

## **Bioeconomy in mountain areas – an opportunity for local development**

### **Ecosystem services Strategies for local development**

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30/06/2018

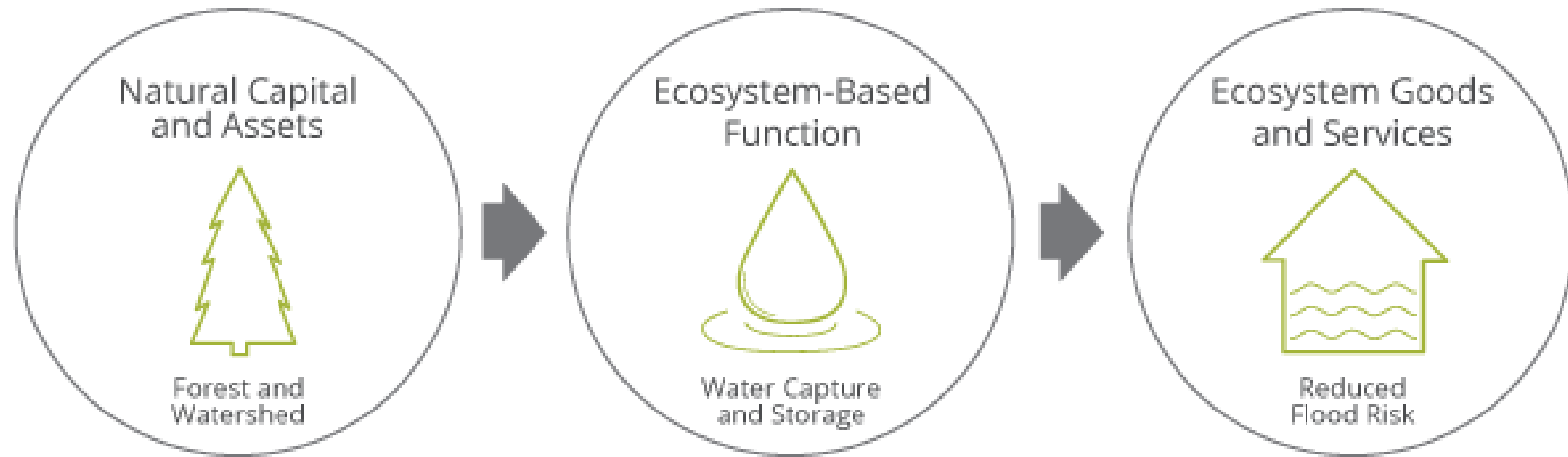
# Contents

- Ecosystem services at a glance
- The context: a sustainable development model
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# Ecosystem services at a glance

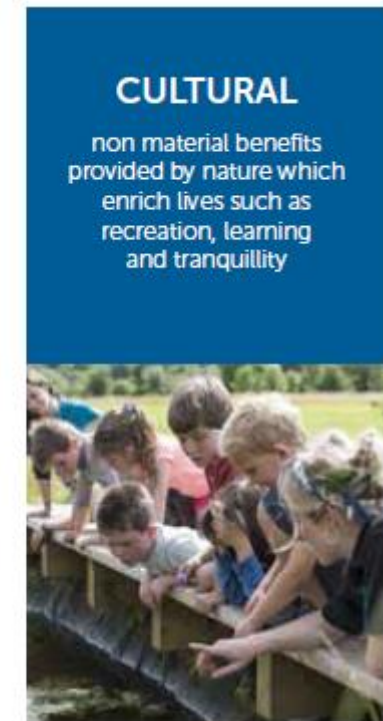
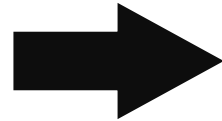
- **Natural capital** is the world's stock of natural resources, which includes geology, soils, air, water and all living organisms.
- **Ecosystem functions** are natural process or characteristic exchanges of energy that take place in the various animal and plant communities of the different biomes of the world.
- **Ecosystem services** are ecosystem functions that provide benefits for people.

# Ecosystem services at a glance



© Earth Economics 2018

# Ecosystem services at a glance



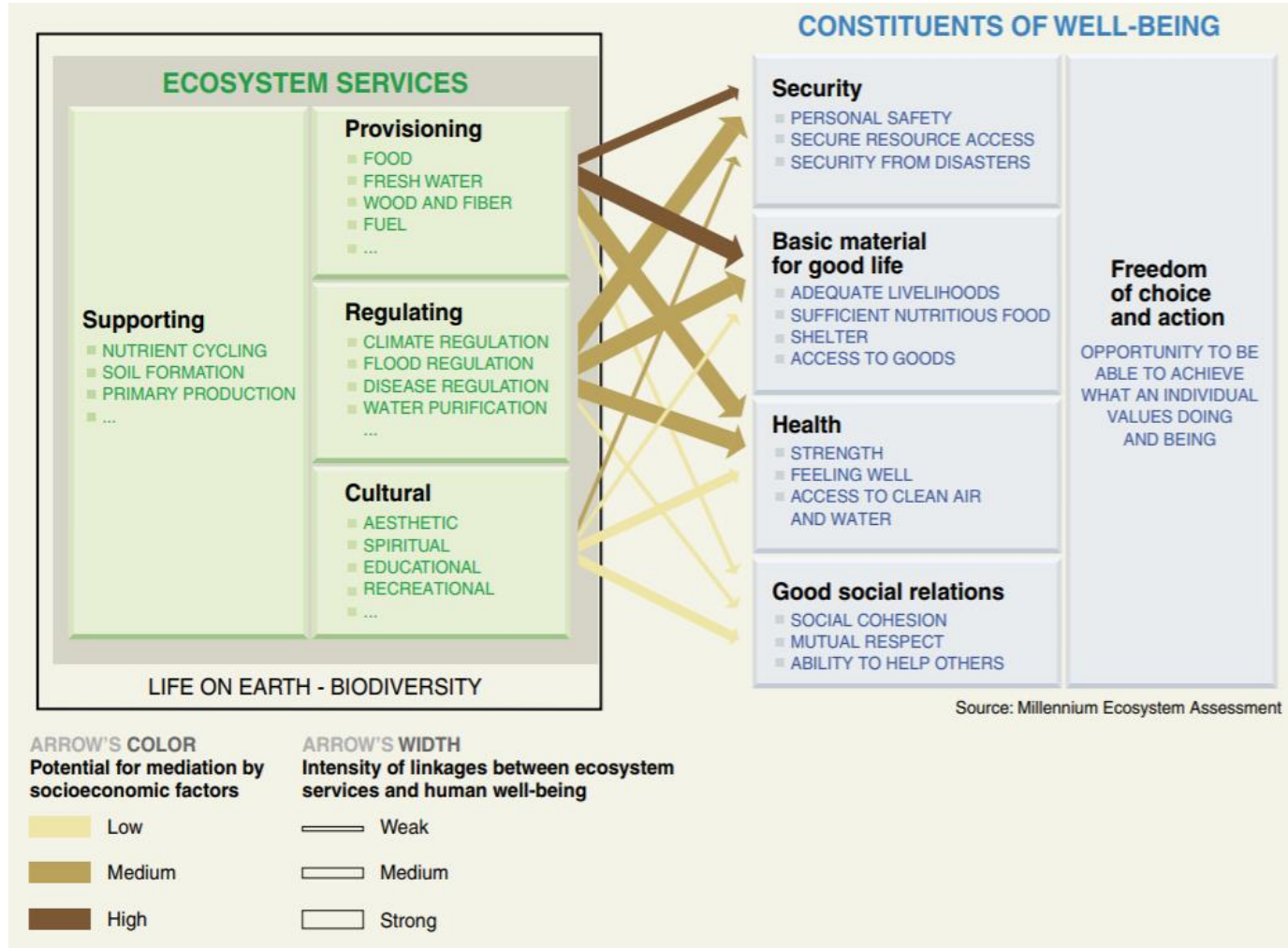
# Ecosystem services at a glance



98 E.S.

CICES, 2017 - V. 5.1

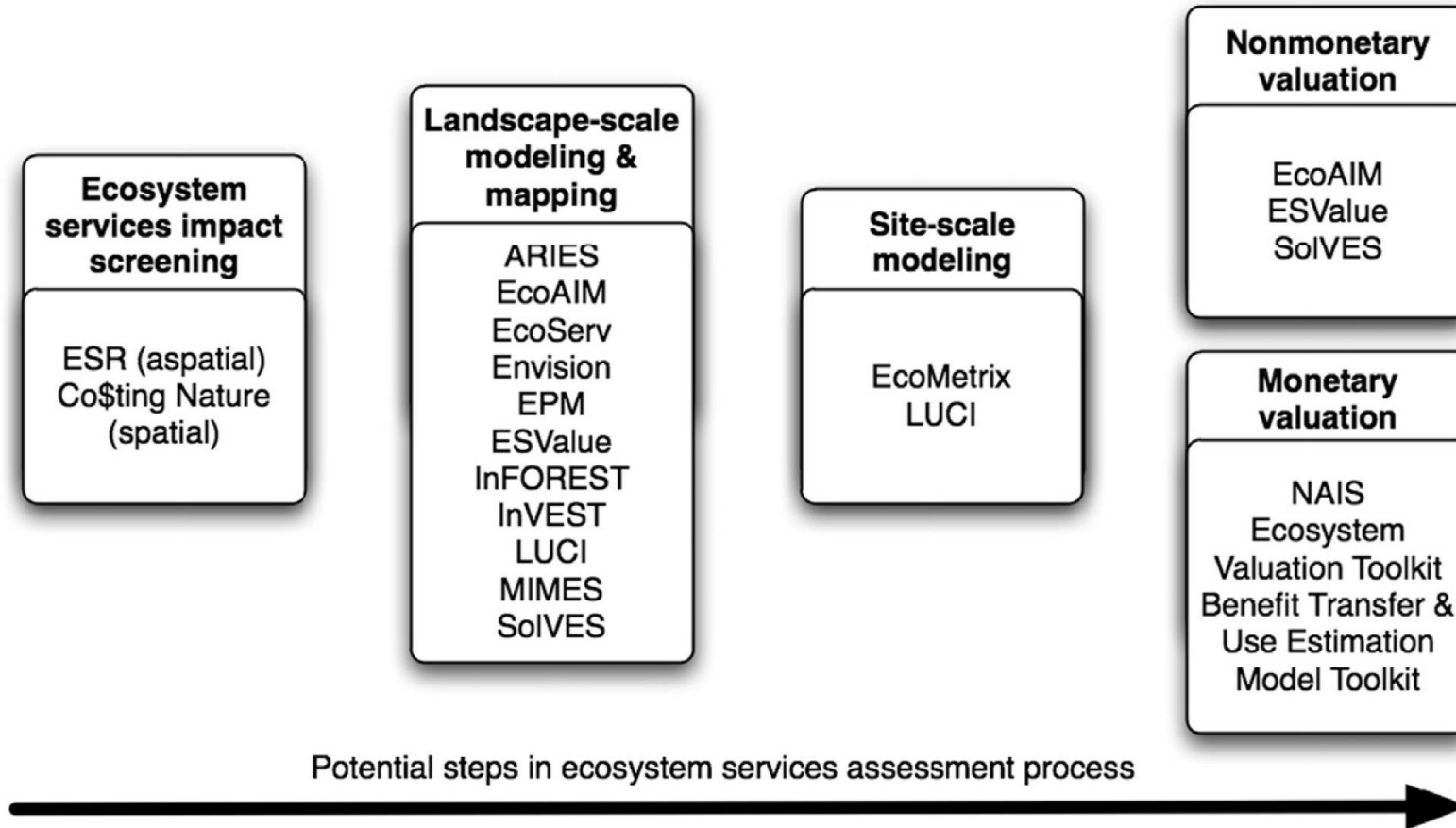
# Ecosystem services at a glance





# Ecosystem services at a glance

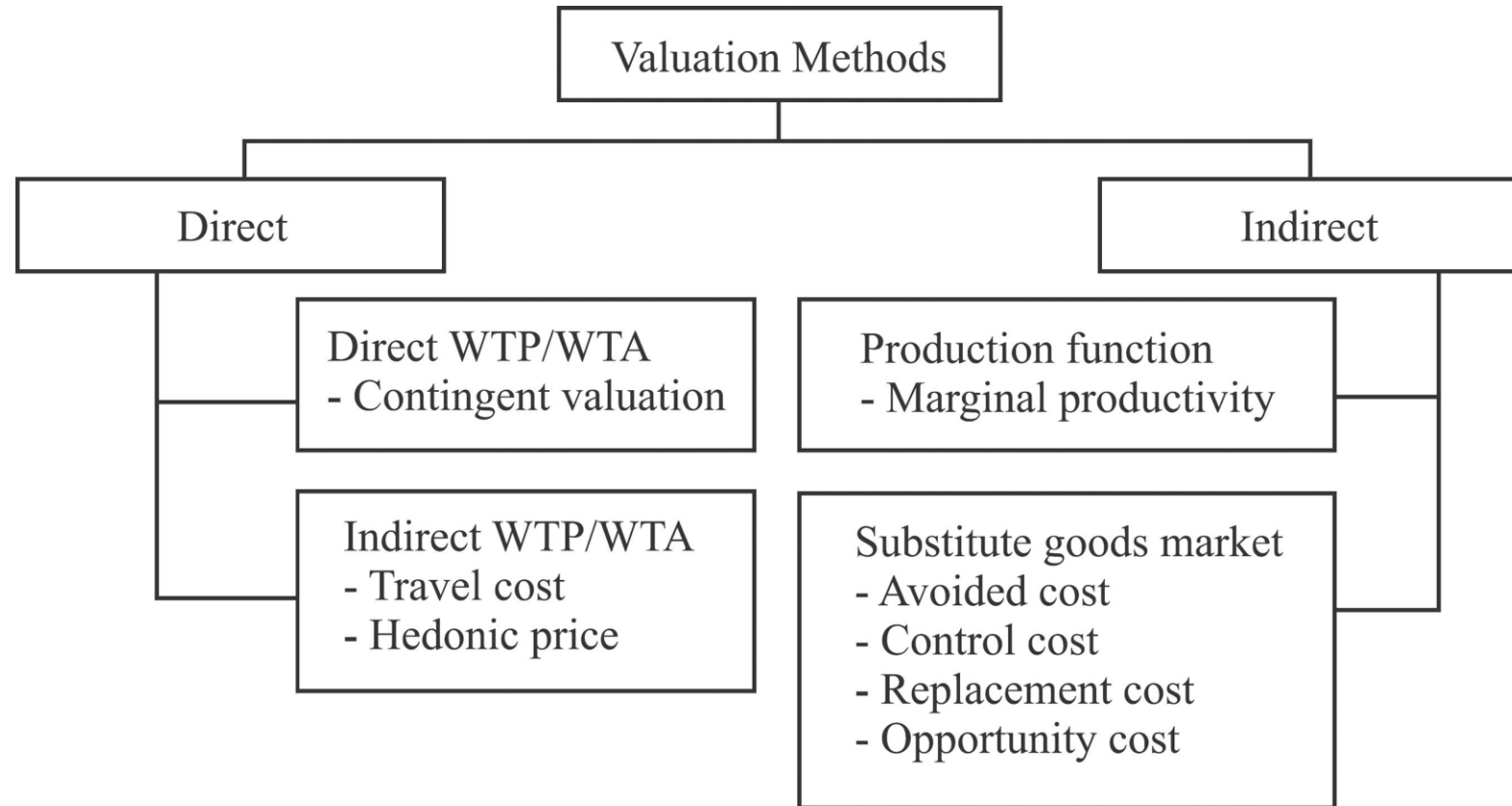
## Valuation/Modelling tools





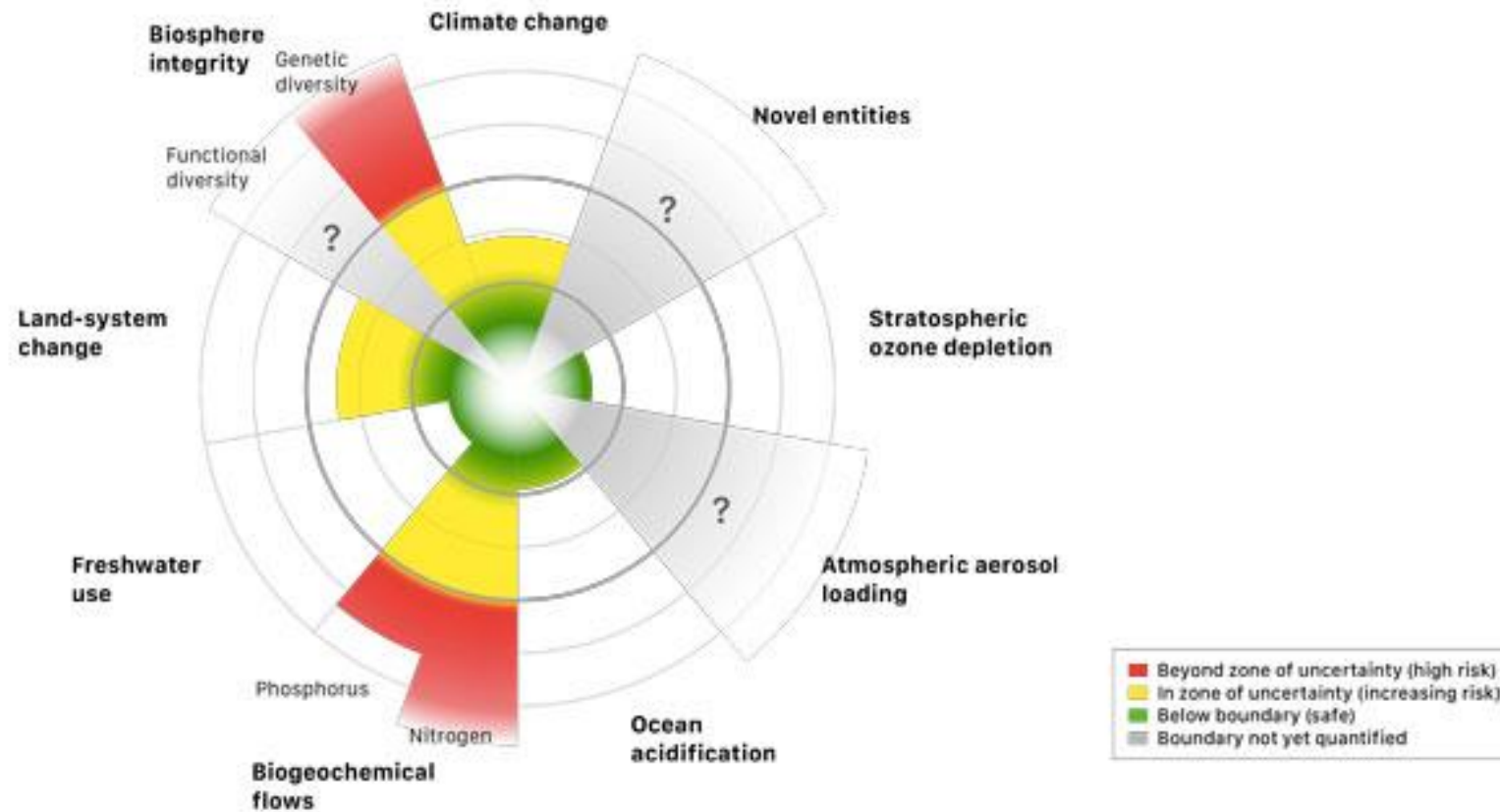
# Ecosystem services at a glance

Translating biophysical assessment into monetary values



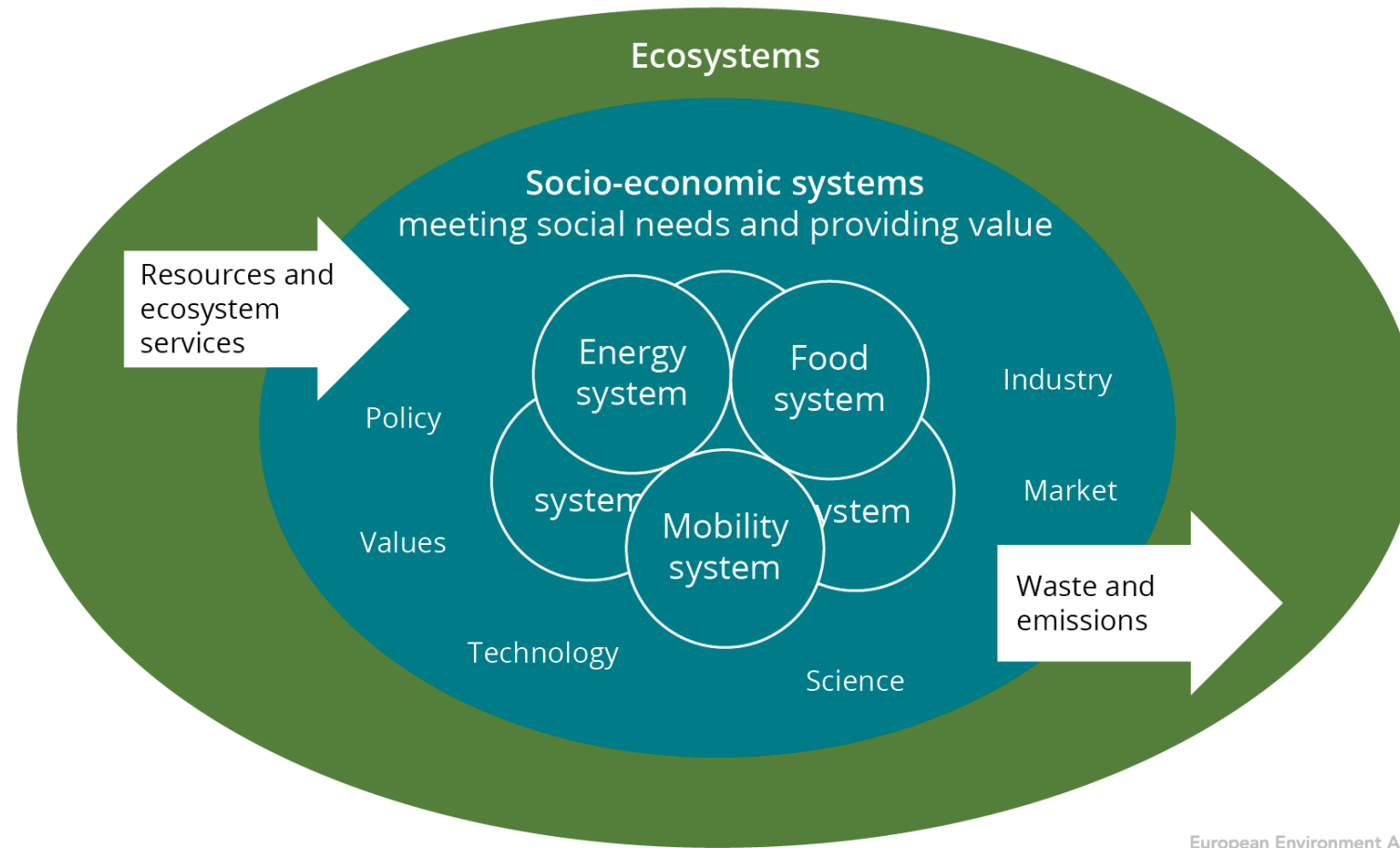
WTP – Willingness to pay; WTA – Willingness to Accept.

# The context: a sustainable development model

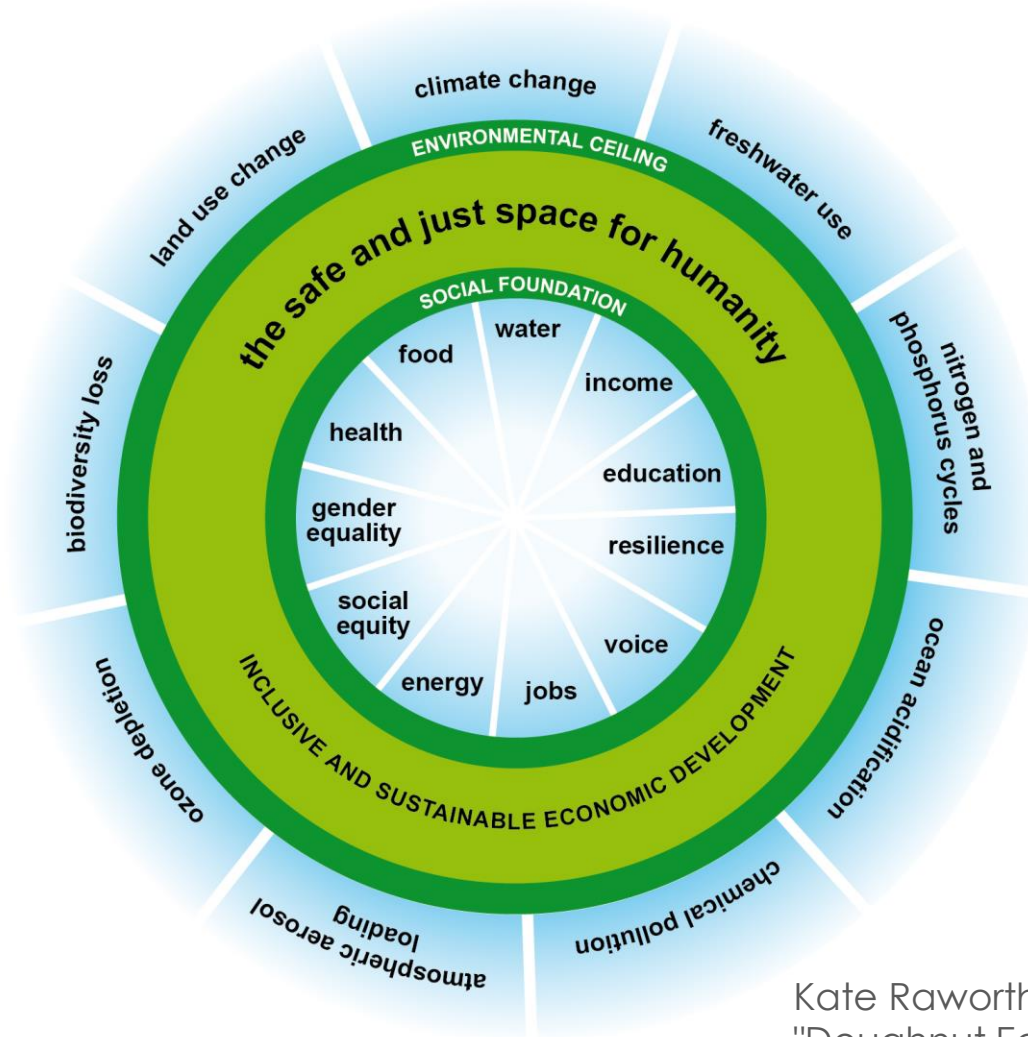


Stockholm Resilience Centre. Source: Steffen et al. 2015

# The context: a sustainable development model

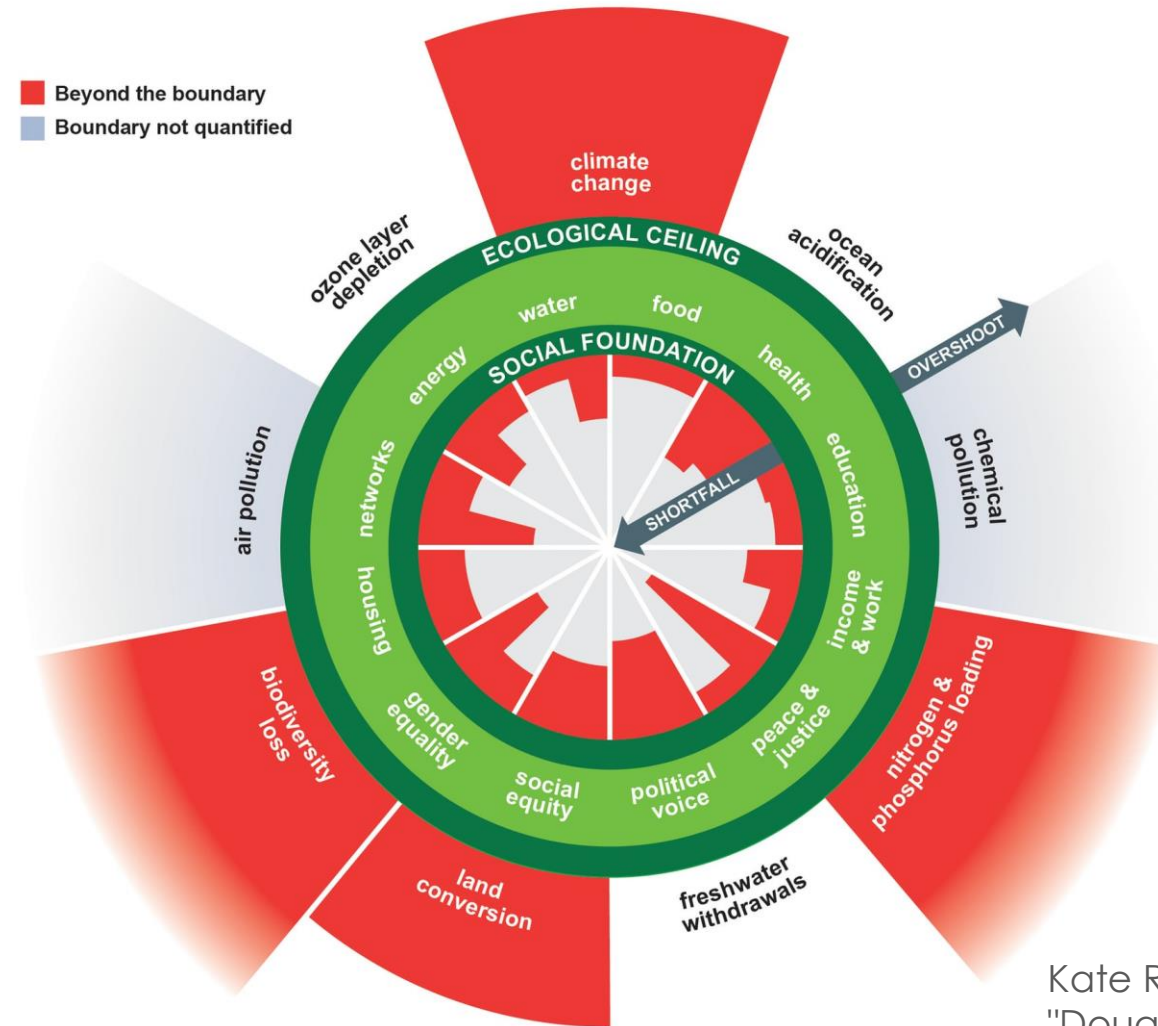


# The context: a sustainable development model



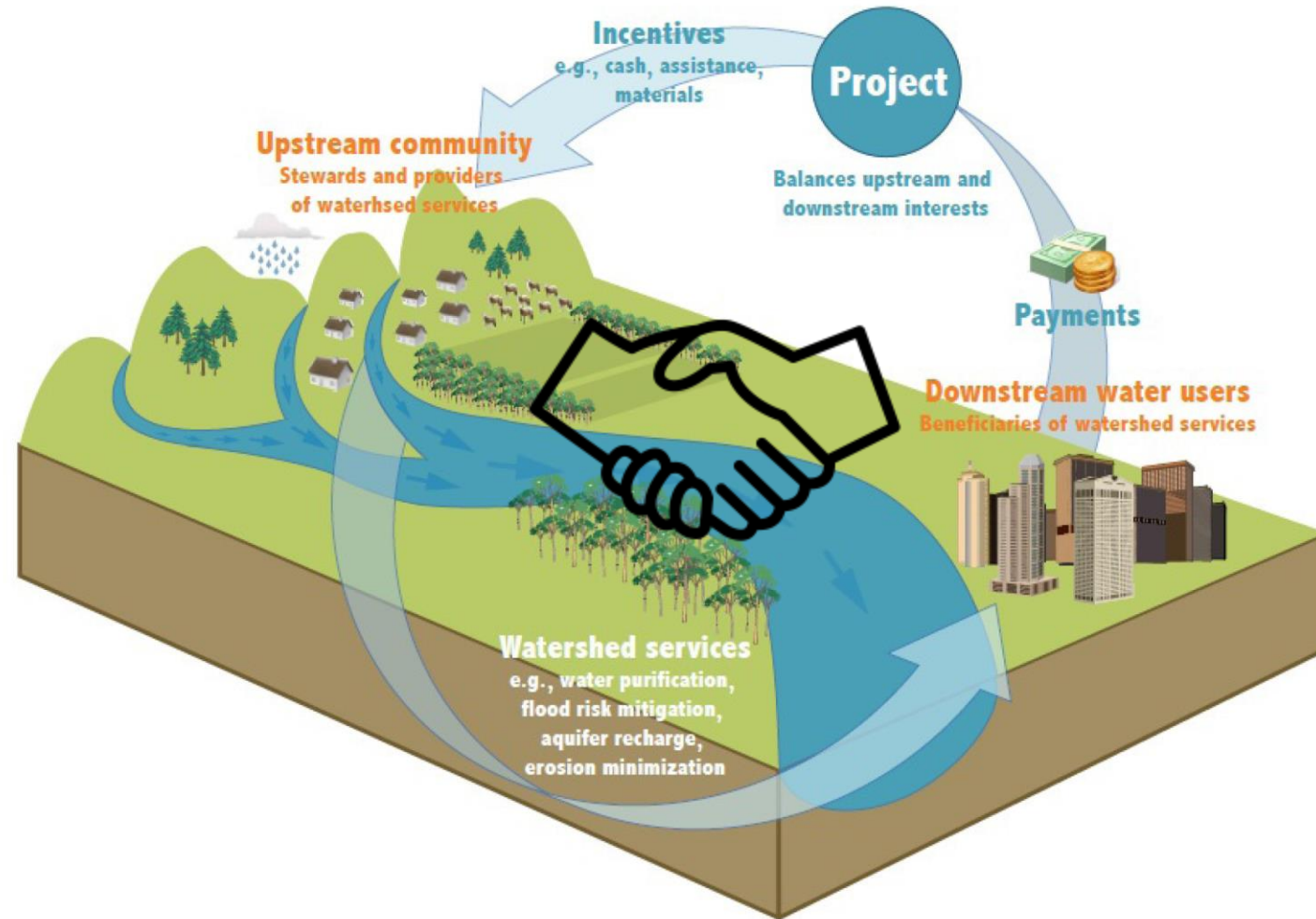
Kate Raworth  
"Doughnut Economics" (2017)

# The context: a sustainable development model



Kate Raworth  
"Doughnut Economics" (2017)

# Payment of ecosystem services (PES) in brief



DEFRA - UK. Source: *Payments for Ecosystem Services: A Best Practice Guide* . 2015



# Payment of ecosystem services (PES) in brief

- **Voluntary:** stakeholders enter into PES agreements on a voluntary basis;
- **Beneficiary pays:** payments are made by the beneficiaries of ecosystem services;
- **Direct payment:** payments are made directly to ecosystem service providers;
- **Additionality:** payments are made for actions over-and-above those which land or resource managers would generally be expected to undertake;
- **Conditionality:** payments are dependent on the delivery of ecosystem service benefits;
- **Ensuring permanence:** management interventions paid for by beneficiaries should not be readily reversible, thus providing continued service provision;
- **Avoiding leakage:** PES schemes should be set up to avoid leakage, whereby securing an ecosystem service in one location leads to the loss or degradation of ecosystem services elsewhere.



# Pantaies project

*PANTAIES* (= dreams in Occitan)

**pantaiES** ECOSYSTEM SERVICES, developed by SEAcop, provides consultancies to support local development projects by means of payment of ecosystem services.

**pantaiES** ECOSYSTEM SERVICES, supports developers that need to compensate environmental impacts and local development plans that can realize compensation interventions.



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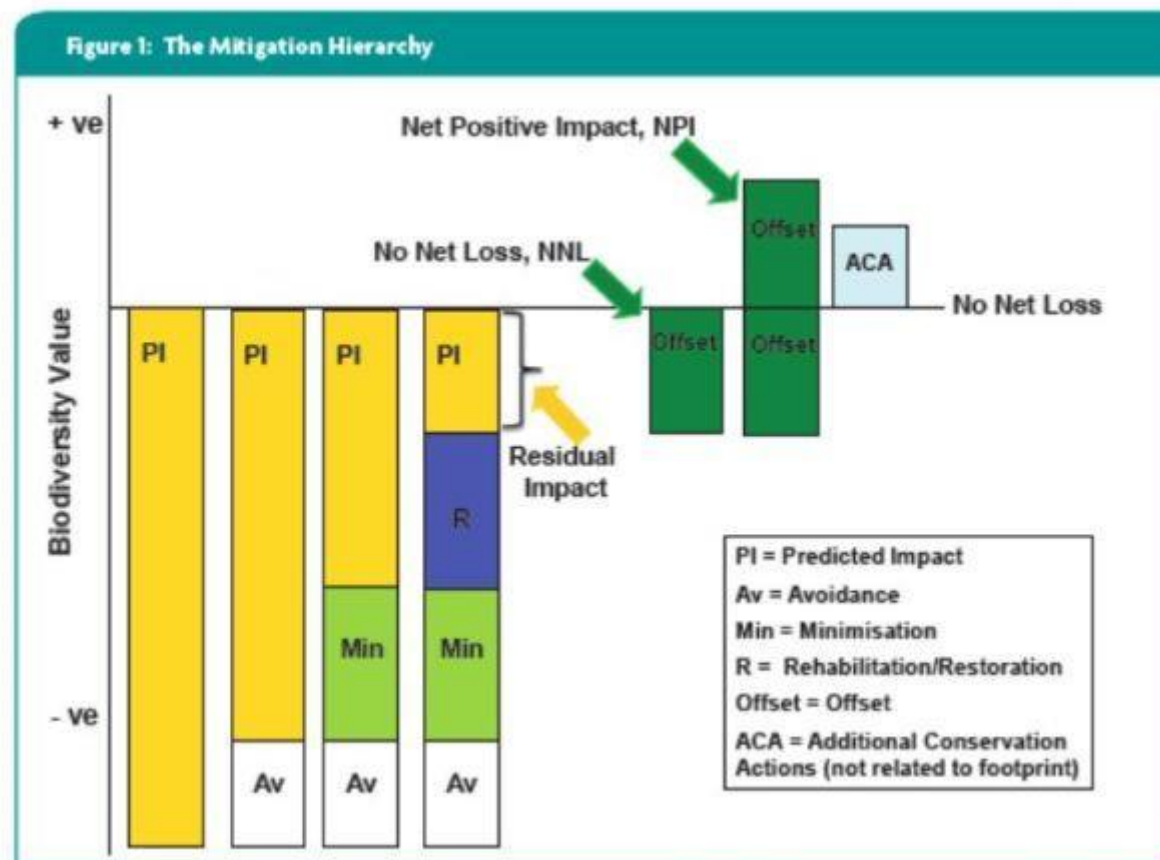
[www.pantaies.com](http://www.pantaies.com)

**ESP**  
Ecosystem Services Partnership



# Pantaies project

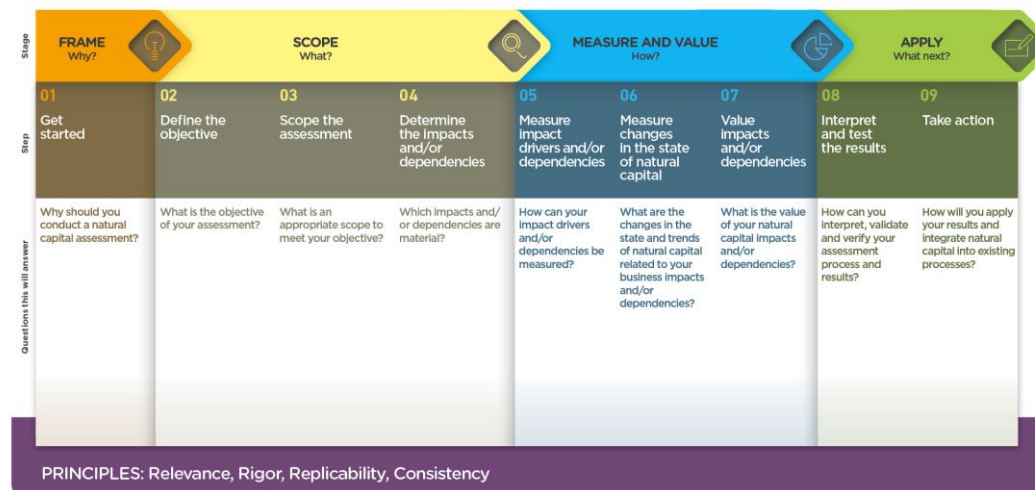
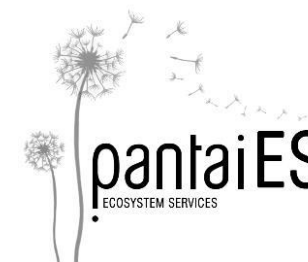
## Mitigation hierarchy



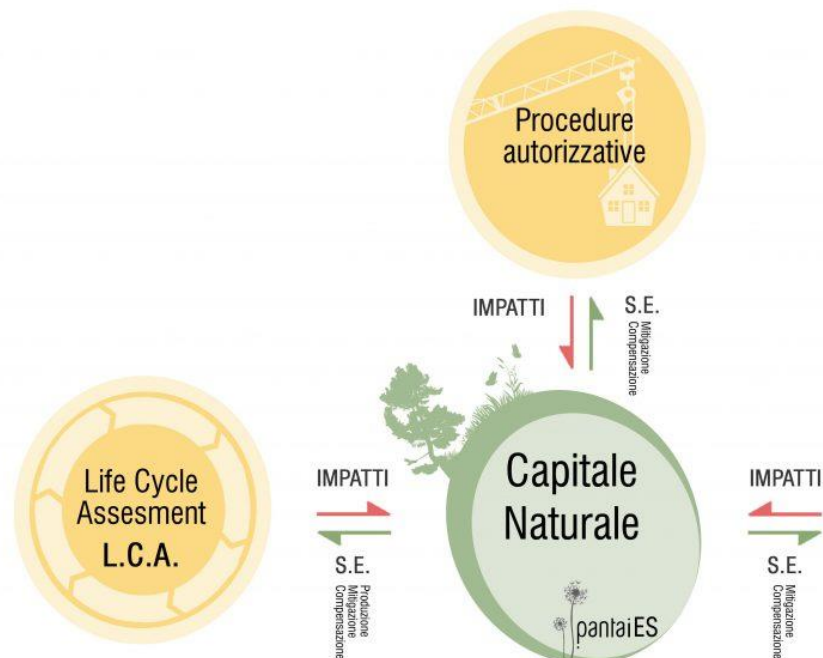
Adapted from Rio Tinto & Government of Australia



# Pantaies project



## Natural Capital Protocol



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# Pantaies project



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Banca delle compensazioni e dei Servizi Ecosistemici



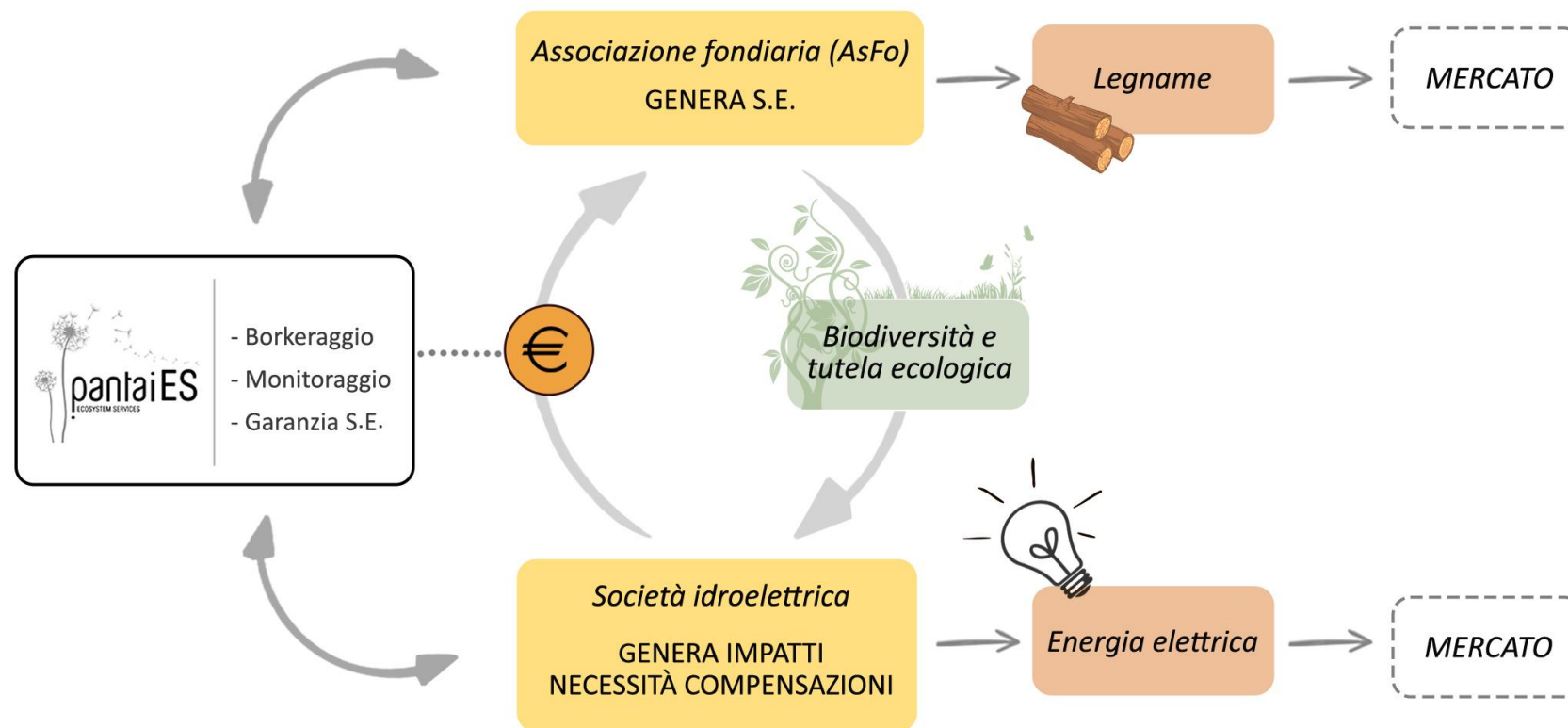
COS'È LA BANCA DELLE COMPENSAZIONI E DEI SERVIZI ECOSISTEMICI? ...*Scopri di più...*

## MAPPA DELLE COMPENSAZIONI DISPONIBILI



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# Pantaies project





# Pantaies project



UNIVERSITÀ  
DEGLI STUDI  
DI TORINO

Scholarship

# Some examples

1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)





# Some examples

1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)



Chieri Municipality Urban Plan

## Specific Objectives for the area

- To improve environmental conditions
- To improve landscape quality
- To improve fruition capabilities
- To provide added source of income for farmers

**Participatory process to create a high quality agro-ecosystem  
in a "High agronomic interest area"  
(PPR art. 20)**

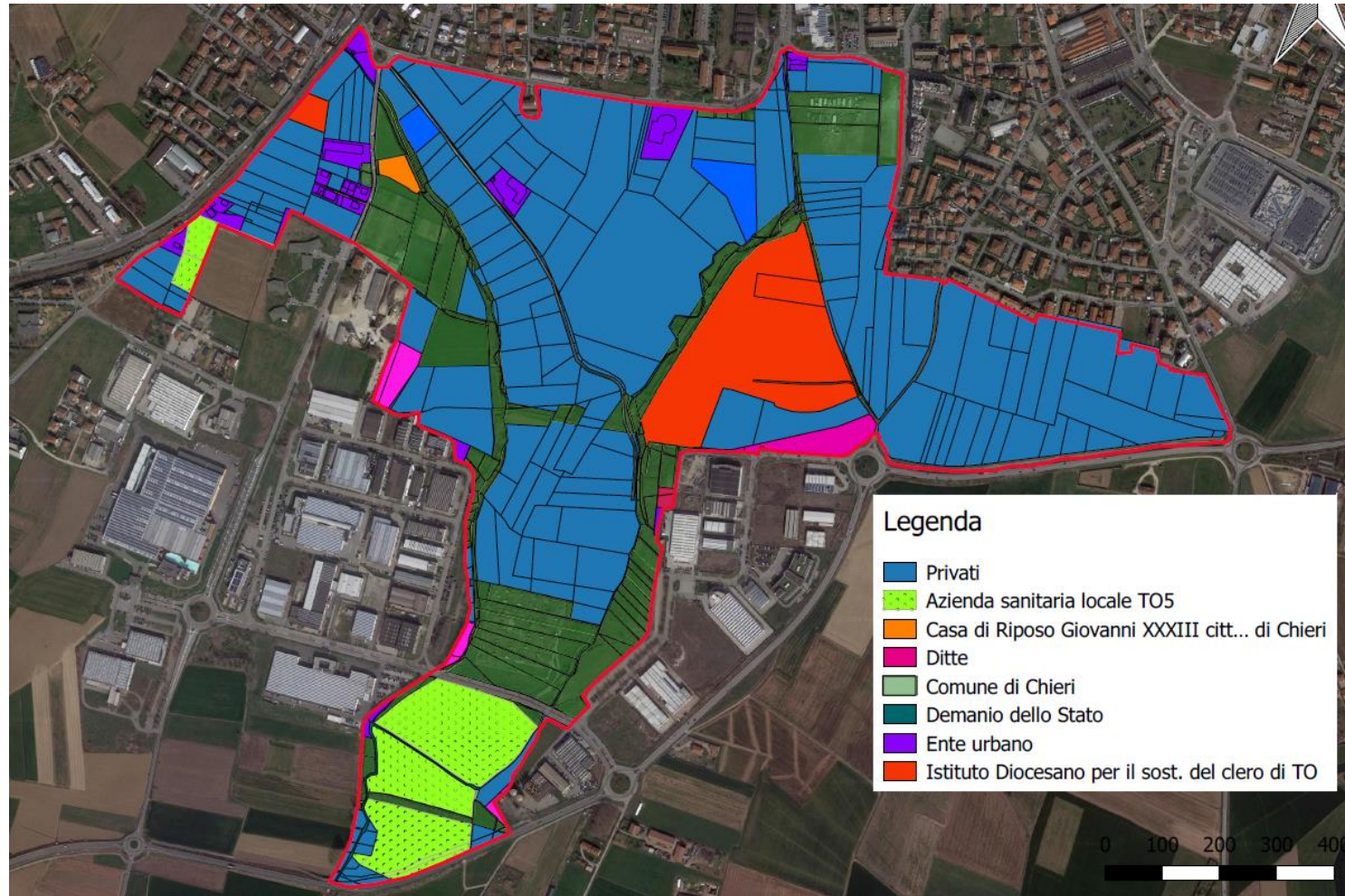
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# Some examples

1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)

## Input



# Some examples

*1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)*

## **Baseline definition activities**

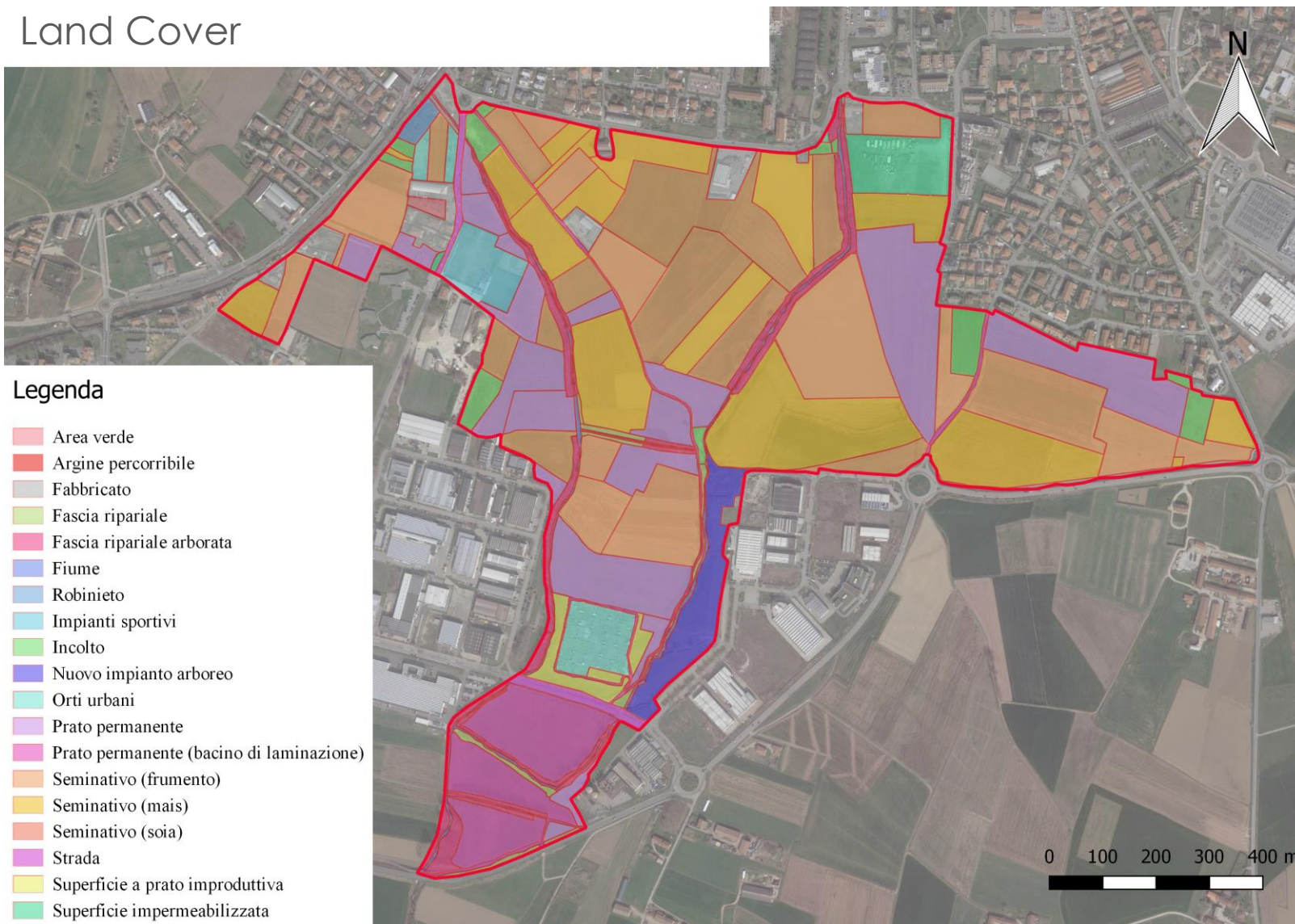
- 1) Land cover map (field survey)
- 2) Soil map and sampling
- 3) Crop (field survey)
- 4) Water table measurement and sampling
- 5) Geology (field survey)
- 6) .....



# Some examples

1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)

## Land Cover



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# Some examples

1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)

## Baseline

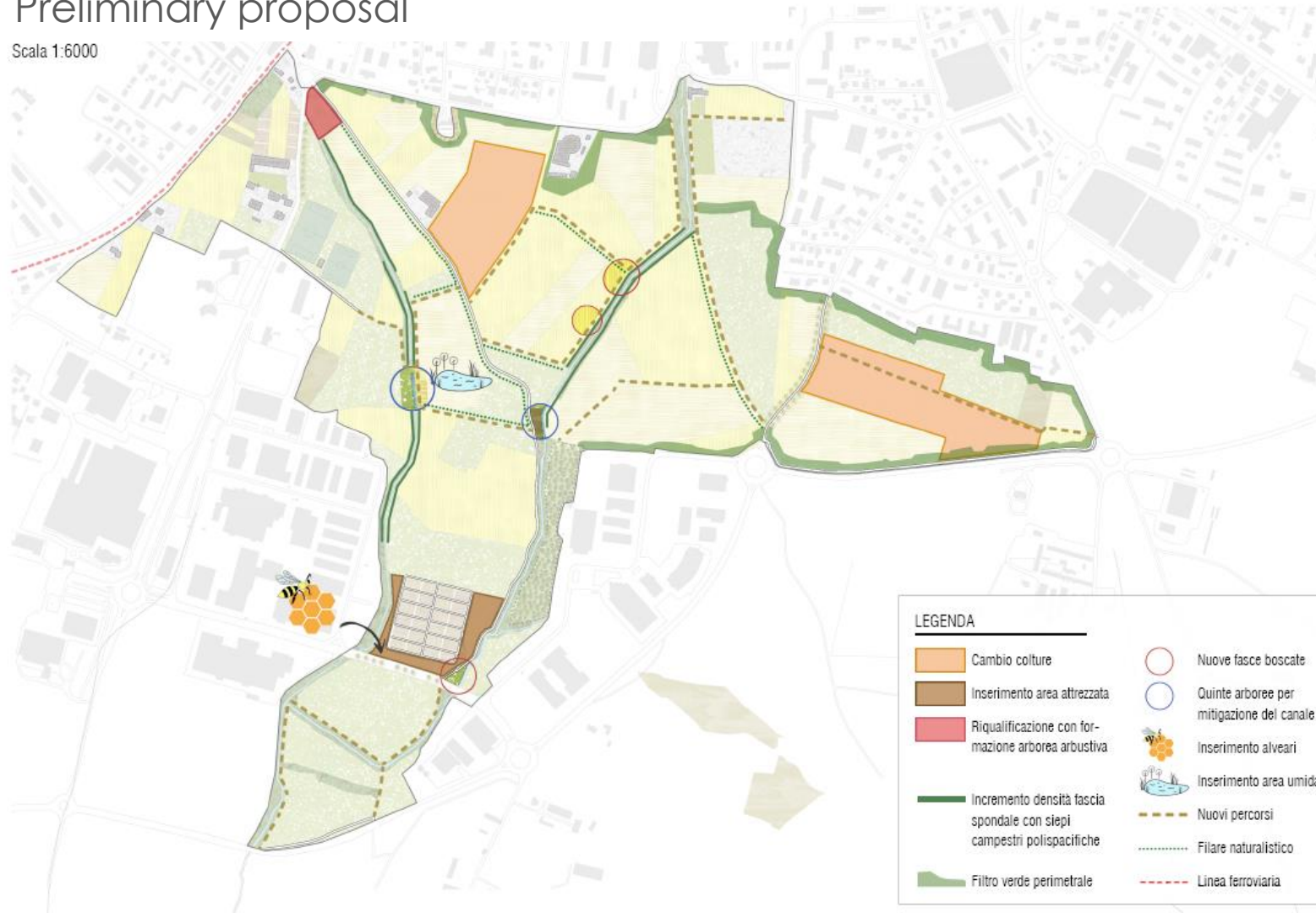
E.S.	Economic value (€/yr)
Crop production	<u>99.000</u>
Timber production	100
Water supply	1.000
Other productions	0
Natural Risk Mitigation	5.000
Habitat	17.000
Water purification	<u>86.000</u>
Climate regulation	<u>59.000</u>
Fruition	100
Landscape	8.000
<b>Total</b>	<b>275.200</b>

# Some examples

1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)

Preliminary proposal

Scala 1:6000



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# Some examples

*1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)*

## Implementation

- **Masterplan** approval (guidelines to realize the agro-environmental district of Fontaneto)
- Land owner and farmer involvement
- Creation of a Land Owner Association for the management of Natural Capital (L.R. 21/16)
- PES activation (L. 221/15)
- Monitoring of the delivery of ES defined by the PES schemes



# Some examples

*1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)*

## **Beneficiaries** (who will pay for the delivery of ES)

- Local administration
- Other local authorities
- Compensation interventions (see [www.pantaies.com](http://www.pantaies.com))
- Sponsorship
- Local associations and citizens
- “Pay by result” scheme (Foundations, other entities...)

# Some examples

1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)

## Municipal budget – allocation of public resources

Preliminary budget - Title I		
	Missions	Programs
Environmental activities	09 – Sustainable development, environmental protection	01 – Natural Risk mitigation
		02 – Protection and promotion of environment
Recreational activities	06 – Youth policies, sport and recreational activities	01 – Sport and recreational activities

# Some examples

*1) Agro-environmental district of Fontaneto  
(Chieri Municipality, Turin Province, Piedmont region)*

## Funds

- Environmental compensation (urban plan)
- Visitor tax
- Contribution for local market tax (farmers)
- Road fines (cycle paths)
- Environmental fines
- Rural Development Plan (Piedmont Region)

# Some examples

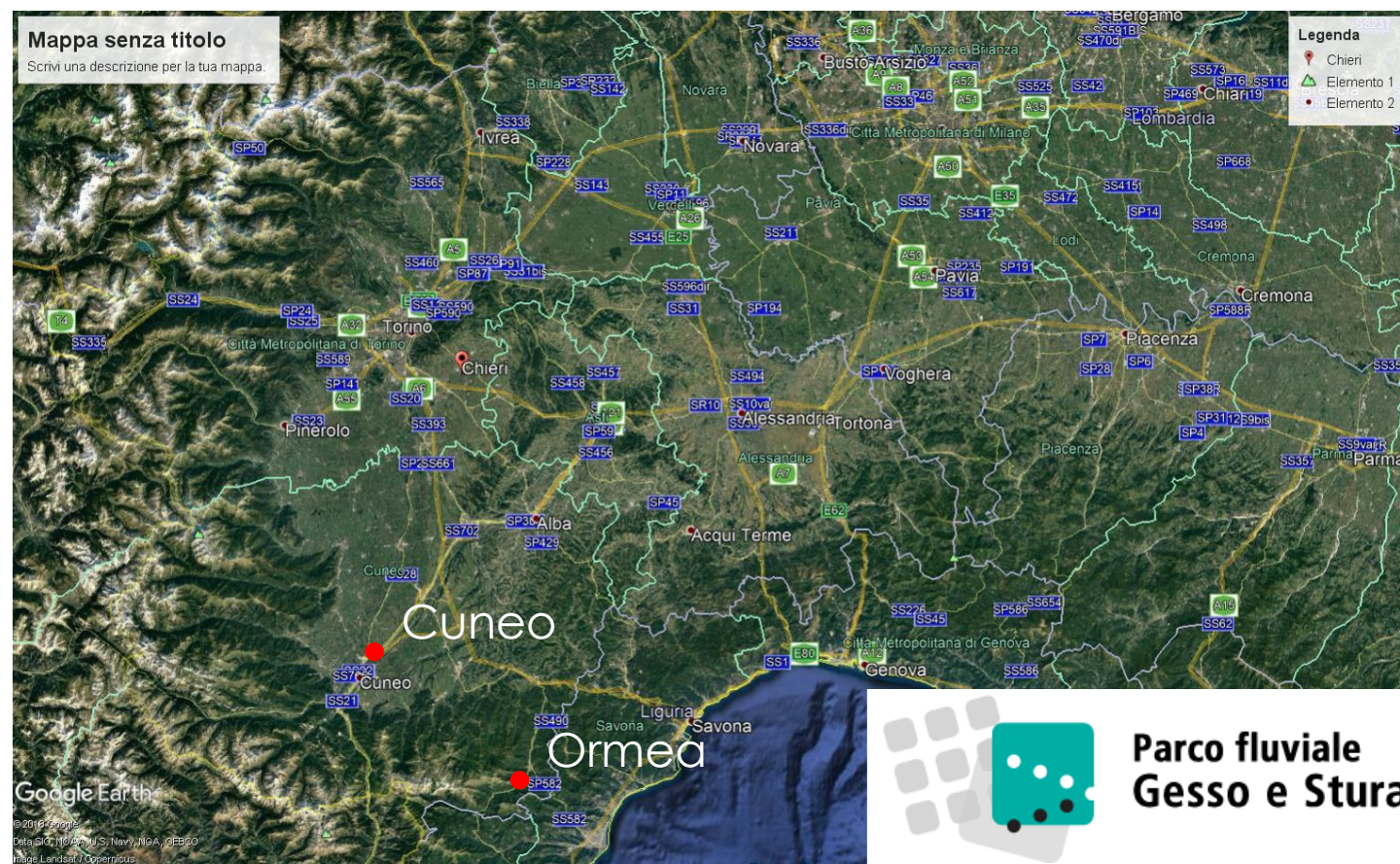
*1) Agro-environmental district of Fontaneto  
(Chieri, Turin Province, Piedmont region)*

## Possible payments

- Public competition for the achievement of specific Masterplan goals
- Specific agreement between Chieri Municipality and the Land owner association

# Some examples

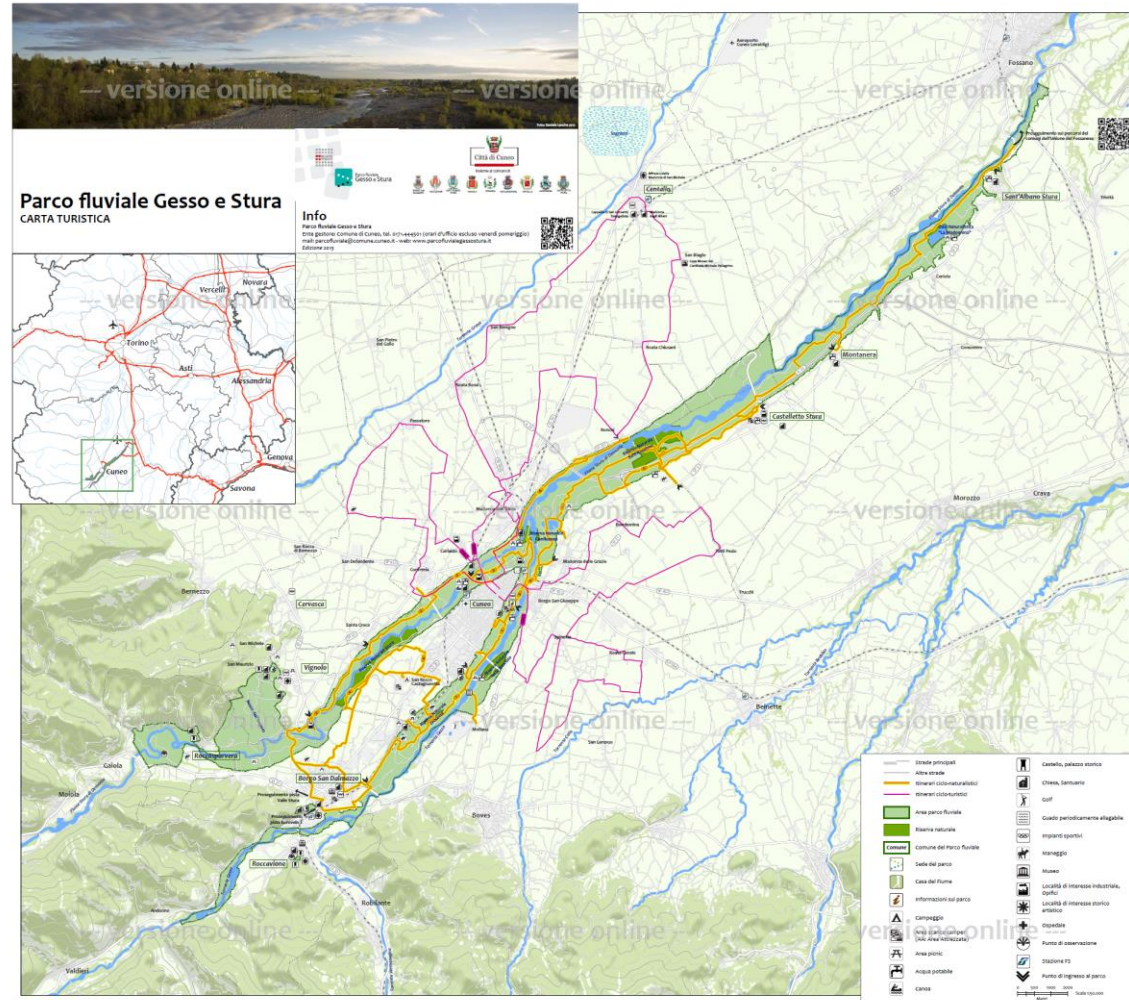
## 2) Natural Plan of Gesso-Stura Natural Park (Cuneo, Cuneo Province, Piedmont Region)





# Some examples

## 2) Natural Plan of Gesso-Stura Natural Park (Cuneo, Cuneo Province, Piedmont Region)



# Some examples

2) *Natural Plan of Gesso-Stura Natural Park  
(Cuneo, Cuneo Province, Piedmont Region)*

## Goals

- To provide a plan for the management of six protected areas
- To define actions to be taken to preserve and improve biodiversity and environmental quality
- To define monitoring indicators base on ES





# Some examples

2) *Natural Plan of Gesso-Stura Natural Park  
(Cuneo, Cuneo Province, Piedmont Region)*

## Baseline

- Landcover
- Geology and hydrogeology
- Ecosystems map
- Ecosystem functions and services
- Pressure sources



# Some examples

2) *Natural Plan of Gesso-Stura Natural Park  
(Cuneo, Cuneo Province, Piedmont Region)*

**Actions** *In progress*

Pressure - State (baseline)

Responses function of ES based indicators



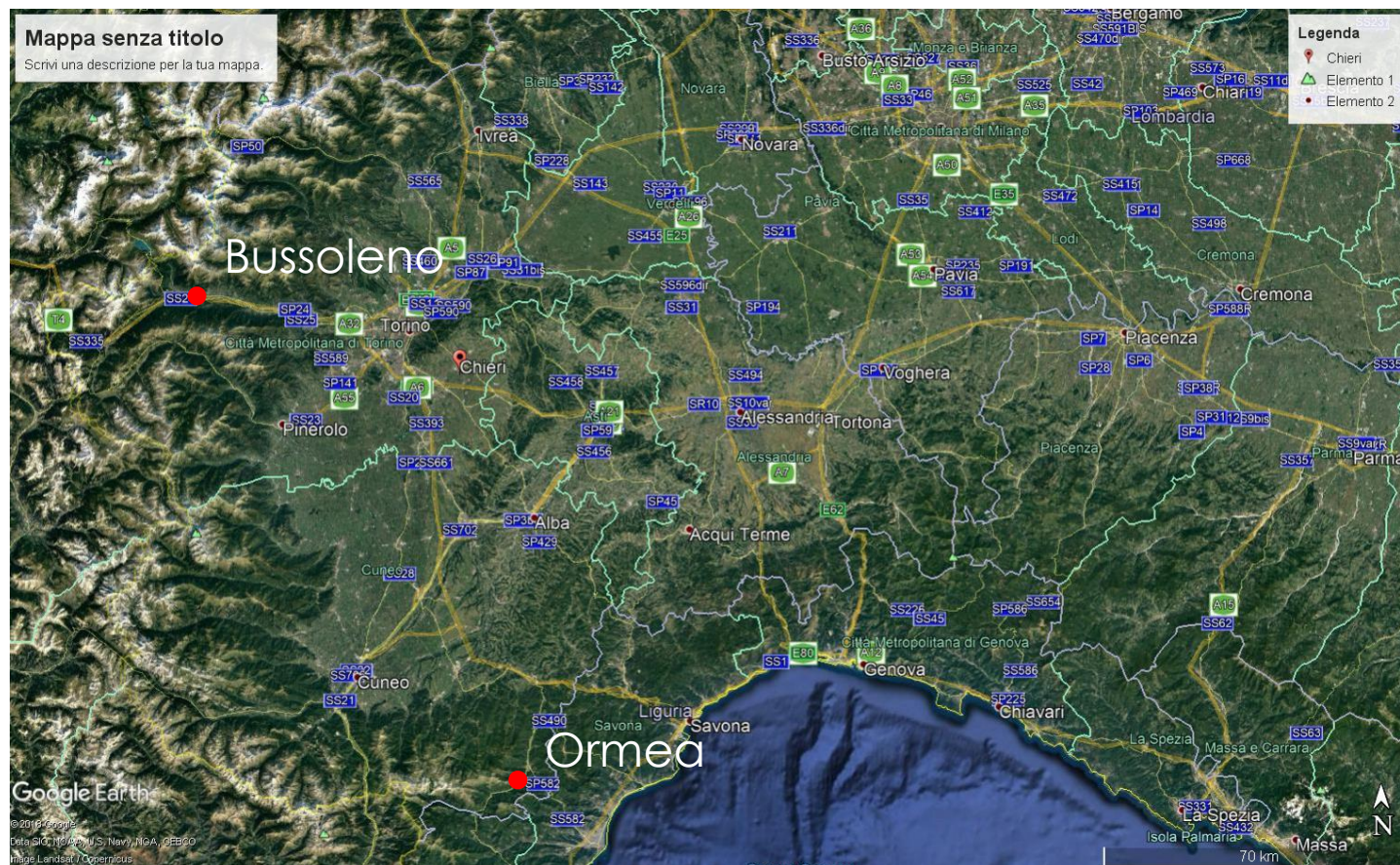
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# Some examples

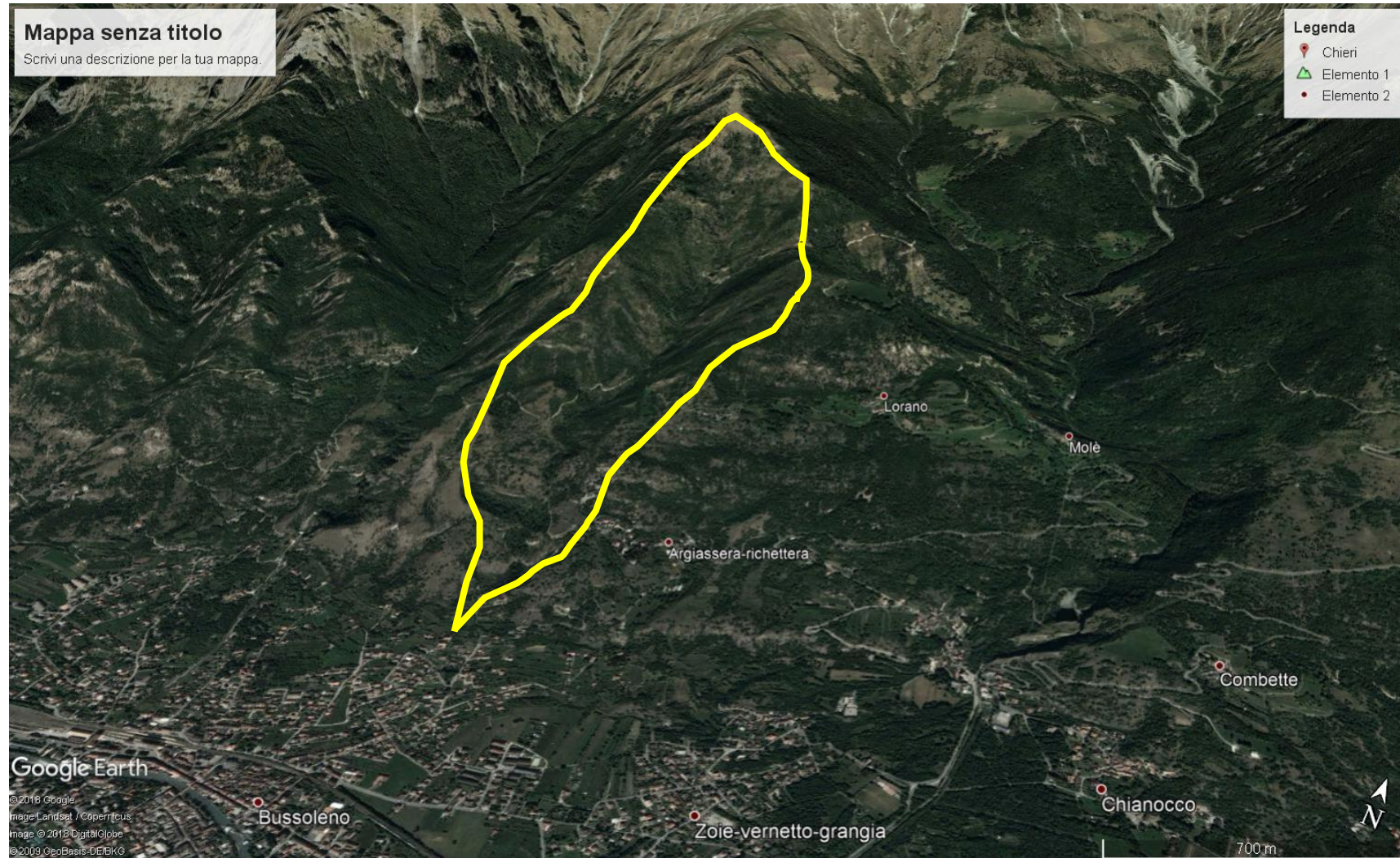
## 3) Debris flow risk management (Bussoleno, Turin Province, Piedmont Region)





# Some examples

## 3) Debris flow risk management (Bussoleno, Turin Province, Piedmont Region)





# Some examples

3) Debris flow risk management  
(Bussoleno, Turin Province, Piedmont Region)

## The event *Debrisflow*

7<sup>th</sup> June 2018

Foglie creek

Rainfall intensity  
60 - 100mm/h





# Some examples

## 3) Debris flow risk management (Bussoleno, Turin Province, Piedmont Region)





# Some examples

## 3) Debris flow risk management (Bussoleno, Turin Province, Piedmont Region)



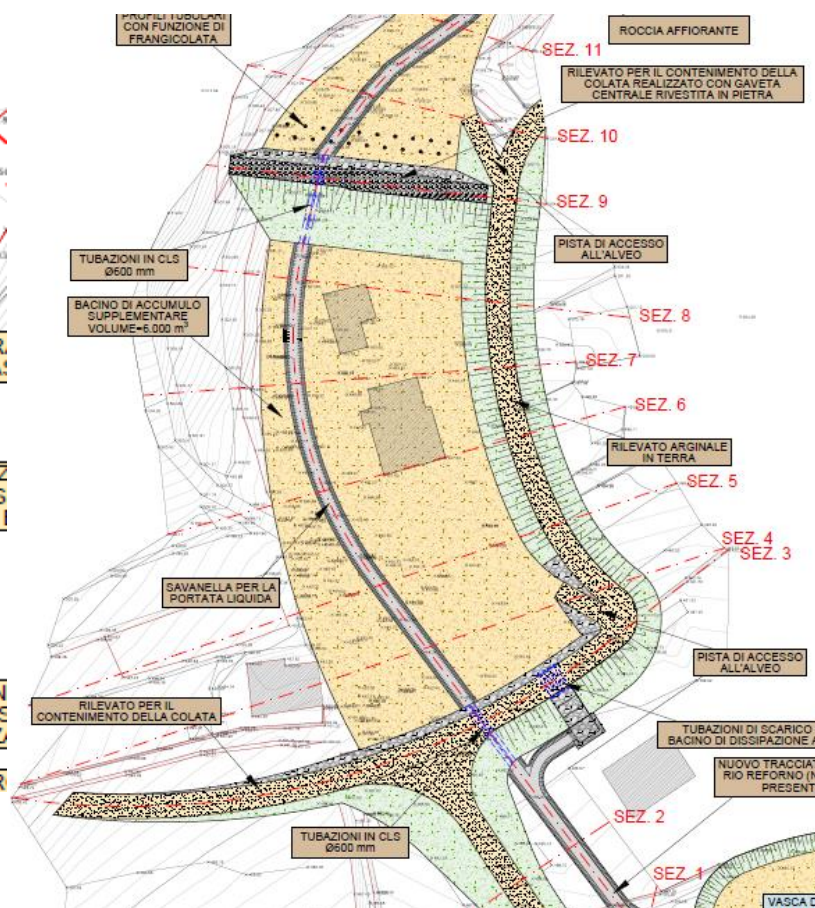
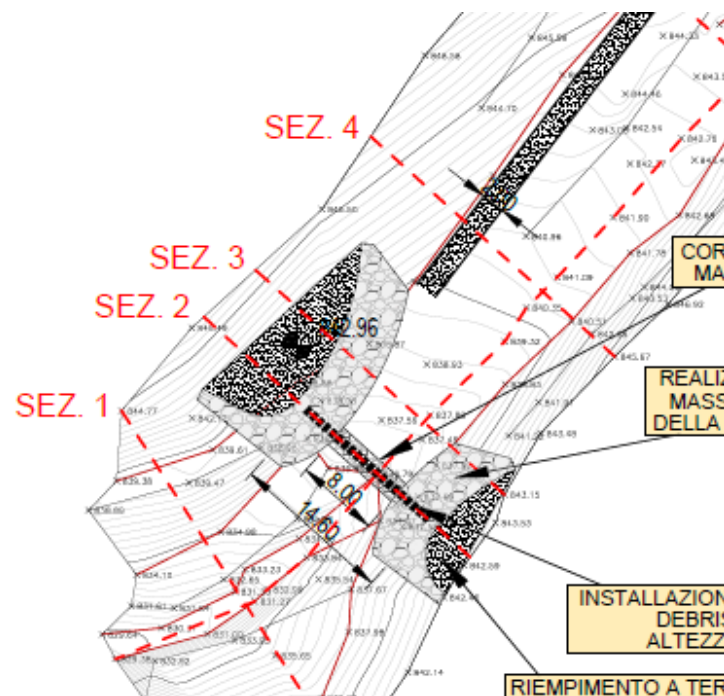
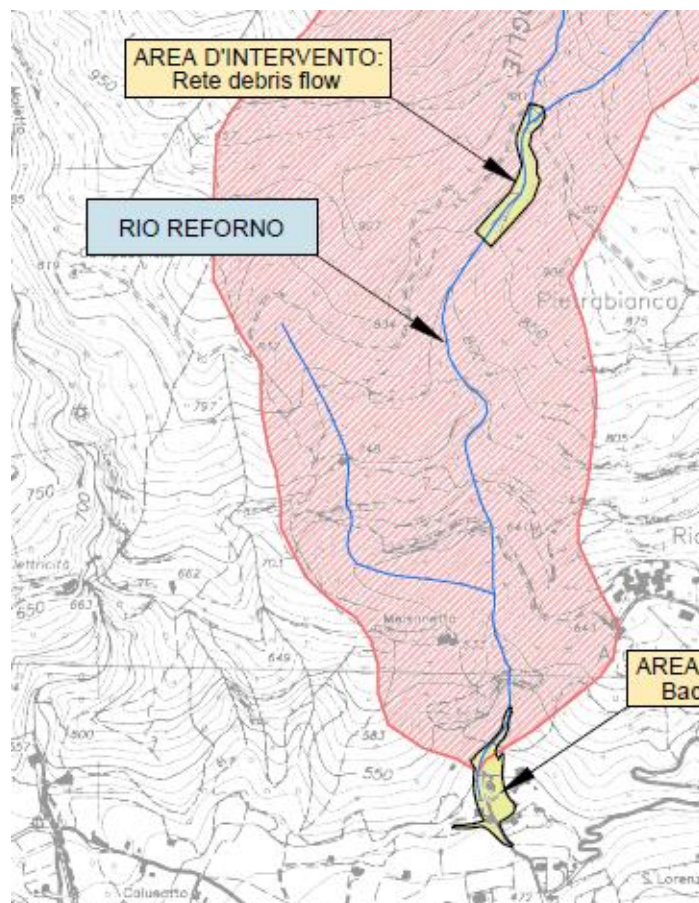
## Forest fires autumn 2017

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# Some examples

## 3) Debris flow risk management (Bussoleno, Turin Province, Piedmont Region)





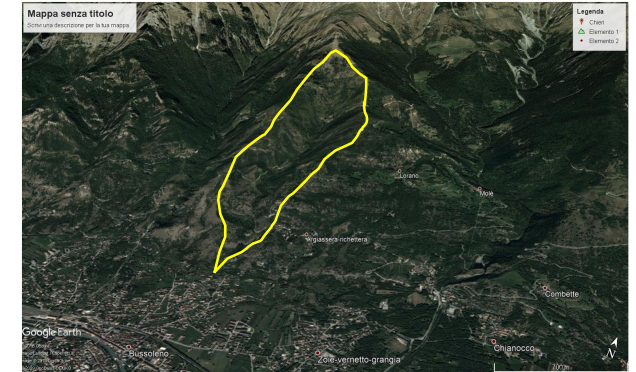
# Some examples

3) Debris flow risk management  
(Bussoleno, Turin Province, Piedmont Region)

## Alternative/Complementary Actions

### Catchment scale analysis

- Geology and Vegetation survey
- Shallow landslide susceptibility assessment
- Magnitude of reference event
- Interventions along the thalweg
- Review of retention basins design
- Foglie Creek Catchment management plan (PES)



# Let's try ourselves

## The context

Dreamland valley

3 communities:

- Highlanders
- Middle Earth
- The town



# Let's try ourselves

## The context

Dreamland valley

3 communities:

- Highland
- Middle Earth
- The Town





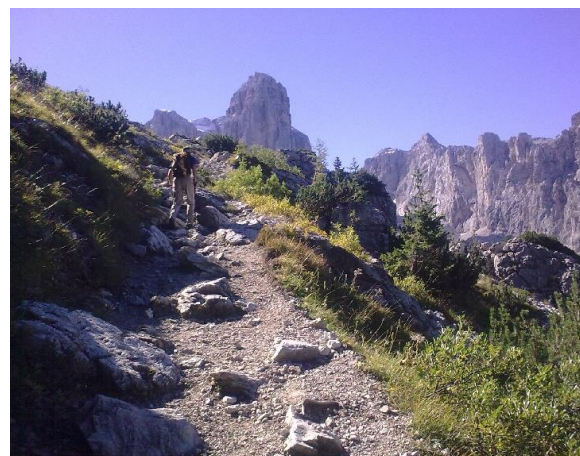
# Let's try ourselves

## The context

*Highland*

200 inhabitants

(forests, grasslands,  
mountain trails, grazing,  
springs, tourism, river ...)





# Let's try ourselves

## The context

*Middle Earth*

600 inhabitants

(forests, mountain trails,  
tourism, crops, hydroelectric  
power plant-dam,  
protected area ...)

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# Let's try ourselves

## The context

### *The town*

5000 inhabitants

(tourism, crops,  
factories, market ...)





# Let's try ourselves

## Rules

Each community has:

- to define a local development plan: identify problems (5-7) and identify goals (5-7)
- to define the strategies and resources needed to achieve the goals
- to include ES and PES as part of the strategy (ask me for the list of ES. Economic assessment based on avoided costs)

Constraint: resources come only from Dreamland Valley!

# Let's try ourselves

## Phases

Phase 1 – to create the communities (3 groups)

Phase 2 – to define the local plan and strategies

Phase 3 – negotiation (two communities at a time). 4 rounds (depending on the time)



# Let's try ourselves

## ES list

Let's try ourselves

... and the winner is ...

hopefully the human kind

THANK YOU