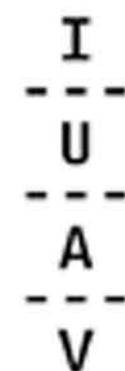


The Evolution of Agricultural and Forest Landscape in Garrotxa



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TutorElena Gissi



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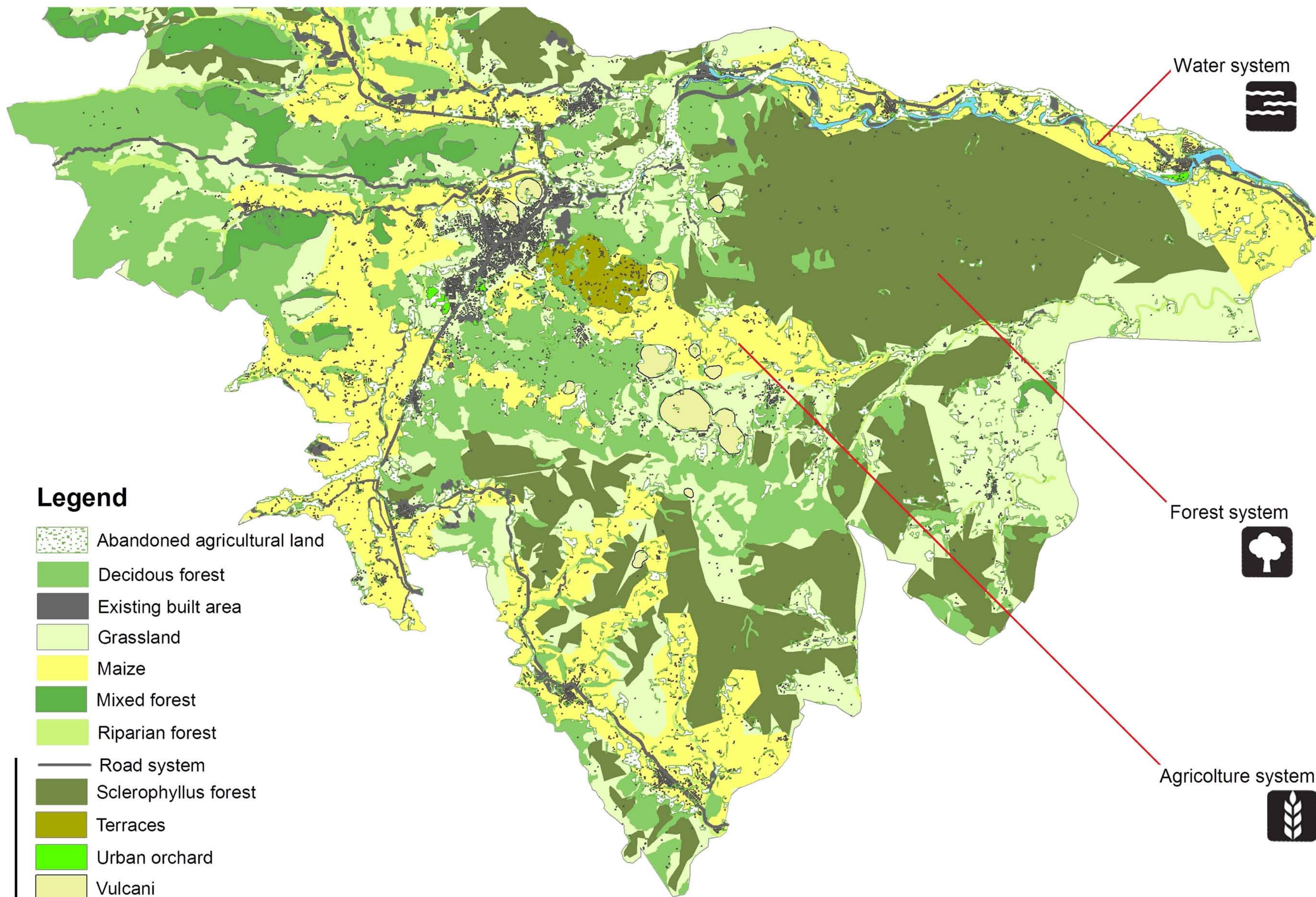
_Landscape and Climate Change: 2050 Scenarios, Impacts, Objectives

_Strategies





Agricultural and Forest Landscape in Garrotxa



The cultural evolution of the Landscape



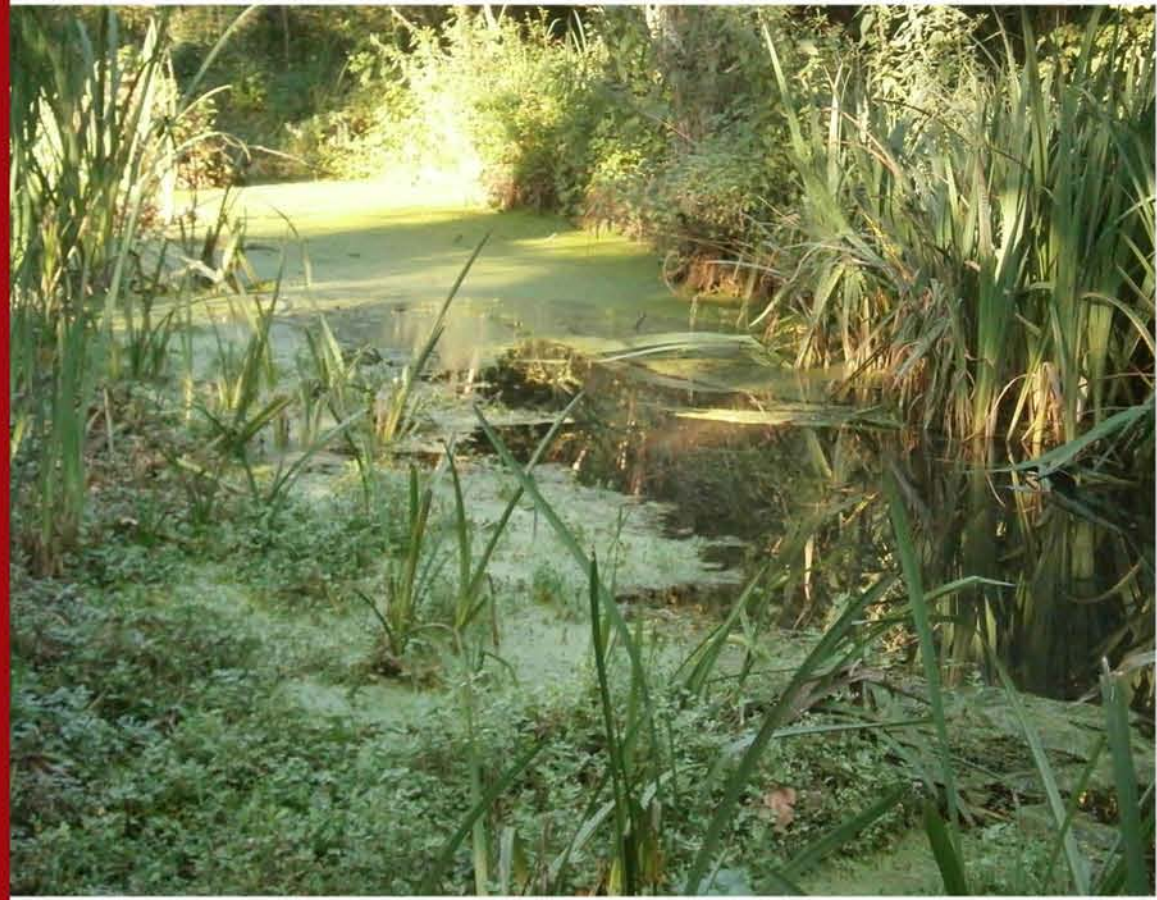
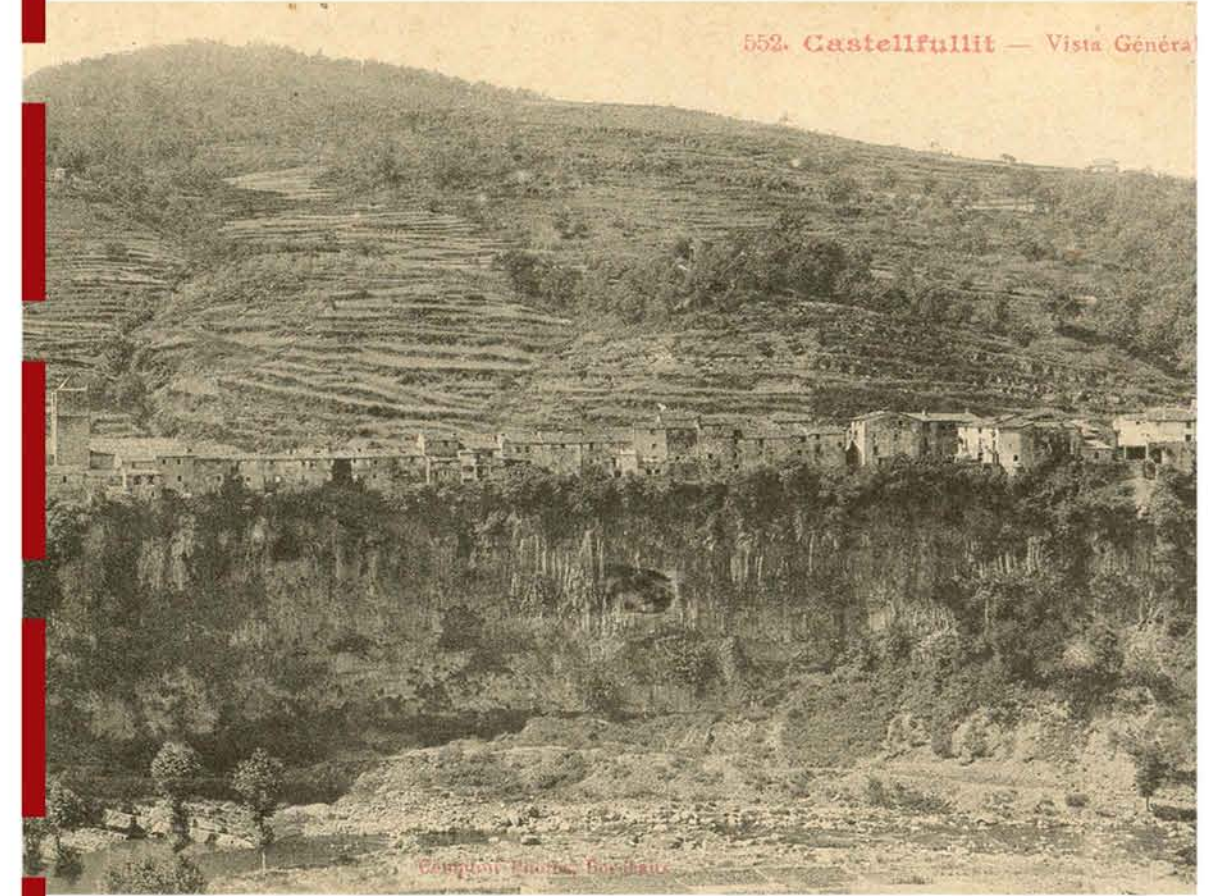
Desde lo alto de esta cordillera se descubre la Plana de Bas, [...] cercada de altas montañas, con lo cual, y del color de la flor de fajol, de que toda ella está sembrada, parece un gran lago.

Francisco de Zamora, 25th August 1787

Des del cim de Montsacopa ens miràvem amb bona ullera tota la cordillera espadada que enclou les riallares valls olotines, muntanyes emboscades de dalt a baix, d'un verd d'esmeragda.

Carles Bosch de la Trinxeria, 1892

The cultural evolution of the Landscape



- S** - specificity of volcanic landscape (geomorphological, ecological and visual values)
- existence of a management system for natural protected areas
 - good access to panoramic views through paths and itineraries
 - architectural heritage
 - traditional artistic and cultural activities
 - existence of territorial traditions and identities linked to singular villages
 - Highly people landscape awareness



- fluvial historic infrastructures



- agricultural products with quality labels
- agricultural mosaic landscape (chromatic differences)
- high value of the agricultural land (mainly in Vall d'en Bas) connected to the volcanic soil characteristics
- high value orchards
- conservation of typical stone dry walls
- high exposure to sun light



- High natural value of forest (74% of la Garrotxa)
- Forest surface prevent soil erosion

- W**
- Volcanic soil characteristics do not allow intense edification
 - Olot urban sprawl/infrastructures conflict with natural protection objectives
 - Increases in industrial and commercial land uses
 - Rural abandonment: already 500 abandoned masies



- Fluvia's water capacity is not sufficient for hydroelectric energy production



- Abandonment of traditional agricultural schemes, which are less productive -> higher water demand



- General decrease in agricultural land use
- Abandonment of peripheral agricultural lands
- Homogenization and intensification of flat agricultural lands
- Increase in the size of parcels of agricultural lands -> loss of aesthetic value because of homogenization;



- uncontrolled forest land growth

- O**
- Highly people landscape awareness -> land stewardship
 - promotion of landscape values by the natural park management authority
 - existence of higher-level territorial planning dealing with landscape protection.



- enhance local agricultural production in response to increasing transportation costs
- further promotion of local high quality food to cope with domestic and external demand -> maintain traditional agricultural landscape



- development of agro-tourism
- Intensification of the commercial network through infrastructural development.

- increase in agricultural energy production linked to EU subsidies



- increase the amount of biomass production as alternative to fossil fuels

- T**
- Possible increase of road infrastructures which could break off the ecological continuity within the protected areas
 - Further expansion of urban land -> isolation of natural protected areas
 - Further rural abandonment



- decrease Fluvia's water capacity (until -25% under the worst possible conditions by 2050)
- increase of water demand for domestic and agricultural purposes



- Strong dependence of agricultural productive choices on EU subsidies -> Further abandonment of traditional agricultural schemes
- Intensive agricultural schemes can increase the Nitrogen soil and water concentration



- Increase risk of insect plagues due to homogeneization



- increased fire risk due to longer drought periods

The cultural evolution of the Landscape

Severe Scenario

LESS SEVERE Scenario

Temperature

+1.2 C°

+0.8 C°

Population growth

+ 20%

+ 8%

Precipitations

- 12/15%

-5/7%

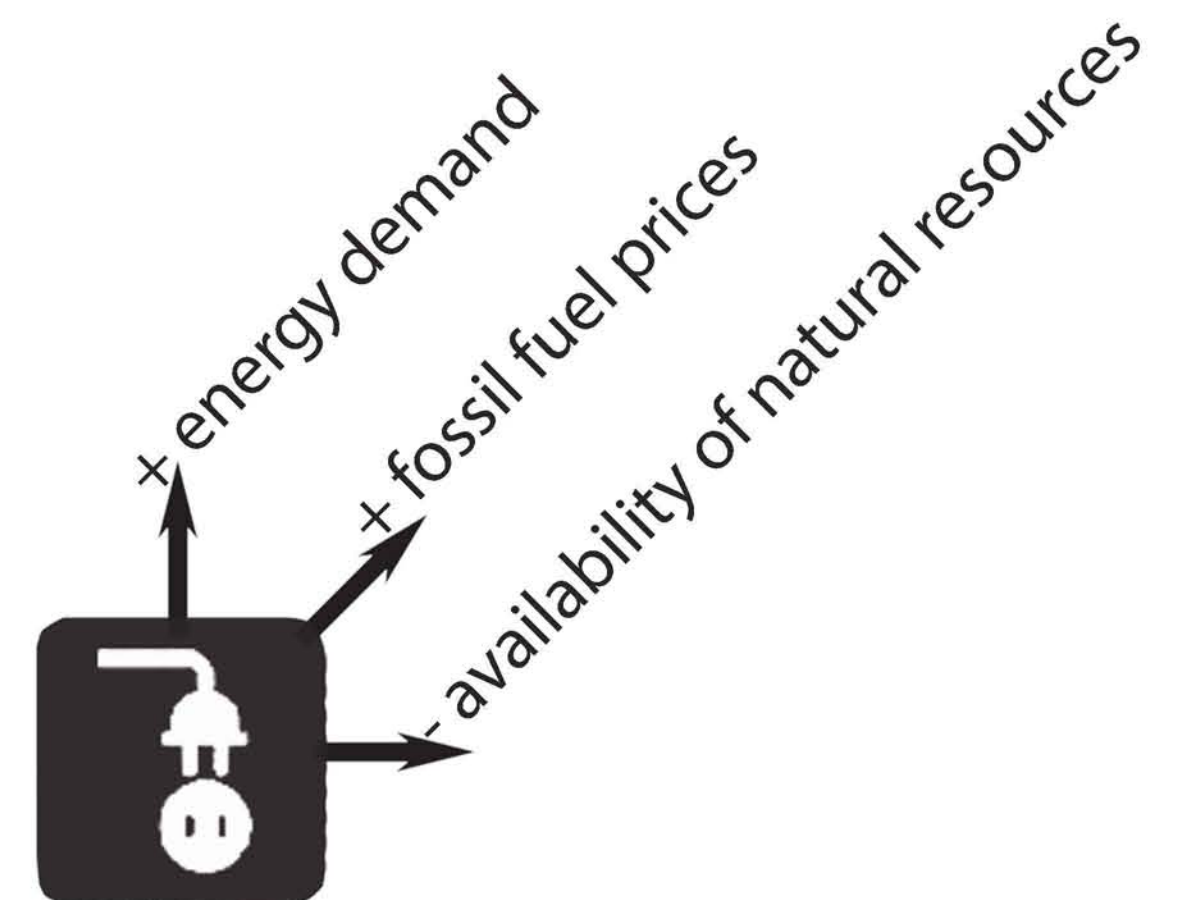
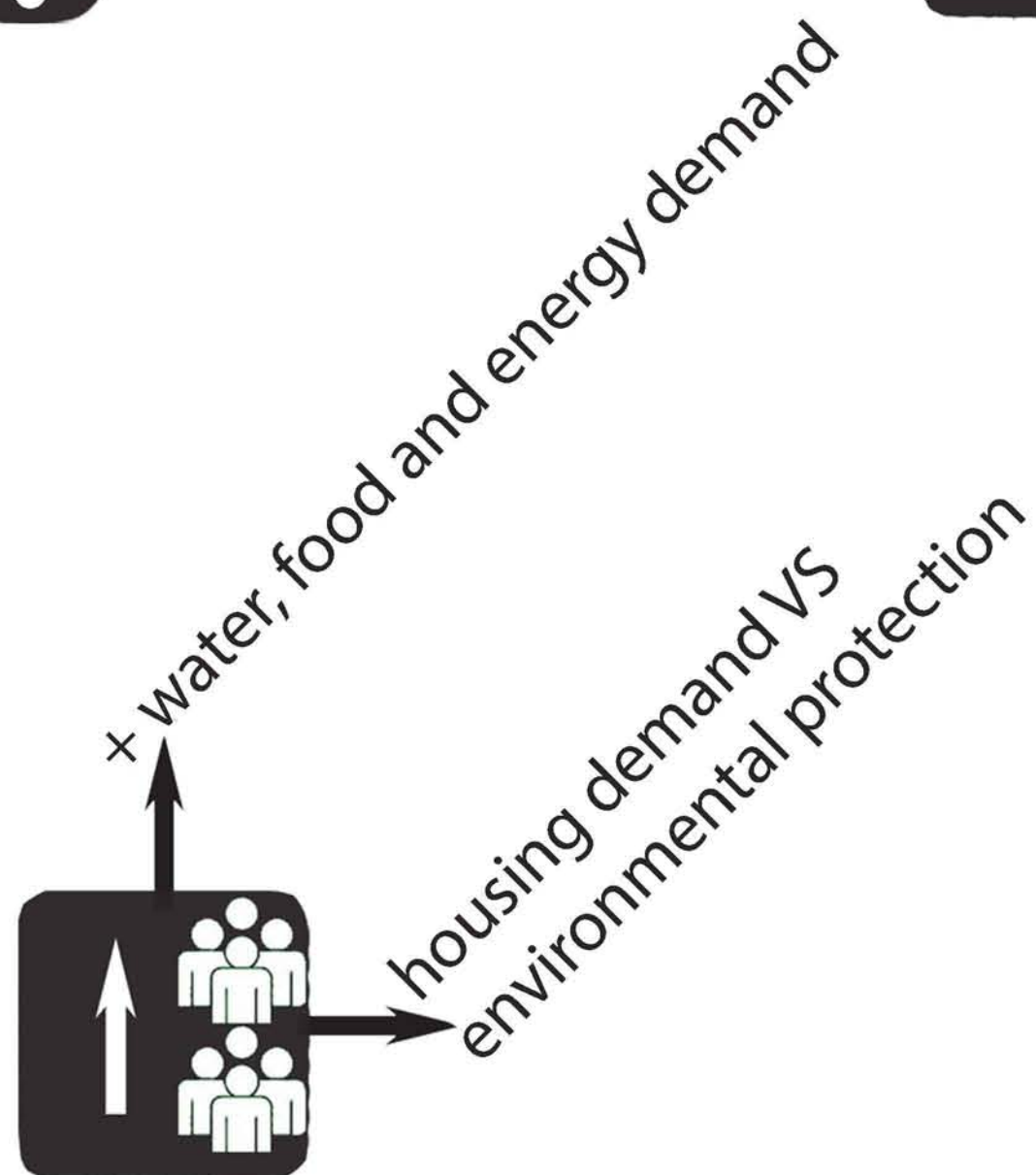
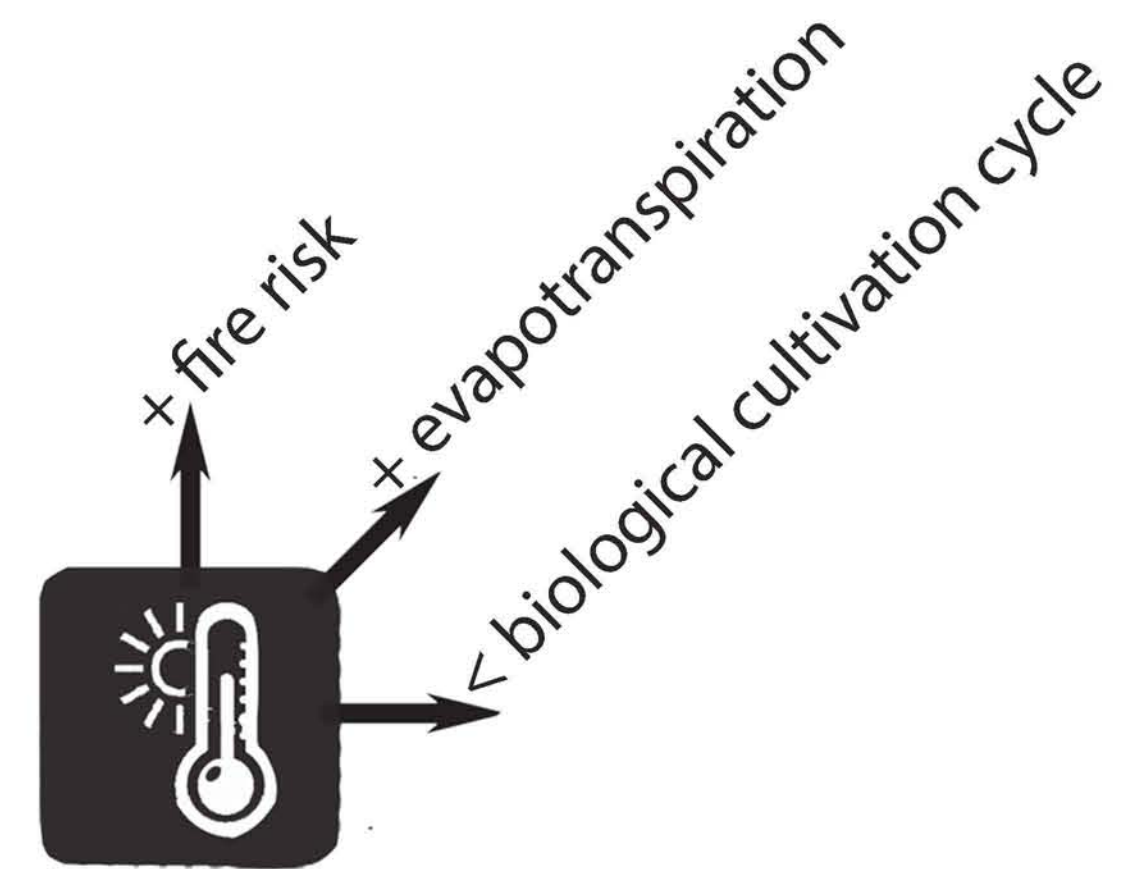
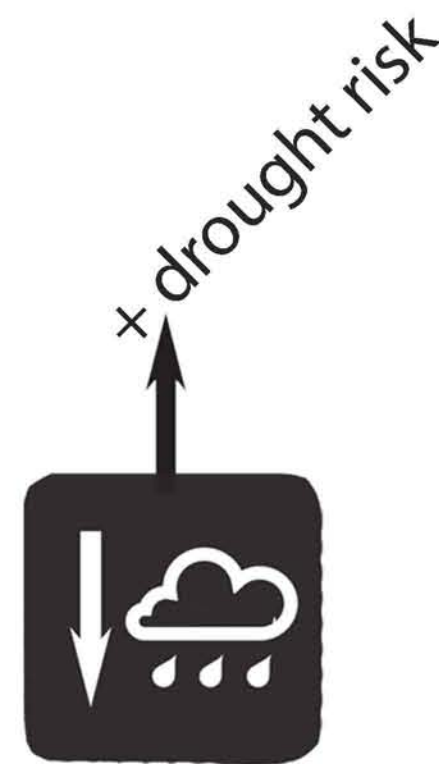
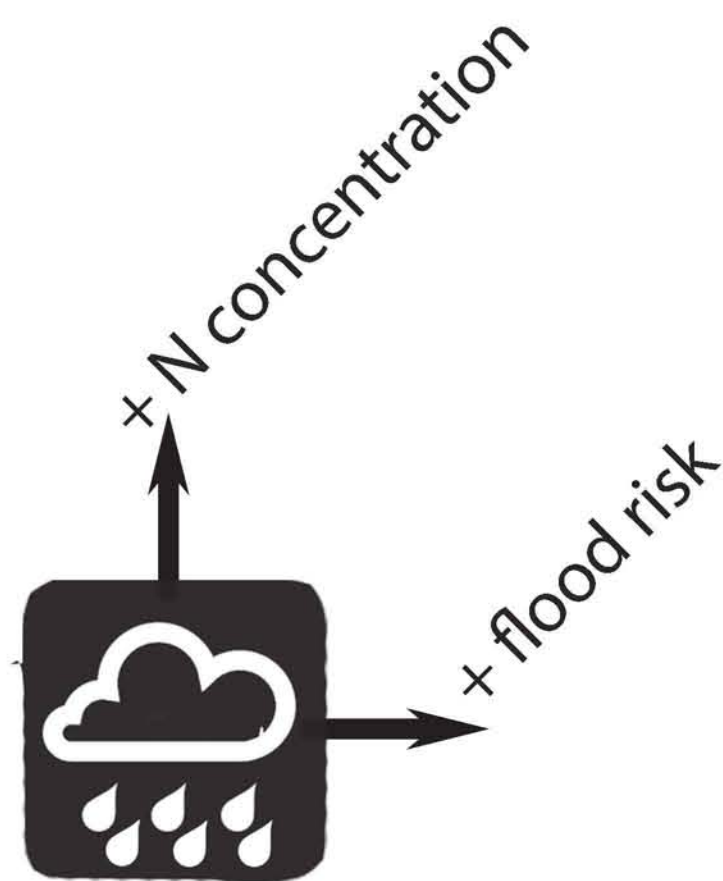
Annual rainfall intensity variation

[+750 mm/year;
+1250 mm/year]

[+500 mm/year;
+1700 mm/year]

Energy

+8/10% of energy demand +4/5% energy demand



Objectives

_develop cultivation patterns capable of **adapting** to new climate conditions

_improve the **quality of surface and groundwater** through sustainable agricultural systems, also considering the decreasing water availability in the long run

_promote **multifunctionality** of the landscape in order to increase the adaptation capabilities of the territory

_develop specific measures to face up increased **energy and water demand**

_promote a sustainable **forest management**, capable of facing the increase in fire risk and to its potential in energetic terms

Strategies

1_ Strengthen proximity agricultural production and spread hort urbà

2_ Diversify Agricultural production and promote traditional cultivation and productive schemes

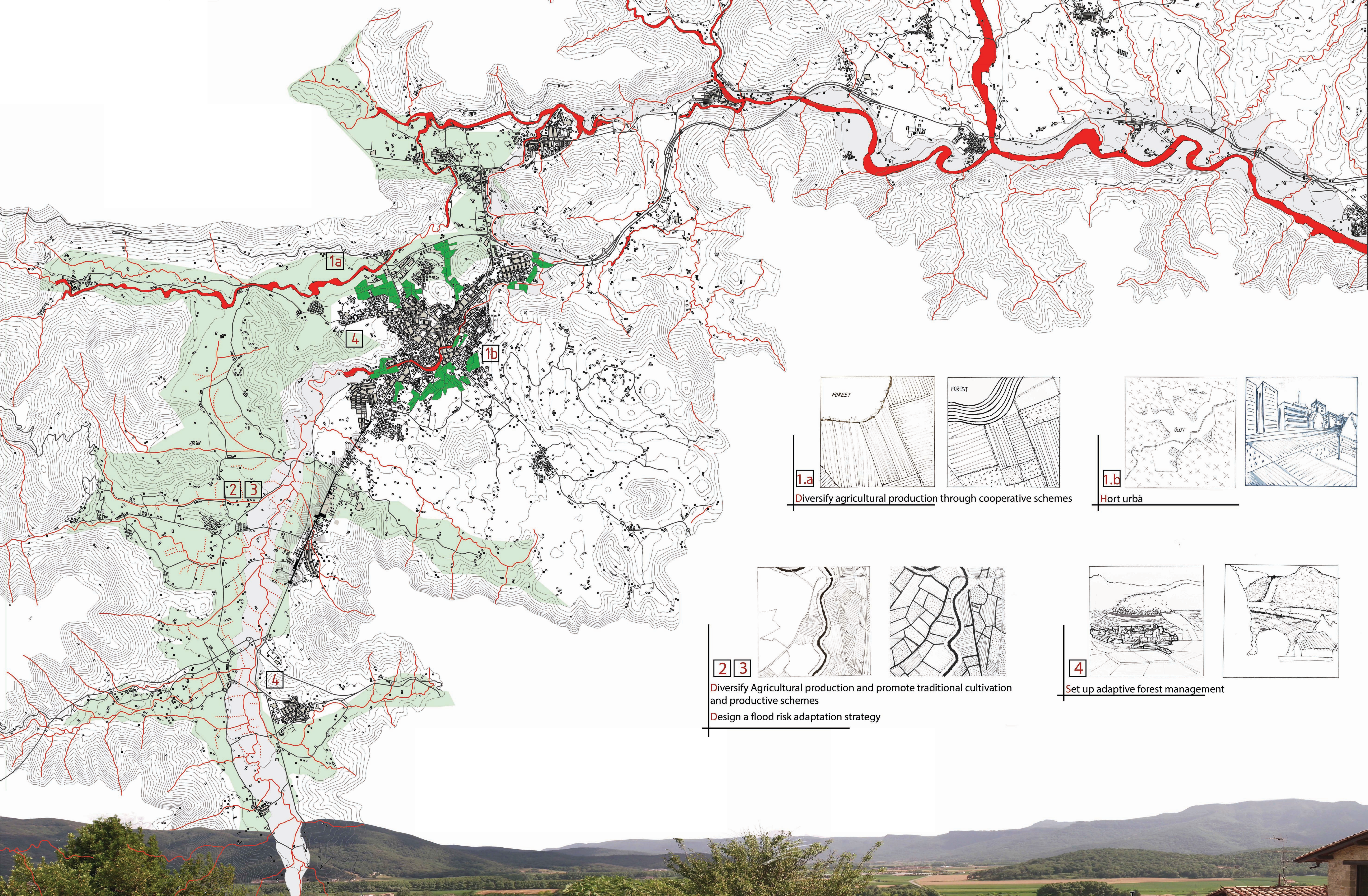
3_ Design a flood risk adaptation strategy

4_ Set up an adaptive forest management



_urban sprawl

_infrastructural system/landscape management



1.a

Diversify agricultural production through cooperative schemes

1.b

Hort urbà

2 3

Diversify Agricultural production and promote traditional cultivation and productive schemes
Design a flood risk adaptation strategy

4

Set up adaptive forest management



1

Strengthen proximity agricultural production and spread hort urbà

_Proximity agricultural systems will introduce **higher diversification** in land use, thus increasing the ecological and landscape values. Indirectly, it will also lead to reduce rural abandonment.

_They will allow to **save energy**, by decreasing transport costs.

_They will allow to **save water**, through the re-discovering of traditional productive schemes.

_It will increase the local **self-sustainability**, by increasing local food supply and thus diminishing the dependence from EU subsidies.

_The spread of **urban orchards** will allow to better integrate urban and agricultural landscapes, to improve the quality of peri-urban areas and to provide mitigation for climate change.

Specific actions/activity proposals

_support of a **cooperative scheme**, which will have to include the involved stakeholders (farmers, cattlemen, community inhabitants, land owners, cooperatives, food producers, consumers);

_enhance **communication** with expertize (Landscape Observatory, Academic Institutions)

_promotion of urban orchards in **public land**.

1

Strengthen proximity agricultural production and spread hort urbà

higher diversification

save energy

save water

self-sustenance

urban orchards

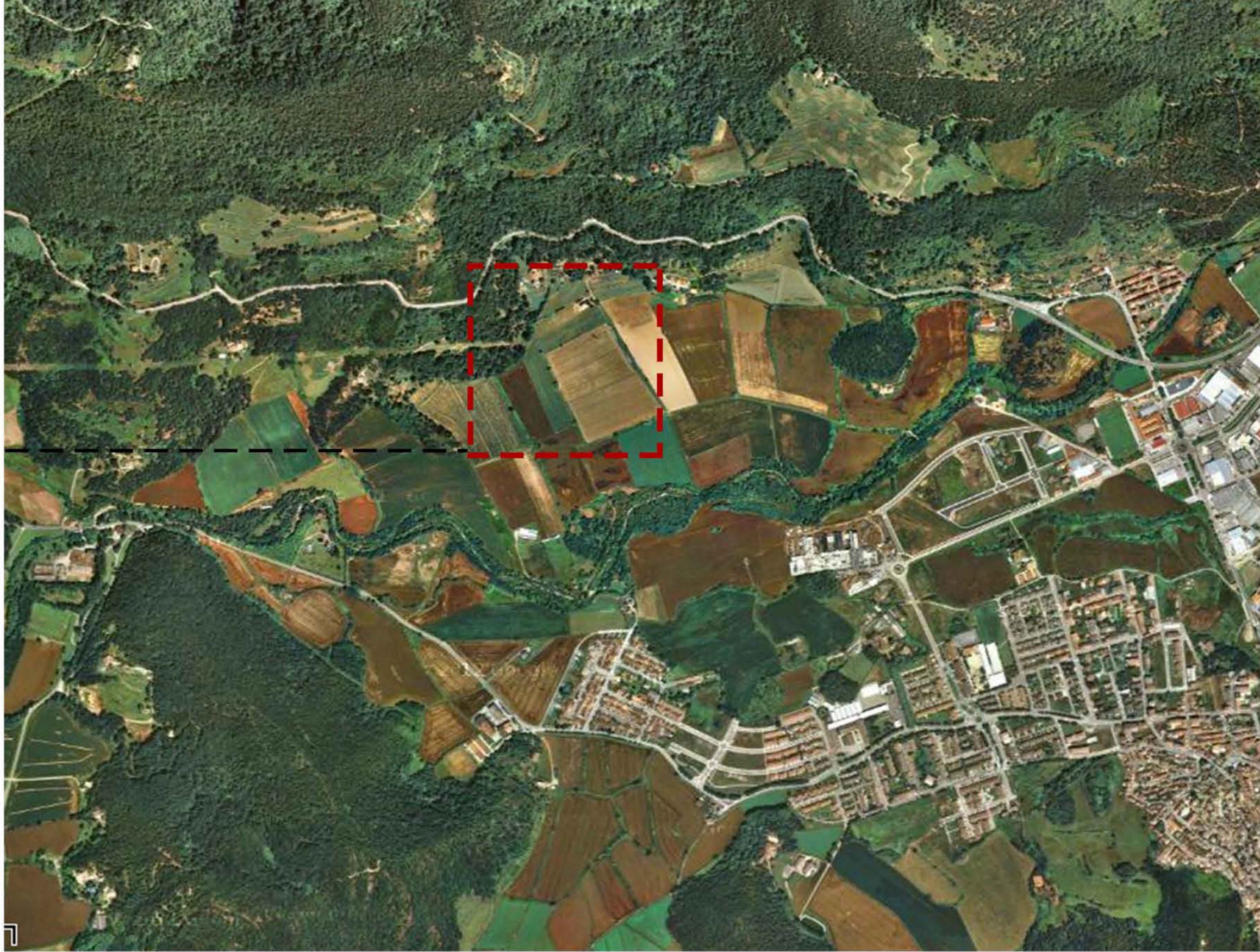
cooperative scheme

communication

public land.

1.a

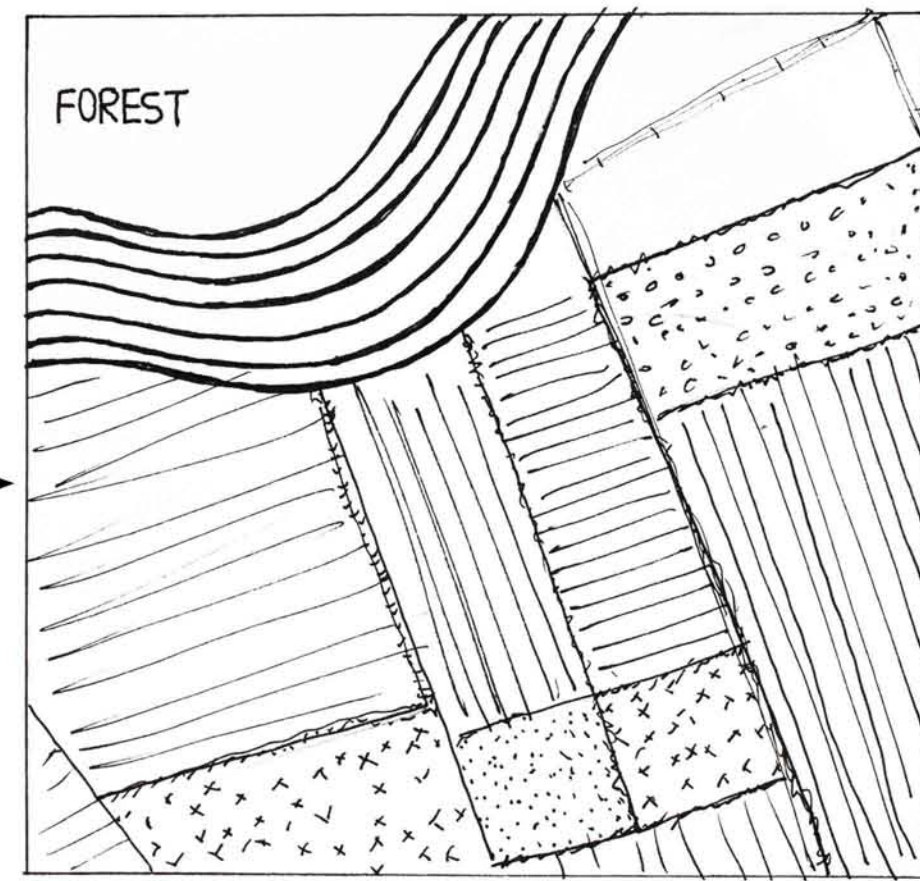
Diversify agricultural production through cooperative schemes



2012



2050



Reintroduction of traditional cultivations

Riparian vegetation Vall d'en Bas

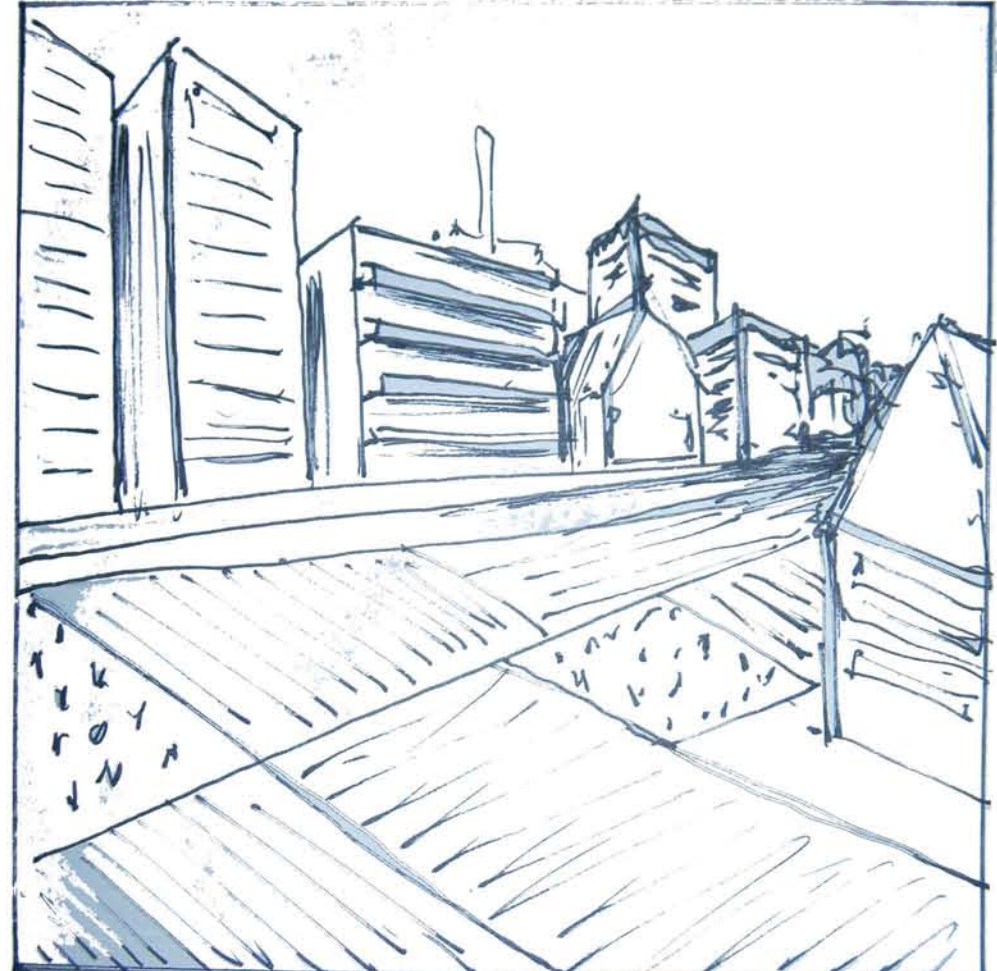
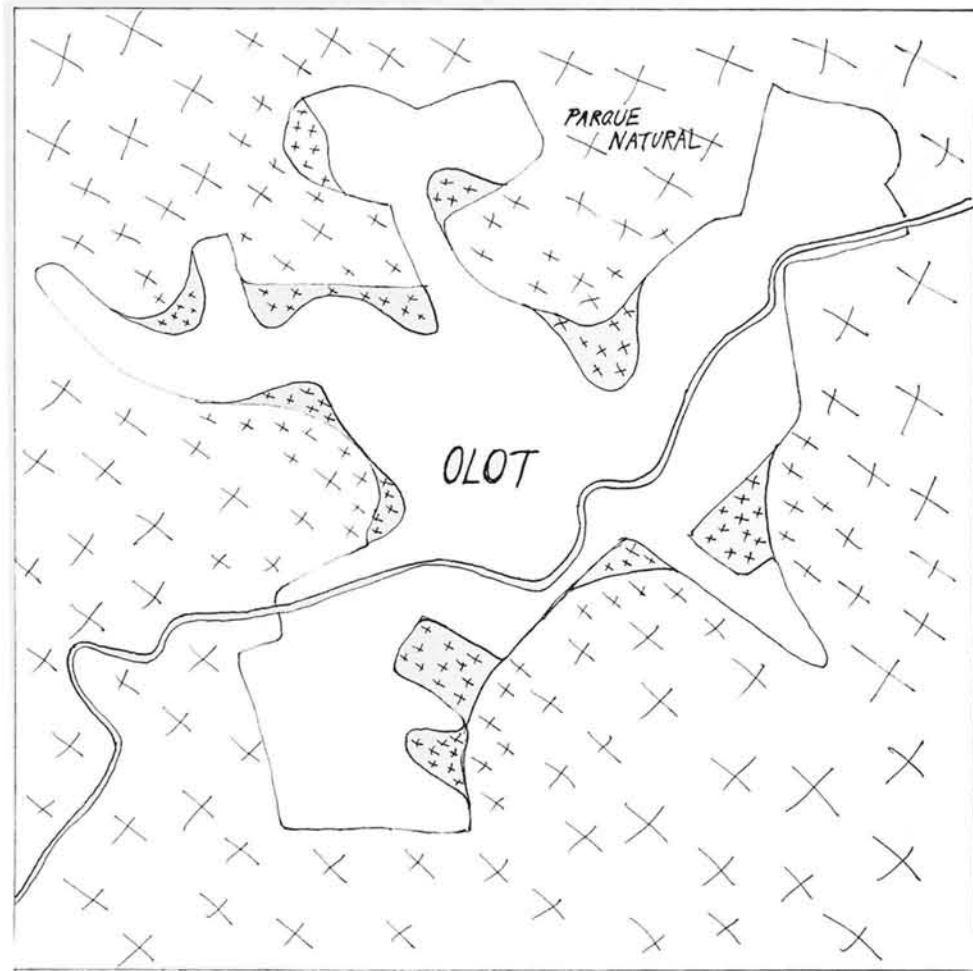


Terraces cultivation and herbal plants Vall d'Olot



1.b

Hort urbà



2

Diversify agricultural production and promote traditional cultivation and productive schemes

_More diversification will increase **biodiversity**, so improving the adaptation capability of the landscape. It will also lead to improve **visual, olfactory and perceptive** landscape values.

_They will allow to **save water and energy**, through the re-discovering of **traditional** productive schemes, that requires less water.

_The introduction of local traditional and organic cultivation will decrease soil and water **pollution** level.

Specific actions/activity proposals

_Research development in order to find cultivations which develop more **slowly**;

_enhance **communication** with expertize (Landscape Observatory, Academic Institutions) and **discussion** with involved stakeholders.

_Specific intervention to recover the **agricultural architectural heritage** (masies and granges);

_Strengthen **terraces cultivation** along the mountain;

_Create a **coordination body** responsible for the management of agricultural waste for energy production;

_Support **green building** using local materials (also from agricultural production)

2

Diversify agricultural production and promote traditional cultivation and productive schemes

biodiversity
visual, olfactory and perceptive

water and energy

traditional

pollution

slowly;

communication
discussion

agricultural architectural heritage

terraces cultivation

coordination body

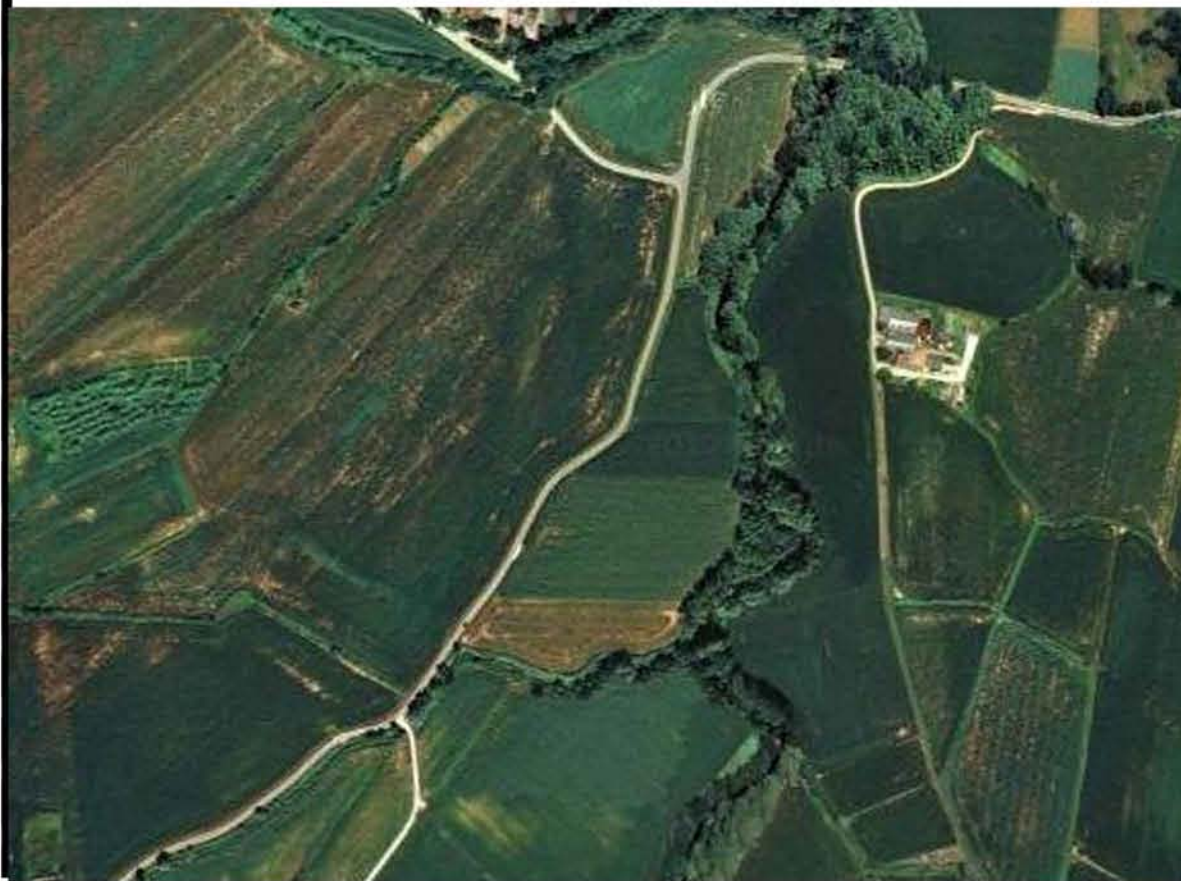
green building

2

Diversify Agricultural production and promote traditional cultivation and productive schemes



2012



2050



3

Design a flood risk adaptation strategy

_In order to face **flood risk** that will probably increase because of more **intense rainfall** period. A proper strategy would allow to collect water for agricultural uses.

Specific actions/activity proposals

_Design a system of canals to decrease flood risk and to direct overflowed water into a **capillary irrigation system**;

_Insert **water-resisting vegetation** in the fluvial-agricultural **buffer-zone**.

_Find vegetal species that limit soil erosion and **sediment transportation** risk

3

Design a flood risk adaptation strategy

flood risk

intense rainfall

irrigation system;

water-resisting vegetation

capillary

buffer-zone.

sediment transportation

4

Set up adaptive forest management

_In order to face the uncontrolled increase of forest surface (already 74,4% of the total surface), it is necessary to manage it. Considering the **increasing fire risk**, it is also necessary to think at specific interventions. Within the energy crisis, the forest could be a potential source for **non-fossil energy** production.

Specific actions/activity proposals

_establish a forest **management procedures**, based on **local stewardship**;

_insert **break-fire zones**, which can also be used as pasture areas

_increase forest use for energetic purposes, by strengthening **biomass** production;

_enhance **discussion** with private land owners

4

Set up adaptive forest management

increasing fire risk,

non-fossil

energy

management procedures

local stewardship

break-fire zones

biomass

discussion

4

Els arbres, a Olot, inoblidables I potser constitueixen l'essència del seu paisatge.

The trees, in Olot, are unforgettable and they constitute the essence of the landscape.

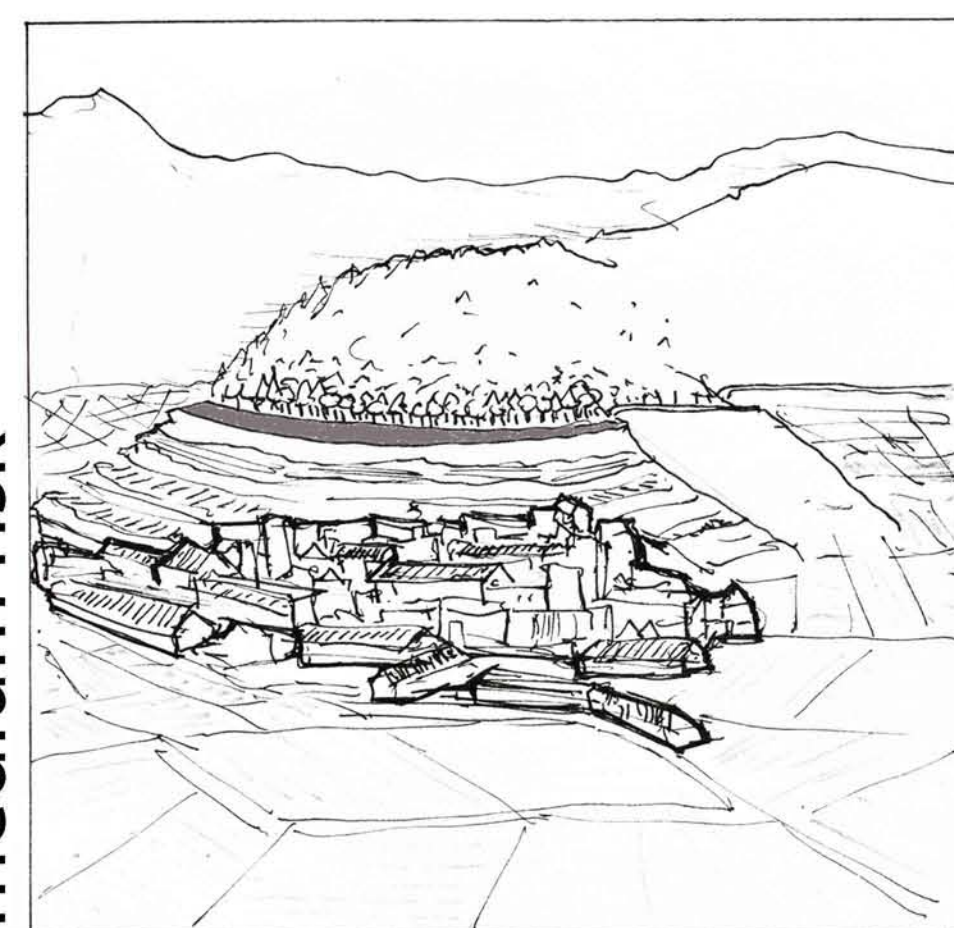
Josep Pla, 1968

2012



2050

medium risk

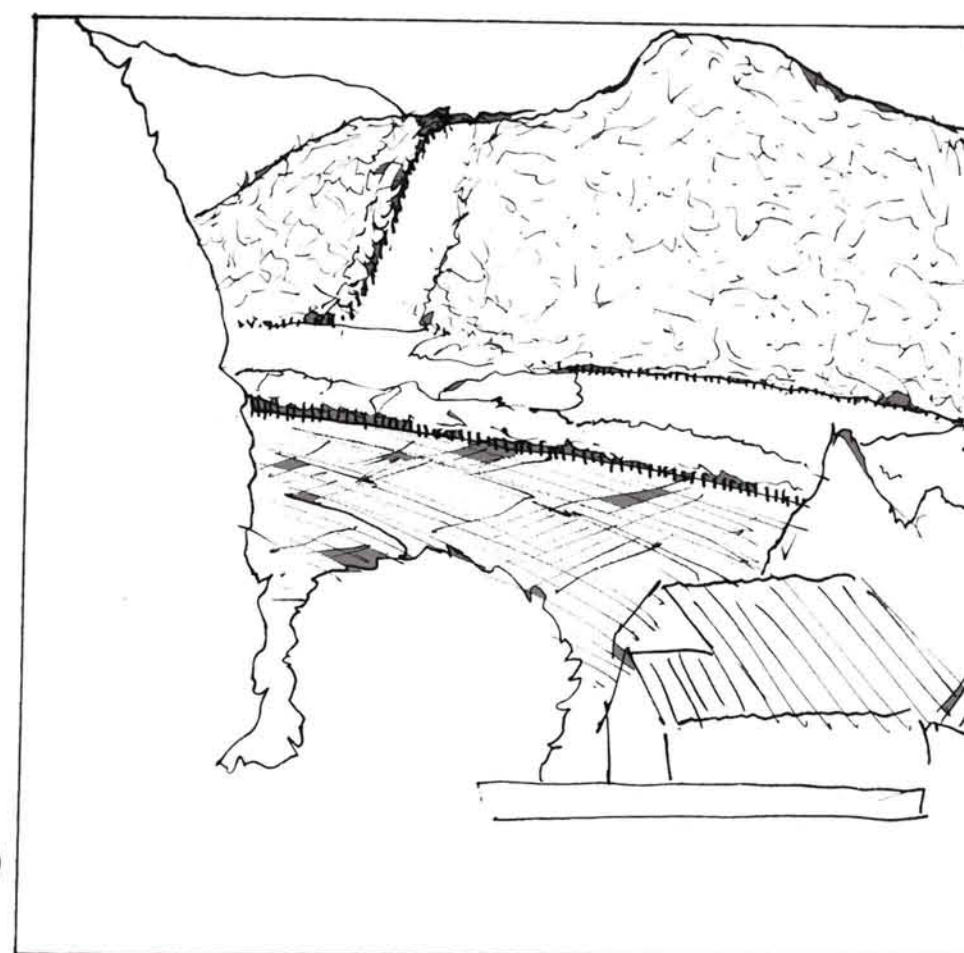


2012



2050

high risk



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