

LANDSCAPE AND CLIMATE CHANGE

*Relations between
urban and natural
systems*

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OBJECTIVES AND HYPOTHESIS

MAIN OBJECTIVE

Spark mechanisms to promote the values of the landscape in the perspective of a climate change based on the uncertainty.

HYPOTHESIS

How climate changes can influence the build up landscape?

Low scenario

population growth: the same current regime;
stability or increase of economic and technological differences.

High scenario

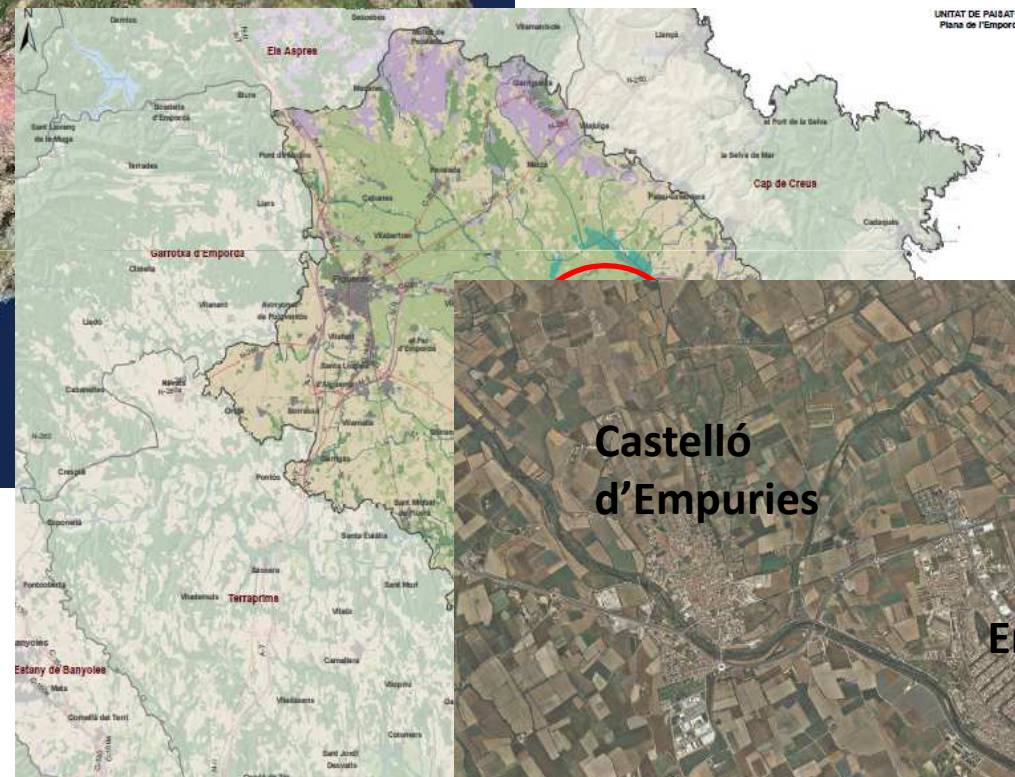
increase in population until 2050, then lower growth;
rapid changes in economic structure;
equity in a global perspective.



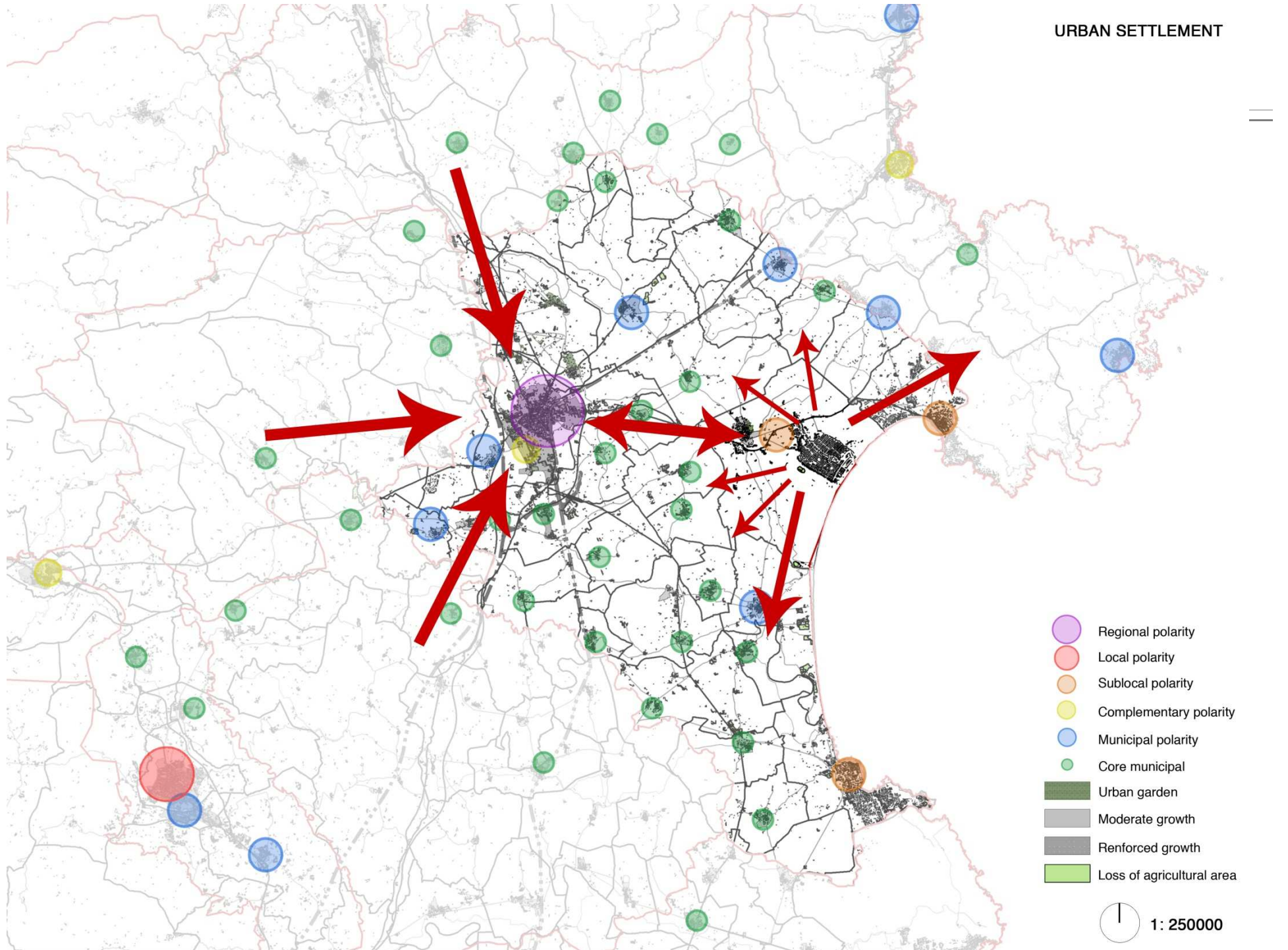
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- Diagnosis
- Masterplan
- Interventions
- Conclusion

INTRODUCTION. Study Area



URBAN SETTLEMENT





CASTELLÓ D'EMPURIES. Diagnosis

General information

Surface: 42,3 km²

Population 2011: 11885 inhab.

Density Castelló d'Empuries: 44 inhab/ha

Density Empuriabrava: 13 inhab/ha

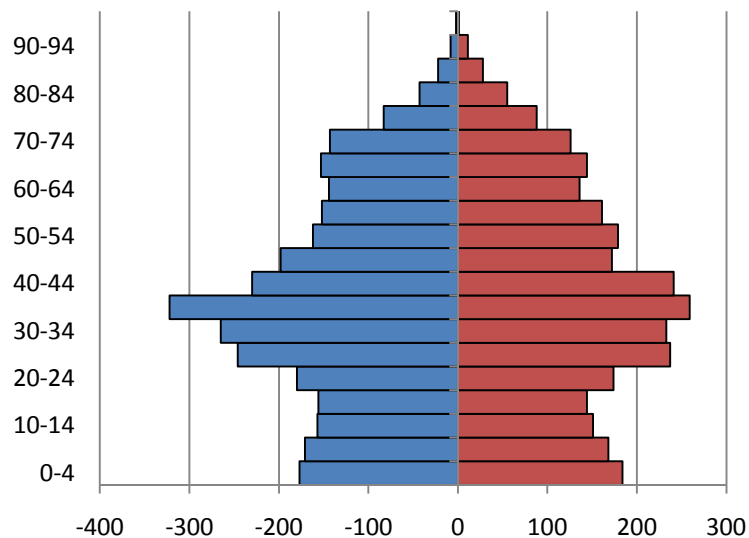
Altitude: 17 m

CASTELLÓ D'EMPURIES. Diagnosis

POPULATION INFORMATION

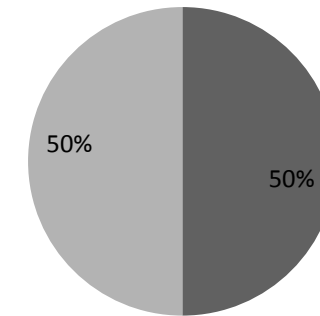
Spanish and stranger population (2001)

Resident Population Pyramid (2001)



FONT: IDESCAT

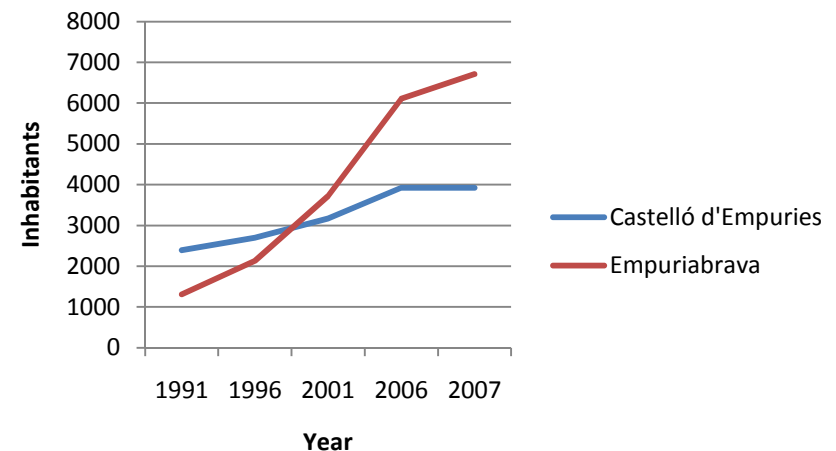
■ spanish people ■ strangers



■ Mujeres
■ Hombres

FONT: IDESCAT

Population growth (1991-2007)



FONT: Pla Territorial de les Comarques Gironines (2006)



CASTELLÓ D'EMPURIES. Diagnosis

- _ ecological richness (european law protection)
- _ territorial horography
- _ high local self-restraint caused by working activities
- _ low visual impact (moderate height of the buildings)
- _ local production (agriculture)
- _ **cultural and landscape heritage**
- _ **good infrastructure system for urban connection**

- _ **territorial fragmentation**
- _ **no interaction between urban space and parks**
- _ soil nitrification
- _ agricultural landscape modification caused by urban pressure on the coast line
- _ **acoustic pollution (aerodrome and highway C68)**
- _ **low density urban model (compact city-garden city)**
- _ **low availability of public transport**
- _ abuse of private vehicles

S W
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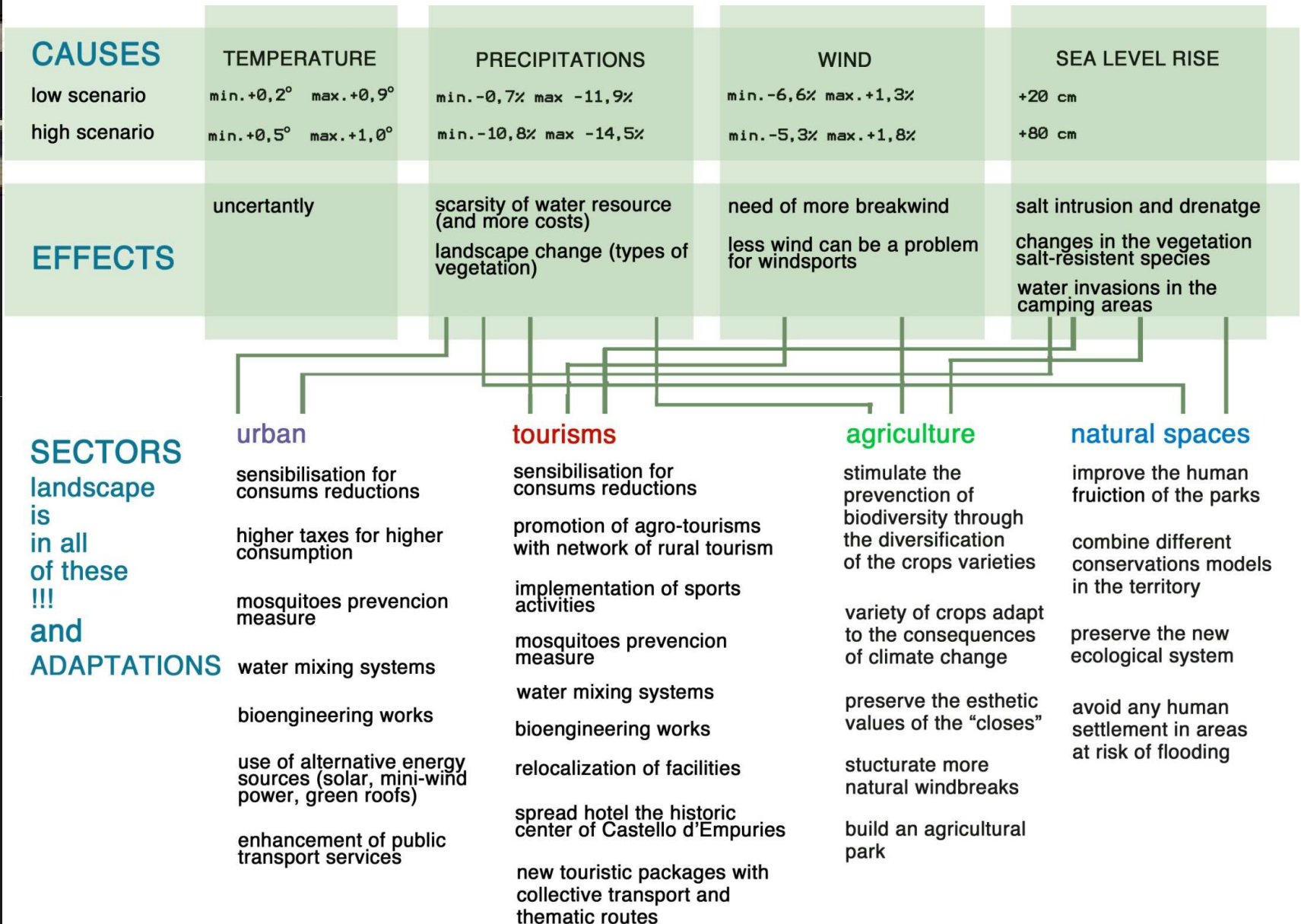
- _ **improvement of ecological connection**
- _ sustainable tourism
- _ valorisation of cultural heritage
- _ **development of local agriculture production**
- _ creation of a agriculture park (restriction in urban growth)
- _ **improvement of public transport**
- _ **adoption of a sustainable energetic model**

- _ **conflicts between park and urban management**
- _ ecological connection fragmentation
- _ salt intrusion
- _ change in natural character of landscape (loss of natural protection, no integration between new buildings and landscape)
- _ **low energy efficiency**
- _ **flood risk**
- _ **high water consumption**

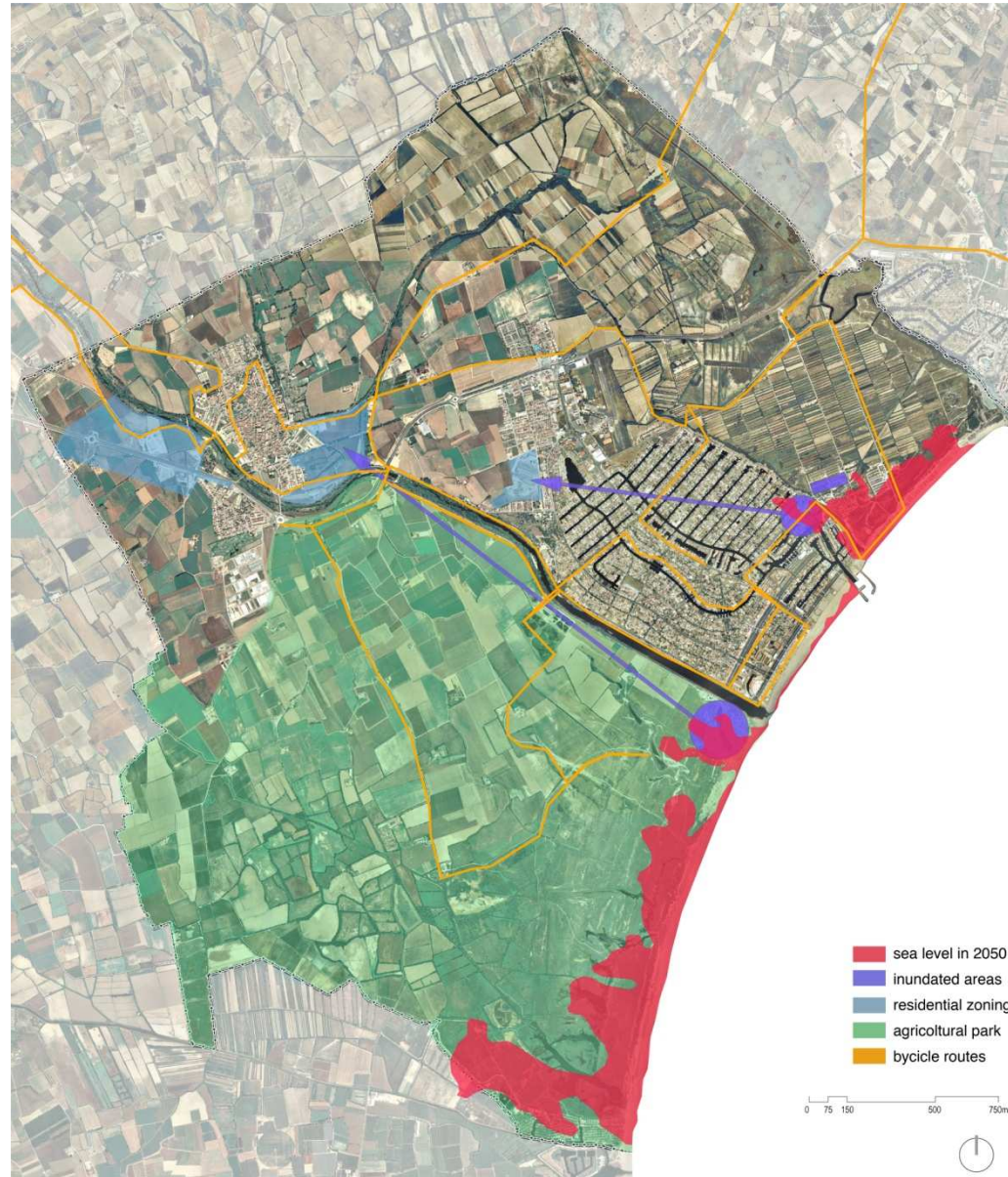
Uncertainty about the magnitude, but some clear trends

	POPULATIONS	TOURISMS	LANDSCAPE	URBAN SETTLL.	MOBILITY
NOW	<p>growth in the number of residents population</p> <p>50% immigrants</p>	<p>boat_marina sun&beach sport nature</p> <p>no interest for agri-tourisms</p>	<p>ecological richness (closes, wetlands)</p> <p>agriculture</p> <p>cultural heritage</p>	<p>low density Empuriabrava) vs. concentration (medieval centre of Castellò d'Empuries)</p>	<p>high self-restraint</p> <p>many bike-roads for leisure activity</p>
+2050	<p>more people</p> <p>+14% low scenario +40% high scenario</p> <p>high percentage of middle-aged people</p>	<p>uncomfort connected with the higher see level</p>	<p>evolution of coastal ecosystem</p> <p>new agricultural landscape</p>	<p>localised problems of accessibility in Empuriabrava debit to the sea level rise</p>	<p>increase of oil cost</p>
+2050	<p>changes of lifestyles (energy and water consumption, more sensitivity to the scarcity of resources)</p>	<p>dislocation of accomodations and promotion of new touristic offers</p>	<p>different perception of the landscape, more balance between human and natural</p>	<p>rethinking of the function of the towns in the second crown (between Figueres and the coast, in particular Castellò d'Empuries)</p>	<p>oportunity for collective transport, bikes and ecological boats</p>
opportunities of intervencion					

CAUSES, EFFECTS AND ADAPTATIONS



MASTERPLAN



INTERVENTION 1: Spread hotels and rural tourism



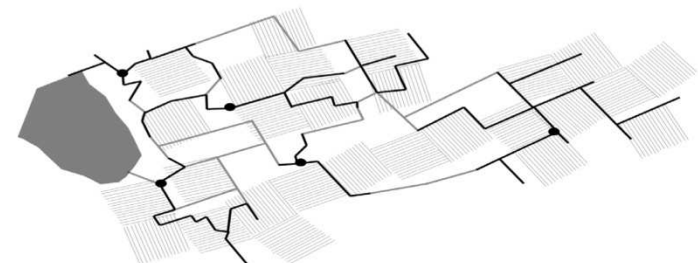
OBJECTIVE: spread hotels and rural tourism

POLICY INTERVENTION PHYSICAL INTERVENTION

SECTOR INVOLVED: public buildings and tourism

FUNCTION: valorize of historical, cultural and lanscape heritage

MAIN FEATURES: enhancement of empty houses, construction of a network of rural routes, packages for tours.





INTERVENTION 2: Avoid problems in vessels and possible flooding

OBJECTIVE: avoid problems in vessels and possible flooding

POLICY INTERVENTION PHYSICAL INTERVENTION

SECTOR INVOLVED: Urban

FUNCTION: preserve security and accessibility of urban settlement

MAIN FEATURES: raising the height of the walls of the channels



INTERVENTION 3: Energy model



OBJECTIVE: energy model that allows more energy sovereignty

POLICY INTERVENTION PHYSICAL INTERVENTION

SECTOR INVOLVED: Urban and Tourism

FUNCTION: reduction of electricity consumption per household

MAIN FEATURES: installation of photovoltaic solar panels and rain-water collection



ENERGY

GENERAL INFORMATION

Surface roofs (m ²)	870976
Sant Pere Pescador solar radiation (solar radiation Atlas of Catalonia) average annual	16.29
Total radiation per m ² per day (kWh/m ² day)	4.53
Usable surface covered	20%
Performance	15%
Power consumption of a Mediterranean house (kWh / year) Source OCU	8363
Num apply for housing	14801
Daily electricity production (kWh /day)	118365
Annual electricity production (kwh/year)	43203225
Annual electricity consumption (kwh/year)	123780763
Difference between consumption and production	80577538
% Of energy that represents the electrical installation	65,09697957
Total cost photovoltaic (€/Wp)	1,5
Total budget installation	



INTERVENTION 4: Create and agricultural park

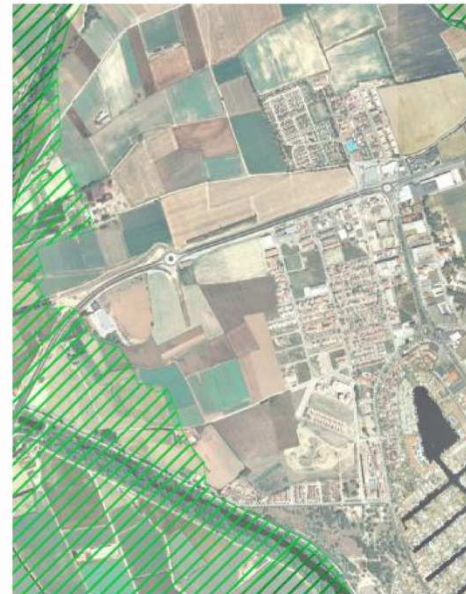
OBJECTIVE: create an agricultural park

POLICY INTERVENTION PHYSICAL INTERVENTION

SECTOR INVOLVED: agricultural matrix

FUNCTION: connector ecological, crops adapt to climate change, preserve the esthetic values of the "closes"

MAIN FEATURES: diversity of crops, creating natural windbreaks



WATER RESOURCE

Precipitation low scenario (l/m ²)	496
Precipitation high scenario (l/m ²)	440

SOURCE: Primer Informe Escenari Climàtic

Agricultural water consumption

Typology of crops	Ha of crop	%	Water requeriments (m ³ /Ha)	Total water resource (m ³)
Cereals in grain	619	19,2	7239	4480941
Vegetables and industrial crops	1449	44,9	10765	15598485
Pasture and unproductive land	1047	32,4	5648	5913456
Fruit trees	75	2,3	5465	409875
Slow-growing timber species	1	0	-	-
Fast-growing timber species	37	1,2	-	-
Total crops	3228	100	29117	26402757

SOURCE: Instituto Nacional de Estadística, 2006

Urban water consumption

Total water consumption (m ³ /year)	1740587
Pic water demand in summer (m ³ /day)	12000
Total water consumption (m³/year)	1740587

SOURCE: AQUALIA

Total water resource first scenario (m ³)	16010880
Total water resource second scenario (m ³)	14203200

SOURCE: Own elaboration



INTERVENTION 5: Avoid human settlement in areas at risk of flooding

OBJECTIVE: avoid human settlement in areas at risk of flooding

POLICY INTERVENTION PHYSICAL INTERVENTION

SECTOR INVOLVED: natural park and Integral reserve

FUNCTION: preserve new ecological systems

MAIN FEATURES: remove human structures



INTERVENTION 6:

Protection from sea level rise



OBJECTIVE: protection from sea level rise

POLICY INTERVENTION PHYSICAL INTERVENTION

SECTOR INVOLVED: urban system

FUNCTION connection between Castello de Empuries and Empuriabrava, riqualification of degraded areas

MAIN FEATURES: new space to interact with the park, connection with territorial structures supposed by coastal group



Il scenario



INTERVENTION 7: Protection from sea level rise

OBJECTIVE: protection from sea level rise

POLICY INTERVENTION PHYSICAL INTERVENTION

SECTOR INVOLVED: urban and natural system

FUNCTION connection between Castello de Empuries and Empuriabrava, integration of a different type of tourism (valorisation of the rural tourism)

MAIN FEATURES

sostenibilità ambientale, energy efficiency, contestualizzazione



I - II scenario

INTERVENTION 8: Protection from sea level rise



OBJECTIVE: protection from sea level rise

POLICY INTERVENTION PHYSICAL INTERVENTION

SECTOR INVOLVED: tourism and natural system

FUNCTION maintenance of the services for sport activities (wind sports) and maintenance of the main type of tourism (sun and beach)

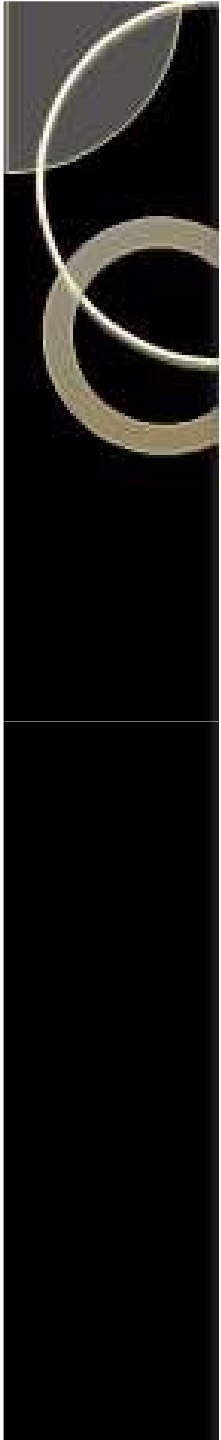
MAIN FEATURES: rent, sport equipment, sport school, beach





CONCLUSION

The proposals are structured with an integration of strategies and physical intervention, in line with all the other group choices, to ensure that climate change may be an opportunity to rethink the living spaces.



THANK YOU