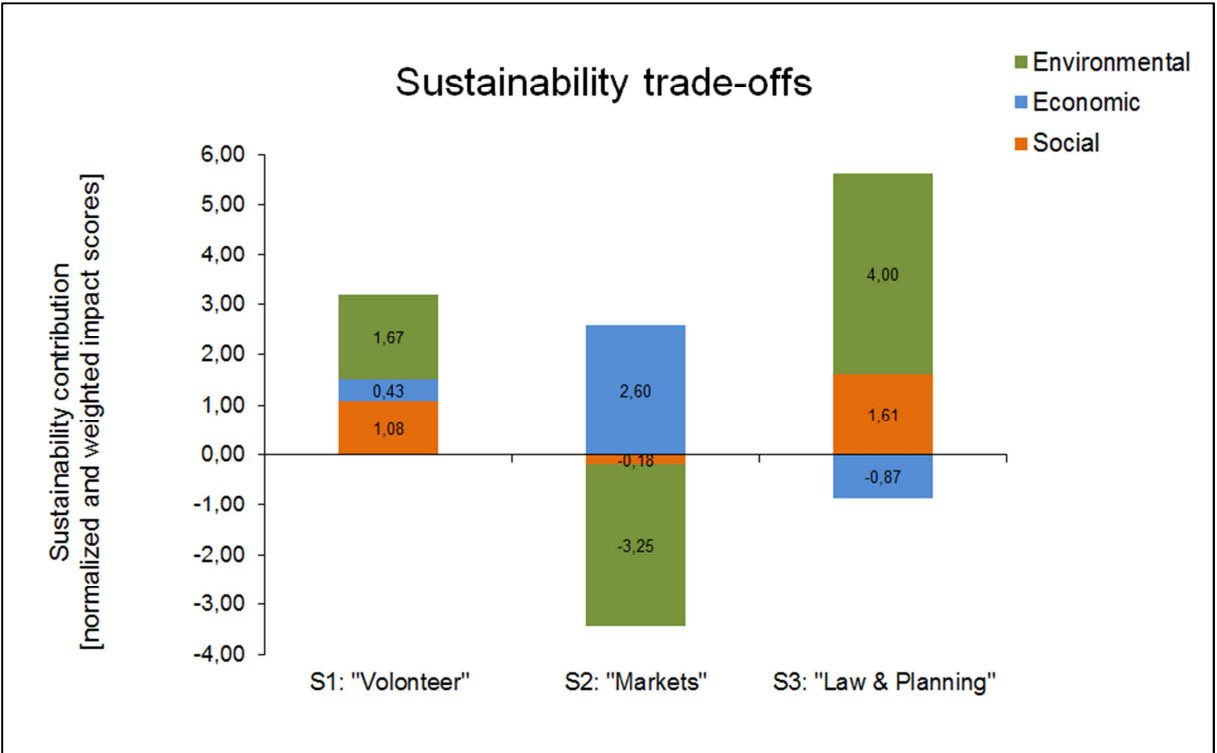
# Thank You!



### Scenario impact assessment results



### Aggregated results (trade-offs)



Land use functions weights (sustainability preferences)

